

Environmental & Social Impact Assessment (ESIA)

**SUEZ Wind Energy BOO Wind Power Plant
1.1 GW – SWE North (PLOT 1)**

30 May 2024

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LIST OF ABBREVIATIONS

AC	Alternating Current
AfDB	African Development Bank
BOO	Build, Own and Operate
CAAs	Competent Administrative Authorities
CBO	Community Based Organization
CRM	Collision Risk Modelling
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EEAA	Egyptian Environmental Affairs Agency
EETC	Egyptian Electricity Transmission Company
EHS	Environment, Health, and safety
EHSS	Environmental, Health, Safety and Social
EIA	Environmental Impact Assessment
EMU	Environmental Management Unit
EPC	Engineering, Procurement, and Construction
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GDP	Gross Domestic Product
GOE	Government of Egypt
GoS	Gulf of Suez
IEA	International Energy Agency
IFC	International Finance Corporation
IFIs	International Financial Institutions
IRENA	International Renewable Energy Agency
ISES	Integrated Sustainable Energy Strategy
ISO	International Organization for Standardization
ISS	Integrated Safeguards System
Km	Kilometre
kWh	Kilowatt Hour
LoS	Line of Sight
MSB	Migratory Soaring Birds
MV	Medium Voltage
MW	Megawatt
NREA	New and Renewable Energy Authority
NGO	Non-Governmental Organization
NTS	Non-Technical Summary
OHS	Occupational Health and Safety
OHTL	Overhead Transmission Line
OS	Operational Safeguard
PPA	Power Purchase Agreement
PPS22	Planning Policy Statement 22
PR	Performance Requirement
PSs	Performance Standards

RCREEE	Regional Center for Renewable Energy and Energy Efficiency
SCA	Supreme Council of Antiquities
SCADA	Supervisory Control and Data Acquisition
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
TSP	Total Suspended Particulate
VP	Vantage Points
WGS	World Geodetic System
WTG	Wind Turbine Generator
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

The Project is located within the Gulf of Suez (GoS) around 211km southeast of the capital city of Cairo. The total area of the Project site is 145 km².

Administratively, the Red Sea Governorate is divided into 7 Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 150km south of the Project site.

The Project is located within the Ras Gharib District and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib city and two (2) rural (village) local units: Zaafarana and Wadi Dara. The closest community settlement to the Project site is Ras Gharib city (located 20km to the east).

Generating electricity through wind power is rather pollution-free during operation. Compared with the current conventional way of producing electricity in Egypt through thermal power, the clean energy produced from renewable energy resources is expected to reduce consumption of fossil fuels, and is to aid in reducing GHG emissions, as well as air pollutant emissions. The Project is to displace around 1.1 million metric tons of CO₂ annually.

The Project footprint (i.e. the area of disturbance), based on the Project's components, is significantly small, calculated at less than 1% of the total boundary of the Project area.

Table 1: Footprint of the Project Components

Component	Footprint	Description
Turbines	0.31km ²	Typically, each crane pad is around 4,000m ² in area, whereas each foundation typically consists of a circular footing of maximum 25m diameter with a maximum of 74 turbines.
Substation and Warehouse and Storage facilities	0.05km ²	Typically, footprint for substation and building facilities is around 0.05km ² .
Trenches for MV cables and communication cables	0.10km ²	This includes trenches with a calculated length of around 95.80 km and a width of 1m.
Road networks	0.57km ²	This includes the road network with a total length of 26.29 km and a width of 6m.
Total Project Footprint	1.02km ²	
Total Project site Boundary Area	145 km ²	Project footprint is less than 1% of the total boundary of the Project area.

The table below provides a summary of the key Project components, along with a detailed description of each of those components to follow. It is important to note that the selection of wind turbines depend on a feasibility study as well as a technical and economical evaluation undertaken by the Developer.

Table 2: Summary of Key Project Components

Component	Description
Project Generation Capacity (MW)	550 MW
Technology Type	Envision
Number of Wind Turbines	69
Rated Power per Turbine (MW)	8.0 MW
Rotor Diameter (m)	182 m

Hub Height (m)	110 m
Infrastructure and Utilities	This includes: (i) internal road network; (ii) underground MV cables; (iii) warehouse and offices; (iii) substation; and (iv) associated facilities such as the high voltage overhead transmission line.

INTRODUCTION

The energy sector is a key driver for the socio-economic development of Egypt, representing around 13% of current GDP and thus making economic growth in the country contingent upon the security and stability of energy supply. To align and reinforce the sector with sustainable development, the Arab Republic of Egypt (through the Ministry of Electricity and Renewable Energy) had developed and adopted the Integrated Sustainable Energy Strategy (ISES) 2015 – 2035, which provides an ambitious plan to increase the contribution of renewable energy to 42% of the country's electricity mix by 2030, of which wind power is a key component, to be developed mostly in the Gulf of Suez (GoS) due to the wind characteristics in the area.

As a result, the GoE issued the Renewable Energy Law (Decree Law 203/2014) to support the creation of a favourable economic environment for a significant increase in renewable energy investment in the country and establishes the legal basis for the Build, Own and Operate (BOO) framework. Through the BOO mechanism, the Egyptian Electricity Transmission Company (EETC) invites private investors to submit their offers for solar and wind development projects, for specific capacities and the award is to be made to that bidder with the lowest Kilowatt Hour (kWh) price. In addition, the GoE (through the New and Renewable Energy Authority (NREA)) provides the land for the investors.

In accordance with the Law above, a consortium composed of ACWA Power and Hassan Allam Utilities B.V (hereafter referred to as 'the Developer') is proceeding with developing a new wind power plant project (Suez

Wind Energy – (SWE)) with a capacity of 1,100MW under the BOO scheme. SWE is to be developed over two (2) Plots – the first located within the northern parts of the Gulf of Suez (hereafter referred to as 'Plot 1') and the second located within the southern parts of the Gulf of Suez - Plot 2.

The Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) is managing the Environmental and Social (E&S) process for the Project development on behalf of the Developer. RCREEE commissioned the consortium consisting of Eco ConServ, ECO Consult and Safe Soar (hereafter referred to as 'the ESIA Consultant') to carry out an Environmental and Social Impact Assessment (ESIA) for the Project.

As noted earlier, the above 1,100MW Project will be developed over two (2) plots. Given the geographical distance between the plots, from an environmental and social perspective, separate ESIA studies will be undertaken for each plot. This report represents the ESIA for Plot 1 / SWE North.

Project Description

Project Setting

The Project is located in the Red Sea Governorate of Egypt, around 211 km to the southeast of the capital city of Cairo. More specifically, the Project is located near the Red Sea shoreline and within the Ras Gharib District of the Red Sea Governorate, where the closest residential areas include Ras Gharib city (located 19.7 km to the east) refer to the figures below.

The Project is located within a 300km² Strategic Area that has been allocated by NREA for wind farm development Projects with a total capacity of 1,500 MW. Refer to **Error! Reference source not found.** for the Strategic Area location in relation to the Project site. A strategic ESIA study has been undertaken for the 300km² area known as the “ESIA for an Area of 300km² at the Gulf of Suez” (Lahmeyer & Ecoda, 2013) (hereafter referred to as “Strategic ESIA”), where this Strategic ESIA investigated the E&S issues at cumulative and strategic level. Within this, a land area of 145 km² (presented in the figures below) has been allocated to the Developer by NREA for the development of this Project.



Figure 1 Project Site in Relation to the Capital City of Egypt



Figure 2 Project Site and Closest Villages

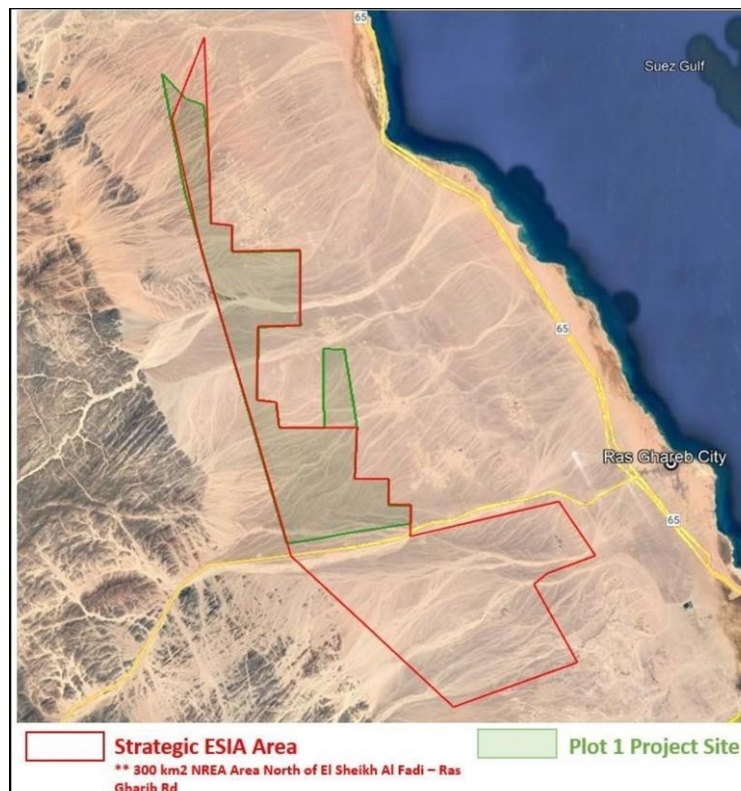


Figure 3 Project Site as Part of the 300km2 Area Allocated for Wind Farm Developments

The Project site is located within the Ras Gharib City (or District) and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib town as well as 2 rural (village) local units (Zaafarana and Wadi Dara). The closest community settlement to the Project site is Ras Gharib city (located 19.7 km to the east).

Ras Gharib City is the second-largest city in the Red Sea Governorate, and the most important Egyptian city in terms of oil production.

As discussed earlier, the Project is located within a 300km² area that has been allocated by the GoE to NREA for development of wind farms. Within this, a land area of 145 km² has been allocated to the Developer by NREA for the development of this Project.

Table 3 Project Site Coordinates

Point	WGS Coordinates	
	Latitude	Longitude
1	28.615215°	32.697273°
2	28.537443°	32.714706°
3	28.307687°	32.790744°
4	28.320687°	32.882920°
5	28.332656°	32.883035°
6	28.332639°	32.866592°
7	28.349849°	32.866863°
8	28.349921°	32.841234°
9	28.383821°	32.843178°
10	28.434599°	32.833706°
11	28.435147°	32.818074°
12	28.383098°	32.818490°
13	28.383539°	32.785204°
14	28.400148°	32.782533°
15	28.401697°	32.768413°
16	28.449028°	32.769706°
17	28.450261°	32.800961°
18	28.498779°	32.800497°
19	28.498305°	32.750015°
20	28.515613°	32.749931°
21	28.516918°	32.734239°
22	28.566613°	32.732002°
23	28.588506°	32.729232°
24	28.594769°	32.728442°
25	28.598624°	32.715303°

Project Components

Wind turbine technology relies on harvesting the kinetic energy in wind (i.e. movement of wind) and turning it into mechanical energy which in turn is used for electricity generation. The key components of the Project include the following:

- **Wind Turbines:** a typical wind turbine is presented in the figure below. For this Project there are to be 69 wind turbines occupying the project site for a capacity of 8.0 MW, respectively. The turbines under either possibility will have a hub height of 110 m and a rotor diameter of 110 m, respectively.
- **Supporting infrastructure and utility** elements for the Project which will include:

- Cables that will connect the turbines to an onsite substation
 - Substation that converts the output from the turbines to a voltage that is appropriate for connection with the National Grid
 - Onsite building infrastructure that will include an administrative building (offices) and a warehouse for storage of equipment and machinery
 - Road network for ease of access of various project components throughout the site
- Associated facilities which will mainly include an Overhead Transmission Line (OHTL) that will connect from the substation onsite to the National Grid.

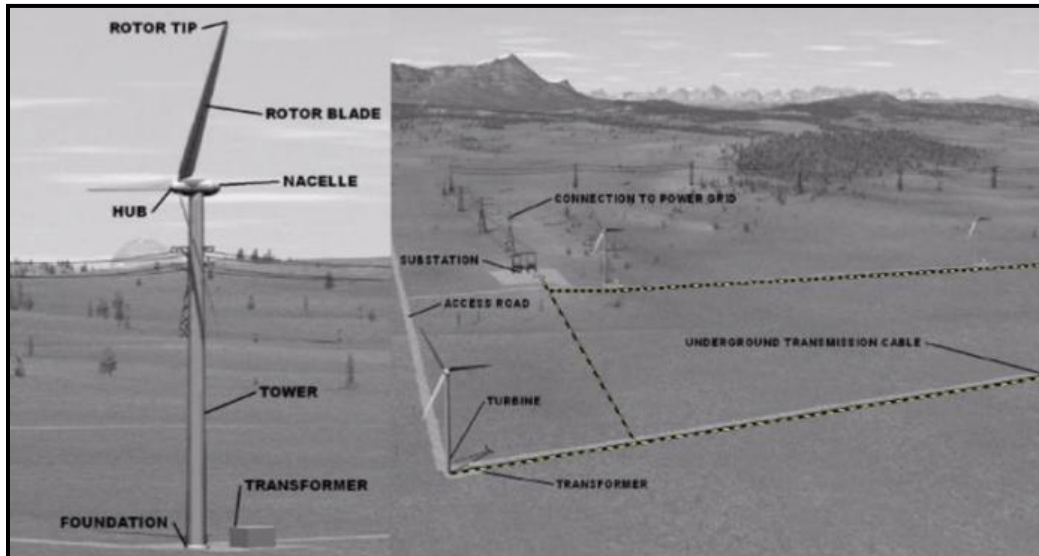


Figure 4: (a) Typical Structural Components of a Wind Turbine, (b) Typical Components of a Wind Farm

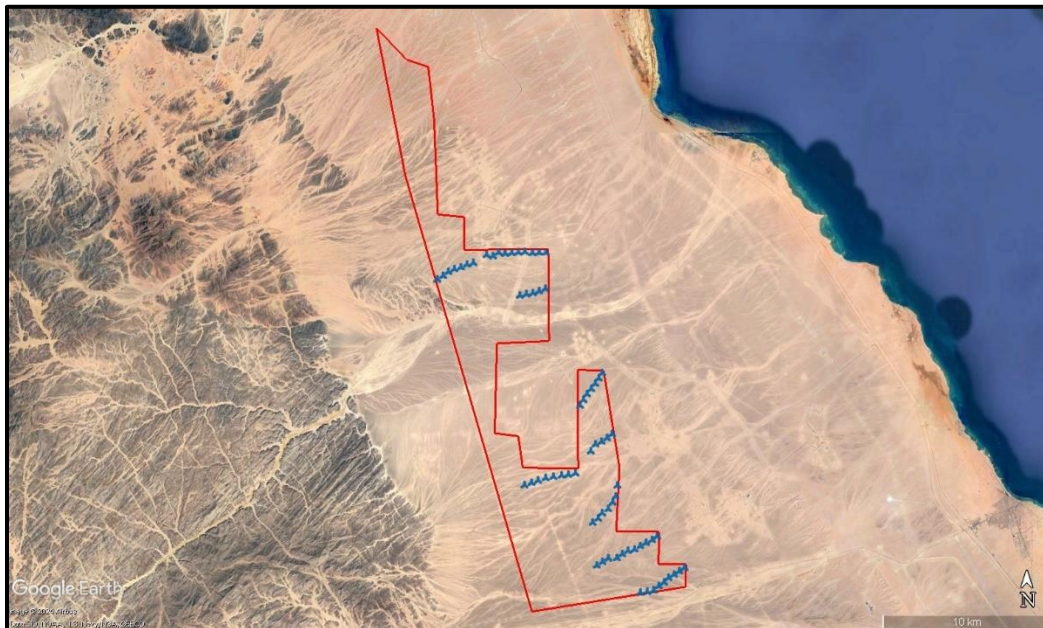


Figure 5: Project Site Turbine Layout

Project Phases

The Project will include 3 distinctive phases as follows:

- Design and Construction Phase that will include: (i) preparation of the detailed design, (ii) transportation of components to the site, (iii) site preparation activities (land clearing, excavations, etc.), and (iv) installation of components.
- Operation Phase that will include the normal daily operation of the wind farm and the undertaking of maintenance activities as required.
- Decommissioning Phase that will include the dismantling of the various Project components at the end of the life time.

According to the current timeline, construction of the Project is anticipated to commence approximately Q4 of 2024 and will require approximately 30 months for construction and commissioning (i.e. mid-year 2027). Operation of the Project is therefore anticipated to commence in late 2027 for a period of 25 years.

Summary of Environmental and Social Baseline Conditions & Impacts

Introduction

The Environmental and Social Impact Assessment (ESIA) comprised environmental and social baseline studies and an assessment of impacts. Mitigation measures, which are included in the ESMP, were identified for potential significant effects and the significance of residual effects determined. The impact assessment followed an assessment methodology developed to reflect current best practice. The key baseline and impact assessment findings are further discussed below.

Stakeholder Consultations

As part of the scoping process of the Project, targeted consultations were undertaken with key stakeholders that are relevant to the Project to include but not limited to: central governmental entities; local governmental entities; key Non-Governmental Organizations (NGOs); and local community representatives. Throughout the consultations, a handout (in Arabic language) was prepared and distributed to such stakeholder groups with key information to include but not limited to rationale for Project, Project location and setting, key components and activities of the Project and other as applicable.

The table below is a condensed breakdown of the stakeholder categories that were engaged in this process.

Table 4 Summary of Consultations

Stakeholder	Number	
	Males	Females
Ministry of Tourism and Archeology Red Sea Archeology and Heritage Institute	2	
Nature Conservation Egypt (NCE)	1	-
Egyptian Environmental Affairs Agency EEAA	1	-
Egyptian Electricity Transmission Company EETC	-	4
EEAA Red Sea Branch	1	-
State property Department in the Red Sea Governorate	1	-

Stakeholder	Number	
	Males	Females
Ras Gharib City Council	1	-
local unit of Wadi Dara village	5	-
Red Sea Water and Wastewater Company	1	-
Department of Planning and Projects in the Red Sea Governorate	-	1
General Petroleum Company	1	-
General Administration of Ground Water in Red Sea	-	1
Etisalat Misr Orange company	2	-
Radio and Television Unit in Ras Ghareb and the Red Sea Governorate	4	-
Bedouin families in Ras Gharib	12	-
Total	32	6

Environmental & Social Baseline Conditions & Impacts

(i) Landscape and Visual

The Project site is a plain area with fine topography except at the upstream part of the mainstream of Wadi Hawashyia basin. The ground surface of the whole project area is covered by clastic sediments of gravels, pebbles and sometimes boulder of different rock fragments imbedded in fine sand and silt.

The Project site is completely devoid of any dense vegetation, nonetheless for some simple seasonal grasses that grow after the rain falls in scattered spots in front of the first dam in Wadi Hawashiya and the streams of some shallow drainage. Long, wide and shallow dry wadies represent the upstream parts of the drainage basins the project area on their way from West-Northwest to East-Southeast directions.

In terms of visual characteristics, no critical visual receptors were identified within the 10km radius. The area in general includes the following:

- Petroleum activities;
- Several planned and existing wind farms;
- Existing Overhead Transmission Lines (OHTL) and substations;
- A Dam;
- Telecommunication towers; and
- Several military posts.

The key impacts from the Project development are limited to the operation phase and which include impacts from Project visibility are associated with, typically, the turbines themselves (e.g. colour, height, and number of turbines) and impacts relating to their interaction with the character of the surrounding landscape and the visual receptor which might be present.

These impacts are considered not significant given that there are no key sensitive visual receptors (communities, visitors or otherwise that would be impacted) within nor in proximity to Project. In fact, the Project is located within an industrial area which also includes several other wind farm developments, for which aesthetical value loses some importance.

Impact Overview: Construction Phase

- Site preparation activities involve land clearing, levelling, excavation, grading, etc., potentially altering the visual quality of the desert terrain temporarily.
- Presence of construction equipment and machinery may disturb the natural appearance of the site and its surroundings.
- Visual impacts during construction are expected to be of medium magnitude but are considered minor due to the distance from sensitive receptors.

Mitigation Measures: Construction Phase

- Implement proper housekeeping and personnel management measures.
- Maintain an orderly construction site and remove unused machinery and equipment promptly.
- Ensure proper storage, collection, and disposal of waste streams.
- Implement restoration and rehabilitation measures post-construction.

Potential Impacts during the Operation Phase:

- Visual impacts mainly concern the wind turbines themselves and their interaction with the landscape.
- Turbines, being tall structures, can be visible from several kilometers away and may alter the landscape.
- Visual impacts are mitigated by factors such as distance, landscape characteristics, and the absence of sensitive visual receptors within the project area.

Mitigation Measures:

- Ensure no critical or sensitive visual receptors are within the project area and its vicinity.
- Consider the barren and industrial nature of the project area, reducing the significance of visual impacts.
- Recognize existing wind farm developments and transmission lines in the area, minimizing the additional impact of the project.
- Acknowledge the subjective nature of aesthetic issues regarding wind farms.
- Address potential distraction to drivers passing near the project site.

Monitoring and Reporting Requirements:

- Inspections should be conducted regularly to ensure adherence to mitigation measures during both the construction and operation phases.

(ii) Land Use & Infrastructure

The Project site location does not conflict with any environmental land use planning such as areas of critical environmental concern – in particular, the Project site is not located within environmental protectorates or Important Bird Areas (IBAs). The Project is located within the Strategic ESIA Area as mentioned earlier.

A detailed land use survey was undertaken for the Project site to understand any informal land use activities undertaken such as physical activities (houses, structures, etc.) or economical activities (such as grazing, agricultural, etc.).

Few activities may occur within the Project site with a limited number of structures including the Buhaira One Dam and decommissioned petroleum wells and pools. No evidence of such activities (e.g. ploughing marks, abandoned structures, livestock remains, etc.) were observed during the land use survey that would otherwise indicate the land's use for herding, recreation nor residence.

There are two (2) telecommunication towers belonging to Orange and Etisalat Misr located along the Project site's southern border.

Various infrastructure elements were recorded within the Project site and along its perimeter including telecommunication towers, closed oil wells, high voltage lines, and others indicated in the figures below.

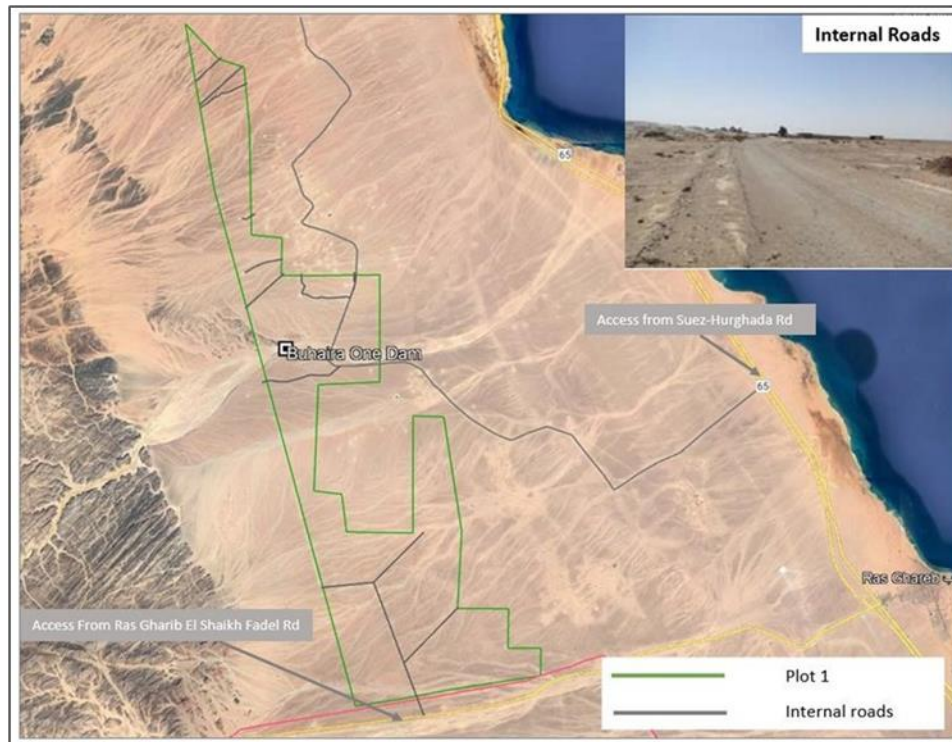


Figure 6: Main roads and informal (dirt paths) in and around the Project Site

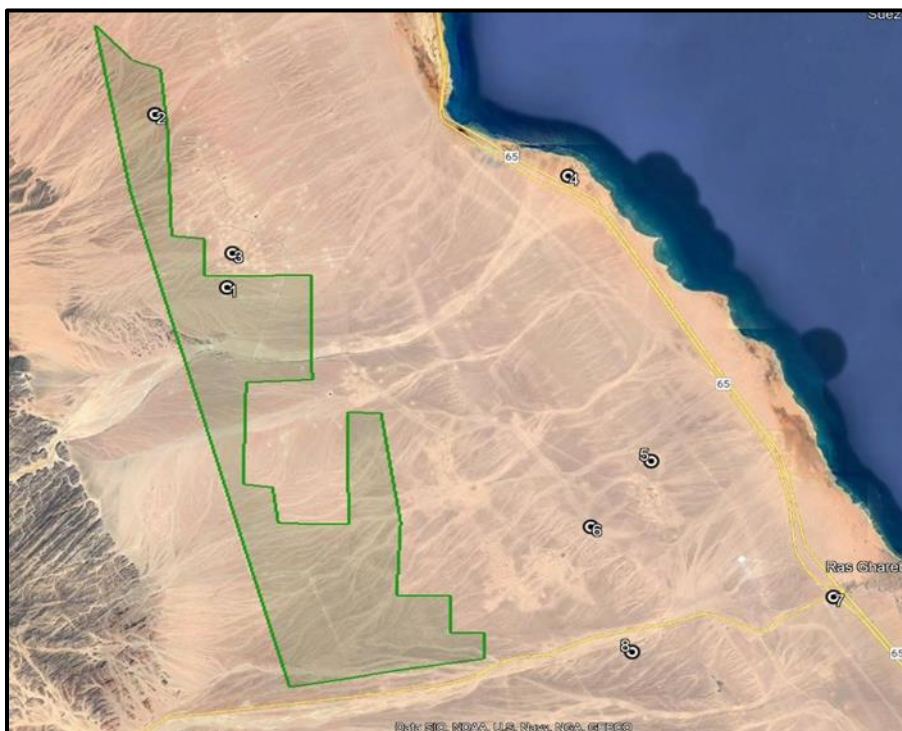


Figure 7: Infrastructure located around and in the proximity of the Project Site

Table 5 Infrastructure located within and around the Project Site

#	Facility	Lat.	Long.
1	Closed oil well	28.493481°	32.761128°
2	Closed oil well	28.573945°	32.726597°
3	Oil storage tanks	28.509411°	32.763599°
4	Petroleum companies complex	28.545908°	32.923280°
5	Dara Petroleum Company	28.412776°	32.962833°
5	West Bakr oil collection station K	28.368564°	32.920650°
6	West Bakr Oil Company	28.382221°	32.933988°
7	Petrojet Camp, Ras Gharib	28.349288°	33.049770°
8	Petroleum Unit	28.323961°	32.953603°

Apart from the above, it is important to note that area is under the “Ghafra System” of Bedouin Groups (although they have no physical or economical activities within the site), which entails involving such Bedouin groups in the Project (through jobs, services, etc.) for their support. In particular, the key Bedouin Groups known in the area are the Tabbna and the Hamadin families.

Taking the above into account, there are no physical or economical displacement impacts anticipated from the development of the Project and no key issues of concern are expected. Nevertheless, the ESIA identifies mitigation measures to be implemented at the planning stage to include:

- Establish coordination via NREA with the relevant entity (such as General Petroleum Company) to agree on any specific requirements to be taken into account as part of the detailed design for existing facilities such as the petroleum storage facility and oil rig, amongst other requirements; and

- Establish coordination with the Bedouin Groups for inclusion and engagement in employment opportunities during construction and operation to obtain their support.

Impact Overview:

- The project site is generally uninhabited and vacant, with no significant physical or economic land use activities, except for petroleum activities.
- Historical land use by Bedouin groups under the Ghafra system is acknowledged, potentially leading to conflicts if not addressed appropriately.
- Failure to consider these issues in the planning phase could result in long-term, negative impacts, including disputes with Bedouin groups and the General Petroleum Company.

Mitigation Measures:

- Coordinate with Bedouin groups for their involvement in employment and procurement opportunities.
- Implement a Stakeholder Engagement Plan (SEP) with specific provisions for engaging and coordinating with Bedouin groups, ensuring transparency and regular communication.
- Disclose the SEP to tribal leaders through scheduled meetings and distribute relevant updates and notifications regularly.

Monitoring and Reporting Requirements:

- Monitor the effectiveness of the grievance mechanism for Bedouin communities to address concerns and conflicts, ensuring accessibility, transparency, and responsiveness.
- Submit documentation of employment and procurement procedures involving Bedouin groups.
- Provide evidence of coordination and agreement with Bedouin groups as part of the SEP, including engagement records.

(iii) Hydrology and Hydrogeology (Soil and Groundwater)

The project site is located in an area of wadi deposits, surrounded by local moderately to low productive aquifers with insignificant surface and limited sub-surface recharges. Surface water hydrology in the area of the project concerned mainly about the accumulation of rainwater in the watershed areas of dry wadies and the nature of flow along the main streams of them.

The project site is dissected by five main streams of drainage basins. The watershed area of Wadi Hawashyia is the largest among the others. Therefore, the volume of rainwater accumulated in the drainage basin of Wadi Hawashyia is big enough to be considered if we consider the possibility of flooding in the project area.

Based on the history of flooding practiced in Wadi Hawashyia, three successive dams were built after the flash flood disaster in 2016. One of these dams – the Buhaira One Dam – is located within the Project site.

Buhaira One Dam is located at the far west just below the foot slope the high lands (watershed area). At the site of the dam, an artificial lake was constructed in upstream part of the dam. The average dimension of the dam and artificial lake are provided below.

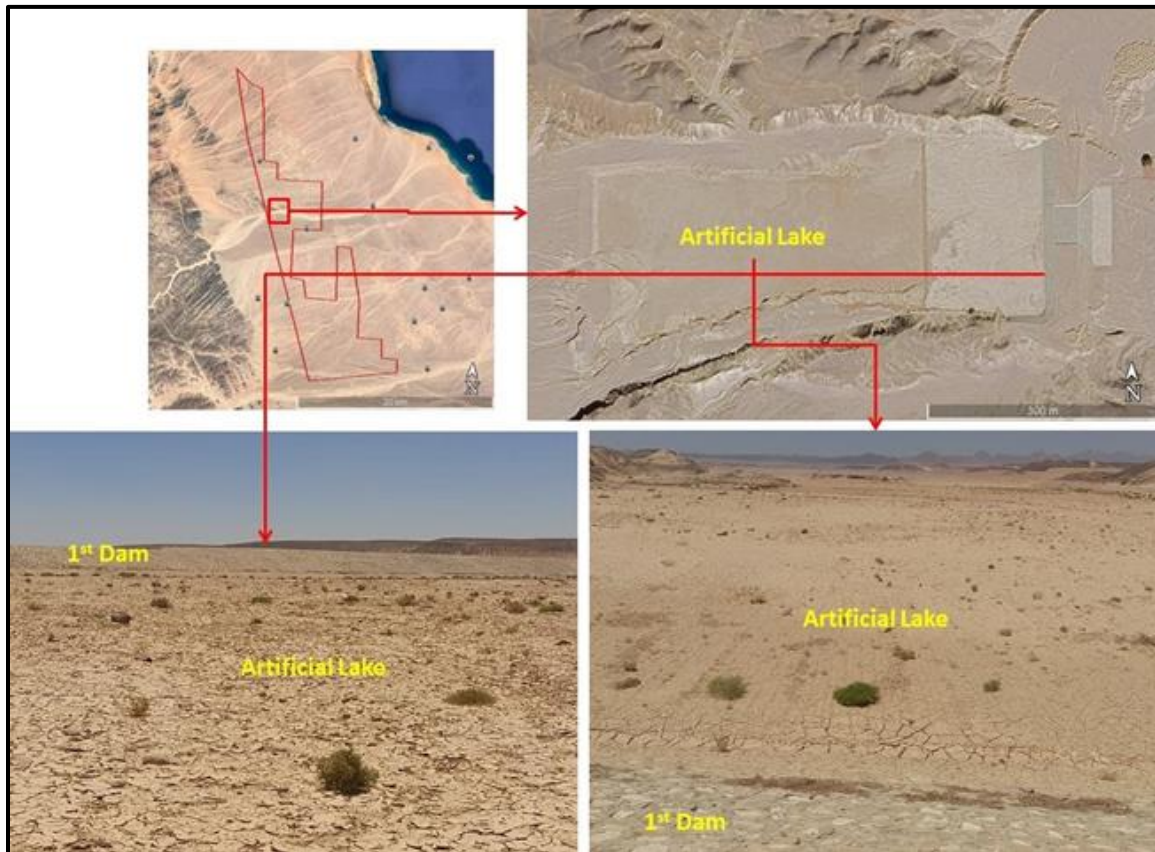


Figure 8 Buhaira One Dam and Artificial Lake

Key impacts related to the Project include potential for flood risks which could affect the Project site during the rainy season and especially during flash flood events. At the time of the development of the ESIA, the developer was in the process of undertaking a flood risk assessment of the Project site.

Impact Overview:

- Investigation of potential flood hazards from wadi systems during rainy seasons and flash flood events is crucial.
- Failure to address flood risks could lead to infrastructure damage, impacting health and safety.
- Flood risk assessment is being conducted using simulated models based on multi-source data, considering climate change impacts and risks.

Mitigation Measures:

- Undertake a flood risk assessment for the project site, incorporating simulated models based on climate satellite images, rainfall data, and digital elevation models.
- Conduct site visits to verify study results and model designs.

- Consider climate change impacts and risks in the assessment.

Potential Impacts from Improper Management of Waste Streams during Construction and Operation:

Impact Overview:

- Improper management of waste streams could contaminate soil, pollute groundwater, and pose risks to workers' health and safety.
- Impacts can be controlled through best practice housekeeping measures during both construction and operation phases.

Mitigation Measures:

- Implement proper sorting, storage, and disposal of waste streams, distinguishing between solid non-hazardous and hazardous wastes.
- Coordinate waste collection and disposal with relevant authorities and contractors.
- Prohibit illegal disposal of waste to the land and ensure adherence to waste hierarchy principles.

Monitoring and Reporting Requirements:

- Regularly inspect waste management practices onsite.
- Review records and manifests for consistency in waste volume data.
- Provide regular environmental reports on waste management practices.

Additional Mitigation Measures for Specific Waste Streams:

Solid Waste Generation:

- Sort and store waste according to categories.
- Coordinate waste collection with the municipality or waste contractor.
- Prohibit fly-dumping and distribute litter bins appropriately.

Wastewater Generation:

- Coordinate wastewater collection with relevant authorities or contractors.
- Prohibit illegal disposal of wastewater and ensure proper maintenance of septic tanks.

Hazardous Waste Generation:

- Coordinate hazardous waste collection and disposal with licensed contractors.
- Ensure proper storage and labeling of hazardous waste.
- Prohibit illegal disposal and maintain records of hazardous waste management.

Hazardous Material:

- Store hazardous materials properly and maintain a register of their usage.
- Incorporate measures to prevent spills and leakage during handling and storage.
- Respond promptly to spills and report measures taken to minimize impacts.

Potential Impacts from Erosion and Runoff during the Construction Phase:**Potential Impacts Overview:**

- Construction activities could increase erosion and runoff, leading to siltation of surface water.
- Adequate control measures are necessary to minimize these impacts.

Mitigation Measures:

- Avoid excavation works during aggressive weather conditions.
- Implement erosion control barriers and clear markers around the work site.
- Restore disturbed surfaces to their original condition as much as possible.

Monitoring and Reporting Requirements:

- Regularly inspect erosion and runoff control measures onsite.
- Conduct inspections to ensure implementation of mitigation measures.

(iv) Biodiversity

The biodiversity baseline assessment concludes that the Project site in general is barren and of low ecological significance and sensitivity. The assessment identified several flora, fauna and avi-fauna species within the Project site most of which are considered of least concern and common to such area habitats. There are no sensitive habitats recorded within the Project site.

The main impacts on biodiversity are mainly from improper conduct, traffic control and housekeeping practices by workers (i.e. hunting of animals, discharge of hazardous waste to land, etc.) during the construction and operation phase throughout the site to safeguard flora and fauna. The ESIA has identified adequate mitigation measures which aim to control such impacts and ensure proper conduct and housekeeping practices are implemented. With the implementation of such measures the impact is considered potentially significant.

Potential Impacts Overview:

- Habitat Loss, Fragmentation and Degradation
- Introduction of invasive species
- Disturbance of identified species on site

Mitigation Measures:

- Mandatory staff induction for all site including a comprehensive biodiversity element where the baseline ecological value and sensitivity of the site will be discussed.
- Prior to construction works, working areas will be clearly marked (using temporary fencing (e.g. orange netting attached to wooden posts)) so that site workers fully understand the working area and minimize encroachment into features of local habitats and identification of sensitivity of receptors
- On completion of construction the engineering, Procurement and construction (EPC contractor) will be responsible for habitat rehabilitation
- Following construction, an area of around 2.0 km² will be enhanced using appropriate, native planting in suitable parts of the Project Area to ensure no net loss of habitat has occurred
- Occurrences of non-native species are to be identified and removed
- Wheel washing facilities constructed at the Project site's entrance and wastewater disposed of accordingly to prevent spread of undesirable species
- Species identified as vulnerable receive specific mitigations under the Construction Biodiversity Management / Biodiversity Action Plan
- Working areas to avoid vegetated areas
- Relocation of vulnerable species when necessary, such as for the Egyptian Spiny-tailed Lizard
- Vehicular speeds will be limited and enforced to avoid traffic collisions with animals
- Strict controls enforced on poaching and collection for animals
- Proper and strict housekeeping measures and waste management enforced

Monitoring and Reporting Requirements:

- Outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Ecologist to check enforcement of working areas.

(v) Birds (avi-fauna)

A baseline assessment was undertaken that included an avi-fauna survey that studied the use of the migratory and resident soaring birds of the Project site, while providing a detailed analysis of the durations that these species use the site and the elevations at which they are present, which would eventually provide an in-depth understanding of the predicted impact of the Project on bird species.

The survey was undertaken through eighteen (18) observation points that covered the spring 2022 and 2023 and autumn 2022 and 2023 bird migration seasons. On average, each observation point was for a minimum of 8 hours per day and per season as follows: in spring 2022 – 185.9 hours per VP for a total of 3,345.3 hours; autumn 2022 – 264.9 hours per VP for a total of 4,768 hours; spring 2023 – 247.5 hours per VP for a total of 4,455 hours; and autumn 2023 – 266.6 hours per VP for a total of 4,798.5 total hours.

During spring surveys, over 208,000 individual birds were recorded in spring 2022 and 266,000 in 2023. In

autumn, 8,244 individual birds were recorded in 2022 and 17,619 in 2023. 23 species were recorded with a total of 62,451 individual birds. Among globally threatened species during the observation periods are detailed in the following tables.

Table 6 Avifauna designated as Vulnerable Species identified during Avi-fauna Survey for all seasons

Species	Spring 22		Spring 23		Autumn 22		Autumn 23	
	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height
Eastern Imperial Eagle	24	11	41	36	0	0	1	1
Greater Spotted Eagle	12	5	16	12	0	0	0	0
Sooty Falcon	0	0	1	1	21	21	15	15
Red-footed Falcon	0	0	1	1	3	3	0	0
TOTAL	36	16	59	50	24	24	16	16

Table 7 Avifauna designated as Endangered Species identified during Avi-fauna Survey for all seasons

Species	Spring 22		Spring 23		Autumn 22		Autumn 23	
	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height
Steppe Eagle	2,055	871	18,793	14,501	2	2	6	3
Egyptian Vulture	84	58	260	182	0	0	0	0
TOTAL	2,139	929	19,053	14,683	2	2	6	3

Table 8 Avifauna designated as Near Threatened Species identified during Avi-fauna Survey for all seasons

Species	Spring 22		Spring 23		Autumn 22		Autumn 23	
	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height
Pallid Harrier	21	21	16	14	21	20	27	26
Dalmatian pelican	1	1	0	0	0	0	0	0
TOTAL	22	22	16	14	21	20	27	26

Potential Impacts Overview:

- Key impacts anticipated on birds is during the operation phase and mainly related to risk of bird strikes and collisions with rotors of the operating wind turbines. The majority of species passing through are at low risk of collision annually. Those of conservation concern (i.e. considered endangered by the International Union for the Conservation of Nature's Red List) or associated with potentially high levels of collision are the Steppe Eagle, for which collisions could amount to approximately 12.25 collisions during the operational lifetime of the Project and the Egyptian Vulture – 0.32 collisions during the Project's operational lifetime.
- Other species with notable collision risk that were identified included Levant Sparrowhawk (0.24

collisions per year), Steppe Buzzard (3.43), White Stork (23.02), Common Kestrel (0.32), Black Kite (0.6), White Pelican (1.57) and Honey Buzzard (7.86). The populations of these species are typically abundant, and the species are not of conservation concern.

- Of particular interest regarding the monitoring of birds was the dam and artificial pond located within the Project site. The artificial pond, which forms during rainfall in the winter typically once every four years, is a source of attraction for storks, pelicans and other water birds. Water was present in the dam in 2022, at which time 6,000 White Storks were recorded in a single day with over 15,000 individuals (about 11% of the total number of birds recorded during the migration season). Scarce numbers of birds were present at this location when no water was present in 2023.
- The Collision Risk Model indicated that species passing through the Project site are at low risk of collision on an annual basis.

Mitigation Measures:

- Bird Monitoring and Active Turbine Management Program (Shutdown On-Demand and Predictive Fixed Shutdown Programs using strategically located vantage points for monitoring flight activity and to facilitate effective turbine shutdown and effective communication networks between bird observers as well as and wind turbine operators
 - All of the turbines and a buffer area is to be covered by constant observation.
 - The buffer is to ensure that enough time is available for WTG to be shut down when birds approach
 - Observers are to work in pairs and in shifts to ensure a vigilant effort from observers.
 - Observers are to communicate both with shut down operatives and other observers to ensure effective practices
- Shut down protocol is to be undertaken in discussion with other operatives in the region to discuss best practice for the location
- Current WTG layout takes into account a 2km setback distance from the Dam area which is a source of attraction for migratory birds particularly during spring season.

Monitoring and Reporting Requirements:

- Fatality Monitoring Program entailing a systematic fatality surveys (i.e. carcass searches) by trained experts which have become the main means of monitoring collision victims and estimating collision rates at wind power plants worldwide.
- Operational monitoring is to be completed for at least the first 3 years of operation, with scope to continue depending upon results during the first three years, all years of operation to monitor actual levels of mortality.
- Post construction fatality monitoring is to be completed at all of the turbines and the programme of post construction monitoring is to include carcass searching, searcher efficiency trials and carcass persistence trials. The results of the post-construction fatality monitoring is to be used to inform a GenEst Analysis. Such effort is to be in line with the Post-construction Bird and Bat Fatality Monitoring

for Onshore Wind Energy Facilities in Emerging Market Countries – Good Practice Handbook and Decision Support Tool (2023).

(vi) Bats

The presence of bats was evaluated using a nocturnal acoustic survey and a manual search of possible roosting sites across and within the near proximity of the Project area. Eight (8) acoustic detectors were utilized across 24 locations that were aligned with intended wind turbine locations. Based on the literature review, several bat species of 'least concern' (IUCN Red List of Threatened Species) could be present in the area; however, the Project site is characterized by low vegetation coverage and limited habitat.

Four known and two unknown species of bat were recorded across the survey period. The known bat species were Arabian Barbastelle *Barbastella leucomelas*, European Free-Tailed Bat *Tadarida teniotis*, Botta's Serotine *Epitesicus bottae* and Desert Long-Eared Bat *Otonycterus hemprichii*.

Potential Impacts Overview:

- Key impacts anticipated on bats is during the operation phase and mainly related to risk of bat strikes and collisions with rotors of the operating wind turbines. Such impacts are anticipated to be not significant due to low activity excepted as roosting sites for bats were not observed on the Project site.

Mitigation Measures:

- Implement adaptive monitoring during post construction – fatality monitoring in accordance with international best practices

Monitoring Requirements:

- Post construction fatality monitoring around wind turbines

(vii) Archaeology and Cultural Heritage

An archaeological baseline survey has been carried for the Project site which concluded the absence of records of any sites of interests or significance within the Project area. Therefore, there are no anticipated impacts.

The main potential impact could occur during the construction phase from site preparation activities if a possible site of archeological remains is uncovered. Improper management (if such sites are discovered) could potentially disturb or damage such sites. Nevertheless, the ESIA requires the implementation of chance find procedures if such remains in the ground be discovered throughout the construction phase. With the implementation of such measures the impact is considered not significant.

Potential Impacts Overview:

- Site preparation activities may involve land clearing, excavation, and grading, posing a risk to archaeological remains.
- Although no surface archaeological sites are identified, buried remains may be discovered during construction.

Mitigation Measures:

- Notify the Supreme Council of Antiquities (SCA) during excavation activities to oversee and prevent disturbance of underground archaeological remains.
- Implement chance find procedures, including halting construction, fencing the area, and notifying relevant authorities if archaeological remains are discovered.

Monitoring Requirements:

- Submit formal communication with SCA regarding excavation activities.
- Inspect actions taken in case of new archaeological discoveries and report to the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office.

Note: There are no anticipated impacts during the operational phase of the project.

(viii) Air Quality and Noise

An air quality and noise baseline was undertaken for the Project area at three monitoring points for a period of 24 hours. The baseline concluded that pollutant levels for all parameters measured are significantly lower than the maximum allowable ambient air levels indicated within the legal limits. Similarly for noise, the results were within national limits for both day and night-time.

No key source of noise emission or activity were noted throughout the monitoring period. Therefore, the exceedance of noise levels is mainly attributed due to the intensity and speed of the wind at the measurement sites, despite efforts to mitigate the effect of wind speed on measurements.

Construction and operation activities of wind power project are passive in nature and do not result in any key air emissions or significant noise sources. However, construction activities may increase level of dust and particulate matter emissions, which will temporarily impact ambient air quality due to the use of heavy machinery contributing to both noise levels and dust.

Potential Impacts Overview:

- Anticipated impacts on air quality and noise during both construction and operation phases of the wind farm.
- Construction phase activities expected to increase dust and pollutant emissions, as well as noise levels, temporarily.
- Potential health and nuisance effects on onsite workers and nearby receptors, though closest community is 18km away.
- Operation phase impacts primarily related to noise generated by wind turbines, discussed in detail in Public Health and Safety section.

Mitigation Measures:

- Identification and control of excessive dust and pollutant emissions from construction activities.

- Provision of Personal Protective Equipment (PPE) for workers exposed to high dust and noise levels.
- Implementation of dust control measures like regular watering of roads, proper stockpile management, and covering of trucks transporting materials.
- Inspection and maintenance program for vehicles and equipment to minimize unnecessary emissions.
- Identification and mitigation of excessive noise levels through source control and general noise suppression measures.

Monitoring and Reporting Requirements:

- Dust and noise monitoring on a quarterly basis at key construction points, including Total Suspended Particulates (TSP), PM10, PM2.5, and noise levels.
- Periodic inspections at nearby sites to assess dust and noise impacts from construction activities.
- Reporting of excessive pollutant/dust or noise levels and measures taken to mitigate impacts.

(ix) Infrastructures and Utilities

Water Resources and Utilities – the Project is expected to require significant amounts of water throughout the construction phase. This will include water for construction requirements (concrete works, minimize dust, etc.) and potable use (drinking, washing, etc.). Similarly, during the operation phase, water will mainly be required for potable use of onsite staff at the Wind farm but is expected to be minimal and insignificant. The Contractor and Operator are required to coordinate with Ras Ghareb Water Company to secure water requirements for the Project, most likely through tankers.

Waste Utilities – solid waste, wastewater and hazardous waste generated during the construction and operation phase will be minimal and is expected to be managed and disposed through coordination with relevant authorities for disposal of waste streams (e.g. Ras Ghareb Water Company for wastewater and Ras Gharib City Council – solid waste).

Road Networks: Given the increasing size, weight, and length of components of the wind turbines, proper transportation and logistical solutions could be required for managing the heavy-load long-haul requirements. If improperly planned and managed, trucks hauling the various heavy Project components may damage existing roads, highways, bridges, utility lines (e.g. electricity lines), and could also be a public safety concern for other vehicles on the road. The Contractor will be required to prepare a Traffic and Transport Plan before commencement of any transportation activities to ensure that process is properly and adequately managed.

Aviation and Telecommunication: Improper planning and site selection of the Project could impact and affect infrastructure elements related to aviation, telecommunication and television & radio links in the surrounding area. ESIA requires establishing coordination with relevant entities to provide information on the Project and include any specific requirements to be considered as part of the detailed design, if required.

Potential Impacts Overview:

Potential Impacts on Road Networks during Planning and Construction Phase:

- Heavy-load transportation for wind turbine components may damage existing roads, highways, and bridges.
- Public safety concerns due to increased truck traffic hauling heavy components.

Potential Impacts on Civil and Military Aviation during Planning and Construction Phase:

- Wind turbines could interfere with aircraft safety and surveillance systems.
- Improper planning may lead to disturbances in aviation practices.

Potential Impacts on Petroleum Facilities during Construction:

- Inappropriate management may damage or disturb nearby petroleum facilities and road networks.
- Coordination with relevant entities required for detailed design considerations.

Potential Impacts on Water Resources during Construction and Operation:

- Short-term impacts on water resources during construction phase; the Project is to require around 70,000 m³ and 47,500 m³ for construction requirements (concrete works, minimize dust, cleaning of requirements, etc.), and 22,500 m³ as potable water requirements (drinking, washing);
- Long-term impacts on water resources during operation phase will be considerably less to include potable water for on-site operational staff (i.e. approximately 20 on-site staff)
- Coordination with Ras Gharib Water Company for water supply.

Potential Impacts on Waste Utilities during Construction and Operation:

- Generation of wastewater, solid waste, and hazardous waste during construction and operation phases.
- Coordination with relevant authorities for waste collection and disposal.

Potential Impacts on Telecommunication and Television & Radio Links during Planning and Construction Phase:

- Wind turbines may interfere with telecommunication, TV, and radio infrastructure.
- Planning phase coordination required to minimize disruptions.

Potential Impacts on Water Dams during Construction:

- Construction activities may disturb nearby water dams.
- Submission of final design for approval to relevant entities.

Potential Impacts on Nearby Wind Farms:

- Improper planning may affect nearby wind farms and avi-fauna migration corridors.
- Buffer distance considerations and coordination with relevant entities necessary.

Mitigation Measures:

Road Networks:

- Develop a Traffic and Transport Plan.
- Analyze transportation routes and worst-case scenarios.
- Coordinate with relevant authorities for compliance.

Civil and Military Aviation:

- Establish coordination with NREA and military aviation entities.
- Implement setback distances and regulatory requirements.

Petroleum Facilities:

- Coordinate with General Petroleum Company's head office for detailed design.
- Ensure compliance with coordination agreement requirements.

Water Resources:

- Coordinate with Ras Gharib Water Company for water supply.
- Secure water requirements through tankers.

Waste Utilities:

- Coordinate with water company for wastewater collection.
- Hire contractors for solid and hazardous waste collection.

Telecommunication and Television & Radio Links:

- Coordinate with NTRC to address infrastructure disruptions.
- Provide project details and obtain approval.

Water Dams:

- Submit final design for dam approval.

- Ensure coordination with relevant entities.

Nearby Wind Farms:

- Follow up with NREA to ensure appropriate buffer distances.
- Coordinate with relevant entities for approval.

Monitoring and Reporting Requirements:

- Submission of designs, plans and studies to the relevant entities
- Coordination with the relevant authorities.
- Implementation and monitoring of reviewed and approved plans; maintain coordination with relevant authorities

(x) Socio-economic Conditions

The main impact anticipated on socio-economic conditions is related to potential job opportunities for local communities from the Project during construction and operation. However, such impacts are limited taking into account the nature of activities. No details are available at this stage on the number of job opportunities targeted to local communities, type of jobs, duration, etc.

Taking the above into account, the Project is committed to ensuring that priority for job opportunities are targeted for local community members to the greatest extent possible throughout the construction and operation phase for skilled and unskilled jobs.

At a later stage, a local recruitment procedure will be developed by the Contractors and Operator, under supervision from the Project. The procedure will identify the number of job opportunities targeted for local communities and recruitment process will be undertaken through the Governorate's Labor Office. Based on that, the recruitment procedure will also include a selection process that is fair, transparent and provides equal opportunities for all including females.

In addition, the Project will also implement a Social Responsibility Program that will be implemented for the local communities based on their needs and requirements.

Potential Impacts Overview:

- Creation of job opportunities: 750 during construction phase and 20 jobs during operation phase.
- Potential procurement activities targeted towards local communities.
- Positive impacts expected on local economic activities and living environment.

Recommendations and Required Action:**Local Recruitment Procedure:**

- Develop a Local Recruitment Procedure to identify job opportunities for local communities, including skilled and unskilled workers and Bedouin groups.
- Ensure fair and transparent selection processes, equal opportunities for all, and collaboration with other wind farm developers in the area.

- Prioritize employment from the community and provide capacity building opportunities.
- Develop a Local Procurement Procedure to identify procurement opportunities for local communities, including subcontractors, supplies, and services.
- Ensure fair and transparent selection processes, equal opportunities for all, and collaboration with other wind farm developers in the area.
- Prioritize procurement opportunities from the community.

Social Responsibility Program:

- Implement a social responsibility program aiming to benefit local communities.
- Develop a structured approach to identify priority development projects based on needs assessment.
- Prioritize projects for local communities based on available budget, vision, timeline, and other factors.

Note: As the impacts discussed are mainly positive, no specific mitigation measures are identified. The focus is on enhancing positive impacts through recommended actions.

(xi) Occupational Health and Safety and Worker Accommodation

During the construction and operation phase there will be generic occupational health and safety risks to workers, such as working on construction sites, exposure electric shock hazards during maintenance activities, working at heights, etc. The ESIA requires that the Contractor and Operator prepare an Occupational Health and Safety Plan (OHSP) tailored to the Project's site and activities. Such plans aim to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel. With the implementation of such measures the impact is considered not significant.

In addition, the Contractors will prepare a worker accommodation plan, which will define the minimum health and safety standards and principles for worker accommodation and ensure impacts on community health and safety from worker influx are managed and controlled. This could include impacts related to pressure on infrastructure, services and utilities, introduction of new reservoirs of diseases, inappropriate code of conduct by workers towards local communities, possible increase in social vices, and other.

Potential Impacts Overview:

- Anticipated impacts on occupational health and safety during both construction and operation phases of the wind farm.
- Risks to workers, including accidents and injuries, associated with onsite work activities.
- Impacts expected to be of medium magnitude and high sensitivity, primarily during the construction phase.

Mitigation Measures:**Occupational Health and Safety:**

- Development of an Occupational Health and Safety Plan (OHSP) tailored to construction, installation,

commissioning, and operation phases.

- OHSP to comply with national regulations and international standards, addressing roles and responsibilities, risk assessment, training, safety procedures, and COVID-19 protocols.
- Implementation of measures to ensure hazard elimination, engineering controls, and provision of Personal Protective Equipment (PPE).

Emergency Preparedness and Response:

- Preparation and implementation of an Emergency Preparedness and Response Plan.
- Establishment of emergency responder teams, emergency procedures, control measures, communication protocols, and worker training.
- Conducting emergency drills and coordination with external emergency response services.

Worker Grievance Mechanism:

- Development of a comprehensive worker grievance mechanism to address and resolve complaints.
- Establishment of a step-by-step process for lodging and handling grievances, including anonymous options, case handling, resolution monitoring, and close-out procedures.

Worker Accommodation:

- Compliance with national regulations and international best practices for onsite worker accommodation, if provided.
- Adherence to standards regarding living facilities, room facilities, medical facilities, and management of accommodation units.

Monitoring and Reporting Requirements:

- Inspection and reporting to ensure compliance with OHSP provisions and health and safety performance onsite.
- Reporting of accidents, incidents, emergencies, and measures taken to control and prevent reoccurrence.
- Inspection of worker accommodation, if applicable, to ensure compliance with health and safety standards.
- Submission of Emergency Preparedness and Response plan and Worker Grievance Mechanism for monitoring and review.

Note: Implementation of these mitigation measures is crucial to reducing the significance of residual impacts to not significant. Monitoring and reporting requirements are essential for ongoing assessment and improvement of health, safety, and worker accommodation standards.

(xii) Community Health, Safety, and Security

During construction and operation phase the main impacts on community health, safety and security include the noise, shadow flicker, trespassing by unauthorized personnel, and potential occurrence of

incidences between site personnel and communities. These potential impacts are outlined below, accompanied by mitigation and monitoring measures in brief (full elaboration included in the ESIA).

Potential Impacts Overview:

Potential Impacts from Noise – Wind Turbine Operation

Wind turbines produce noise and cast shadows (known as shadow flicker) during operation. As the rotor blades rotate, shadows pass over the same point causing an effect known as ‘shadow flicker’. Both noise and shadow flicker could be a source of nuisances and disturbances. However, within the Project site and surrounding there are no sensitive receptors that could be affected by such impacts and therefore this is considered irrelevant.

Potential Impacts from Trespassing of Unauthorized Personnel:

Potential Impacts Overview:

- Trespassing of unauthorized personnel into the Project site could result in potential risks from several hazards of the various Project components.
- Unauthorized access to Project components poses safety hazards.
- Long-term impact during operation phase, moderate significance.

Mitigation Measures:

- Develop a Security Risk Assessment and implement security measures.
- Install locked doors on turbines, fence substations, and post informative signs. The detailed design the security measures are to prevent unauthorized access to the Project site to control any such impacts. This could include onsite security guards, fencing of some Project components (substation area), onsite surveillance and other.

Monitoring and Reporting Requirements:

- Submission of Security Risk Assessment.

Potential Impacts from Worker Influx during Construction:

Potential Impacts Overview:

- Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events.
- Influx of workers may introduce health risks, social issues and vices including inappropriate code of conduct (sexual exploitation and harassment (SEAH))
- Short-term impact during construction phase, minor significance.

Mitigation Measures:

- Nevertheless, a Security Management will be prepared which will identify appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues.

- Implement a Worker Influx Plan addressing medical examinations, hygiene, and code of conduct.
- Provide induction training on contagious diseases and COVID-19 procedures.
- Development of a code of conduct for workers which takes into account appropriate behaviour by workers and EPC Contractor at all times, religious customs, traditional cultures and social norms in the area. In addition, it must include specifically requirements for social vices including gender-based violence, sexual harassment, alcoholism, drug abuse, etc.
- Induction training and awareness raising sessions on risks associated to the most common contagious diseases (e.g. influenza virus), communicable diseases, general measures for hygiene, code of conduct expected to be implemented and other as appropriate.

Monitoring and Reporting Requirements:

- Submission of the Worker Influx Plan
- Monitoring, Receipt and Follow-up of Incidence and Grievance mechanism

ENVIRONMENTAL & SOCIAL MANAGEMENT

The ESIA includes an Environmental and Social Management Plan (ESMP) which provides a high-level outline plan for managing and monitoring the environmental and social impacts during construction, operation and decommissioning of the Project. The ESMP identifies the mitigation measures which aim to eliminate and/or reduce the potential impact to acceptable levels and monitoring actions to ensure that the identified mitigation measures are implemented.

In addition, the development and implementation of an Environmental and Social Management System (ESMS) during the construction and operation is considered a key requirement under EBRD and IFC requirements. Therefore, IFP also prepared an ESMS Manual which includes the following:

Identification of the overall structure and outline for the ESMS that will be implemented for the Project during both construction and operation;

Identification and outline of the key procedures and plans to be developed at a later stage by the Contractors and Operator that will handle the key impacts and risks during construction and operation (e.g. air quality management plan, waste management plan, etc.)

Identification of an institutional framework to ensure that such plans and procedures are implemented effectively and efficiently. This includes identification of roles and responsibilities, training requirements, monitoring and reporting requirements, and other as applicable;

Identify approach for periodically auditing entities involved during the construction and operation phase to ensure that ESMS requirements are implemented effectively;

Identification of a high-level framework for labour management that should be adhered to during the construction and operation phase; and

Identification of a strategy and commitment in relation to local hiring and community support initiatives.

ESMP: Planning and Construction Phase across Environmental Attributes and Impacts

Table 9: ESMP for the Planning and Construction Phase

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Landscape and Visual	Visual and landscape impacts due construction equipment and machinery.	Ensure proper general housekeeping and personnel management: (i) construction site is orderly at the end of each workday; (ii) equipment, and vehicles that are not in use should be removed and kept in locations to reduce visual impacts to the area. (iii) Ensure proper storage, collection, and disposal of waste streams	Mitigation	Visual inspections	At construction active areas	Daily / Weekly	EPC Contractor
Land Use	Potential for informal land use. This includes the Ghafra system of the Bedouin groups and existing petroleum facilities within the area.	(i) Coordinate with Bedouin Groups for inclusion and engagement in employment and procurement opportunities. (ii) Implement SEP that includes specific references for engagement and coordination with Bedouin groups.	Additional requirement	Signed agreement / MoM with Bedouin groups	Not applicable	Once before Initiation of construction	Developer
Geology, Hydrology and hydrogeology	Solid waste management	Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite	Mitigation	Submitted contract	Not applicable	Once before commencement of construction	EPC Contractor
		Prohibit fly-dumping of any solid waste	Mitigation	Visual inspections	Active Construction Sites	Daily / weekly	
		Commitment to adherence to the waste hierarchy principle	Mitigation	Visual inspections	Active Construction Sites	Daily / weekly	
		Distribute litter bins and containers properly marked as "Municipal Waste	Mitigation	Visual inspections	Active Construction Sites	Once before commencement of construction	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Distribute a sufficient number of properly contained containers clearly marked as "Construction Waste" for the dumping and disposal of construction waste	Mitigation	Visual inspection	Active Construction Sites	Once before commencement of construction	
		Implement proper housekeeping practices	Mitigation	Visual inspections	Active Construction Sites	Daily / weekly	
		Maintain records of volumes of waste generated onsite, collected by contractor, and disposed	Mitigation	Submission of manifests	Not applicable	Throughout construction period	
	Wastewater management	Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP	Mitigation	Signed Contract	Not applicable	Once before commencement of construction	EPC Contractor
		Prohibit illegal disposal of wastewater to the land	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Ensure that constructed septic tanks during construction and those to be used during operation are well contained and impermeable to prevent leakage of wastewater into soil	Mitigation	Visual inspections	At applicable area	Once before commencement of construction	
		Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing	Mitigation	Visual inspection	At applicable area	Daily/weekly	
		Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP	Mitigation	Submission of manifests	Not applicable	Throughout construction period	
	Hazardous Waste	Hire approved private contractor for the collection of hazardous waste from the	Mitigation	Signed	Not applicable	Once before commencement	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	Management	site to the approved hazardous waste disposal facilities		contract		nt of construction	
		Ensure that hazardous waste is disposed in a dedicated area that is enclosed, of hard surface, with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste	Mitigation	Visual inspections	At applicable area	Once before commencement of construction	
		Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Prohibit illegal disposal of hazardous waste to the land	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities	Mitigation	Submission of manifests	Not applicable	Throughout construction period	
	Hazardous material management	Hazardous materials are stored in an area that is of hard impermeable surface, flame-proof, accessible to authorized	Mitigation	Visual inspections	At applicable area	Once before commencement of	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another, and includes secondary containment systems				construction	
		Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Ensure that a minimum of 1,000 liters of general-purpose spill absorbent is available at hazardous material storage facility.	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste	Mitigation	Visual inspection	At applicable area	Upon occurrence	
	Erosion and runoff management	Avoid executing excavation works under aggressive weather conditions	Mitigation	Visual inspections	At construction active areas	Upon occurrence	EPC Contractor
		Place clear markers indicating stockpiling area of excavated materials to restrict	Mitigation	Visual inspections	At construction	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas			active areas		
		Erect erosion control barriers around work site during site preparation and construction to prevent silt runoff where applicable such as silt fences, gravel basins, fiber rolls, and other.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible	Mitigation	Visual inspections	At construction active areas	Upon occurrence	
Biodiversity	Construction activities would disturb existing habitats (flora and fauna). In addition, other impacts could be from improper management of the site (e.g. improper conduct and housekeeping practices).	Implement Biodiversity Management Plan (BMP) which is provided as a standalone document.	Mitigation	Refer to BMP	At applicable area	Refer to BMP	EPC Contractor
		Undertake a detailed Egyptian Dabb Lizard survey through a biodiversity expert. The survey should focus on all construction activities areas and in particular the Wadi systems where such a species is likely to be located. Should burrows and/or records of this species be identified, relocation activities should be undertaken to nearby similar habitats.	Additional Survey	Submission of report	Prior to construction	Once; before construction	EPC Contractor
		Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Daily / weekly	EPC Contractor
		Implement project induction for all workers on site and clearly mark (construction and habitat / botanical areas)	Mitigation	Training; visual inspections and site signage	Refer to BMP	Training – As needed	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Birds (avi-fauna)	Construction activities could disturb existing habitats of birds breeding and/or nesting within the Project site.	Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Daily / weekly	EPC Contractor
		Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Daily / weekly	EPC Contractor
		Develop a protocol to swiftly report and dispose of any dead or injured wildlife or animals recorded onsite.	Mitigation	Submission of report	Prior to construction	Prior to construction	EPC Contractor
Archaeology and Cultural Heritage	Improper management of construction activities could disturb/damage archaeological remains which could be buried in the ground (if any).	As required by the SCA, SCA must be notified to to oversee the process	Mitigation	Submission of evidence of communication with SCA	Not applicable	Prior to construction	EPC Contractor
		Measures for construction activities to be halt upon discovery of archaeological finds; notify the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office. Work halts until confirmation clearance to resume the work is provided.	Mitigation	Visual inspections and submittal of chance find report	At applicable area	Upon occurrence	EPC Contractor
Air Quality and Noise	Probably increase in dust, particulate matter and pollutant emissions as well as noise which in turn will directly impact ambient air quality and noise levels.	If found to be excessive due to construction, the source of such emissions should be identified and adequate control measures must be implemented (as identified below)	Mitigation	Visual inspections	Active construction areas, nearby receptors and internal road networks	Upon occurrence	EPC Contractor
		Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Egyptian Codes to provide PPE for workers to protect against dust and noise.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Apply basic dust control and suppression measures: (i) regular watering of roads; (ii) anticipate and manage dust-causing activities; (iii) manage stockpiles and excavated material via watering, containment, covering, bundling; (iv) cover trucks transporting aggregates and fine materials; (v) enforce site-speed limit of 15km/h	Mitigation	Visual inspections	At active construction areas	Daily / weekly	
		Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment for early detection to avoid unnecessary pollutant and noise emissions	Mitigation	Submission of maintenance program	Not applicable	Monthly	
		If noise levels were found to be excessive from construction activities, the source of such excessive noise levels should be identified and adequate control measures must be implemented	Mitigation	Visual inspections	At active construction areas and receptors to include petroleum storage facilities	Upon occurrence	
		Apply adequate general noise suppressing measures: well-maintained mufflers and noise suppressants for high-noise generating equipment and machinery, regular maintenance of all vehicles, machinery, and equipment.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
Infrastructure and Utilities	Traffic and transport management	Develop Traffic and Transport Plan to reduce risk of damage to the existing roads, highways, overpasses whilst ensuring public safety including analysis of the entire route; investigate	Additional study	Submission of Traffic and Transport Plan and approval from	Not applicable	Once before commencement of construction	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		constraints along the highways and identify accommodations which need to be taken into account.		local authorities			
	Civil and Military Aviation	Provide information on the Project to relevant office and details of design to include setback distances if required (e.g. from radar systems if applicable) and navigational safety requirements (e.g. navigational lights, blade paintings, etc.)	Additional requirement	Submission of formal non-objection letter (or similar) with relevant entity	Not applicable	Once before commencement of construction	Developer
	Improper planning and design of project could affect petroleum facilities	Coordinate through NREA to the General Petroleum Company's head office in Cairo to discuss and determine requirements for the detailed design of the Project as well as coordination agreement requirement during the construction and operation phase (e.g. avoidance of areas, buffer distances to be considered, etc.)	Additional requirement	Coordination activities are initiated no less than six (6) months prior to construction Submission of formal communication letter (or similar) with relevant entity	Not applicable	Once before commencement of construction	Developer
	Water resources management	Coordinate with the Ras Ghareb Water Company to sector the water requirements of the Project	Additional requirement	Submission of formal communication letter (or similar) with Ras Ghareb Water Company	Not applicable	Once before commencement of construction	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	Waste utilities	(i) coordinate with the Ras Ghareb Water Company to select authorized contractors for collection of wastewater from the site; (ii) coordinate with the Ras Gharib City Council to hire a private contractor for the collection of solid waste; and (iii) obtain list of authorized contractors for collection of hazardous waste	Additional requirement	Submission of formal communication letter with relevant entities	Not applicable	Once before commencement of construction	EPC Contractor
	Telecommunication and TV/Radio management	Coordinate through NREA/EETC to relevant entity and other applicable local agencies; provide information on the Project (location and specifications of turbines, etc.) and other requested requirements that may determine setback distances if required	Additional requirement	Coordination activities are initiated > (6) six months prior to construction Formal communication letter submitted	Not applicable	Once before commencement of construction	Developer
	Nearby Wind Farms	Further follow/communication with NREA to ensure if buffer distance of the Project from other nearby wind farm projects is sufficient	Mitigation	Submission of formal communication letter with relevant entities	Not applicable	Once before commencement of construction	Developer
	Petroleum Facilities	Coordinate with General Petroleum Company prior to Construction works	Mitigation	Submit formal communication letter to the relevant entities	Not applicable	Once before commencement of construction	Developer
Occupational Health and	There will be some generic risks to workers health and	Develop and submit an Occupational Health and Safety Plan (OHSP) that is	Additional study	Submission of OHSP plan	Not applicable	Once before commencement	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Safety	safety from working on construction sites, as it increases the risk of injury or death due to accidents.	project and site specific to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property.				nt of construction	
		Develop and submit an Emergency preparedness and Response Plan that is project- and site-specific, accounting for all potential emergency situations onsite to ensure the health and safety of all personnel and property onsite.	Additional study	Submission of EPRP	Not applicable	Once before commencement of construction	EPC Contractor
Human Rights	Inappropriate management of the workforce resulting in human right risks and violations by employing entities: EPC Contractor and Project Operator. This could include, but not limited to, engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.	Provide reasonable and lawful working conditions and terms of employment Recognize workers' rights to form and to join workers' organizations and to bargain collectively Prohibit child labour within the workforce Prohibition of forced labour Non-discrimination throughout the entire work cycle Provide equal opportunities for all throughout procurement and employment opportunities including women groups Management of daily workers, migrant workers and third-party workers	Mitigation	(i) Monthly inspections against the developed HR procedure (ii) Submission of HR inspection report that identifying corrective measures undertaken	At applicable area	Monthly	EPC Contractor
Public health and safety	Relatively large worker influx could result in H&S, Sexual exploitation and assault (SEA) issues such as	Submit a worker influx plan which takes into account the following: (i) medical examination program for workers; (ii) procedures to maintain hygienic	Additional study	Submission of worker influx plan	Not applicable	Once before commencement of	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	risk of diseases, inappropriate code of conduct, social vices, etc.	conditions onsite; (iii) code of conduct for workers; (iv) induction training and awareness requirements for risk of diseases, etc; (v) consider impacts from workers migration into nearby communities including pressure on rental accommodations and infrastructures				construction	
	Mismanagement of security issues and incidents by personnel towards local communities, resulting in resentment, distrust and escalation of events	Develop Security Management Plan identifying measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues	Additional study	Submission of security management plan	Not applicable	Once before commencement of construction	EPC Contractor
Socio-economics	The Project is expected to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity	Local Recruitment Procedure: announce the number of job opportunities for local communities to include skilled and unskilled workers, including fresh graduates engineers, technicians, labourers, etc and selection process that is transparent and non-discriminatory. Local Procurement Procedure: Prioritization of procurement from local communities in a transparent and non-discriminatory means from announcement to selection. Social Responsibility Program: the Developer is to implement an SRP to benefit the local communities in a structured approach that identifies priority development projects benefitting local communities (e.g. based on a needs assessment if available). Based on that	Recommendation	Regular reporting on outcomes of Program implementation	Not applicable	Continuous	Project Developer/EPC Contractors

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		the SRP, projects can be prioritized based on available budget, company vision, timeline for implementation as well as other factors.					

ESMP: Operational Phase across Environmental Attributes and Impacts

Table 10: ESMP for the Operation Phase

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Geology, Hydrology and hydrogeology	Solid waste management	Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite	Mitigation	Submit contract	N/A	Once, Prior to operation	Project Operator
		Prohibit fly-dumping of any solid waste to the land	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Distribute litter bins and containers properly marked as "Municipal Waste	Mitigation	Visual inspections	At active areas	Once, Prior to operation	
		Implement proper housekeeping practices onsite at all times	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Maintain records indicating volume of waste generated onsite, collected by contractor, and disposed of at the landfill	Mitigation	Submit manifests	N/A	Throughout operational period	
	Wastewater management	Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP	Mitigation	Submit contract	N/A	Once, Prior to operation	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Prohibit illegal disposal of wastewater to the land	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals	Mitigation	Visual inspection	At applicable areas	Daily/weekly	
		Maintain records indicating volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP	Mitigation	Submit manifests	N/A	Throughout operational period	
	Hazardous waste management	Hire approved private contractor for the collection of hazardous waste (including electrical waste) to waste disposal facilities	Mitigation	Submit contract	N/A	Once, Prior to operation	Project Operator
		Ensure that hazardous waste is disposed in a dedicated, enclosed area, of hard surface and suitable, labelled containers for each classification of hazardous waste type	Mitigation	Visual inspections	At applicable areas	Once, Prior to operation	
		Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available	Mitigation	Visual inspections	At applicable areas	Daily / weekly	
		Prohibit illegal disposal of hazardous waste to the land	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be	Mitigation	Visual inspections	At active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		orderly disposed of as hazardous waste					
		Ensure that containers are emptied and collected by the contractor on a regular basis	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Maintain records of volumes hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities	Mitigation	Submit manifests	N/A	Throughout operational period	
	Hazardous material management	Ensure that hazardous materials are stored in an area that is of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another	Mitigation	Visual inspections	At applicable area	Once, Prior to operation	Project Operator
		Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a	Mitigation	Visual inspections	At active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		suitable location (hard surface) with appropriate measures for trapping spilled material					
		Ensure that a minimum of 1,000 litters of general-purpose spill absorbent is available at hazardous material storage facility.	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste	Mitigation	Visual inspection	At applicable area	Upon occurrence	
Biodiversity	Improper management of the site could disturb existing habitats (e.g. improper conduct and housekeeping practices).	Implement proper management measures to prevent damage to the biodiversity of the site.	Mitigation	Inspection	At applicable area	Continuous	Project Operator
Birds (avi-fauna)	Wind turbines are associated with impacts on birds from risks of strikes and collision on both migratory soaring birds and resident soaring birds in the area. Generally, such impacts depend on several factors but could affect the population levels of certain species especially those with international/national critical conservation status.	Avi-Fauna Monitoring and On-Demand Turbine Shutdown	Mitigation	Submission of report	At active areas	Continuous	Consultant
		Avi-Fauna Carcass Search during Operation	Additional requirement	Submission of report	At active areas	Continuous	
		Carcass Search Surveys	Additional requirement	Submission of report	At active areas	Continuous	
Bats	The potential impacts from the Project during operation are mainly related to risk of bat strikes and collisions with	Undertake at height bat acoustic surveys for one (1) year during first or second year of operations. Such acoustic surveys will be done at the	Mitigation	Submission of report	At active areas	Once during operation	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	rotors of the operating wind turbines.	met masts and should be undertaken by a third-party entity with experience in bat assessments and studies.					
		Carcass Search Surveys	Mitigation	Submission of report	At active areas	Continuous	Consultant
Infrastructure and Utilities	Water resources management	Coordinate with the Ras Gharib Water Company to sector the water requirements of the Project.	Additional requirement	Submit formal communication letter (or similar) with Ras Gharib Water Company	N/A	Once before commencement of construction	Project Operator
	Waste utilities	Undertake the following: (i) coordinate with the Ras Gharib Water Company and obtain list of authorized contractors for collection of wastewater from the site; (ii) coordinate with the Ras Gharib City Council to hire a competent private contractor for the collection of solid waste from the site; and (iii) obtain list of authorized contractors for collection of hazardous waste from the site	Additional requirement	Submit formal communication letter with relevant entities	N/A	Once before commencement of construction	Project Operator
Occupational Health and Safety	There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Develop and submit an Occupational Health and Safety Plan (OHSP) that is project and site specific to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property.	Additional study	Submit OHSP plan	N/A	Once, Prior to operation	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Human Rights	Inappropriate management of the workforce during the construction phase could entail several human right risks and violations by employing entities such as the EPC Contractor and Project Operator. This could include but not limited to engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.	Providing reasonable working conditions and terms of employment to include but not limited to contract management, working hours, salaries/wages, annual and medical leaves, bereavement leaves, accommodation, etc.	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	EPC Contractor
		Recognizing workers' rights to form and to join workers' organizations and to bargain collectively	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Prohibition of child labour within the workforce	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Overall management of young workers within the labour force	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Prohibition of forced labour	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Non-discrimination throughout the entire work cycle in all its forms	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Providing equal opportunities for all throughout procurement and employment opportunities including women groups	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Overall management of daily workers, migrant workers and third-party workers	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
Public Health and Safety	Public access of unauthorized personnel to the various Project components.	A Security Risk Assessment should be developed for the Wind Farm Project and which takes into account the following: (i) each turbine to be fitted with locked doors to prevent unauthorized access to the turbines; (ii) substation area to be completely fenced with concrete walls to prevent unauthorized access; (iii) onsite guards; (iv) post informative signs on the turbines and substation about public safety hazards and emergency contact information, and other as applicable.	Additional study	Submit Security Risk Assessment	N/A	Once, Prior to operation	Project Operator
	Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events	Prepare a Security Management Plan that identifies appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues	Additional study	Submit security management plan	N/A	Once, Prior to operation	Project Operator
	Blade or tower glint can impact nearby receptors in	Consideration should be given to the use of non-reflective finishes to	Mitigation	Visual inspection	Turbines	Once, Prior to operation	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	the area	ensure potential impacts are not significant					
Socio-economics	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity	Local Recruitment Procedure: announce the number of job opportunities for local communities to include skilled and unskilled workers, including fresh graduates engineers, technicians, labourers, etc and selection process that is transparent and non-discriminatory. Local Procurement Procedure: Prioritization of procurement from local communities in a transparent and non-discriminatory means from announcement to selection. Social Responsibility Program: the Developer is to implement an SRP to benefit the local communities in a structured approach that identifies priority development projects benefitting local communities (e.g. based on a needs assessment if available). Based on that the SRP, projects can be prioritized based on available budget, company vision, timeline for implementation as well as other factors.	Recommendation	Regular reporting on outcomes of Program implementation	N/A	Continuous	Project Developer/ Operator

STAKEHOLDER ENGAGEMENT PLAN (SEP)

A Stakeholder Engagement Plan (SEP) was developed which will be implemented for the Project. The SEP identifies in details the stakeholders that are relevant to the Project to include local communities, national governmental and permitting authorities, local government, Non-Governmental Organizations (NGOs) and other. The SEP identifies previous stakeholder engagement activities undertaken for the Project and the key outcomes of such engagement activities. This included in particular several entities such as Red Sea Governorate, Ras Gharib City Council, Bedouin Groups, General Petroleum Company and other. In addition, it also describes the outcomes of a public disclosure session that was undertaken in Ras Gharib City with local communities and other key local governmental entities.

The SEP also identifies in detail a future stakeholder engagement strategy and plan which identifies activities that will be undertaken throughout the Project duration, which provides an opportunity for all stakeholders, including local communities, to express their views and interact with the Project.

The SEP also includes a stakeholder grievance mechanism that is responsive to any concerns and complaints from affected stakeholders and communities.

ESIA DISCLOSURE & CONTACT DETAILS

It is of utmost necessity to ensure that stakeholders are kept well informed about the Project throughout its life cycle, thus information will be accessible to the public, key stakeholders, and local communities through dissemination of related documents.

The disclosure package will include the following key documents that are available publicly in Arabic and English language.

- Environmental and Social Impact Assessment (ESIA) for the Wind Farm
- Non-Technical Summary (NTS)
- Stakeholder Engagement Plan (SEP)
- Cumulative Effect Assessment (CEA)
- Critical Habitat Assessment (CHA)
- Environmental and Social Management System (ESMS) Manual
- Environmental and Social Action Plan (ESAP)

The above documents are available at the following avenues:

- African Development Bank (AfDB) website (<http://www.afdb.org/>)
- Hard copies available at Red Sea Governorate and Ras Ghareb Local Governmental Unit

Ras Ghareb City Council

Location: Al-Mina Street

City: 11432 Ras Ghareb – Red Sea

Tel: 01001318480 – 01201958777

- Soft copies can also be made available to stakeholders via email to

gawhara.abdelrahman@rasgharebwind.com

To communicate the outcomes of the above process, a public disclosure session will be announced and implemented to communicate with stakeholders.

An advertisement will be taken out in the national newspaper about the project, the availability of the disclosure package and the details about an upcoming disclosure event. The same will be done on the Project's website and LinkedIn. In addition, corresponding leaflets will be distributed in Ras Ghareb amongst the key stakeholders in the city, its Military Authorities, Governmental Institutions and the municipality.

The disclosure event will likely take the form of a Facebook Live event. A link and invite to this event will also be provided on the official page for Ras Ghareb city on Facebook. The event will also include a Q&A session. The whole event will be recorded and a summary report on the event and the Q&A session will be made available.

1. INTRODUCTION

1.1 Background

The energy sector is a key driver for the socio-economic development of Egypt, representing around 13% of current GDP and thus making economic growth in the country contingent upon the security and stability of energy supply. To align and reinforce the sector with sustainable development, the Arab Republic of Egypt (through the Ministry of Electricity and Renewable Energy) had developed and adopted the Integrated Sustainable Energy Strategy (ISES) 2015 – 2035, which provides an ambitious plan to increase the contribution of renewable energy to 42% of the country's electricity mix by 2030, of which wind power is a key component, to be developed mostly in the Gulf of Suez (GoS) due to the wind characteristics in the area.

As a result, the GoE issued the Renewable Energy Law (Decree Law 203/2014) to support the creation of a favourable economic environment for a significant increase in renewable energy investment in the country and establishes the legal basis for the Build, Own and Operate (BOO) framework. Through the BOO mechanism, the Egyptian Electricity Transmission Company (EETC) invites private investors to submit their offers for solar and wind development projects, for specific capacities and the award is to be made to that bidder with the lowest Kilowatt Hour (kWh) price. In addition, the GoE (through the New and Renewable Energy Authority (NREA)) provides the land for the investors.

In accordance with the Law above, a consortium composed of ACWA Power and Hassan Allam Utilities B.V (hereafter referred to as 'the Developer') is proceeding with developing a new wind power plant project (Suez

Wind Energy – (SWE)) with a capacity of 1,100MW under the BOO scheme. SWE is to be developed over two (2) Plots – the first located within the northern parts of the Gulf of Suez (hereafter referred to as 'Plot 1') and the second located within the southern parts of the Gulf of Suez - Plot 2.

The Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) is managing the Environmental and Social (E&S) process for the Project development on behalf of the Developer. RCREEE commissioned the consortium consisting of Eco ConServ, ECO Consult and Safe Soar (hereafter referred to as 'the ESIA Consultant') to carry out an Environmental and Social Impact Assessment (ESIA) for the Project.

As noted earlier, the above 1,100MW Project will be developed over two (2) plots. Given the geographical distance between the plots, from an environmental and social perspective, separate ESIA studies will be undertaken for each plot. This report represents the ESIA for Plot 1 / SWE North.

1.2 Project Location and Components

The Project is located within the Gulf of Suez (GoS) around 211km southeast of the capital city of Cairo (Figure 1). The total area of the Project site is 145 km².

Administratively, the Red Sea Governorate is divided into 7 Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 150km south of the Project site.

The Project is located within the Ras Gharib District and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib city and two (2) rural (village) local units: Zaafarana and Wadi Dara. The closest community settlement to the Project site is Ras Gharib city

(located 20km to the east).



Figure 9: Project Site Plot 1's (Green) Distance from Cairo, Egypt

The closest official community settlements to the Project Site are summarized in the table and illustrated in Figure 10 along with selected and notable sites near and within the Project site.

Table 11: Distance of Nearby Communities to Project Sites

Closest Community Settlement	Distance (km)
Ras Ghareb	19.7
Ras Shukeir (located in another District)	44.5
Wadi Dara	49.26

- **Ras Ghareb** is the second-largest city in the Red Sea Governorate, and the most important Egyptian city in terms of oil production. It has a population of about 60,000 individuals (about 17% of the total population of the Red Sea Governorate), most of whom work in the petroleum industry. Ras Ghareb is the leading hub of petroleum production in Egypt, producing about 70% of the country's total output.
- **Ras Shukeir** is located immediately alongside the highway and approximately 45km from the Project site. It is not considered a community settlement as it mainly includes an oil and gas facility, workers accommodation, an airport – Ras Shukeir New Airport, and a recreation center.

- **Wadi Dara** is located around 50km from the Project site. Wadi Dara does not have a large stable community where the total population is between 100-150, this includes 2 families that are there on a permanent basis while the reminder of the population are mainly workers and guards employed at the various poultry, livestock and agricultural farms within the settlement (mainly at a rotational basis).



Figure 10: Distance from nearby villages, cities and settlements

1.3 Environmental and Social Impact Assessment Report

The environmental clearance for this Project is governed by the Egyptian Environmental Affairs Agency (EEAA) as stipulated by “Law No. 4 of 1994 – Law on Protection of the Environment”. Executive Regulations 1995 (Prime Ministers Decree 338) issued in accordance with the Law, classifies wind farm developments of such nature and capacity (i.e. this Project) as “Category C”, requiring a comprehensive Environmental and Social Impact Assessment (ESIA) in order to obtain the environmental clearance and permit, in order to commence with construction and operational activities.

The Project is anticipated to seek financing from International Financing Institutions (IFIs) and therefore the Developer wishes to design and manage the Project in accordance with Good International Industry Practice (GIIP), which also includes the ESIA that will be developed. This ESIA will be developed based on the following GIIP requirements:

- European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2019) and associated Performance Requirements (PR); and
- International Finance Corporation (IFC) Policy on Environment and Social (E&S) Sustainability (2012), IFC Performance Standards (2012), and IFC Environment, Health and Safety (EHS) Guidelines including the IFC EHS Guidelines for the Wind Sector.
- African Development Bank (AfDB) December_2013_-_AfDB’S_Integrated_Safeguards_System_-_Policy_Statement_and_Operational_Safeguards

This report is the ESIA report to be submitted by the ESIA Practitioner to EEAA. This ESIA is undertaken in accordance with the “Law No. 4 of 1994” and its amendments as well as GIIP requirements specified above. There are other complementary studies submitted as standalone documents which are to include the following:

- Non-Technical Summary (NTS)
- Stakeholder Engagement Plan (SEP)
- Cumulative Effects Analysis (CEA)
- Critical Habitat Assessment (CHA)
- Environmental and Social Management System (ESMS) Manual

1.4 Document Structure

The following table provides an overview of the Chapters within this ESIA document. The ESIA includes a standalone Non-Technical Summary (NTS) a Stakeholder Engagement Plan (SEP).

Table 12: ESIA Document Structure

Chapter	Description of Content
Executive summary (Arabic & English)	Summary of the ESIA report
Chapter 1 – Introduction	Introduction and background information on the Project
Chapter 2 – Project Description	Provides a detailed description of the Project in relation to its location, the key Project components and an overview of the proposed activities that are to take place during the various Project phases.
Chapter 3 – ESIA Approach and Methodology	Presents the methodology and approach that was adopted for the ESIA study.
Chapter 4 – Project Stakeholders and Consultations	Discusses in detail the stakeholder consultation and engagement plans which were undertaken as part of the ESIA process for the Project and provides an overview of the findings. In addition, this Chapter also discusses the future stakeholder engagement and consultation plans which are to take place at a later stage.
Chapter 5 – Policy, Legal, Administrative Framework and	Provides an overview of the environmental and social regulatory and policy framework applicable to the Project.
Chapter 6 – Analysis of Alternatives	This chapter investigates several alternatives to the Project development and the reasons for the preferred choice. This includes alternatives in relation to the Project site, selected technology, Project design, and finally investigates the ‘no action alternative’ – which assumes that the Project development does not take place.
Chapter 7 – Existing Physical, Biological, and Social Environment	This Chapter presents the baseline conditions within the Project site and surroundings. This includes the following: Landscape and Visual (Section 7.1), Land Use (Section 7.2), Geology/Hydrology/Hydrogeology (Section 7.3), Climate (Section 7.4), Biodiversity (Section 7.5); Archaeology and Cultural Heritage (Section 7.6), Air Quality and Noise (Section 7.7), Infrastructure and Utilities (Section 7.8), Public Health and Safety (Section 7.9), and Socio-economics (Section 7.10).
Chapter 8 – Impact	This Chapter assesses the anticipated impacts from the Project throughout its various phases

Assessment	on such a receptor. For each identified impact a set of mitigation and monitoring requirements have been identified which aim to eliminate the impact and/or reduce it to acceptable levels. This includes the following: Overview of Strategic Environmental and Economic Impacts (Section 8.1), Landscape and Visual (Section 8.2), Land Use (Section 8.3), Geology/Hydrology/Hydrogeology (Section 8.4), Biodiversity (Section 8.5), Archaeology and Cultural Heritage (Section 8.6), Air Quality and Noise (Section 8.7), Infrastructure and Utilities (Section 8.8), Occupational Health and Safety (Section 8.9) Human Rights (Section 8.10), Public Health and Safety (Section 8.11), (Section 8.12), Socio-economics (Section 8.12), Summary of Anticipated Impacts (Section 8.13), and Assessment of Cumulative Impacts (Section 8.14).
Chapter 9 – Environmental and Social Management Plan (ESMP)	Presents the Environmental and Social Management Plan (ESMP) for the Project; which mainly summarizes the impacts identified as well as the mitigation measures and monitoring requirements to be implemented throughout the various Project phases. In addition, this Chapter describes the institutional framework and procedural arrangement for the ESMP implementation.

1.5 Key Involved Entities

Different entities are involved in the planning and implementation of the Project. The responsibilities of each key entity which is of relevance to the ESIA are listed in the text below along with a general description of their roles.

- Suez Wind Energy (SWE): The owner and developer of the Project (hereafter referred to as ‘the Developer’). SWE is a consortium composed of ACWA Power and Hassan Allam Utilities B.V;
- Egyptian Environmental Affairs Agency (EEAA): the official governmental entity responsible for protection of the environment in Egypt. The EEAA is responsible for approval of the Environmental and Social Impact Assessment (ESIA) and making sure it complies with the “Environmental Protection Law No. 4 of 1994” and granting the environmental clearance for the Project;
- International Financing Institutions (IFIs): entities that provide financing to the Developer for the development of the Project. Such IFIs ensure that the Project is developed in accordance with GIIP requirements. At this stage, the IFIs have not been determined yet;
- Engineering, Procurement, and Construction (EPC) Contractor: responsible for preparing the detailed design and layout of the Project; supply of the material and equipment (e.g. wind turbines); construction of the Project and its various components (turbines, internal roads, building infrastructure, and, etc.). The EPC Contractor for this Project has not been assigned yet;
- Owner’s Engineer (OE): engineering company appointed by the Developer to ensure EPC Contractor develops the Project with the required technical specifications. Owner’s Engineer is also responsible for supporting the Developer in ensuring EPC Contractor adherence to E&S requirements and obligations.
- Independent Environmental and Social Consultant (IESC): consultant that is engaged by and on behalf of the IFIs to ensure that the Project is being developed in accordance with their E&S requirements.
- Project Operator: NOMAC is responsible for Operation and Maintenance (O&M) of the Project.;
- Egyptian Electricity Transmission Company (EETC): the entity that signed the Power Purchase Agreement (PPA) with the Developer. It is responsible for designing, building and operating the associated interconnection facilities including the Overhead Transmission Line (OHTL) connecting the

Project site to the existing national grid.

- New and Renewable Energy Authority (NREA): is entity responsible for allocation of the land for the development of the Project;
- Consultant (EcoConServ, ECO Consult and Safe Soar): hereafter referred to as the 'ESIA Team' who is the ESIA Practitioner and the consultant commissioned by the Developer to prepare the ESIA for the Project in accordance with the requirements of the "Law No. 4 of 1994" as well as GIIP requirements.

2. PROJECT DESCRIPTION

This chapter provides a detailed description of the Project in relation to its location, the key project components and an overview of the proposed activities that are to take place during the construction, operation, and decommissioning phase.

2.1 Administrative Set-up and Project Location

Egypt is divided into 27 Governorates. The Project site is located within the Red Sea Governorate that is bordered by the Red Sea Coast to the east and Beni Suef, Minya, Assyut, Sohag, Qena, Luxor and Aswan Governorates to the west, Suez Governorate to the North, and North Sudan to the south (Figure 3 below). Red Sea Governorate's total area is around 120,000 km², forming 11.9% of the country's total area.

Administratively, the Red Sea Governorate is divided into 7 Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 100km south of the Project site.

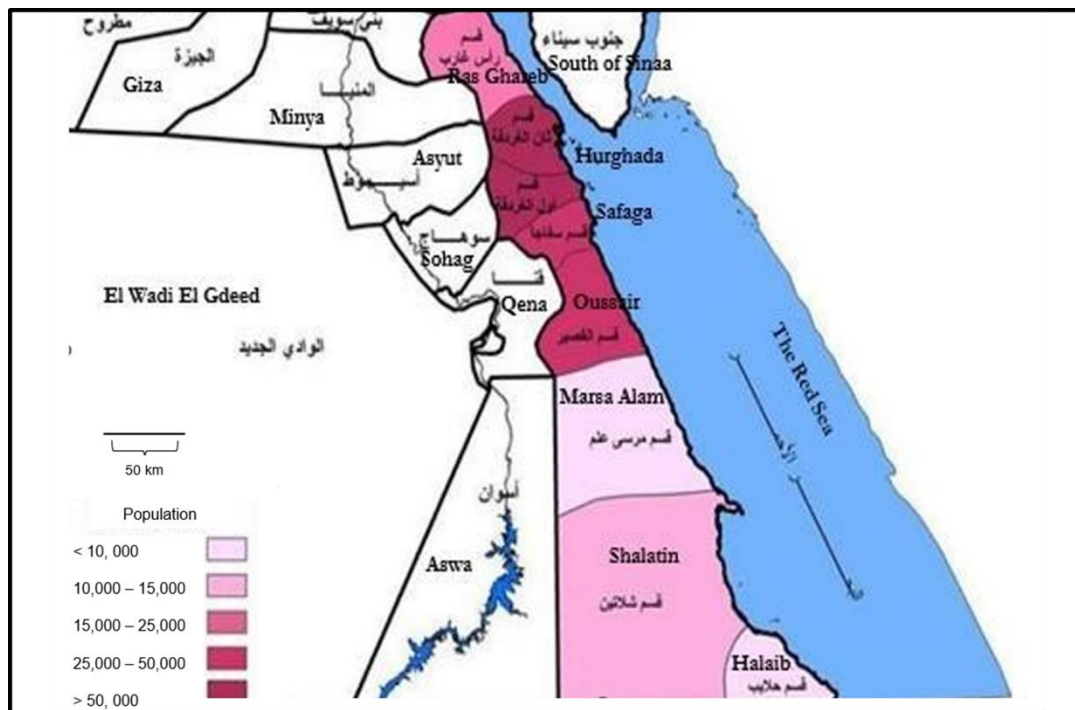


Figure 11: Administrative Borders of the Red Sea Governorate

The Project site is located within the Ras Gharib City (or District) and therefore administratively is under the Ras Gharib City Council (Figure 13). The Ras Gharib District is further divided into Ras Gharib town as well as 2 rural (village) local units (Zaafarana and Wadi Dara). The closest community settlement to the Project site is Ras Gharib city (located 19.7km to the east).

Ras Gharib City is the second-largest city in the Red Sea Governorate, and the most important Egyptian city in terms of oil production.

As discussed earlier, the Project is located within one of several areas in the GoS allocated by the GoE for wind farm development. A 145km² plot located within a 300km² Strategic area allocated to NREA for the development of wind farms (see Figure 12).

Table 13: Project Site Coordinates

Point	WGS Coordinates	
	Latitude	Longitude
1	28.615215°	32.697273°
2	28.537443°	32.714706°
3	28.307687°	32.790744°
4	28.320687°	32.882920°
5	28.332656°	32.883035°
6	28.332639°	32.866592°
7	28.349849°	32.866863°
8	28.349921°	32.841234°
9	28.383821°	32.843178°
10	28.434599°	32.833706°
11	28.435147°	32.818074°
12	28.383098°	32.818490°
13	28.383539°	32.785204°
14	28.400148°	32.782533°
15	28.401697°	32.768413°
16	28.449028°	32.769706°
17	28.450261°	32.800961°
18	28.498779°	32.800497°
19	28.498305°	32.750015°
20	28.515613°	32.749931°
21	28.516918°	32.734239°
22	28.566613°	32.732002°
23	28.588506°	32.729232°
24	28.594769°	32.728442°
25	28.598624°	32.715303°

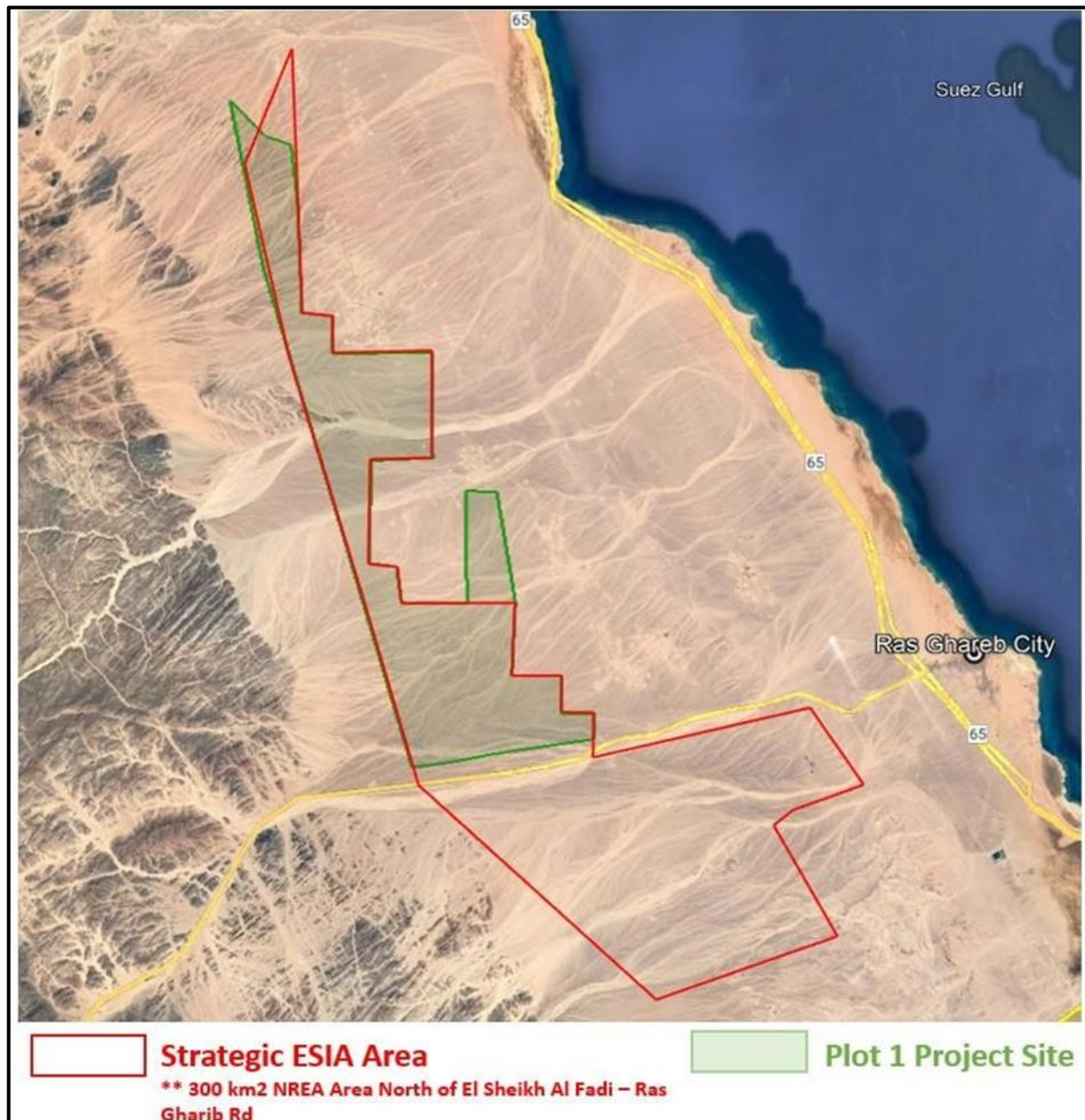


Figure 12: Project location within the land allocated by GoE for Wind Farm Development within the Strategic ESIA Area

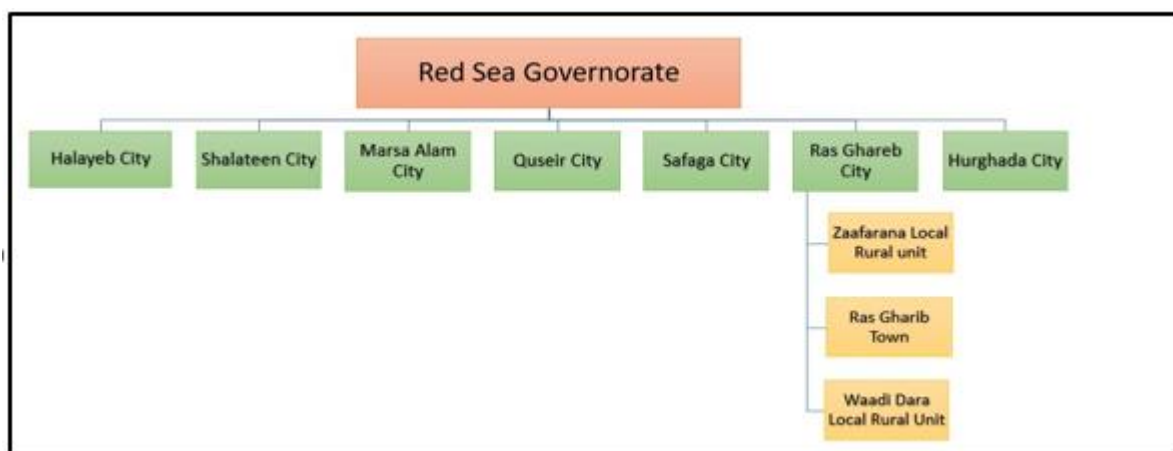


Figure 13: Administrative Division of Red Sea Governorate

2.2 Outline of Wind Turbine Technology

Wind turbine technology relies on harvesting the kinetic energy in wind (i.e. movement of wind) and turning it into mechanical energy which in turn is used for electricity generation. To capture wind, turbines consist of rotor blades which are elevated from the ground using towers to take advantage of faster and less turbulent wind. As wind speed increases, the rotor blades begin to rotate which then spins a shaft that is connected to a generator thereby converting wind energy to electricity.

Wind turbines produce electricity at a certain voltage which must be matched to the grid it connects to. Therefore, transformers are used to convert the output from the wind turbines to a higher voltage that matches the grid.

2.3 Project Components

The table below provides a summary of the key Project components, along with a detailed description of each of those components to follow. It is important to note that the selection of wind turbines depend on a feasibility study as well as a technical and economical evaluation undertaken by the Developer.

Table 14: Summary of Key Project Components

Component	Description
Project Generation Capacity (MW)	550 MW
Technology Manufacturer	Envision
Number of Wind Turbines	69
Rated Power per Turbine (MW)	8.0 MW
Rotor Diameter (m)	182 m
Hub Height (m)	110 m
Tip Height (m)	201 m (+1 m to include wind turbine foundation and elevation to mitigate flood-related impacts)
Infrastructure and Utilities	This includes: (i) internal road network; (ii) underground MV cables; (iii) warehouse and offices; (iii) substation; and (iv) associated facilities such as the high voltage overhead transmission line.

2.3.1 Wind Turbines

Generally, a wind turbine consists of a foundation, tower, nacelle, rotor blades, a rotor hub, and a transformer (refer to Figure 14).

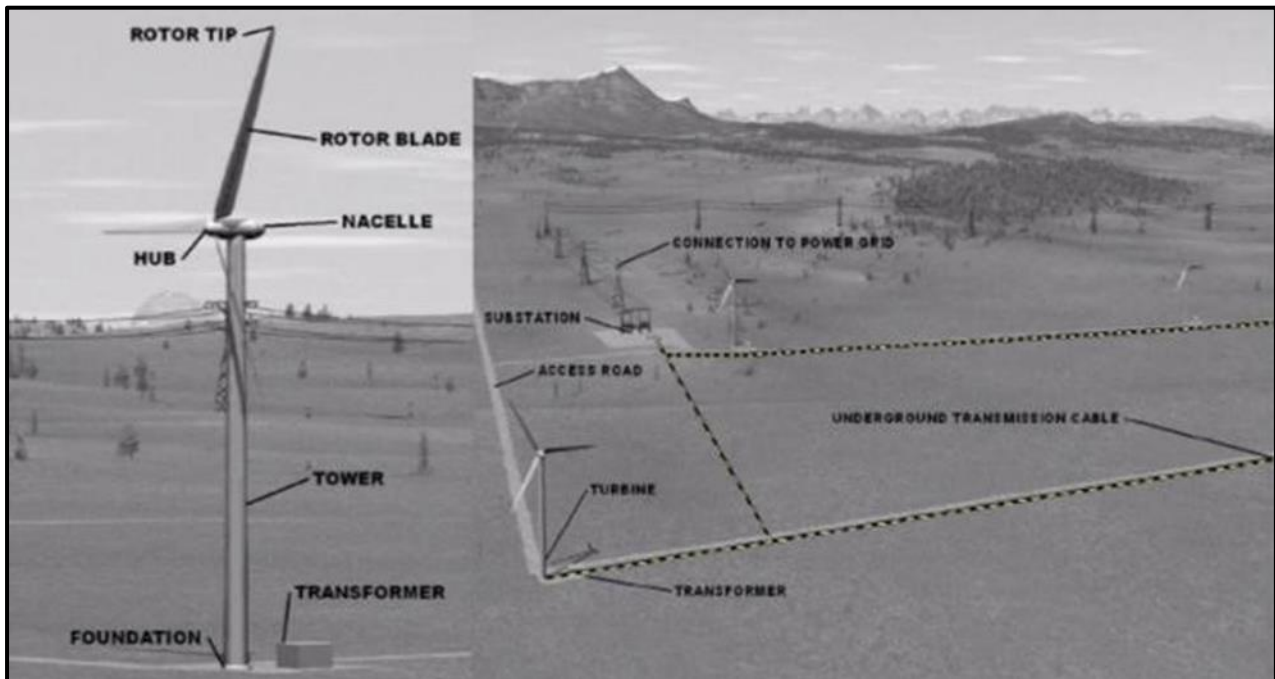


Figure 14: (a) Typical Structural Components of a Wind Turbine, (b) Typical Components of a Wind Farm (Source: EHS Guidelines for Wind Energy, IFC)

Foundations are to be constructed to bolt the tower of the turbine in place (one for each turbine) for which each foundation generally consists of a circular footing of around 20m-25m diameter and a depth of 3m to 4m. The foundation is built with concrete-reinforced with structural corrugated steel.

The tower contains the electrical conduits, supports the nacelle, and provides access to the nacelle for maintenance. Typically, three (3) blades are connected to the hub which then connects with the nacelle; the box-like component that sits atop the tower and which most importantly contains the gear box (which steps up the revolutions per minute to a speed suitable for the electrical generator) and the generator (which converts the kinetic energy into electricity).

In addition, each turbine is equipped with a transformer that converts/steps up the output from the turbine to a higher voltage (from 0.69kV to 33kV) to meet a specific utility voltage distribution level that is appropriate for connection with a substation (explained in details below).

Finally, next to each turbine, a crane pad to accommodate cranes for the installation of the wind turbines and for maintenance activities during operation. The crane pads are to be suitable to support loads required for the erection, assembly an operation and maintenance of the turbines. Generally, crane pads have an area of around 4,000 m².

Currently, the planned turbines are to be characterized by a hub-height of 110 m with a rotor diameter of 182m based on currently suitable market technology, therefore having a tip height of 200 m and a maximum tip height of 201 (with foundation and flood mitigation).

In addition, figure below presents the layout for the turbines as available at this stage by the Developer.

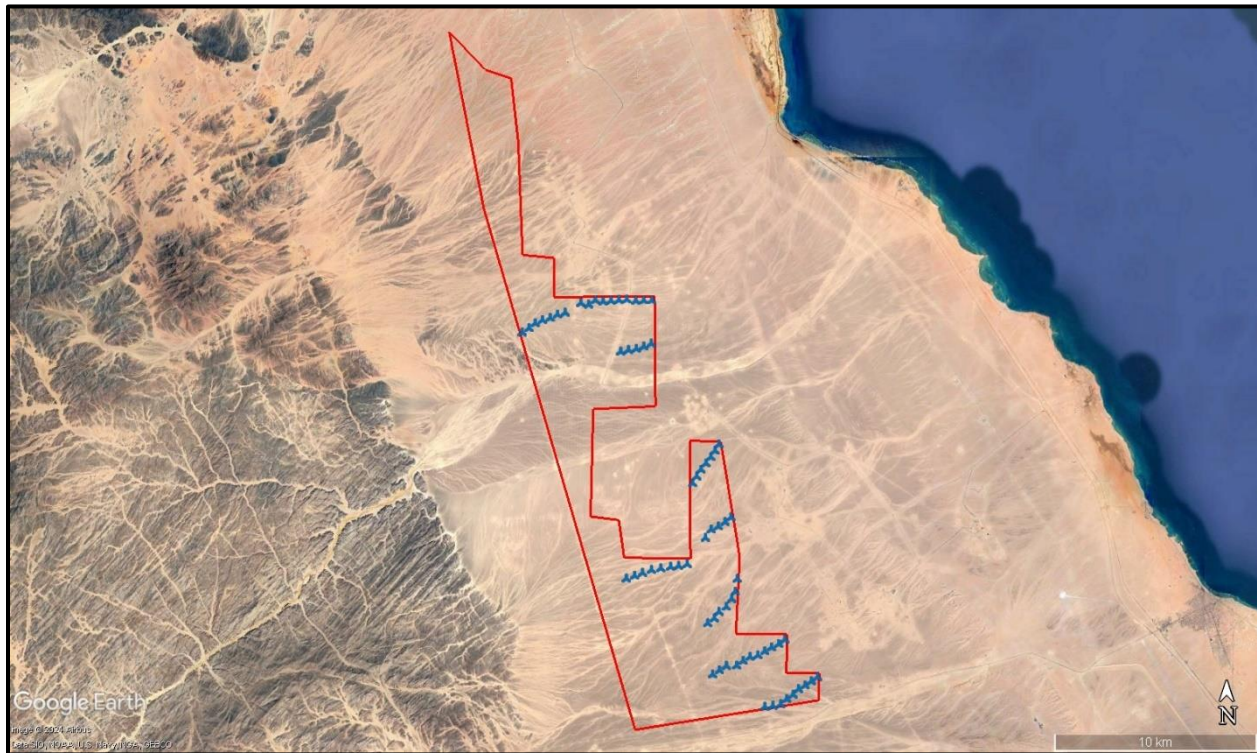


Figure 15: Project Site Turbine Layout

2.3.2 Infrastructure and Utilities

The following highlights the key infrastructure and utility elements that are typically required for a Project.

- **Medium Voltage (MV) Cables:** The turbines are to be connected through medium voltage cables (33kV) to an onsite substation (discussed below). The connection between the turbines and the substation will be made using underground transmission cables buried in ground by trenches.
- **Communications Network:** The Project is to have a Supervisory Control and Data Acquisition (SCADA) system for the remote operation of the facilities. A communication network will be installed which will consist of fibre optic cables connecting the turbines together to the SCADA system at substation. The communication system will be installed in the same trenches as the MV cables discussed above.
- **Substation:** The substation is a high voltage transformer unit that collects and converts the output from the turbines to a higher voltage (from 33 kV to 220 kV) that is appropriate for connection with the High Voltage National Grid (220 kV).
- **Building Infrastructure:** Onsite building infrastructure will be required for the daily operation of the Project. Such buildings could include an administrative building (offices) used for normal daily operational related work, control room, workshop and a warehouse for storage of equipment and machinery such as spare parts, oil cartridges, fuel, lubricants, etc.;
- **Road network:** A road network will be required for installation of the turbines during the construction process and for ease of access to the turbines for maintenance purposes during operation.

2.3.3 Associated Facilities

EETC will be responsible for offsite connection works from the onsite substation to the National Grid. This is to be through a 220 kV Overhead Transmission Line (OHTL). EETC is to be responsible for identification of the OHTL route, preparing the detailed design, undertaking construction activities, as well operation and maintenance activities. It is important to note that at this stage there are no details available by EETC on the OHTL specifications (route, height, number of electrical towers, etc.).

2.4 Footprint of the Project Components

This section provides an estimate on the footprint of the Project taking into account the components discussed in the previous section and based on assumptions made by the ESIA team to determine footprint values. As noted in the table below, the total area of disturbance for the Project is significantly small, calculated at less than 1% of the total boundary of the Project area.

Table 15: Footprint of the Project Components

Component	Footprint	Description
Turbines	0.31km ²	Typically, each crane pad is around 4,000m ² in area, whereas each foundation typically consists of a circular footing of maximum 25m diameter with 69 turbines.
Substation and Warehouse and Storage facilities	0.05km ²	Typically, footprint for substation and building facilities is around 0.05km ² .
Trenches for MV cables and communication cables	0.10km ²	This includes trenches with a calculated length of around 95.80 km and a width of 1m.
Road networks	0.57km ²	This includes the road network with a total length of 26.29 km and a width of 6m.
Total Project Footprint	1.02km ²	
Total Project site Boundary Area	145 km ²	Project footprint is less than 1% of the total boundary of the Project area.

2.5 Overview of Project Phases

This section presents the likely activities to take place during the Project development and which is to include three distinct phases: (i) planning and construction, (ii) operation, (iii) decommissioning and (iv) project schedule each of which is summarized below.

(i) Planning and Construction Phase

The typical activities that are to take place during the planning and construction phase for wind farms include the following:

- Preparation of the detailed design and layout of wind turbines within the Project site in addition to the various other infrastructure/utility elements (buildings, roads, substation, etc.);
- Transportation of wind turbine components to the Project site. The components are expected to be

transported to the closest marine port and then transported by road to the Project site;

- Site preparation of the turbine foundation. Such activities are limited to relatively small individual footprints of the foundations and will include excavations and land clearing activities for building the foundations;
- Installation of turbine components to include tower assembly, hub, rotor, blades and nacelle lift and rotor assembly which most likely will occur through onsite mobile cranes;
- In addition to the erection of each turbine, there is additional construction work (which could include excavations, land clearing activities, electrical work, etc.) that must be conducted to connect each turbine to the power grid, this could include the installation and laying of transmission and communication cables, installation of substations, and installation of project transmission line; and
- Other construction works (which could include excavations, land clearing activities, etc.) for the potential access road construction or upgrade and for the building infrastructure (warehouse and offices).

(ii) Operation Phase

Wind turbines generally require limited operational activities as this mainly includes the following:

- Commissioning tests of the wind farm which usually involves standard electrical tests for the electrical infrastructure as well as the turbine, and inspection of routine civil engineering quality records. Careful testing at this stage is vital if a good quality wind farm is to be delivered and maintained. Commissioning of an individual turbine can take little more than two days with experienced staff;
- Normal daily operation of the wind farm. The long-term availability of a commercial wind turbine is usually in excess of 97 percent (i.e. 97% of the time, the turbine will be available to work); and
- Maintenance will also take place through a dedicated team. Typical routine maintenance time for a modern wind turbine is 40 hours per year. Non-routine maintenance may be of a similar order. Although minimal, maintenance activities may include turbine and rotor maintenance, lubrication of parts, washing of blades, maintenance of electrical components, full generator overhaul, etc.

(iii) Decommissioning Phase

According to the PPA agreement, the Project is expected to be operational for 25 years. In the case of complete decommissioning of a wind turbine, the tower and blades of the removed wind turbine will be taken down by crane, disassembled into components, and then the turbine will be refurbished at source and used elsewhere for another Project. The base will typically be left in place and covered by gravel and peat or loam. Tracks used for maintenance vehicles will be restored and can be kept as agricultural routes. Gates and fences will be removed.

(iv) Project Schedule

According to the current timeline information available by the Developer, construction of the Project is anticipated to commence around Q4 2024, and will require approximately 30 months for construction

and commissioning. Operation of the Project is therefore anticipated to commence in 2027 for a period of 25 years based on the PPA signed.

2.6 Workforce

According to information provided by the Developer, the Project is to require the following workforce throughout the construction and operation phase:

- Around 750 job opportunities at peak during the construction phase for a duration of approximately 24 months. This will mainly include around skilled job opportunities (to include engineers, technicians, consultants, surveyors, etc.) and unskilled job opportunities (mainly labourers but will also include a number of security personnel).
- Around 20 job opportunities during the operation phase for a duration of 25 years. This will include skilled job opportunities (such as engineers, technicians, administrative employees, etc.) and unskilled job opportunities (such as security personnel, drivers, etc.).

Taking the above into account, the Developer aims to hire local community members to the greatest extent possible throughout the construction and operation phase for skilled and unskilled jobs. The Developer is committed to adhering to transparent recruitment procedures which includes local community members.

3. ESIA APPROACH AND METHODOLOGY

This chapter describes the approach and methodology that was adopted for the ESIA study including the following:

- Approach for the analysis of alternatives;
- Approach to stakeholder engagement;
- Approach to determining the spatial and temporal study area;
- Methodology for assessment of the baseline environmental and social conditions;
- Methodology used to assess the potential environmental and social impacts of the Project - including the approach to determining significance, development of mitigation measures and the assessment of residual effects;
- Approach used for the assessment of cumulative effects; and approach for development of an ESMP.

3.1 Analysis of Alternatives

The Egyptian Regulations to include the “Guidelines of Principles and Procedures for Environmental Impact Assessment” (EEAA, 2009) requires that the ESIA identify and analyse alternatives and present the main reason for the preferred choice. The examination of alternatives is also considered to be a key element of the ESIA process under good international practice, to include but not limited to the: (i) IFC Performance Standard 1 (IFC, 2012) and the associated “IFC Guidance Note 1” (IFC, 2012); and (ii) EBRD Performance Requirement 1.

The analysis of alternatives is presented in “Chapter 6”. The chapter discusses and compared several alternatives to the Project development in relation to: (i) the Project site, (ii) the chosen technology, (iii) the Project design, and finally investigated the ‘no action alternative’ - which assumes that the Project development does not take place.

3.2 Stakeholder Engagement

Stakeholder consultation and engagement is an essential part of the ESIA process, and has been carried out in accordance with the regulatory requirements in Egypt and the requirements of IFC and EBRD. The previous and future stakeholder consultation and engagement for the Project are summarized below and discussed in detail in “Chapter 4”.

The Project to date has included extensive stakeholder consultation and engagement with various stakeholder groups such as national governmental entities, local governmental entities, non-governmental organizations, and other as appropriate. This has been undertaken through bi-lateral meetings, e-mail communication, phone communication, formal letters, and other.

“Chapter 4” also discusses future stakeholder engagement and consultations which are to take place at a later stage. This mainly includes: (i) a public disclosure session with stakeholders to present the findings and recommendations proposed within the ESIA; and (ii) implementation of the Stakeholder Engagement Plan (SEP) by the Developer which describes the planned stakeholder consultation activities and engagement process’ to take place after the ESIA approval.

3.3 Delineation of Study Boundaries and Scope of Assessment

3.3.1 Definition of Area of Influence (AOI)

The overall Area of Influence (AOI) for the ESIA represents the potential area of influence of the Project. This is ‘the area over which significant effects of the Project could reasonably occur, either on their own, or in combination with those of other developments and projects’.

In general terms, the AOI for the Project ESIA includes the footprint of Project disturbance as demarcated in the Figure 9 below. This includes the Wind Farm Project Site with a total area of 145 km².

However, for certain environmental and social parameters (such as landscape and visual, noise and shadow flicker, infrastructure and utilities, socio-economics, etc.), the AOI goes beyond the actual footprint of the Project site, and therefore an appropriate thematic study area is determined for each theme on a case-by-case basis. Such a thematic AOI is clearly identified within the relevant chapter it relates to throughout this ESIA.

In identifying this thematic AOI, the type and degree of the potential direct and indirect effects were taken into consideration. The core area where direct effects are likely to occur was determined, as well as the wider area of influence where indirect, combined and cumulative effects are likely to occur on the surrounding areas and communities.

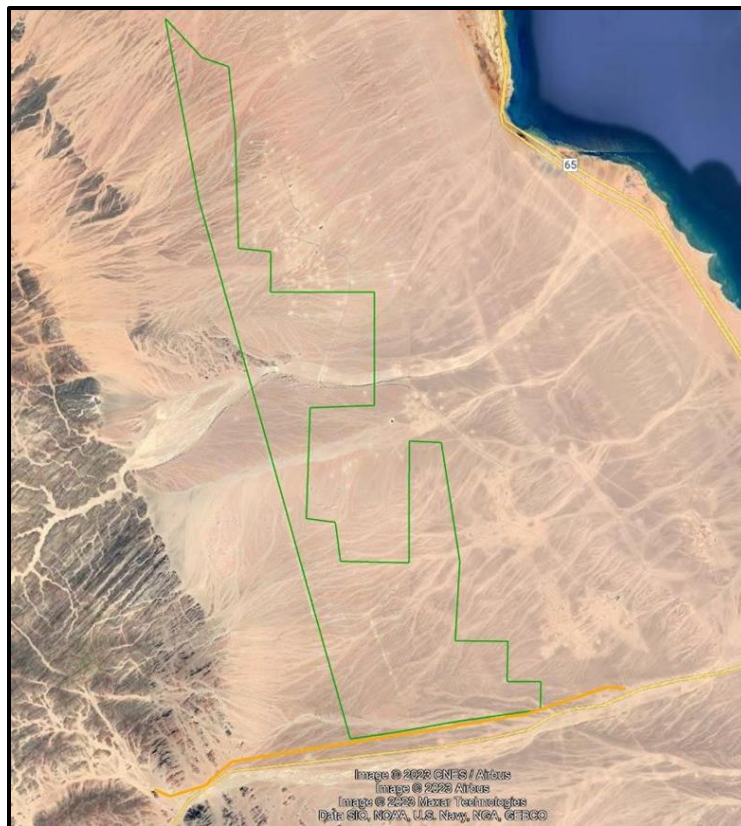


Figure 16: Study Area

3.3.2 Temporal Scope of the Assessment

The Project is to be developed in a three-phase sequence as follows. The potential impacts are assessed throughout the various Project phases.

- Planning and Construction Phase;
- Operation Phase; and
- Decommissioning Phase.

(i) Planning and Construction Phase

This includes onsite construction activities which is to be undertaken by the EPC Contractors under the guidance of the Developer. This mainly includes preparing the detailed design and layout of the turbines, transportation of Project components onsite, construction of the substation, as well as onsite site preparation and construction activities for installation of wind turbines.

(ii) Operation Phase

This includes activities to be undertaken by the Project Operator. Activities expected to take place mainly include the normal daily operation of the Project and the routine maintenance activities.

(iii) Decommissioning Phase

Generally, the anticipated impacts throughout the decommissioning phase are similar in nature to impacts assessed during the construction phase – and specifically in impacts related to soil and groundwater (from improper management of waste streams), air quality and noise, and occupational health and safety. Therefore, the assessment of impacts for those receptors and mitigation identified during the construction phase is assumed to apply to this phase in particular without the need to reiterate or emphasize this throughout subsequent chapters.

3.4 Environmental and Social Baseline Conditions

As part of the ESIA process, the baseline environmental and social conditions of the study area were established. Describing the baseline includes identifying and defining the importance and sensitivity of the various environmental and social resources and receptors likely to be impacted, i.e. within the AOI. Understanding the value or sensitivity of the resources and receptors to impacts and changes is an important consideration when determining the significance of effects, and allows for better identification of the most appropriate measures that could be employed to avoid impacts, and to mitigate any adverse impacts.

The description of environmental and social baseline conditions has considered a wide range of data and information gathered from various sources, including:

- Desk-based studies and literature reviews;
- Data from statutory and non-statutory stakeholders; and
- Field surveys and site investigations.

These studies have covered all the environmental and social aspects related to the Project. The baseline conditions are treated as those conditions which would prevail in the absence of the Project.

Studies of the environment and social baseline are described in “Chapter 7” to include the following: landscape and visual; land use; geology/hydrology/hydrogeology; biodiversity; birds (avifauna); bats; archaeology and cultural heritage; air quality and noise; infrastructure and utilities; and socio-economic conditions. Within each chapter, the methodology which was undertaken for assessment of the each of those baseline conditions is described in detail. The baseline assessments were undertaken throughout 2023 (with exception of the biodiversity and avifauna surveys which have been undertaken in 2022 and 2023). This also included accounting for seasonal factors for biodiversity, avifauna, and bats – refer to each Chapter for additional details on timing of surveys undertaken.

3.5 Impact Assessment Methodology

Given the scale and type of the Project, the ESIA commences with an assessment of the positive environmental and economic impacts on the strategic and national level given the current challenges the energy sector in Egypt faces – as highlighted in “Section 8.1”.

It then moves forward into the main body of the ESIA undertaking the assessment of impacts on environmental and social parameters for each receptor under the relevant chapter, from “Section 8.2” to “Section 8.12”. The following section provides a description of the approach, methodology and process adopted for the impact assessment presented within this ESIA.

3.5.1 Approach to Assessment of Impacts

The adverse and beneficial environmental and social impacts of the Project have been identified and assessed against the established baseline. A consistent approach to the assessment of impacts was followed to enable environmental and social impacts to be broadly compared across the ESIA. A set of generic criteria were used to determine significance (see below) which were applied across the various environmental social and environmental parameters.

As far as possible, environmental and social impacts were quantified. Where it was not possible to quantify impacts, a qualitative assessment was conducted using professional experience, judgment and available knowledge, and including the consideration of stakeholder views. Where there were limitations to the data, and/or uncertainties, these have been recorded in the relevant chapters, along with any assumptions that were taken during the assessment.

In order to determine the significance of each impact, two overall factors are considered:

- The importance and/or sensitivity of the environmental and social receiving parameter, as determined during the assessment of baseline conditions; and
- Magnitude and Nature of the impact.

3.5.2 Sensitivity of the Receiving Parameter:

Receiving parameter sensitivity was determined using information taken from the baseline description on the importance, significance or value of the social or environmental component under examination. It is important to understand the sensitivity of the receiving parameter, as this is a measure of the adaptability and resilience of an E&S parameter to an identified impact. The following categories of sensitivity were

applied to the assessment:

- High: The E&S parameter/receptor is fragile and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.
- Medium: The parameter/receptor has a degree of adaptability and resilience and is likely to cope with the changes caused by an impact, although there may be some residual modification as a result; and
- Low: The parameter/receptor is adaptable and is resilient to change.

3.5.3 Magnitude and Nature of the Impact:

The magnitude of the impact is the scale of change which the impact may cause compared to the baseline and how this change relates to accepted thresholds and standards. The following categories were applied to the assessment:

- High: a large change compared to variations in the baseline. Potentially a clear breach of accepted limits;
- Medium: change which may be noticeable and may breach accepted limits; and
- Low: when compared with the baseline, change which may only just be noticeable. Existing thresholds would not be exceeded.

Furthermore, in determining the magnitude of the impact it is important to take into account and consider several other factors which define the nature of the impact. This includes the following:

Type of Impact

- Positive: applies to impacts that have a beneficial E&S result, such as enhancement of conditions; and
- Negative: applies to impacts that have a harmful aspect associated with them such as loss or degradation of environmental resources.

Type of Effect

- Direct: applies to impacts which can be clearly and directly attributed to a particular E&S parameter (e.g. generation of dust directly impacts air quality); and
- Indirect: applies to impacts which may be associated with or are subsequent to a particular impact on a certain E&S parameter (e.g. high levels of dust could affect occupational health and safety).

Duration (how long the stressor or its effect last)

- Short Term: applies to impacts whose effects on the environment are to be negated (or non-existent) within a 1-year period, or once construction activities are completed;
- Medium Term: applies to impacts whose effects on the environment are to be negated (or non-existent) within a 5-year period; and
- Long Term: applies to impacts whose effects on the environment that are to be negated (or non-existent) in a period greater than 5 years.

Reversibility

- Reversible: applies to impacts whose significance are to be reduced and are alleviated over time (either naturally or artificially), once the impacting activity ceases; and
- Irreversible: applies to impacts whose significance are anticipated to not be reduced nor alleviated over time (either naturally or artificially), once the impacting activity ceases.

3.5.4 Assessment of the Significance Impacts

The concept of 'significance' is central to the ESIA process and aids the identification and categorization of E&S effects. As noted, in order to determine impact significance, the sensitivity of each E&S parameter/receptor is considered in combination with the magnitude of the impact. The table below demonstrates how these parameters are considered in the assessment of significance.

Sensitivity of Receiving Parameter / Receptor \ Magnitude of Impact	Magnitude of Impact		
	Low	Medium	High
Low	Not significant	Minor	Minor
Medium	Minor	Minor	Moderate
High	Minor	Moderate	Major

While the above matrix provides a framework for the determination of significance, and enables comparison across E&S parameters, a degree of professional judgement must be used and some parameter-specific factors to be considered in making the determination of significance. Below provides additional guidance to the degrees of significance used in this ESIA. Note that positive impacts are defined, but are not rated for significance.

- Major significance: requires thorough investigation in the ESIA. These impacts have been studied extensively by consulting expertise in the areas of the identified impacts to design needed mitigation and environmental management measures. Moreover, conducting specific studies and assessments to some of the key issues identified;
- Moderate significance: requires reasonable investigation in the ESIA. These impacts have been studied by expertise in the areas of the identified impacts to design needed mitigation and environmental management measures.
- Minor significance: must be listed, and addressed in some way, but which did not require detailed assessment in the ESIA.
- Not significant: for completeness, impacts which have been included in the assessment but determined not to be significant, are rated formally as 'not significant'.

3.5.5 Management Measures

Based on the impact assessment undertaken a set of management measures are identified for each impact which aims to address it. Management measures include the following:

- Additional Requirements: those are generally regulatory requirements which have been identified and

which must be taken into account at a later stage.

- **Additional Studies:** for certain E&S receptors additional studies must be undertaken at a later stage. Such studies and their scope, timing, etc. have been highlighted where relevant.
- **Mitigation Measures:** a vital step in the ESIA process is the identification of measures that can be taken to ensure that impacts are mitigated or reduced to acceptable levels. The ESIA weighs the significance of any impacts caused by the Project and then assigned mitigation options through applying the following hierarchy:
 - Avoiding or ‘designing out’ impacts wherever possible;
 - Considering alternatives or modifications to the design to reduce the impacts wherever possible;
 - Applying measures to minimize and manage impacts on the receptor; then
 - As a last resort, identifying fair compensation, remediation and offsetting measures to address any potentially significant residual effects.

Some negative impacts can be easily mitigated, whilst others cannot or are too difficult and costly to mitigate. The various potential impacts are described in this ESIA, along with the provision of ‘feasible mitigation measures’ that can be implemented.

Recommendations: for positive impacts it is not possible to identify mitigation measures, but rather recommendations have been identified which aim to enhance the positive impact.

3.5.6 Assessment of Residual Significance

If there are mitigation measures it is then necessary to make an assessment of the ‘residual significance’ after mitigation has been taken account. A re-assessment of Project impacts is then made, taking into account the effect of the proposed mitigation measures in order to determine the significance of the residual effects. Residual effects are discussed for each E&S theme in the ESIA chapters, and their significance determined and summarized in an Impact Assessment Table in “Section 8.13”.

3.6 Assessment of Cumulative Impacts

For each of the impacts assessed, the ESIA investigates the cumulative impacts which could result from incremental impacts from other known existing and/or planned developments in the area, and based on currently available information on such existing/planned developments. The assessment of cumulative impacts is presented in “Section 8.14”.

In addition, a Cumulative Effects Analysis (CEA) was undertaken and which is presented as a standalone document.

3.7 Development of Environmental and Social Management Plan (ESMP)

Based on the results of the impact assessment, development of management measures, and development of monitoring plan, an ESMP was compiled into a single table that details all of the above. The ESMP will be a key document and will list the environmental/social requirements and detail the procedures necessary for managing the significant environmental/social issues connected to proposed Project

activities. The ESMP is to be developed specifically to provide flexibility in the nature and exact location of operations, while ensuring all potential impacts are identified and properly mitigated and monitored throughout the later stages of the Project. This ESMP can be used as a stand-alone document during the different phases of the Project by Developer, EPC Contractors, EEAA, and other responsible parties.

4. STAKEHOLDER CONSULTATION AND ENGAGEMENT

This Chapter discusses in details the stakeholder consultation and engagement plans which were undertaken as part of the ESIA process for the Project and provides an overview of the findings. In addition, this Chapter also discusses the future stakeholder consultation and engagement plans which are to take place at a later stage of the ESIA process as well the Project development.

4.1 Introduction

Stakeholder engagement is an integral part of ESIA good practice and is a statutory requirement of the national EIA legal framework in Egypt and within under good international practice, to include IFC, EBRD and AfDB E&S safeguards requirements. The Developer is committed to a technically and culturally-appropriate approach to consultation and engagement with all stakeholders affected either directly or indirectly by the Project. The consultation program for the Project is based on informed consultation and participation in line with good international practice requirements with affected people, and is designed to be both fair and inclusive. Consultation activities have been an ongoing process since the commencement of the ESIA study in April 2023.

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. These groups also include persons belonging to vulnerable groups (refer to Subsection 4.4.), which may be defined and comprised of persons who are expected to be disproportionately affected by project impacts due to their race, color, sex, language, religion, political opinion, national or social origin, gender, ethnicity, culture, physical or mental disability or otherwise.

Stakeholders, in general, may include: (i) locally affected communities or individuals and their formal and informal representatives, (ii) national or local government authorities, politicians, religious leaders, civil society organisations and groups with special interests, (iii) the academic community, or other businesses.

Stakeholder consultation is an inclusive process for sharing information that enables stakeholders to understand the risks, impacts, and opportunities of a development or project, allowing them to express their views and articulate their perceptions towards it. Project stakeholders and vulnerable groups were consulted as part of both the targeted consultations and the public scoping session.

4.2 Objectives

The objective of stakeholder consultation is to ensure that a participatory approach takes place, which in turn documents concerns of all stakeholder groups and makes sure that such concerns are considered, responded to, and incorporated into the decision-making process of the development. Stakeholder consultation needs to be a two-way communication process that imparts information to stakeholders, but also obtains additional and on-the-ground information from them. Stakeholder consultation and engagement must take place at the inception phase of the ESIA process and implemented all through the study period.

The specific objectives of this chapter are to:

- Summarize national and international legal & policy requirements for stakeholder engagement;
- Describe and identify the stakeholders affected and/or with an interest in the Project;

- Summarize stakeholder engagement and consultation conducted to date. In addition, describe how the views and issues raised have informed and influenced the development of the Project; and
- Outline the future plans and approach to stakeholder engagement.

4.3 Requirements for Stakeholder Engagement

Egyptian Legislation Requirements

Stakeholder consultation and engagement under the Egyptian requirements, is primarily linked to the Environmental and Social Impact Assessment (ESIA) study as stipulated in the “Law of Environment No. 4 of 1994 and its amendments in Law No. 9 of 2009”. According to the last updated executive regulation and the ministerial decree No. 26 of 2016, the ESIA system classifies the projects into four categories based on different levels of ESIA requirements according to severity of possible impacts and location of the establishment and its proximity to residential settlements.

In specific, wind farm development projects in general are categorized as “Category C” (projects which require a comprehensive ESIA study) and which require consultations under two (2) phases as part of the ESIA study: (i) environmental and social scoping phase which requires targeted consultations; and (ii) disclosure phase which requires a public disclosure session for ESIA outcomes.

The scoping should include targeted stakeholder consultations with key stakeholders as relevant to the Project, while the public disclosure consultation must include the following entities:

- Representatives of the Egyptian Environmental Affairs Agency (EEAA)
- Related governmental authorities
- Representatives of the Governorate and local units where the project is located
- Affected groups including local businesses and communities
- Non-governmental Organization (NGOs) and civil society groups

The EEAA guidelines methodology identifies the following articles covering the guidelines on conducting the public consultation as part of the ESIA study are as follows:

- Paragraph 6.4.3.1 Scope of Public Consultation
- Paragraph 6.4.3.2 Methodology of Public Consultation
- Paragraph 6.4.3.3 Documentation of the Consultation Results
- Paragraph 7 Requirement and Scope of the Public Disclosure

Financing Requirements

Stakeholder engagement activities undertaken as part of the ESIA meets international best practice requirements to include the relevant environmental and social requirements of IFIs as follows:

- African Development Bank (AfDB) Integrated Safeguards System (ISS) (2023) Environmental and Social Operational Safeguards (ESOS) to include:

- ESOS 1: Assessment and Management of Environmental and Social Risk Impact; ESOS 2: Labour and Working Conditions; ESOS 4: Community Health, Safety and Security; ESOS 10: Stakeholder Engagement and Information Disclosure
- European Bank for Reconstruction and Development (EBRD) Performance Requirements (PR) to include:
 - PR 1: Assessment and Management of Environmental and Social Risks and Impacts; PR 2: Labour and Working Conditions; PR 4: Health, Safety and Security; and PR 10: Information Disclosure and Stakeholder Engagement PR 10: Information Disclosure and Stakeholder Engagement”
- International Finance Corporation (IFC):
 - Performance Standards (PS) (2012) to include PS 1: Assessment and Management of Environmental and Social Risks and Impacts; PS 2: Labour and Working Conditions; and PS 4: Community Health, Safety and Security
 - EHS Guidelines to include: General EHS Guidelines (2007); EHS Guidelines for Wind Energy (2015); and EHS Guidelines for Electric Power Transmission and Distribution (2007)
- The EBRD “PR 10: Information Disclosure and Stakeholder Engagement” addresses stakeholder engagement and sets out the following requirements:
 - Ensure that stakeholders are appropriately engaged on E&S issues that could potentially affect them through a process of information disclosure and meaningful consultation.
 - Maintain a constructive relationship with stakeholders on an ongoing basis through meaningful engagement during project implementation
 - Stakeholder Engagement is an on-going process that may involve: stakeholder identification and analysis, information disclosure, meaningful consultation and external and ongoing reporting to Affected Communities.
 - A Stakeholder Engagement Plan (SEP) must be developed and implemented that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities.
 - Affected Communities will be provided with access to relevant information on: (i) the purpose, nature, and scale of the project; (ii) the duration of proposed project activities; (iii) any risks to and potential impacts on such communities and relevant mitigation measures; (iv) the envisaged stakeholder engagement process; and (v) the grievance mechanism.
 - When Affected Communities are subject to identified risks and adverse impacts from a project, a process of consultation will be undertaken in a manner that provides the Affected Communities with opportunities to express their views on project risks, impacts and mitigation measures, and allows the client to consider and respond to them.
 - The extent and degree of engagement should be commensurate with the project’s risks and adverse impacts and concerns raised by Affected Communities.
 - The consultation process will be tailored to language preferences of Affected Communities, their decision-making process, and the needs of disadvantaged or vulnerable groups.

- For projects with potentially significant adverse impacts, the client will conduct an informed consultation and participation.
- A grievance mechanism will be established to receive and facilitate resolution of Affected Communities' concerns and grievances about the client's environmental and social performance.

In addition, the IFC Performance Standard (PS) 1 "Assessment and Management of Environmental and Social Risks and Impacts" identifies similar requirements to those of EBRD identified above.

4.4 Stakeholder Identification and Analysis

The purpose of stakeholder identification is to identify and priorities Project stakeholders for consultation. Stakeholder identification is an ongoing process, and thus key stakeholders are to be identified during different stages of the Project. A systematic approach is used to map the stakeholders based on the Project zone of impacts. In this approach, by mapping the zone of social impacts, stakeholders are identified by the impact area.

As a result of the stakeholder mapping, Project stakeholders are categorised into the following main categories:

1. People and groups who are directly or indirectly affected by the project (such as local communities);
2. People and groups who may participate in the implementation of the project (such as investors and lenders);
3. People and groups who are not affected by the project development per se may but have a possibility to influence and make decisions on implementation of the Project (such as Ministries or regulatory agencies).

The main groups of stakeholders identified so far are listed in the Table 6 below. The list can be updated and modified in the course of the Project development and as a result of cooperation of the parties.

Vulnerable Groups

The stakeholder list also includes vulnerable groups and is defined as groups that are expected to be disproportionately affected by project impacts due to their race, color, sex, language, religion, political opinion, national or social origin, gender, ethnicity, culture, physical or mental disability, and other. Vulnerable groups are context-specific and depend on a range of issues which must be understood such as project location, socio-economic, historical, and demographic context, as well as the nature of the development and type of impacts anticipated.

The vulnerable groups within this context were identified to include:

- Women groups: of the local community. Cultural norms in Egypt and within the local communities, in specific, could limit their participation in decision-making in general as well as their employment opportunities as opposed to their male counterparts. Even though such cultural norms are considered applicable within local communities, however Bedouin women in particular are considered much more vulnerable than mainstream women in Upper Egypt.
- Disabled Groups: are considered vulnerable groups mainly due to physical disability which could limit their access to information on the Project and could limit their participation in decision-making in general as well as their employment opportunities as opposed to able-bodied groups.

- Elderly Groups: are considered vulnerable groups mainly due to age limitations which could limit their access to information on the Project and could limit their participation in decision-making in general.

Given the nature and location of the Project there are no additional groups considered as vulnerable that would require special consideration throughout the consultation process.

Table 6: Stakeholder Identification

Level of Stakeholder interest in/involvement to the Project
Stakeholders who may be directly or indirectly affected by the Project
Residents of the nearby villages of the Project to include <u>Ras Gharib Town</u> which are administratively under Red Sea Governorate and Ras Ghareb City (or District). For the above, this includes the following groups within the local communities in specific: ▪ <u>Community Members</u>: local community members have a vested interest in the project due to mainly potential for job opportunities. In addition, local community members could be impacted by other potential negative impacts (e.g. worker influx, noise & shadow flicker, etc.). Such impacts are discussed and identified within the ESIA. ▪ <u>Community Leaders</u>: They are socially active members and known figureheads for local community members, who may or may not hold government positions. Community leaders involved in the project are the heads of affected communities ▪ <u>Business Community (local subcontractors)</u>: such groups have a vested interest in the project due to mainly potential for procurement opportunities such as subcontracting works (e.g. civil works, provision of food and amenities, etc.) <u>Women groups</u> within local communities, such groups have a vested interest in the project due to mainly potential for job opportunities. In addition, such groups could be impacted by other potential negative impacts (e.g. worker influx, Gender Based Violence and Harassment (GBVH), sexual exploitation and abuse (SEA) etc.) Such impacts are discussed and identified within the ESIA <u>Bedouin Groups</u>: Generally, the key Bedouin group known in the area are the Tabbna and Hamadin and Khoshman. Tabbna and Hamadin; however, many have settled permanently in key cities such as Ras Ghareb, Zaafarana. All these Bedouin groups apply a type of customary ownership within the Project area lands which is known as 'Urfi Contracts' and 'Ghafra System'.
Stakeholders who may Participate in Implementation of the Project
<u>Investor/Lender</u>: entities that provide financing for the Project development. In particular, they have interest in ensuring that the Project is developed and implemented in accordance with their E&S requirements and standards, and monitor the compliance of the Project against such requirements. <u>Workers</u>: This includes all Project workforce to include but not limited to workers from Developer team, workers from EPC Contractor, Project Operator and any involved subcontractor(s).
Stakeholders who may have a possibility to influence and make decisions on implementation of the project and/or may have an interest in the Project
Central Government
<u>The Egyptian Environmental Affairs Agency (EEAA)</u>: state body regulating environmental management. For this Project, this include a review and approval of ESIA, issuance of environmental permit, monitoring implementation of Environmental and Social Management Plan (ESMP) and compliance with other conditions, as applicable. <u>Egyptian Electricity Transmission Company (EETC)</u>: off-taker and entity that signed the Power Purchase Agreement (PPA) with Developer. They are responsible for designing, building, and operating the associated interconnection facilities (i.e. Overhead Transmission Line).

New & Renewable Energy Authority (NREA): national focal point for expanding efforts to develop renewable energy technologies to Egypt in coordination with other concerned national institutions. In addition, NREA also the entity responsible for allocation of the land for the development of the Project.
Ministry of Labour: official governmental entity responsible for setting labour policies and legislations as well as ensuring protection of labour rights and working conditions. Has a vested interest in ensuring that labour rights and proper working condition are maintained for the Project in accordance with Egyptian laws and regulations.
Ministry of Civil Aviation: Official governmental entity responsible for civil aviation management in Egypt and responsible for issuing permits for projects with specific height requirements.
Armed Forces Operations Authority: Official governmental entity responsible for military aviation management in Egypt and responsible for issuing permits for projects with specific height requirements.
Ministry of Tourism and Archaeology The ministry is the entity responsible for the preservation and protection of the heritage and ancient history of Egypt, under which operates all inspector offices in the governorates.
Ministry of Interior: The Ministry is responsible for national and local security, as well as approving emergency response and firefighting plans for establishments/projects.
General Petroleum Company: a national State-owned company engaged in exploration, production, and development of hydrocarbons, is responsible for the management of oil and gas exploration and production activities on behalf of the State. It is one of the subsidiary companies affiliated to the Ministry of Petroleum. It has the right of concession for petroleum exploration in some parts of the Project area and adjacent areas and represents the main investment activity in the Project area.
National Telecom Regulatory Authority: Responsible for overall regulation and administration of the telecommunication sector in Egypt including interface with telecommunication companies and their infrastructure elements such as broadcasting towers. Given that project could impact such infrastructure elements, approvals are required.
Telecommunication Operators: Could own and operate telecommunication infrastructure within the area. This includes mainly Orange, Etisalat and Vodafone. Given that project could impact such infrastructure elements, approvals are required.
Radio and Television Union: Responsible for overall regulation and administration of the radio and television sector in Egypt including infrastructure elements. Given that project could impact such infrastructure elements, approvals are required.
Local Governmental Agencies
Red Sea Governorate: Governorate's main role is supporting the Project in all aspects as required to include providing required permissions. They key departments of the Governorate that are related to the Project include the following: - Environmental Administration that is responsible for monitoring compliance to environmental requirements along with EEAA; - Labor Office that is responsible for overall management of the labor force in Red Sea Governorate, monitoring recruitment by development projects within the Governorate, monitor labor grievances and other; - Roads Directorate: responsible for services and development of external roads in the governorate and issuing permits for any construction work on the external roads Public Health Directorate: provide the health services and facilities to the local districts and ensure overall local community health and safety

Ras Gharib Local City Council: main role is supporting the Project in all aspects as required to include providing required permissions. In addition, the Council is also responsible for supervision and follow-up for monitoring compliance to environmental requirements along with EEAA and Red Sea Governorate, and also has overall responsibility for solid waste management and disposal within their area of influence.

Directorate of Social Solidarity Ras Gharib: official governmental entity that acts as the overall management, organization and registration of local community associations, foundations, and NGOs. They could have a vested interest in obtaining updates on employment and procurement opportunities provided by the Developer as well as any social responsibility programs.

Red Sea Water and Wastewater Company: official entity that is responsible for water and wastewater management within the Governorate. It is the entity that is to be responsible for providing the Project's requirements of water as well as disposal of wastewater.

Red Sea Governorate Antiquities Inspector Offices: Official governmental entity representing the Ministry of Antiquities within the Red Sea Governorate. They are responsible for protection and management of archaeology and cultural heritage resources in the area as well as implementation of chance find procedures by development projects.

Non-Governmental Organizations (NGOs) and Other Organizations

NGOs are Organizations with direct interest in the Project, and which may have useful data or insight into local issues of relevance to the Project. These organizations can also influence the views of others regarding the Project, both nationally and international and in general NGOs are responsible for sharing information with the community. The key NGOs active within the area are summarized below.

NGOs/ CBOs	Scope
Orban El-Saharaa	Social Development
Association for the Conservation of the Environment in Red Sea (HEPCA)	Environmental protection
Red Sea Ecotourism	Social and cultural services
Environmental protection in the Red Sea	Environmental protection
Ababdeh Sons Association in Ras Ghareb	Community Development
Resala Association	Social and family services
Firdous Association	Social and family services
Egyptian Red Crescent	Community Development
National Council for Women Red Sea	Social Development

Nature Conservation Egypt (NCE): this is considered one of the most important and key NGOs in Egypt that is involved in biodiversity protection and conservation. NCE is also the Egyptian partner of the Bird Life International. They have a vested interest in the impacts of the Project on biodiversity in general and avifauna in particular and they key mitigation and monitoring programs that will be implemented.

Education providers (in particular technical / vocational training institutes): Provides knowledge and skills required for various occupations, including renewables and solar power in specific that is delivered through formal, non-formal and informal learning processes. The education curriculum in undergraduate, postgraduate, or Technical and Vocational Education and Training (TVET) could be reviewed and revised to match the market and workforce requirements.

Media (Newspaper, Television, Internet): They could disclose potential information and updates about the Project.

Regional Center for Renewable Energy and Energy Efficiency (RCREEE): responsible for managing certain aspects of the overall development process on behalf of the Developer. This includes in specific the overall management of the ESIA process with the Consultant.

4.5 Stakeholder Consultation and Engagement Activities To Date

4.5.1 Targeted Consultations

As part of the scoping process of the Project, targeted consultations were undertaken with key stakeholders that are relevant to the Project to include but not limited to: (i) central governmental entities; (ii) local governmental entities; (iii) key Non-Governmental Organizations (NGOs); (iv) local community representatives; (v) and other.

The objective of such consultations was to:

- Introduce project (rationale, objective, location, key components, etc.)
- Explain and discuss overall methodology for ESIA study
- Explain and discuss key anticipated impacts as relevant
- Identify and determine additional requirements or key issues of concern to be taken into account for the ESIA study

Throughout the consultations, a handout (in Arabic language) was prepared and distributed to such stakeholder groups with key information to include but not limited to rationale for Project, Project location and setting, key components and activities of the Project and other as applicable.

The table below is a condensed breakdown of the stakeholder categories that were engaged.

Table 16: Summary of the consultation activities that were conducted in project area

Stakeholder	Number	
	Males	Females
Ministry of Tourism and Archeology Red Sea Archeology and Heritage Institute	2	
Nature Conservation Egypt (NCE)	1	-
Egyptian Environmental Affairs Agency EEAA	1	-
Egyptian Electricity Transmission Company EETC	-	4
EEAA Red Sea Branch	1	-
State property Department in the Red Sea Governorate	1	-
Ras Gharib City Council	1	-
local unit of Wadi Dara village	5	-
Red Sea Water and Wastewater Company	1	-
Department of Planning and Projects in the Red Sea Governorate	-	1
General Petroleum Company	1	-
General Administration of Ground Water in Red Sea	-	1
Etisalat Misr	2	-
Orange company		
Radio and Television Unit in Ras Ghareb and the Red Sea Governorate	4	-
Bedouin families in Ras Gharib	12	-
Total	32	6

The table below presents summary for the outcomes of the stakeholder consultations undertaken.

Table 17 Outcomes of Stakeholder Consultations

No.	Entity	Outcomes
1	Ministry of Tourism & Red Sea Archeology and Heritage Institute	Attendant(s): - Head of the Egyptian Antiquities Sector - Director of the Red Sea Antiquities Key points: - The nearest known archaeological and heritage sites are located in El Qusayr 232 km from the project site in Jabal El Zayt and 284 km from the Project site in the Gulf of Suez - An appropriate procedure should be in place prior to construction works in order to respond to the potential archaeological and cultural finds at the sites. As part of the procedure, the expectation is that construction works are halted temporarily until the Supreme Council of Antiquities is notified and legal procedures for the documentation and study of the artifact are commenced. Following the Council's further instruction, construction works would resume. - Recommended actions include the following: i. Desk-based studies by experts (including literature and historic map reviews) ii. An archeologically survey prior to the commencement of construction.
2	Nature Conservation Egypt (NCE)	Attendant(s): - Director of the NCE Key points: - The project site is located within a critical migration pathway and home to the Egyptian Lizard. - Delivering and incorporating insights on the cumulative impact on biodiversity, and birds in particular, of developed and future wind farms into ESIA's is critically needed. - The attendant is currently conducting a biodiversity survey for a nearby area, which was also allocated for wind farm development. The information and data contained wherein may be provided when it (the survey results) is available for use in the development of the ESIA.
3	Egyptian Environmental Affairs Agency (EEAA)	Attendant(s): - Director of the Energy Projects Impact Assessment Department Key points: - The locations of the project sites are important to biodiversity, particularly for migrating birds.

		- The discussion (echoing above statements) emphasized that there needs to be greater understanding of the cumulative impacts of the wind energy projects operating and being developed as well as the infrastructure connecting them to the OHTLs in the Gulf of Suez. - Adherence to guidelines for community and stakeholders consultation in the development of ESIA as established by the EEAA.
4	Egyptian Electricity Transmission Company (EETC)	Attendant(s): - General Manager of the Environmental and Social Assessments Units - Environmental and Social Specialists for Electricity Generation Projects Key Points: - Adherence to environmental standards during construction and operation - The sooner the initial paths for the OHTL infrastructure are drawn for each station, the easier it may be to determine and account for their potential impact on migrating birds. EETC has been in the process of meeting with EEAA officials to determine the cumulative impacts of constructing OHTLs on bird and migrating bird populations as well as identifying mitigation measures to reduce such impacts on biodiversity overall.
5	EEAA Red Sea Branch	Attendant(s): - Head of the EEAA Red Sea Branch Key points: - Observing environmental standards during all phases of the project and mitigating impacts that may be detrimental to biodiversity and migrating birds.
6	State Property Department in the Red Sea Governorate	Attendant(s): - Director of the State Property Department in the Red Sea Governorate Key points: - The land allocated for the development of wind farms is state property. There is no ongoing dispute over land nor property rights in the project area. - Prior economic activities at the site are limited to those of the General Petroleum company and subsidiaries.

		Promoting the participation of local communities would likely be aided by the advertisement and provisioning of job opportunities to locally based individuals during the course of the project. Coordinating with the respective City Council(s) was also advised.
7	Ras Gharib City Council	Attendant(s): - Head of the Ras Gharib City Council Key points: - The City Council is supportive of the wind energy projects and investors coming to the area. Wind energy projects are considered the only investment initiative that's come along other than oil projects. - Echoing the statement from above, local communities and key local stakeholders would be motivated to participate and be supportive of the initiative if employment opportunities were offered to the local community. Announcements for employment can be done through the Ras Gharib City Council and through the Council's social media. - The CSR that has been discussed and / or implemented in past years has been limited in scope (typically being designed to support the projects of developers) and have rarely addressed the core interests of the local community including employment opportunities for youth and aiding groups of the local community to be able to develop and promote sustainability.
8	Red Sea Water and Wastewater Company (RSWWC)	Attendant(s): - Head of the Red Sea Water and Wastewater Company Key Points: - There are considerable issues regarding the quality (namely high salinity) of groundwater in the governorate, which depends on groundwater for irrigation. The water is non-potable due to its high salinity. - The Project Area is considered uninhabited desert areas and do not contain water nor sanitation infrastructure. - The Petroleum and energy production projects that are already established in the area depend on water purchased from water trucks from Ras Gharib city by contractors. - The Ras Gharib Water and wastewater Company provides services to the urban residences and the area's oil companies. - RSWWC's branch located in Ras Gharib could facilitate the site's water needs during the construction and operation phases.
9	Department of Planning and Projects Department of the Red Sea Governorate	Attendant(s): Staff of Planning and Projects Department of the Red Sea Governorate Key Points:

		- Gas exploration by General Petroleum Company has been the only other development in the area prior to the Presidential Decree for energy projects in 2016. - The project site is not included in any other of the department's future plans for the development of the Red Sea Governorate. - Because flash flooding has become a concern in recent years, the General Administration of Groundwater in the Red Sea constructed dams within the last five years to control flash flooding. - Request for the locations of oil and gas infrastructure should be made directly and officially to the General Petroleum Company.
10	General Petroleum Company	Attendant(s): - General Field Manager Key Points: - Within the project area, there are no exploration sites belonging to the General Company, but there are some sites and facilities belonging to the company close to the site borders in the Gulf of Suez (refer to image below). - Coordination with General Petroleum should be sought prior to construction activities. This is likely to require coordination with the General Petroleum Corporation before construction begins.



Figure 17 General Petroleum Company's Active Project Plots Respective of SWE's

11	General Administration of Ground Water in Red Sea	Attendant(s): - Staff civil engineer of the General Administration of Groundwater of the Red Sea Key Points: - In the past three years, the General Administration of Ground Water has implemented projects in Ras Gharib with the aim of reducing the risk of floods to the city and the surrounding villages. - The projects were implemented according to plans and studies prepared by experts from the Water Resources Research Institute of the Ministry of Irrigation. - These studies included field and hydrological surveys of the affected area, identified hazards in the area, and outlined structural mitigation measures to be implemented. - The General Administration of Ground Water has constructed lakes, dams, and an industrial canal with a length of 12 km, in addition to rainwater drainage at the bottom of Sheikh Fadl Road, which were established by the General Administration of Roads and Bridges. - The GOS area in general includes a number of important valleys that must be studied for flood risks before starting the Project, including: - El Huwayshiah Valley, high risk - Abu Hadd Valley, high risk - El Duhel Valley, medium to high risk - Dara Valley, medium to high risk - The following projects have been implemented in different areas of these valleys to reduce risks: - 4 lakes were built 3 dams 2 culverts were built to drain rainwater - An industrial canal with a length of 12 km has been established parallel to the Ras Gharib- Hurghada Road
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	Telecommunications Companies Etisalat Misr and Orange company	Attendant(s): - Government Relations Officer at Etisalat Misr - Network Engineer for Orange Company Key Points: - Officials from the telecom companies confirmed that the Project area has two telecom towers, one for Etisalat Misr and the other for Orange Company. They are located along the Ras Ghareb Al Shaikh Road to the south of the project site. - The officials requested that Project-related details be made available at least six (6) months prior to the start of construction works in order to avoid potential impacts on the communications network, including: - information related to maximum turbine tip and blade height; - wind turbine fan diameter, - distance from turbine and existing communication tower, - and plans for future development of wind farms. - All of the communication towers are constructed near the main roads
	Radio and Television Unit of Ras Ghareb and the Red Sea Governorate	Attendant(s): - Radio engineering officers - Network maintenance technicians Key Points: - Paths of the radio and television towers paths are close to the project site, extending from Zafarana to Ras Ghareb to Hurghada, in addition to other towers in the direction of Sheikh Fadl Road. - The distance between each tower is about 60 km, depending on the terrain of the area - The existing radio and television towers receive and transmit microwave signals, and for radio waves - FM, TV and VHF waves - To determine the impact of constructing a wind farm near the radio and television towers, the broadcast engineering sector should be contacted at the headquarters of the Radio and Television Union in Cairo. - The consultant sent a fax to Eng. Ashraf Hamed, Head of the Broadcast Engineering Sector at the National Media Authority, including an introduction to the project, the coordinates of the proposed project sites, and awaiting a response in this regard. The response letter affirms (with reference to Presidential Decree No. 116 of 2016, outlining the land allocated to NREA in the Gulf of Suez for the production of electricity from renewable energy sources and the establishment of wind stations) that the Project Site is not in conflict with the services of the radio and television transmission stations in Ras Gharib. The letter is contained in Annex 9.2.



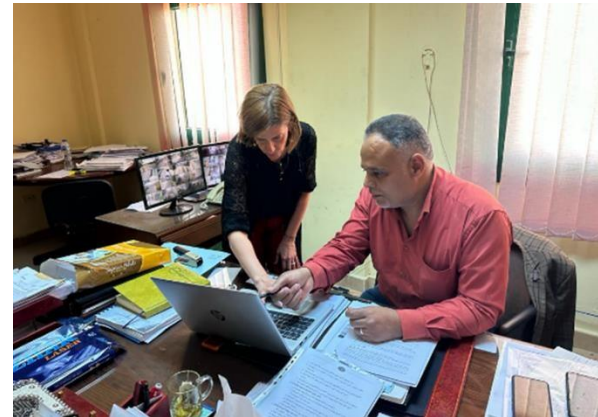
Consultation at Red Sea Antiquities with Head of the Egyptian Antiquities sector



Consultation with the Director of Energy Projects Evaluation Unit of the EEAA



Consultation with officials of the Environmental Department of the EETC



Consultation with the Head of the EEAA Red Sea Branch



Consultation with the Head of Ras Gharib City Council



Consultation with staff of the Planning and Projects Department of the
Department of
Planning and Projects of the Red Sea Government



Consultation with the General Manager of Petroleum Fields of General Petroleum Corporation



Consultation with Beodoun Groups within the Project Area

4.5.2 Public Scoping Session

A public consultation session was held in Ras Gharib City, Red Sea Governorate (Four Seasons venue) on May 24, 2023.

The objective of the session included the following:

- Introduce the Project to stakeholders;
- Identify the key anticipated impacts;
- Present the methodology for the ESIA study;
- Allow interested stakeholders to comment on the scope of work undertaken, key issues identified and any other issues of concern they might have.

The public consultation was an open session for anyone to attend that was announced through an advertisement that was published in El Akbar Newspaper two (2) weeks prior to the session.

However, specific invitations were provided to certain stakeholder groups identified by RCREEE and the ESIA consultant to include: EEAA Headquarters and its regional branch, NREA, EETC, Red Sea Governorate (including its environmental office), Ras Gharib City Council, key NGOs / CBOs in the area (including women NGOs/CBOs), local community representatives, and Bedouin groups. Invitees were subsequently informed of the date, location and were provided an executive summary of the Project provided as hard and soft copies and through fax.

A total of 93 participants attended the session.

Table 18 Distribution of Participants

Attendance	No.
Egyptian Environmental Affairs Agency EEAA	2
EEAA – Red Sea	2
Egyptian Electricity Transmission Company EETC	2
Regional Center for Renewable Energy and Energy Efficiency RCREEE	3
New and Renewable Energy Authority NREA	2
Red Sea Electricity Company	1
Suez Winds Energy Company/ Developer	3
Environment Department in Red Sea Governorate	2
Ras Gharib City Council	3
Local community members (Ras Gharib)	32
Bedouin Communities	7
Clergy	2
Youth	4
NGOs	8
Academic institutions	2
Wind energy projects	6

General Petroleum Company and other oil and Gas companies	5
Directorate of Social Solidarity Red Sea	1
National Council for Women Red Sea	2
Total	89

The session was moderated by the following key entities: (i) Representatives from the Suez Wind Company (as the Developer); (ii) Director of the Environment Department in the Red Sea Governorate as a representative of the Red Sea Governor; (iii) RCREEE, EEAA, NREA and EETC representatives and (iv) ESIA consultant.

The public consultation began with a welcome speech by the representatives of all the aforementioned parties and underscored the opportunity for community discussion on the projects impacts, especially energy projects that help to increase investment projects and development.

The ESIA consultant presented the details of the ESIA process which was followed by an open discussion, in which attendees were given the chance to comment/ raise concerns. Among the comments raised by the attendees were related to the economic impact of the intended project, the potential impact of the occurrence of flash floods in the area on the wind farm, potential health impacts on the community and the result of decommissioning of the project.

- Regarding the first point, the planning, construction and operation of wind farms in the GoS, as part of GoE's ongoing initiative, has generated an interest on the part of the participants from the local communities in the potential benefits that the project may make available. The range of inquiries, in this regard, included the scale of employment opportunities for local persons and training, as well as the potential for subsidies on the cost of electricity. In response to employment, there are efforts to provide training, in collaboration with the Red Sea Governorate in conjunction with the formation of a Wind Energy Investors Association, to local residents to maximize local recruitment. Additionally, due to the significance of the GoS as a geographic area amid the international bird flyway and the potential risk to migrating birds the operation of the wind farm may pose, there is to be an initiative centered on recruiting and training Beduins in bird identification and classification to enhance monitoring of the Project's impact in this regard. As far as subsidies on electricity is governed and within the jurisdiction of the government. While the Project supports the GoE's objectives in increasing the share of electricity generated by renewable sources, there is currently no defined activation of the Project to provision subsidies on electricity costs in this way.
- On the topic of flooding, there is a dam and artificial lake located within the Project site that fills during rainfall. To avoid risks that may be associated with flooding, such as damage to project infrastructure, inspections have been conducted to inform the placement of turbines and roads.
- An inquiry was expressed about the safety and exposure to electromagnetic waves from the Project. The attending project team affirmed that wind energy generators emit minimal electromagnetic waves and that there is currently little evidence to suggest they impose a negative impact.
- In general, the timeline for decommissioning is defined by the perceived viability of the project as well as by the scope of tenders offered by the Renewable Energy Authority.

4.6 Future Stakeholder Engagement and Consultation

Future stakeholder engagement and consultations are to include the following, each of which is discussed in further details.

4.6.1 Disclosure of the ESIA document

The below documents are to be disclosed on the Developer's to allow any stakeholder to review the studies and comment on the scope of work undertaken, key issues identified and any other issues of concern they might have. At the end of the disclosure period, all received comments will be addressed and taken into account and an updated as appropriate.

- Environmental and Social Impact Assessment (ESIA)
- Non-Technical Summary (NTS)
- Stakeholder Engagement Plan (SEP)
- Cumulative Effects Analysis (CEA)
- Critical Habitat Assessment (CHA)
- ESMS Manual

4.6.2 Public Disclosure Session

An additional public disclosure session is to be undertaken. The list is to involve targeted stakeholders that will be identified by the "ESIA Team" in coordination with EEAA and other authorities. The session is to be undertaken in the GoS primarily targeted for local governmental institutions and local communities – this session will be announced through newspaper advertisement at least one week in advance. The objective of the sessions is to:

- Introduce the Project to stakeholders;
- Identify the key anticipated impacts;
- Present the methodology for the ESIA study;
- Present key outcomes and conclusions; and
- Comments on scope of work undertaken, key issues identified and any other issues of concern.

As discussed earlier, once the public disclosure session is completed, all received comments will be addressed and taken into account and an updated ESIA will be submitted.

4.6.3 Stakeholder Engagement Plan

Stakeholder Engagement is an on-going process that involves: stakeholder analysis & planning, disclosure

& dissemination of information, consultation & participation, grievance mechanism, and on-going reporting to Affected Communities. A Stakeholder Engagement Plan (SEP) is developed and implemented that is scaled to the Project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities and key stakeholders.

The SEP for the Project describes the planned stakeholder consultation activities and engagement process and includes the following:

- Define the Project's approach to future stakeholder engagement;
- Identify stakeholders within the area influenced by the Project;
- Profile identified stakeholders to understand their priorities;
- Propose an action plan for future engagement with identified stakeholders; and
- Set out the grievance/project complaints mechanism.

The Developer is committed to implementing the requirements of the SEP throughout the lifetime of the Project. The SEP is provided as a standalone document.

4.6.4 Disclosure of approved ESIA

The final ESIA after its approval by both EEAA and IFAs such as the AfDB will be disclosed on the developer's website, competent authorities (Governorate of Red Sea, Ras Ghareb City Council, etc.) websites and so the AfDB website to allow for public revision and commenting back, if any.

5. REGULATORY AND POLICY FRAMEWORK

This chapter first provides an overview of the environmental clearance process for the Project. The Chapter then discusses the regulatory context which is directly related to environmental compliance which must be adhered to by all parties involved in the Project throughout the planning and construction, operation, and decommissioning. The Chapter goes on to summaries the relevant international agreements and conventions to which Egypt is a signatory.

Finally, as the Project is seeking financing from IFIs, this Chapter highlights the E&S policies and requirements of the IFIs which must be adhered to by the Developer.

5.1 Egyptian Environmental Institutional Framework

Egyptian Environmental Affairs Agency (EEAA)

The EEAA is an authorized state body regulating environmental management issues. Egyptian laws identify three main roles of EEAA:

- A regulatory and coordinating role in most activities, as well as an executive role restricted to the management of natural protectorates and pilot projects.
- The responsibility of formulating the Environmental Management (EM) policy framework, setting the required action plans to protect the environment and follow their execution in coordination with Competent Administrative Authorities (CAAs).
- The responsibility of EEAA in reviewing and approving the ESIA studies for new projects/expansions undertaken as well as monitoring the implementation of the ESMP.

Environmental Management Unit (EMU)

The Environmental Management Unit (EMU), at Governorate and district level, is responsible for the environmental performance of all projects/facilities within the Governorates premises. The Governorate has established EMUs at both Governorate and city/district levels. EMUs are responsible for the environmental protection within the Governorate boundaries. They are mandated to undertake both environmental planning and operation-oriented activities. EMU is mandated to:

- Follow-up the environmental performance of the projects within the Governorate during both construction and operations phases to ensure the project is in compliance with the laws and regulations as well as with the mitigation measures included in its ESIA approval.
- Investigate any environmental complaints filed against projects within the Governorate.
- EMUs are administratively affiliated to the Governorate, yet technically to EEAA. EMUs submit monthly reports to EEAA with their achievements and inspection results.
- The Governorate has a solid waste management unit at Governorate and district level. The units are responsible for the supervision of solid waste management contracts.

Competent Administrative Authorities (CAAs)

The Competent Administrative Authorities (CAAs) are the entities responsible for issuing licenses for project construction and operation. The ESIA is considered one of the requirements of licensing. The CAA for this project is NREA. NREA is thus responsible for receiving the ESIA studies, checking the information included in the documents concerning the location and for the suitability of the area to the project activity. It is also responsible for ensuring that the activity does not negatively impact the surrounding activities and that the location is in compliance with the ministerial decrees related to the activity. NREA forwards the documents to EEAA for review and to issue its response in 30 days period. They are the main interface with the project proponents in the ESIA system. The CAA is mandated to:

- Provide technical assistance to Project Proponents
- Ensure the approval of the Project Site
- Receive ESIA Documents and forward it to EEAA
- Follow-up the implementation of the ESIA requirements during post construction field investigation (before the operation license).

Table 19 Other Related National Government & Permitting Authorities

Entity	Scope
Egyptian Electricity Transmission Company (EETC)	Purchase of electrical energy produced from power plants, which authorizes local and foreign investors to create, and sell them on the ultra-effort networks. The implementation of projects for the electricity transmission
New & Renewable Energy Authority (NREA)	NREA act as the national focal point for expanding efforts to develop and introduce renewable energy technologies to Egypt on a commercial scale together with implementation of related energy conservation programs. NREA is entrusted to plan and implement renewable energy programs in coordination with other concerned national and international institutions within the framework of its mandate
General Petroleum Company	A national State-owned company engaged in exploration, production and development of hydrocarbons, is responsible for the management of oil and gas exploration and production activities on behalf of the State. It is one of the subsidiary companies affiliated to the Ministry of Petroleum It has the right of concession for petroleum exploration in some parts of the project area and adjacent areas. Represents the main investment activity in the project area
Ministry of Defence: Army Intelligence force, Border guards	They also provide permissions to get into the desert area. Secure and support the project.
Red Sea Governorate	The main role of the governorate is supporting the project by providing the various permissions needed, and infrastructure maps in case if needed.
Ras Gharib City Council	Involved in several requirements to include: (i) provide permits for any construction activities within their area of jurisdiction; (ii) supervision and follow-up from the Environmental Department in Ras Gharib City Council during the construction phase; and (iii) provide services related to solid waste collection and disposal.
Water and wastewater Company in Ras Ghareb	Provide the project needs of water and wastewater disposal during the construction phase; through the construction contractors (In the case of contracting with them).

Public Health: Directorate of Health in Red Sea Governorate, Ras Ghareb General Hospital	They provide the health services and facilities to the local districts.
Manpower Directorate: Labour Office in Red Sea Governorate	Data of the labour force in Suez Governorate and complaints of workers. Monitor labour recruitment standards during construction.
Roads Directorate in Red Sea Governorate	Services and development of external roads in the governorate. Issuing permits for any construction work on the external roads.
Entity	Scope
Ministry of Interior	MI is responsible for national and local security, as well as approving emergency response and firefighting plans for establishments/projects.
EEAA	Issues the Environmental approval for the project. Monitors the compliance with the conditions of approval.
Ministry of Electricity and Renewable Energy	The ministry of electricity is the responsible entity for the generation, transmission and distribution of electricity in Egypt, under which operates NREA, Egyptian Electricity Holding company and EETC.
Ministry of Environment	The ministry of Environment is the entity responsible for the formulation of environmental policies. The preparation of necessary plans for environmental protection and environmental development projects and following up on the implementation of all of the above. Under the ministry, the EEAA and the Nature protection bureau operate.
Ministry of petroleum and mineral resources	The ministry of petroleum is the entity responsible for the supervision of the exploration, production, marketing and distribution of oil, gas and other natural resources
Ministry of Antiquities	The ministry of antiquities is the entity responsible for the preservation and protection of the heritage and ancient history of Egypt, under which operates all inspector offices in the governorates
Red Sea Governorate antiquities inspector offices	First contact in case of any chance finds during construction. Responsible for protecting and managing antiquities in the area.
Ministry of Civil Aviation	Civil aviation approval might be necessary for large-scale wind farms. The impact of wind turbines on air traffic control systems, radar, and aircraft operations is evaluated by the civil aviation authority.
Ministry of Transportation	Provide the necessary permissions and approvals related to potential traffic disruptions during the construction phase, such as the transportation of blades.

5.2 Egyptian Environmental Clearance Process

The ESIA is governed by the Law No. 4 of 1994 and its amendments, the Law on Protection of the Environment and its Executive Regulations 1995 and its amendments (Prime Ministers Decree 338). According to Law 4 of 1994, applications for a license from an individual, company, organization or authority, an assessment of the likely environmental impacts of development projects should be undertaken. An ESIA is required for all electricity generation projects including renewable energy projects.

Based on the categorization of development projects included within the Guidelines for EIA issued by the EEAA in 2009 and EEAA Decree 518 in 2023, wind farm projects are considered under Category C projects (projects with high potential impacts) which require undertaking a full ESIA study.

The involvement of the public and concerned entities in the EIA planning and implementation phases is mandatory for Category C projects through the public consultation process with concerned parties. Consultation is undertaken twice during the EIA process the first in the phase of identifying the scope of the project EIA, and the second is after the preparation of the draft EIA.

Before the public consultation on the draft EIA, the draft technical summary in Arabic should be disclosed to all concerned parties. After the EIA process is complete, the EIA report will be stored at EEAA's central library or that of the RBO of the project's region. Moreover, the executive summary of the final EIA will be available at

EEAA website. The project proponent should identify in a letter attached to the EIA the parts that he/she does not wish to disclose. These include sections that may have sensitivity related to trade, technology, or security.

An individual chapter in the EIA should be prepared for public consultation including:

- Methodologies used to inform and involve concerned parties in the EIA process
- Analysis of the data and information gathered and feedback acquired.
- Table 11 with all aspects that have been discussed during the public consultation meetings and how the project will address or mitigate the aspects
- Methodologies followed by the project proponent to ensure the continuity of the consultation process during the construction and, operation phases and until the project reaches the closure phase.
- Commitments of the project owner to improve surrounding environment and support the neighboring community

An Annex in the EIA should be prepared for public consultation including: Documentation of public meetings and meetings including dates, name of attendees as well as agenda and topics of discussion.

The ESIA process is set according to the guidelines issued by the EEAA including: EIA Guidelines (2009), and the Environmental Impact Assessment Guidelines and Monitoring Protocols for Wind Energy Development Projects along the Rift Valley/Red Sea Flyway with a particular reference to wind energy in support of the conservation of Migratory Soaring Birds (MSB) (2013).

The key requirements for a full ESIA as per the requirements above include the following:

- Environmental and Social (E&S) Regulatory and Legal Review
- Project Description
- Description of the Baseline Environment (physical, biological, social)
- Identification and Analysis of Impacts
- Analysis of Alternatives

- Public Consultation (on the draft ESIA)
- Environmental Management Plan (EMP) (mitigation measures, monitoring program, institutional arrangements)
- Upon submission of the ESIA report by the ESIA Practitioner to the CAA in charge of issuing licenses, sends the ESIA to EEAA for evaluation. The EEAA shall review the ESIA and provide comments or feedback within 30 days. The CAA in charge of issuing licenses in case of wind power projects is the NREA.
- After submission of an ESIA for review, EEAA may request revisions in the ESIA report within 30 days, including additional mitigation measures, before issuing the report approval.

5.3 Egyptian E&S Regulatory Context

This section lists those legislations that are directly related to environmental and social compliance that must be adhered to by all parties involved in the Project throughout the planning and construction, operation, and decommissioning phase. These legislations include: (i) those issued by EEAA (laws, regulations and instruction), and (ii) the relevant national legislations issued by other line ministries (laws, regulations, instructions, standards).

The table below lists the key relevant legislation and regulator/entity relevant to each of the environmental and social parameter being studied and assessed within this ESIA. Throughout the following Chapters, reference to the requirements set out within those legislations is provided under each relevant parameter.

Table 20 Relevant Legislation and Regulations of Environmental and Social Parameters

Legislation	Relevant Article	Requirements
Land Use		
Electricity Law 87/2015	Article 53	Stipulates the right of proper compensation for the affected persons due to the establishment of Electricity projects
	Article 55	- Identifies the Right of Way that should be avoided for the OHTL and the underground cables: 25 meters from the centre for extremely high voltage OHTL 13 meters from the centre for the high voltages OHTL 5 meters for the medium voltage OHTL 5 meters for the high and extremely high voltage cables 2 meters for low and medium voltage cables - The Owner of the land should be compensated in case of land acquisition. The right of way stated in article 55 should be abided by
Law 10/1990	The project will not entail land acquisition	The main site is located on a state-owned land which does not trigger any expropriation activities, according to law no. 10/1990.
Law 577/1954	Law 577/54, later amended by Law 252/60 and Law 13/162	- Establishes the provisions pertaining to the expropriation of real estate property for public benefit and improvement. - The project will not entail any land acquisition activities
Civil code 131/1948	Articles 802-805	- Recognises private ownership right. - Article 802 states that the owner, pursuant to the Law, has the sole right of using and/or disposing his property. - Article 803 defines what is meant by land property - Article 805 states that no one may be deprived of his property except in cases prescribed by Law and would take place with an equitable compensation. - Land for the Project was allocated by NREA and was not previously owned and thus no compensation would be needed
Unified Building Law No. 119 of year 2008	Article 39	- Apply and receive the construction permit before start of the implementation - Ensure that all designs abide by the building codes of Egypt
Geology, hydrology, hydrogeology		
Law 4/1994	Article 33 of the Executive regulations of	The owner of the project is responsible to decontaminate the area/soil in case of relocation or decommissioning

	Law 4/1994	
Management of solid waste and hazardous waste generated from the facility during generation, handling, transportation and disposal		
Law 4/1994 amended by Law 9/2009 and ER 1095/2011 amended by Decree 710/2012)	Articles 28, 29, 33, 37, 39	- Identification: Using the HW lists issued by the competent authority. - Minimization: strive to reduce quantitatively and qualitatively the generation of the HW - Segregation: HW is to be separated from other types of non-hazardous waste. In addition, the different types of HW must not be mixed together. - On site Storage: HW is to be stored in a designated area, and containers must be made of suitable materials and be properly sealed to avoid any leakages or spills into the surroundings. - Off-site transportation: HW is to be submitted to authorized HW contractors. - Obtaining a license from the competent authority to handle Hazardous waste
	Article 22 and Article 17 of the Executive Regulations	The establishment should maintain an environmental register in accordance with Annex 3 of the Executive regulations
	Article 39 and Article 41 of the Executive Regulations	- Article 39: The establishment should maintain the cleanliness of garbage bins and vehicles. Garbage collection bins shall be tightly covered and waste shall be transported at suitable intervals. - Article 41: The establishment shall undertake necessary precautions to secure the safe storage and transportation of waste. These precautions include the following: - Construction waste storage is to be carried out at site such that it does not obstruct movement of vehicles and personnel. - Waste subject to emission should be covered to avoid air pollution - Waste is to be submitted to authorized waste contractors
	Articles 26, 28 and 29 of the Executive regulations	The establishment should maintain a register for the hazardous waste should be maintained as well as record for the hazardous substances used
Law 202/2020 on waste management and its executive	Article 10	The waste generators or holders shall safely dispose of the wastes of their establishment or their projects or entities after the delivery or initial operation of the new or renovated projects, or after the completion of the works from which wastes are generated, whatever their purpose, within a period not exceeding twenty days starting from the date of delivery or initial operation of the project or works, in the event that these wastes are located outside the boundaries of these establishments. or projects. The generators or possessors of the waste shall also abide by the measures and requirements set out in the appendices attached to this regulation.

regulation 722/2022	Article 36	All entities and individuals, when carrying out demolition and construction works, are obligated to manage safe transportation, recycling and final disposal through entities licensed and authorized to do so.
	Article 50	The owner of the facility or the person in charge of its management whose activity produces hazardous waste, in accordance with the provisions of the law, must keep a paper or electronic record, or both, of these wastes, and how to dispose of them, as well as the parties contracting with them for any management operations of these wastes, and in the event that the activity of the facility is transferred or suspended The owner of the facility or the person responsible for its management must clean it and the soil in which this activity was carried out, in accordance with the requirements and standards set out in Appendix No. (8) attached to this regulation.
Control of the wastewater discharge into the sewage system and public network.		
Ministerial Decree 44/2000, Decree of Law 93/1962	Article 14	- The law prohibits the disposal of domestic, industrial and commercial wastewater, treated or untreated, in public drainage system without obtaining a prior approval. - Article 14 of the executive regulations set the parameters required regarding the quality of the wastewater discharged to the public sewage network. - The owner of the project should abide by the limits stated in article 14 of the Executive regulations of Law 93/1962
Biodiversity, Birds, and Bats		
Law 4 of 1994	Article 28, as amended by Law 9 of 2009. Annex 4 of the Executive Regulations of law 4/1994, amended by Prime Minister Decree 1095 of 2011	- Defines fauna and flora which are forbidden to be hunted or disturbed. - Ensure that no species are being disturbed and implement all mitigation measures needed to reduce the impact on any fauna and flora in the vicinity of the project
Environmental Impact Assessment Guidelines and Monitoring Protocols for Wind Energy Development Projects along the Rift	Section One Guidelines for Environmental Impact Assessment for Wind Energy Development in Egypt 1.5 Description of EIA Study Components for Wind Farm Projects – 0.7 Project Environmental Setting	- Defines the ecological components of plant, animals and their habitats, including threatened species and areas that have been identified as protected areas or IBAs and requests the review IUCN Red List of Threatened Species. - Defines baseline information requirements for birds at Wind Farm Projects.

Valley/Red Sea Flyway with a particular reference to wind energy in support of the conservation of Migratory Soaring Birds (MSB)	Section Two Guidelines on Mitigation, Monitoring and Training 2.2 Monitoring Protocols	▪ Defines standard methods and models to predict risk for migratory birds. ▪ Define standard methods used in pre- and post-construction studies of Wind Energy Facilities are focused on assessing impacts on birds. ▪ Define standard protocol to be implemented building on results of species recorded and numbers of passage birds recorded during studies.
Archaeology and cultural heritage		
Law 117/1983	Article 1	▪ Defines a monument as a building or movable property produced by different civilizations or by art, sciences, literature and religions from prehistoric era and during successive historical eras until a hundred years ago or historical buildings.
	Article 2	▪ States that any building or movable property that has an historical, scientific, religious, artistic or literary value could be considered as a monument whenever the national interest of the country imposes its conservation and maintenance without adherence to the time limit contained in the preceding Article no.1
	Article 5	▪ States that the Supreme Council of Antiquities (SCA) is the competent authority responsible for antiquities in Egypt.
	Article 20	▪ States that license of construction in archaeological sites or land is not permitted. It is prohibited to make any installation or landfill or digging channels, construct roads, agricultural land or for public benefits in the archaeological sites or land within its approved border lines. ▪ The Article additionally, states that a buffer zone around the monument or the site is defined as three kilometres in the uninhabited areas or any distance determined by the SCA to achieve environmental protection of the other parts of the monument in the surroundings (article 20-Ch.1). ▪ The provisions of this article (20) apply on land which appears to the SCA - based on conducted studies – that there is a probable existence of monuments in the subsoil. ▪ The provisions of this article are also applied to desert and areas where quarrying work is licensed.
	Article 22	▪ States that license of construction in the immediate vicinity of archaeological sites within populated areas could be delivered by the competent authority, after the approval of SCA. ▪ The competent authority must state in the license the conditions which the SCA emphasizes to guarantee that the building does not have a negative visual impact on the monument and its direct buffer zone protecting the archaeological and historical surroundings. ▪ The SCA has to pronounce its verdict on the license demand within 60 days of the date of submission.

		Otherwise, the elapsing of this period is regarded as a decision of refusal.
	Article 23	- States that the SCA should take the necessary steps to expropriate land that is found in or kept in place and registered according to the rules of this Law. (Article 23- Ch.1). [These rules are defined in the second chapter of the Law 117 – articles 26-30]. - The Ministry of State for Antiquities must be notified in the event that an unrecorded ruin is found by any person (Article 23).
	Article 24	- States that everyone finding by chance part or parts of a monument in its place must promptly inform the nearest administrative authority within forty-eight hours. - Although there are no cultural heritage areas in the site vicinity, the ESIA report will refer to relevant regulations for unexpected cases of chance finds.
Air quality and noise		
Law 4/1994 amended by Law 9/2009 and ER 710/2012	Article 42 of Law 4/1994 amended by Law 9/2009	Maximum allowable limits for ambient noise intensity and maximum exposure duration
	Article 44 of ER 710/2012	Open burning of garbage and non-hazardous solid waste is strictly prohibited, and garbage and solid waste shall only be dumped or treated in designated areas away from residential, industrial, agricultural and waterways.
		- Dumping areas should be bound by a wall, away from obstruction, traffic and pedestrians and take into account the coverage of volatile soil so as not to cause air pollution. - Transporting waste and dust resulting from excavation, demolition and construction in special containers or using transport vehicles prepared and licensed for this purpose. (A) The vehicle shall be equipped with a special box or a tight cover that prevents the spread of dust and debris to the air or falling on the road. (B) The vehicle shall be equipped with special equipment for loading and unloading. (C) The car should be in good condition according to the rules of safety, durability and lights and equipped with all safety devices.
	Article 38 of ER	Ensure that the places to which this type waste transported so that a distance of not less than 1.5 km from the residential areas and be of a low contour level and settled after filling and filling.

ERs (amended by Decree 1095/2011 amended by Decree 710/2012)	Annex 5	Maximum limites of ambient air pollutants
	Annex 6	Permissible limits of air pollutants in emissions
	Annex 8 and Annex 9	Maximum allowable limits for air emissions, heat stress, ventilation rates within the work environment
Modified ERs (710/2012) of Law 4/1994	Article 37	Maximum allowable limits for exhaust gases from machines, engines and vehicles.
Law 4/1994	Article 36	It is prohibited to use machines, engines or vehicles whose exhaust emissions exceed the limits set by the executive regulations of this Law.
Law 4/1994 and its modified ERs	Article 35 of Law 4/1994 and article 34 of its modified ERs	Maximum allowable limits for ambient air pollutants stated should be met by the contractors and operator throughout the lifetime of the plant.
Infrastructure and utilities		
Petroleum pipelines Law 4/1988	Decree 292/1988	The owner of a property should allow the passing of pipelines transporting liquid or gaseous hydrocarbons beneath the ground surface in accordance with the procedure mentioned in the executive regulations
	Article 2	- Specifies that no buildings or trees, other than agricultural land trees, should be constructed or planted at a distance less than 2 m on each side of the pipeline inside urban and 6 m on each side of the pipeline outside the urban areas. - If it is necessary to place the pipelines at a closer distance than what is specified in the law, it is allowed through a decision from the chairman of Egyptian General Petroleum Corporation (EGPC); taking into consideration the necessary safety precautions. - also specifies that if the activities done in accordance to the law will result in damage to the property, the owner has the right to a fair compensation to be decided by a committee formed by a decision from the Minister of Petroleum, and the executive regulations include the guidelines for compensation estimation.
Occupational health and safety		
Law 4/1994	Articles 43 – 45 of Law 4/1994, which address air quality, noise, heat stress, and the provision of protective measures to	- The owner of the project should abide by the limits stated in Annex 7 of the Executive regulations - In case the limits are exceeded, special protective equipment should be made available (earmuffs, masks...) - In case the limits are exceeded, the workers should have rests as specified by the limits (especially for noise and vibration from electric jack hammers or any other ramming equipment) - Conduct regular medical check-ups for workers that are facing noise, vibration or heat stress exceeding

	workers.	the limits
Law 12/2003 on Labour and Workforce Safety	Articles 80-87	- Regulates working hours and rest times for workers - The working hours shall include a period of one or more meals and rest not less than one hour in total and the period shall not exceed five consecutive hours. The competent minister may, by a decision, determine the cases or works which are imperative for technical reasons or operating conditions. - Work hours and rest periods should be organized so that the period between the beginning and the end of working hours does not exceed ten hours per day.
		- Work shall be organized at the facility so that each worker shall receive a weekly rest of not less than 24 hours after six working days at most. In all cases, weekly rest shall be paid. - The employer shall put on the main doors used by the workers for entry, as well as in a visible place in the establishment a schedule showing the weekly rest day, working hours and rest periods for each worker and the amendment to this schedule.
	Book 3 - Single worker contract: Article 32	- The employer shall be obliged to issue the contract in writing in Arabic in three copies. The employer shall keep one and deliver a copy to the worker. In particular, the contract shall include the following data: - Name of employer and place of work. - The name of the worker, - his qualification, - his profession or craft, - his insurance number, - his place of residence and what is necessary to prove his identity. The nature and type of work being contracted. - If there is no written contract for the worker, the unit to prove his rights, all methods of proof. The employer shall be given a receipt for the papers and certificates he has deposited with him.

Law 12/2003 on Labour and Workforce Safety and Book V on Occupational Safety and Health (OSH) and assurance of the adequacy of the working environment	Minister of Labour Decree 48/1967. Minister of Labour Decree 55/1983. Minister of Industry Decree 91/1985 Minister of Labour Decree 126/2003. Minister of Industry Decree 134/2003	- The owner of the project is bound with the provision of protective equipment to workers and fire-fighting/emergency response plans. Moreover, the following laws and decrees should be considered: - The contractors should have appropriate number of first aid kits in relation to the size of the site and the number of workers on site - Work-related accidents, injuries, fatalities and diseases should be notified and bi-annual OHS statistics reporting should be developed. - Types of establishments needing to establish OHS services and committees.
	Article 211 and article 34 of the Decree of the Minister of Labour and Manpower no. 211/2003	The establishment should prepare records/reports/register for chemical safety
Law 137/1981	Article 117	The employer should inform his workers of the hazards associated with non-compliance with safety measures
Decree 458/2007		Egyptian Drinking Water Quality Standards should be met for all water bought and stored on site for the workers' use.
Decree 162, 2019	Articles 5, 9, 11, 19.	- Without prejudice to article 17 of the Labour Act (No. 12 of 2003), all parties, including Government entities and their affiliated bodies, public sector companies, the public business sector, the private sector, trade-union and professional associations and youth employment agencies are prohibited from employing workers subject to this regulation other than via the competent department in the Directorate of Manpower and within whose competence the activity falls. - Labour, occupational safety and health inspectors are required in the course of conducting their inspections to monitor the informal
Decree 162, 2019	Articles 5, 9, 11, 19.	- Without prejudice to article 17 of the Labour Act (No. 12 of 2003), all parties, including Government entities and their affiliated bodies, public sector companies, the public business sector, the private sector, trade-union and professional associations and youth employment agencies are prohibited from employing workers subject to this regulation other than via the competent department in the Directorate of Manpower and within whose competence the activity falls. - Labour, occupational safety and health inspectors are required in the course of conducting their inspections to monitor the informal workers in the establishments under inspection and to notify employers that they are required to proceed to the competent department of the Directorate to register these workers, regularize their status and take the requisite legal measures as per the provisions of the Labour Act and its implementing ministerial decisions.

		- Without prejudice to the social insurance and pensions system in force, the employer shall at his own expense provide first aid to any worker subject to the provisions of this regulation who suffers injury during work and he shall transport him to the requisite provider treatment. - Labour, occupational safety and health and employment inspectors shall monitor the employment of workers subject to the provisions of this regulation and the enforcement of the rules for employment set out in this regulation.
Law 94/2003		- The Law on Establishing the National Council for Human Rights (NCHR) aims to ensure respect, set values, raise awareness and grant observance of human rights. - At the forefront of these rights and freedoms are the right to life and security of individuals, freedom of belief and expression, the right to private property, the right to resort to courts of law, and the right to fair investigation and trial when charged with an offence. - This Constitution came into force after a public referendum on 11th September 1971 and was amended on 22nd May 1980 to introduce the Shoura Council and the press.
EEAA guidelines	EIA Paragraph 6.4.3.1 Scope of Public Consultation Paragraph 6.4.3.2 Methodology of Public Consultation Paragraph 6.4.3.3 Documentation of the Consultation Results Paragraph 7 Requirement and Scope of the Public Disclosure	- Conduct a public consultation as part of the ESIA study according to the EEAA guidelines methodology. The involvement of the public and concerned entities in the EIA planning and implementation phases is mandatory for Category C projects through the public consultation process with concerned parties. - Preparation of the Public Consultation Plan before starting the consultation activities in the EIA scoping phase, the project proponent prepares a plan indicating the methodology of the public consultation to be adopted in the two public consultation phases (EIA scoping phase and consultation on the draft EIA). The plan should indicate the concerned parties that will be consulted, method of consultation and other points. - An individual chapter in the EIA will be prepared for public consultation - Disclosure of relevant material is an important process and should be undertaken in a timely manner for all Category C projects. This process permits meaningful consultations between the project proponent and project-affected groups and local NGOs is required to take place. Before the public consultation on the draft EIA, the draft technical summary in Arabic should be disclosed to all concerned parties. - workers in the establishments under inspection and to notify employers that they are required to proceed to the competent department of the Directorate to register these workers, regularize their status and take the requisite legal measures as per the provisions of the Labour Act and its implementing ministerial decisions. - Without prejudice to the social insurance and pensions system in force, the employer shall at his own expense provide first aid to any worker subject to the provisions of this regulation who suffers injury during work and he shall transport him to the requisite provider treatment. - Labour, occupational safety and health and employment inspectors shall monitor the employment of workers subject to the provisions of this regulation and the enforcement of the rules for employment

		set out in this regulation.
Socio-economics		
Law 94/2003 EEAA EIA guidelines	Paragraph 6.4.3.1 Scope of Public Consultation Paragraph 6.4.3.2 Methodology of Public Consultation Paragraph 6.4.3.3 Documentation of the Consultation Results Paragraph 7 Requirement and Scope of the Public Disclosure	▪ The Law on Establishing the National Council for Human Rights (NCHR) aims to ensure respect, set values, raise awareness and grant observance of human rights. ▪ At the forefront of these rights and freedoms are the right to life and security of individuals, freedom of belief and expression, the right to private property, the right to resort to courts of law, and the right to fair investigation and trial when charged with an offence. ▪ This Constitution came into force after a public referendum on 11th September 1971 and was amended on 22nd May 1980 to introduce the Shoura Council and the press. ▪ Conduct a public consultation as part of the ESIA study according to the EEAA guidelines methodology. The involvement of the public and concerned entities in the EIA planning and implementation phases is mandatory for Category C projects through the public consultation process with concerned parties. ▪ Preparation of the Public Consultation Plan before starting the consultation activities in the EIA scoping phase, the project proponent prepares a plan indicating the methodology of the public consultation to be adopted in the two public consultation phases (EIA scoping phase and consultation on the draft EIA). The plan should indicate the concerned parties that will be consulted individual chapter in the EIA will be prepared for public consultation ▪ Disclosure of relevant material is an important process and should be undertaken in a timely manner for all Category C projects. This process permits meaningful consultations between the project proponent and project-affected groups and local NGOs is required to take place. Before the public consultation on the draft EIA, the draft technical summary in Arabic should be disclosed to all concerned parties., method of consultation and other points.

5.4 International Agreements

Egypt has signed and ratified a number of international conventions committing the country to the conservation of environmental resources and protection of workers' health & safety and labour rights. The following Table 12 lists the key conventions, of which are reflected and applied in their respective sections on environmental and social management aspects.

Table 21 Relevant Egyptian International Conventions and Agreements

Name of Multilateral Environmental Agreement	Date of ratification	Ratification date by Egypt
<i>Biodiversity and Natural Resources</i>		
International Plant Protection Convention	1951	September 12, 1954
Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Near East	1965	July 10, 1963.
Convention on Wetlands of International Importance Especially as Water Fowl Habitat (RAMSAR)	1971	October 24, 1982
Convention Concerning the Protection of the World Cultural and Natural Heritage	1972	May 14, 1975
Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	1973	September 30, 1976
Convention on the Conservation of Migratory Species of Wild Animals	1979	April 30, 1980
Protocol to Amend the Convention on Wetlands of International Importance Especially as Water Fowl Habitat	1982	September 25, 2002
Convention on Biological Diversity (CBD)	1992	June 2, 1993
Agreement for the Establishment of the Near East Plant Protection Organization	1993	December 5, 1953
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa	1994	October 8, 1996
Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean	1995	December 1, 1995
African Convention on the Conservation of Nature and Natural Resources (revised)	2003	November 29, 2006
International Tropical Timber Agreement	2006	February 27, 1995
<i>Hazardous Materials and Chemicals</i>		
Convention Concerning Prevention and Control of Occupational Hazards Caused by Carcinogenic Substances and Agents	1974	May 14, 1979
Convention on the Prohibition of the Development, Production and Stock-Piling of Bacteriological (Biological) and Toxin Weapons, and on their Destruction	1972	September 8, 1972
Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal	1976	March 10, 1997
Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques	1976	June 30, 1981

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1989	September 24, 1984
Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	1991	May 26, 1995
Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1995	July 15, 1992
Stockholm Convention on Persistent Organic Pollutants (POPs)	2002	May 17, 2005
Atmosphere, Air Pollution and Climate Change		
Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies	1967	January 12, 1984
Vienna Convention for the Protection of the Ozone Layer	1985	April 2, 1988.
Montreal Protocol on Substances that Deplete the Ozone Layer	1987	March 28, 1990
(London) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	1990	September 25, 1990.
United Nations Framework Convention on Climate Change	1992	June 11, 1994
(Copenhagen) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	1992	September 19, 2005
Name of Multilateral Environmental Agreement		
Kyoto Protocol	1997	February 27, 2005
Paris Agreement under the United Nations Framework Convention on Climate Change	2015	November 4, 2016
Health and Worker Safety		
International Labour Organization Core Labour Standards	1936	1957-1967
Convention Concerning the Protection of Workers Against Ionizing Radiation	1960	October 14, 1961.
Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration	1977	June 28, 1976
Occupational Safety and Health Convention	1979	June 28, 1976

5.5 Requirements for Project Financing – IFI's Requirements

The Project is anticipated to seek financing from International Financing Institutions (IFI). Therefore, the E&S requirements of such IFI's must be considered throughout the Project development, which require the Project development to adhere to specific E&S requirements which reflect international best practice.

The ESIA is based on the International Finance Corporation (IFC) E&S requirements, as well as the European Bank for Reconstruction and Development (EBRD) E&S requirements, both of which are discussed below.

5.5.1 IFC E&S Requirements

The IFC E&S requirements are considered the most comprehensive. The IFC of the World Bank provides a range of guidance documents related to the assessment and management of E&S issues in project development. Not only does IFC guidance provide a generally accepted basis for good practice, but it also provides the technical cornerstone for the Equator Principles which set out the E&S requirements of banks for project finance. The IFC requirements have become the *de facto* international E&S performance benchmark for project financing.

Summarized below are the requirements for the International Finance Corporation (IFC).

IFC Policy on E&S Sustainability (2012)

The IFC policy on E&S Sustainability puts into practice IFC's overall commitments to E&S sustainability. The policy seeks to: (i) enhance the predictability, transparency, and accountability of IFC's actions and decision making; (ii) help clients manage their environmental and social risks and impacts and improve their performance; and (iii) enhance positive development outcomes on the ground. In addition, the Policy identifies IFC's commitments, its roles and responsibilities and other as applicable.

One of the key outputs of the Policy is the E&S Categorization of projects, which are summarized as follows:

- Category A: Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented.
- Category B: Business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.
- Category C: Business activities with minimal or no adverse environmental or social risks and/or impacts.
- The IFC does not provide specific details on what wind farm projects should be classified.

IFC Performance Standards (2012)

The IFC Performance Standards (PS) on Social and Environmental Sustainability set out a framework for managing and improving project performance from planning and assessment, through construction and operations to closure. The Performance Standards requirements are summarized in the table below.

Table 22 IFC Performance Standard Requirements

IFC PS	Key Points
PS1: Assessment and Management of Environmental and Social Risks and Impacts	▪ PS1 underscores the importance of managing social and environmental performance throughout the life of a project by using a dynamic social and environmental management system. Specific objectives of this Performance Standard are: ▪ To identify and assess social and environment impacts, both adverse and beneficial, in the project's area of influence; ▪ To avoid, or where avoidance is not possible, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment; ▪ To ensure that affected communities are appropriately engaged on issues that could potentially affect them; and ▪ To promote improved social and environment performance of companies through the effective use of management systems.
PS2: Labour and Working Conditions	The requirements set out in this PS have been in part guided by a number of international conventions negotiated through the International Labour Organization (ILO) and the United Nations (UN). Specific objectives of this Performance Standard are: ▪ To establish, maintain and improve the worker-management relationship;

IFC PS	Key Points
	- To promote the fair treatment, non-discrimination and equal opportunity of workers and compliance with national labour and employment laws; - To protect the workforce by addressing child labour and forced labour; and - To promote safe and healthy working conditions, and to protect and promote the health of workers.
PS 3: Resource Efficiency and Pollution Prevention	This Performance Standard outlines a project approach to pollution prevention and abatement in line with international available technologies and practices. It promotes the private sector's ability to integrate such technologies and practices as far as their use is technically and financially feasible and cost-effective in the context of a project that relies on commercially available skills and resources. Specific objectives of this Performance Standard are: - To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; and - To promote the reduction of emissions that contribute to climate change.
PS 4: Community Health, Safety and Security	This PS recognizes that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development. However, projects can also increase risks arising from accidents, releases of hazardous materials, exposure to diseases, and the use of security personnel. While acknowledging the public authorities' role in promoting the health, safety and security of the public, this PS addresses the project sponsor's responsibility in respect of community health, safety and security.
PS 5: Land Acquisition and Involuntary Resettlement	Involuntary resettlement refers both to physical and economic displacement as a result of project-related land acquisition. Where involuntary resettlement is unavoidable, appropriate measures to mitigate adverse impacts on displaced persons and host communities should be carefully planned and implemented.
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	This Performance Standard reflects the objectives of the Convention on Biological Diversity to conserve biological diversity and promote the use of renewable natural resources in a sustainable manner. This Performance Standard addresses how project sponsors can avoid or mitigate threats to biodiversity arising from their operations as well as sustainably manage renewable natural resources. Specific objectives of this Performance Standard are: - To protect and conserve biodiversity; and - To promote the sustainable management and use of natural resources through the adoption of practices that integrate conservation needs and development priorities.
PS 8: Cultural Heritage	Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to protect irreplaceable cultural heritage and to guide project sponsors on protecting cultural heritage in the course of their business operations.

Note: PS 7 (Indigenous Peoples) is not considered to be applicable to this Project. The Indigenous World 2018 Report (IWGIA, 2018) states that Egypt is not classified as a country with indigenous people. In addition, this was confirmed based on previous experiences on E&S assessments with IFIs in Egypt where such standard was not triggered.

IFC EHS Guidelines

In addition, to the Performance Standards, the IFC have sector-specific EHS guideline documents. With regards to the project the following are applicable:

- IFC General EHS Guidelines (2007): identifies detailed EHS management and technical recommendations which are applicable for all development projects;

- IFC EHS Guidelines for Wind Energy (2015): identifies the key E&S impacts that should be investigated and provides detailed management and technical recommendations with regards to Industry-Best Practice. The IFC EHS Guidelines identifies the following key issues:
 - Landscape and visual
 - Noise
 - Biodiversity (to include birds and bats)
 - Shadow flicker
 - Water quality
 - Occupational health and safety
 - Blade and ice throws
 - Aviation
 - Electromagnetic interference
 - Public access
 - Abnormal load transportation
- IFC EHS Guidelines for Electric Power Transmission and Distribution (2007): this in particular could be applicable for the associated facilities of the Project (i.e. transmission line for connection with the grid). The Guideline identifies the key E&S impacts that should be investigated and provides detailed management and technical recommendations with regards to Industry-Best Practice. The IFC EHS Guidelines identifies the following key issues:
 - Biodiversity (to include birds and bats)
 - Electric and magnetic fields
 - Hazardous materials
 - Occupational health and safety
 - Community health and safety

5.5.2 EBRD Requirements

EBRD's 2019 Environmental and Social Policy seek to ensure, through its environmental and social appraisal and monitoring processes, that the projects it finances:

- Are socially and environmentally sustainable;
- Respect the rights of affected workers and communities; and
- Are designed and operated in compliance with applicable regulatory requirements and good international practice.

In addition, EBRD's E&S policy identifies large scale wind power projects as 'Category A' which are projects that could result in potentially significant environmental and/or social impacts that require an environmental and social impact assessment.

To translate this objective into successful practical outcomes, EBRD has adopted a comprehensive set of Performance Requirements (PRs) covering key areas of environmental and social impacts and issues.

EBRD is committed to promoting European Union (EU) environmental standards as well as the European Principles for the Environment, to which it is a signatory, and which are also reflected in the PRs. EBRD expects clients to assess and manage the environmental and social issues associated with their projects so that projects meet the PRs.

The EBRD Performance Requirements applicable to this project are summarized in the table below.

Table 23 Overview of Key Points of EBRD Performance Requirements of Relevance to the Project

EBRD PR	Key Points Relevant to the Project
PR 1: Assessment and Management of E&S Risks and Impacts	This PR outlines the process of appraising, managing and monitoring environmental and social issues associated with a project consistent with the European Union environmental impact assessment directive (85/337/EEC as amended).
PR 2: Labour and Working Conditions	This PR assures that human resources policies, procedures and standards will meet the following minimum requirements during the life of the Project with regards to labour and working conditions: - Establish and maintain a sound worker-management relationship and promote the fair treatment, non-discrimination and equal opportunity of workers; - Promote compliance with any collective agreements to which the client is a party, national labour and employment laws, and the fundamental principles and key regulatory standards embodied in the applicable ILO conventions; and - Protect and promote the health of workers, especially by promoting safe and healthy working conditions. - In addition, EBRD requires compliance with applicable EU Occupational Health and Safety requirements and, where such requirements do not exist, applicable IFC Occupational Health and Safety guidelines (IFC PS2).
PR 3: Resource Efficiency and Pollution Prevention and Control	Pollution prevention and abatement are key ingredients of a sustainable development agenda and EBRD - financed projects must meet good international practice in this regard. The impacts and issues associated with polluting activities need to be considered in all economic activities, and from effluents and emissions at the facility level, to impacts at a regional and global level where appropriate. This performance requirement assures that all aspects of the Project will meet the following objectives: - To avoid or, where avoidance is not possible, to minimize adverse impacts on human health and the environment by avoiding or minimizing pollution directly arising from projects; - To assist clients in identifying project-related opportunities for energy and resource efficiency improvements and waste reduction; and - To promote the reduction of project-related greenhouse gas emissions.
PR 4: Health, Safety and Security	While bringing many positive benefits to local communities, projects can also increase the potential for community exposure to risks and impacts arising from temporary or permanent changes in population; transport of raw and finished materials; construction, operations and decommissioning; accidents, structural failures, and releases of hazardous materials. This performance requirement addresses the project proponent's responsibility to identify and to avoid or minimise the risks and adverse impacts to community health, safety and security.

EBRD PR	Key Points Relevant to the Project
PR 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Involuntary resettlement refers both to physical and economic displacement as a result of project-related land acquisition. Where involuntary resettlement is unavoidable, appropriate measures to mitigate adverse impacts on displaced persons and host communities should be carefully planned and implemented.
PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	EBRD recognises the need for the protection and conservation of biodiversity in the context of projects in which it invests. In pursuing these aims, EBRD is guided by and supports the implementation of applicable international law and conventions and applicable EU Directives: ▪ To protect and conserve biodiversity; ▪ To avoid, minimize and mitigate impacts on biodiversity and offset significant residual impacts, where appropriate, with the aim of achieving no net loss or a net gain of biodiversity; ▪ To promote the sustainable management and use of natural resources; ▪ To provide for fair and equitable sharing of the benefits from project development and arising out of the utilization of genetic resources; ▪ To strengthen companies' license to operate, reputation and competitive advantage through best practice management of biodiversity as a business risk and opportunity; and ▪ To foster the development of pro-biodiversity business that offers alternative livelihoods in place of unsustainable exploitation of the natural environment.
PR 8: Cultural Heritage	Cultural heritage is important as a source of valuable historical and scientific information, as an asset for economic and social development, and as an integral part of a people's cultural identity, practices, and continuity. EBRD requires the protection of cultural heritage from project activities.
PR 10: Information Disclosure and Stakeholder Engagement	EBRD considers stakeholder engagement as an essential part of good business practice and corporate citizenship. In particular, effective community engagement is central to the successful management of risks and impacts on communities, as well as central to achieving enhanced community benefits. The specific objectives of this PR are: ▪ To identify people or communities that are or could be affected by the Project, as well as other interested parties; ▪ To ensure that such stakeholders are appropriately engaged on environmental and social issues that could potentially affect them through a process of information disclosure and meaningful consultation; and ▪ To maintain a constructive relationship with stake holders on an ongoing basis through meaningful engagement during project implementation.

Note: PR 7 (Indigenous Peoples) is not considered to be applicable to this Project. The Indigenous World 2018 Report (IWGIA, 2018) states that Egypt is not classified as a country with indigenous people. In addition, this was confirmed based on previous experiences on E&S assessments with IFIs in Egypt where such standard was not triggered. In addition, PR 9 (Financial Intermediaries) is also not considered applicable.

5.5.3 AfDB Requirements

The AfDB's has an Integrated Safeguards System (2015) to manage:

environmental and social risks. The Integrated Safeguards System (ISS) is a cornerstone of its strategy to promote growth that is socially inclusive and environmentally sustainable. The ISS is a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment.

The Integrated Safeguards System not only promotes best practices in these areas but also encourages greater transparency and accountability. It upholds the voices of people who are affected by Bank-funded operations,

especially the most vulnerable communities, by providing, for example, project-level grievance and redress mechanisms—a structured, systematic and managed way of allowing the voices and concerns of affected people to be heard and addressed during project planning and implementation.

The following safeguards are particularly relevant:

Table 24 AfDB Integrated Safeguards Systems (ISS)

AfDB - OS	Key Points
OS 1: Environmental and social assessment	OS1 includes the requirements for identifying, assessing, and managing the potential environmental and social risks and impacts of a project, including climate change issues. The safeguard document includes requirements for the different stages of the assessment process. The Integrated Environmental and Social Impact Assessment (ESIA) process guidelines are published in the Safeguards and Sustainability Series in three sets (Volume 2 issued in 2015). Based on OS1 states ‘<i>borrower or client shall be responsible for conducting and providing evidence of meaningful consultation</i>’. <i>Consultation should be based on stakeholder analysis and is preceded by disclosure of adequate project information and environmental and social information to ensure that participants are fully informed.</i>
OS 2: Involuntary resettlement, land acquisition, population displacement and compensation.	Involuntary resettlement, land acquisition, population displacement and compensation.
OS 3: Biodiversity and ecosystem services	Biodiversity and ecosystem services. Requires, inter alia, that as part of the environmental and social assessment, the borrower or client identifies and assesses the potential opportunities for, risks to, and impacts on biological diversity and ecosystem services, including direct, indirect, cumulative and pre-mitigation impacts. It also requires the borrower or client to apply the mitigation hierarchy.
OS 4: Pollution prevention and control, hazardous materials and resource efficiency	Pollution prevention and control, hazardous materials and resource efficiency. This safeguard covers the range of key impacts of pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry-specific and regional standards, including greenhouse gas accounting, that other multilateral development banks follow.
AfDB - OS	Key Points
AfDB states ‘ <i>the borrower or client shall apply pollution prevention and control measures consistent with national legislation and standards, applicable international conventions, and internationally recognized standards and good practice – particularly the World Bank Group Environmental, Health and Safety (EHS) Guidelines</i> ’.	
OS 5: Labor conditions, health and safety	Labor conditions, health and safety. Includes requirements regarding working conditions, such as the management of worker relationships, workers organizations, non-discrimination, retrenchment, and the grievance mechanism, and it includes safeguards for the pretention of the workforce, addressing, for example, child labor.

In specific, the following AfDB policies and standards have been adopted:

- The Integrated Safeguards System (ISS) Policy adopted in December 2013
- The Gender Policy (2001) and Bank Group Gender Strategy (2013)

- AfDB Civil Society Engagement Framework (2012)
- Disclosure and Access to Information Policy (2012)
- Policy on Poverty Reduction (2001)
- Policy for Integrated Water Resources Management (2000)
- Environmental and Social Assessment Procedures (ESAP)
- AfDB ISS Guidance Materials
- AfDB ISS Sector Key sheets
- The Presidential Directive on Exploitation, Abuse and Sexual Harassment (PD. 2021.02)

6. ANALYSES OF ALTERNATIVES

6.1 Site Selection Alternatives

The GoE has allocated to the NREA through Prime Ministerial Decree No. (37/4/15/14) of 2015 land for development of renewable energy projects through usufruct rights.

The area was proposed by the National Centre for Land-use Planning and was approved by the Council of Ministers. In line with the decree, the government assigned about 7,600km² in the GoS, east and west of the Nile, Benban and Kom Ombo regions, of which about 5,700km² are for wind projects (75% share) and about 1,900 km² for solar energy projects (25% share). This includes an area of 1,220 km² in the GoS with a total capacity of 3,550 MW for wind power projects (IRENA, 2018).

Of the 1,220 km² area in the GoS, currently an area of around 300km² is being developed for multiple wind farm projects as noted in Figure 12. The key factors taken into account for selection of this area include the following:

- The area is under governmental ownership and, therefore, does not require land acquisition measures;
- The area is mostly free from competing uses;
- The area is presumed to be one of the areas in Egypt with the highest wind power potential;
- The area mostly consists of vast desert grounds;
- The geomorphology of the area is favourable for wind power development requiring limited construction and landscape modification measures; and
- The access to the area can be considered to be easy requiring only limited road construction measures.

Based on the above, NREA granted the Developer full access rights to the specific Project for the development of a 550 MW Wind Farm Project (i.e. PLOT 1). Therefore, taking the above into account, there are no site alternatives that were considered by the Developer in this case.

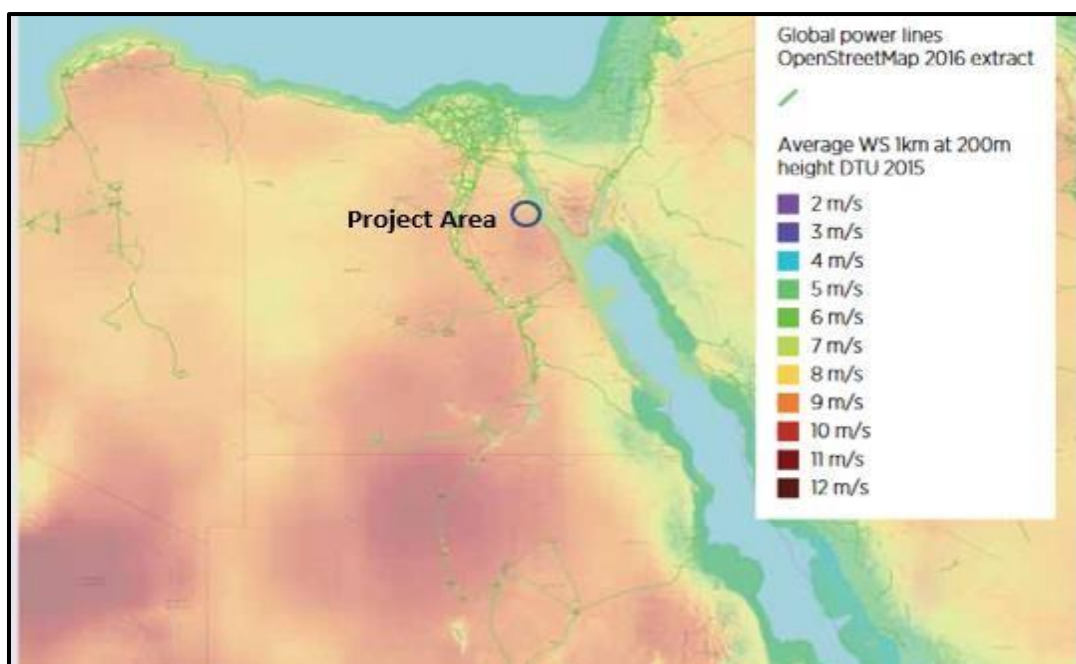


Figure 18 Egypt's Wind Atlas (Source: IRENA, 2018)

6.2 Technology Alternatives

This section discusses several alternatives besides the development of a wind farm project. This mainly includes other renewable energy alternatives suitable for Egypt, as well as other technological alternatives for power generation such as conventional thermal power plants.

6.2.1 Renewable Energy Development Projects

As discussed earlier, the GoE has taken bold steps to adopt an energy diversification strategy with increased development of renewable energy and implementation of energy efficiency, including assertive rehabilitation and maintenance programs in the power sector (IRENA, 2018).

To this extent, in 2013, the Arab Republic of Egypt (through the Ministry of Electricity and Renewable Energy) had developed and adopted the ISES 2015 – 2035, which provides an ambitious plan to increase the contribution of renewable energy to 20% of the electricity generated by the year 2022, through hydro, wind, and solar.

Egypt enjoys favourable solar radiation intensity and it is considered one of the most appropriate regions for exploiting solar energy both for electricity generation and thermal heating applications. Similar to the wind power development process, the GoE is developing many solar development projects (to include solar Photovoltaic (PV) and concentrated solar power) through the BOO mechanism and other (such as the Feed-In Tariff mechanism). Such development projects have been identified within key areas that provide the most favourable potential and conditions for solar development – this includes but not limited to Kom Ombo, West Nile, Hurghada, Zaafarana, Benban and other.

With regards to hydropower, the main hydro resource in Egypt is the Nile River, with the highest potential in Aswan where a series of power stations are located. Within this context, several projects have been realised and several other hydroelectric plants are being developed.

Taking the above into account, with regards to the Project site in specific it is best utilised for wind power projects. According to Egypt's Wind Atlas (Wind Atlas for Egypt Measurement and Modelling

1991-2005), the country is endowed with abundant wind energy resources, particularly in the GoS area. This is one of the best locations in the world for harnessing wind energy due to its high stable wind speeds that reach on average between 8 and 10 m/s at a height of 100m, along with the availability of large uninhabited desert areas. Check Figure 12 below.

Therefore, as discussed earlier, the GoE has allocated to the NREA through Prime Ministerial Decree No. (37/4/15/14) of 2015 an area of 1,220km² in the GoS for wind development projects.

6.2.2 Thermal Power Plants

Other energy generation alternatives suitable to be built in Egypt include conventional thermal power plants, similar to others already existent in the country. Despite the advantages that a solution of this kind would entail - such as a potential bigger energy generation capacity or the creation of more jobs during both construction and operation - the disadvantages would be significant; especially those related to environmental impacts. Conventional thermal power plants are well known for their environmental impacts when compared to this Project and could include significantly higher water consumption, generation of air pollutants and greenhouse gas emissions, etc.

More importantly, as noted earlier such developments would not be in line with the Government's ISES 2015 – 2035" which in broad terms advocates for the diversification of energy resources and increasing the share of renewable energy to 20% in 2022.

6.3 Design Alternatives

6.3.1 Strategic Environmental Social Impact Assessment (Strategic ESIA)

As discussed earlier, currently an area of around 300km² in the GoS is being developed for multiple wind farm projects. NREA has granted the Developer full access rights to the specific Project for the development of a 550 MW Wind Farm Project (i.e. PLOT 1).

A Strategic Environmental and Social Impact Assessment was undertaken for the 300km² area (was carried out by the Joint Venture (Lahmeyer International GmbH and Ecoda) on behalf of NREA).

One of the objectives of the Strategic ESIA Area was to investigate the cumulative impacts of the wind farm developments and identify constraints to be taken into account by the various developers.

The Strategic ESIA Area investigated key E&S attributes to include biodiversity, birds, bats, land use, archaeology and cultural heritage, etc. In summary, the Strategic ESIA Area identified some constraints that should be taken into account. In addition, the approval requirements identified by EEAA on the Strategic ESIA Area also identified additional requirements. Those are identified below and have been taken into account (as applicable) by the Developer as part of the layout of the Project components.

It is important to note that at the time of the development of the Strategic study, the GoE had only approved the maximum tip height of turbines of 200m. However, in July 2022, new governmental regulations have provide for an increase in tip height of up to 220m.

Table 25 E&S Constraints Identified within the Strategic ESIA and its Permit

E&S Attribute	Requirement	Adherence
---------------	-------------	-----------

General	Adherence to all specification and conditions included within the 300km ² ESIA study.	This will be adhered to as applicable
Avifauna Discussed in further details in “Section 7.5.6.”.	a) Avoid continuous lighting of turbines. Use minimum number of intermittent flashing lights in accordance with civil aviation authority requirements. b) Paint turbine blades to increase blade visibility by using blades with black and white aviation markings. c) Adhere to a buffer area of 1km from any adjacent wind farms that is parallel to the bird migration pattern. d) Minimum distances between wind turbines to be not less than 3 x 12 rotor-diameter to provide corridors for bird migration. e) Restrict turbine height to a maximum total tip height of 120 m (as collision risk increases with height). f) Avoid turbines with lattice towers in order to reduce suitable perching sites.	a. Adhered to this requirement. b. This requirement will be revised within the new environmental permit that will be issued by EEAA. c. This requirement will be revised within the new environmental permit that will be issued by EEAA. d. This requirement will be revised within the new environmental permit that will be issued by EEAA. e. As explained earlier, new governmental decision has been issued approving turbine heights of 220m. f. Adhered to this requirement. g. This requirement will be revised within the new environmental permit that will be issued by EEAA.
	a) Utilize underground electricity cables. If the use of overhead lines cannot be avoided (e.g. 220 kV OHL), such overhead lines should be designed according to the guidelines b) “Protecting birds from power-lines, Nature and environment No. 140, Council of Europe Publishing”; and c) Analogous measures should be applied at any substation to be built in that area.	h. Adhered to this requirement

Biodiversity Discussed in further details in “Section 7.5.3”.	a) Installation of turbines and other technical installation should be avoided in areas settled by the Egyptian Dabb Lizard. Execution of reconnaissance on Egyptian Dabb Lizard burrow sites prior to detailed design. Installation of turbines and other construction measures are to be avoided at a distance of 250 m from Egyptian Dabb Lizard burrows.	This requirement will be revised within the new environmental permit that will be issued by EEAA.
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In addition, one of the objectives of this ESIA is to build on the outcomes of the Strategic ESIA and investigate/identify any further site-specific E&S constraints to be taken into account by the Project developer throughout the planning and design phase of the Project.

However, as presented throughout the ESIA, no further site-specific constraints have been identified in relation to the Project site. Therefore, there are no additional design alternatives to be considered in relation to E&S issues. However, the ESIA identifies additional E&S requirements which must be taken into account as presented throughout the document.

Overall, the following mitigation measures are strongly recommended as part of the EIA Study of the NREA Concessionary Area pertaining to the mitigation of wind turbines’ potential impact on avi-fauna:

- Avoid wind turbines with a maximum height of more than about 100m, because the majority of birds migrate well above 100m
- Avoid turbines with lattice towers in order to reduce suitable perching sites.
- Avoid lighting of turbines. If lighting of turbines is absolutely required, use the minimum number of intermittent flashing white lights of lowest effective intensity
- Paint turbine blades to increase blade visibility according to HODOS (2003): a single, solid black blade or a single blade with thin stripe patterns paired with two white blades.
- Avoid small turbines with high-speed rotors and with turbines closely packed together.
- Maintain a corridor aligned with main flight directions (south-southeast in autumn and north-northwest in spring) with a breadth of more than 1 km between wind farms at reasonable distances.
- Implement a detailed post-construction monitoring programme in order to:
 - verify the assumptions gathered within the impact assessment and determine significant
 - deviations from predicted impacts;
 - determine the weight and significance of proposed impacts (especially collision rate);
 - examine behaviour of migrating birds in the vicinity of the proposed wind power plant;
 - examine the conditions in which collisions occur and the cause-and-effect chain of collisions;

- test the effectiveness of mitigation measures;
- (if so) identify critical wind turbines;
- (if necessary) maintain further mitigation measures (acoustical deterrents, temporal shutdown of critical turbines);
- (if necessary) remove problem turbines associated with unacceptable mortality

NOTE: all of the above requirements have been considered within this ESIA as applicable. However, for requirement: (i) are outdated (e.g. requirement related to maximum top height of 100m where the GoE not allow developments up to 220m) or (ii) will be updated based on the updated environmental permit that will be issued by EEAA for this project (e.g. maintaining a 1km corridor)

6.4 No-Project Alternative

The 'no Project' alternative assumes that the Project will not be developed. Should this be the case, then the Project site area would remain the same. The land area would remain with its current characteristics – a vast desert grounds with sparse vegetation.

Should the Project not move forward, then the Project-related negative environmental impacts discussed throughout this ESIA would be averted. However, as noted throughout the ESIA, generally such impacts do not pose any key issues of concern and can be adequately controlled and mitigated through the implementation of the ESMP discussed in "Chapter 9". Nevertheless, should the Project not move forward; the significant and crucial positive economic and environmental benefits would not be realised. Such benefits include the following:

- This development allows for more sustainable development and shows the commitment of the GoE to realizing the energy strategy;
- Contribute to increasing energy security through development of local energy resources and reducing dependency on external energy sources;
- The clean energy produced from renewable energy resources is expected to reduce consumption of alternative fuels for electricity generation, and will thus help in reducing greenhouse gas emissions, as well as air pollutant emissions; and
- Project is expected during the construction and operation phase to generate local employment and commit to other social responsibilities. As such, this is expected, to a certain extent, to subsequently enhance the socio-economic conditions and standards of living of the local communities.

In conclusion, an ESIA must investigate all potential positive and negative impacts from a project development. In the case of this Project, it is important to weigh the significant positive economic and environmental impacts incurred from the Project development, against the negative environment impacts anticipated at the site-specific level – in which generally this ESIA concludes to be minor in nature and can be adequately controlled. The comparison in this chapter clearly concludes that the 'no Project' alternative is not a preferable option.

7. EXISTING PHYSICAL, BIOLOGICAL AND SOCIAL ENVIRONMENT

7.1 Landscape and Visual

This section provides an assessment of baseline conditions within the project site and surrounds in relation to landscape and visual aspects.

7.1.1 Baseline (Site) Assessment Methodology

A site assessment was undertaken to characterize the general landscape and topography characteristics of the Project site.

In addition, the site assessment also focused on identifying any key critical visual receptors within the Project site and a 5km radius from the area. Moreover, based on desktop review and consultations with relevant stakeholders (Red Sea Governorate), any current plans in the area as well as key visual receptors within a 10 km radius from the project site were identified.

Such distance (10 km radius) was considered, given that based on several European guidelines and regulations, four zones of potential visual impact are identified which can be distinguished as noted in Table 16: up to 2km, 2-5km, 5-10km and exceeding 10km. At distances greater than 10 km, visibility impacts are not relevant and can only be seen as minor elements in the landscape (if seen at all).

Table 26 Classification of Different Zones of Potential Visual Impact

Distance	Perception of tall, man-made structures	Impact
Up to 2 km	perceptible, likely to be a prominent feature in the landscape	high impact
2 to 5 km	regularly perceptible, relatively prominent	moderate impact
5 to 10 km	only perceptible in clear visibility, seen as part of the wider landscape	low impact
> 10 km	only occasionally seen in very clear visibility, only minor element in the landscape (if at all)	no relevant impact

7.1.2 Results

Landscape and Topography

The Project site is a plain area with fine topography except at the upstream part of the mainstream of Wadi Hawashyia basin. The ground surface of the whole project area is covered by clastic sediments of gravels, pebbles and sometimes boulder of different rock fragments imbedded in fine sand and silt.

The Project site is completely devoid of any dense vegetation, nonetheless for some simple seasonal grasses that grow after the rain falls in scattered spots in front of the first dam in Wadi Hawashiya and the streams of some shallow drainage. Long, wide and shallow dry wadies represent the upstream parts of the drainage basins the project area on their way from WNW down to ESE direction.

The figures below present the genera landscape and topography features of the Project site, starting from the northern parts to the southern parts.

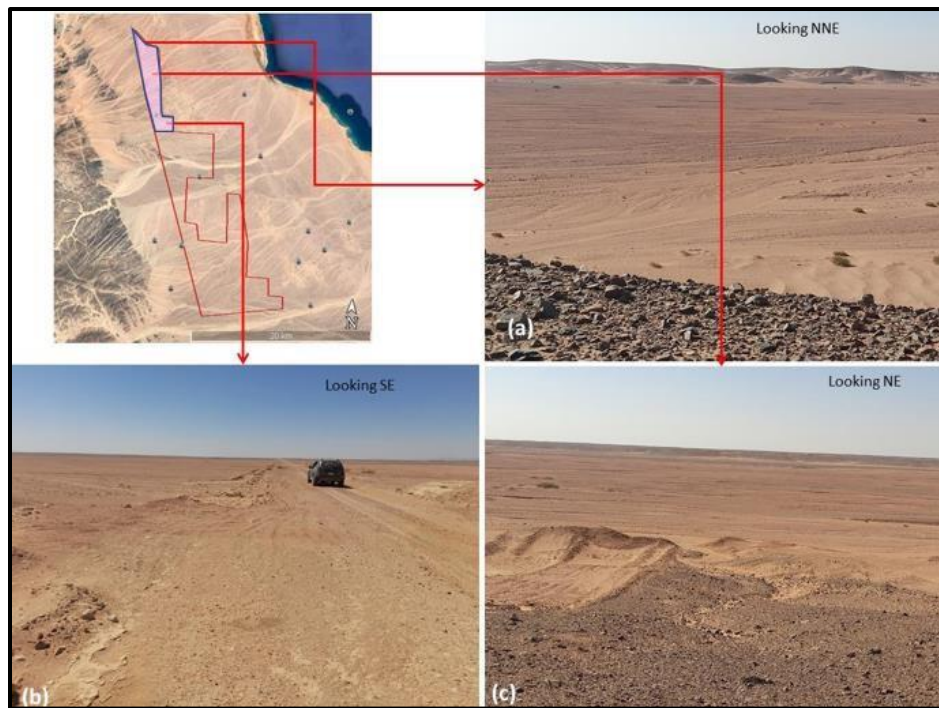


Figure 19 Regional topography of the project site. Wide and shallow drainage lines bounded by elevated lands.

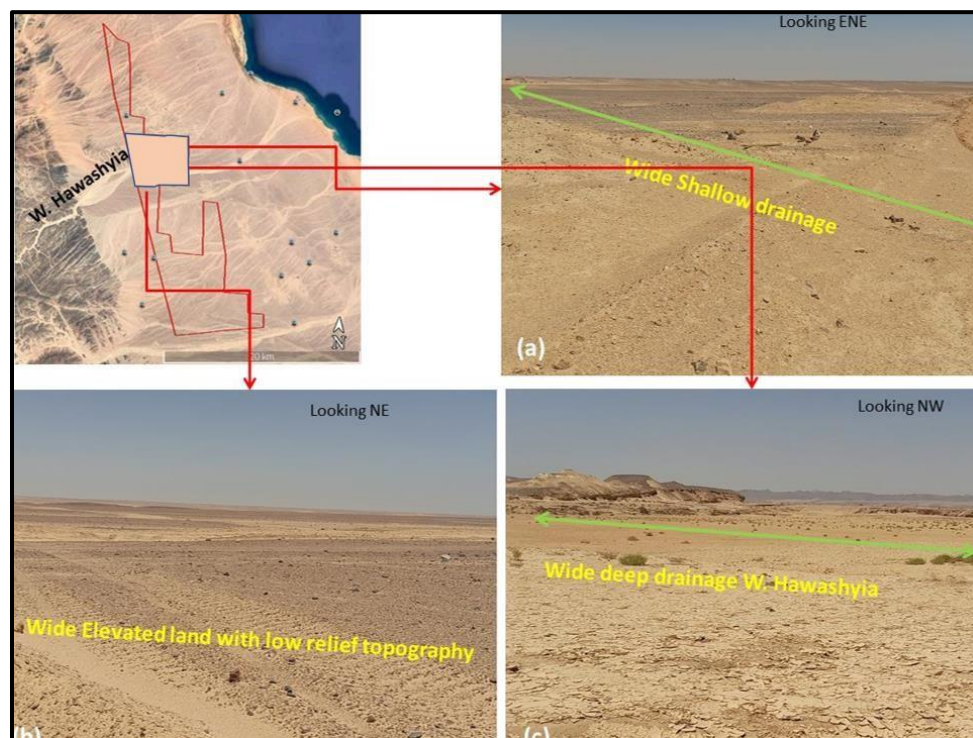


Figure 20 Simple relief areas either along the wide shallow drainage lines (a) or the surface of the elevated

lands. (b). Note that the rough topography at the upstream part of Wadi Hawashyia(c)

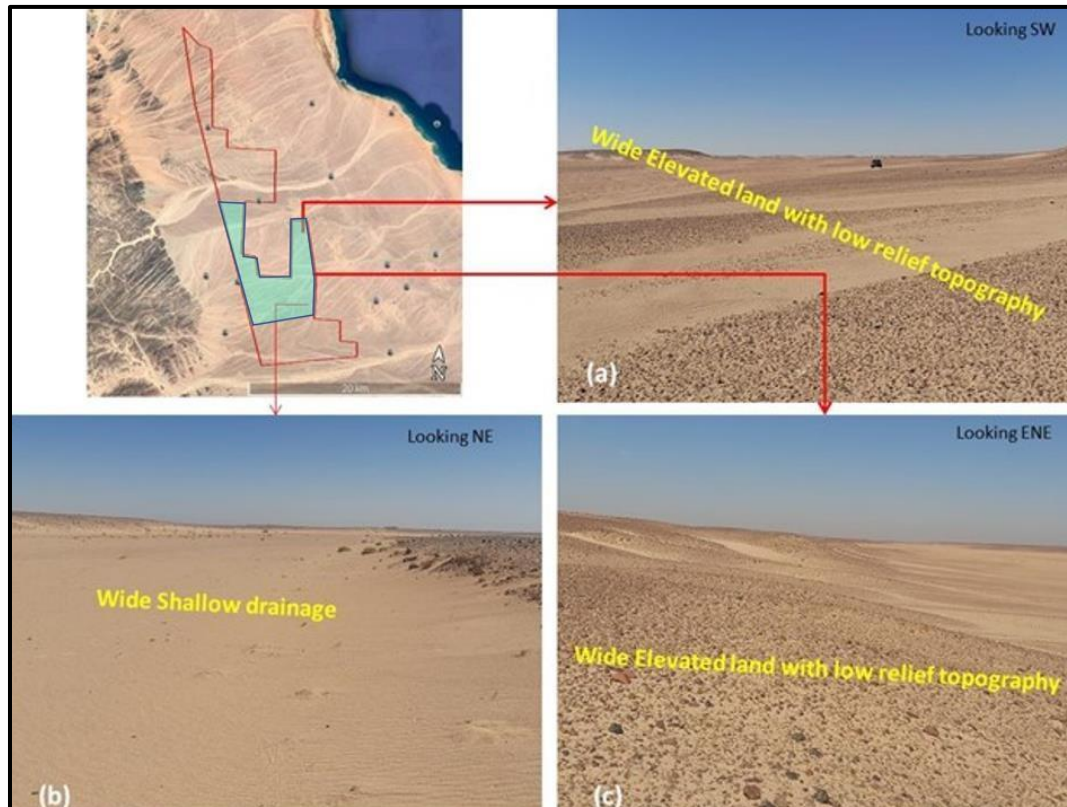


Figure 21 Simple relief ground surface of the wide drainage lines and elevated lands at the west of the middle part of the site

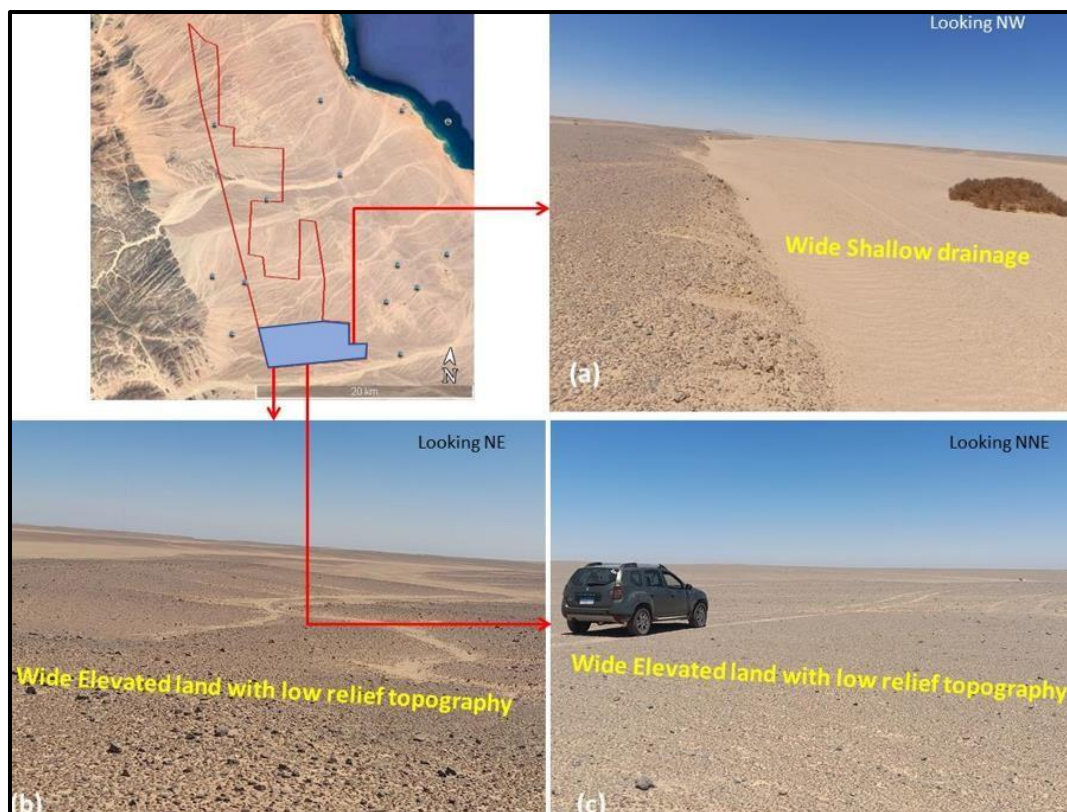


Figure 22 Simple relief ground surface of the wide drainage lines and elevated lands at the south of the site
Visual Receptors

Critical visual receptors are identified as those normally seen as valuable by the human perception and include recreational activities, environmental reserves, local community settlements, remarkable historical or cultural sites, and other.

Based on the literature review and consultations, no critical visual receptors were identified within the 10km radius. The area in general includes the following:

- Petroleum activities;
- Several planned and existing wind farms;
- Existing Overhead Transmission Lines (OHTL) and substations;
- Dam;
- Telecommunication towers; and
- Several military posts.

Description and location of all of the above facilities is provided in more details in “Section 7.8”. The closest visual receptor that can be identified would be Ras Ghareb city located at around 19km to the east. Other key critical visual receptors are located at a distance from the Project area. This includes for example: (1) closest key archaeology/cultural heritage site (harbor complex dating to the Old Kingdom located at more than 60 km away), (2) key biodiversity areas (Gabal El Zeit Important Bird Area located more than 12km away); (3) a touristic resort located more than 50 km to the north.

7.2 Land Use

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to land use.

7.2.1 Baseline Assessment Methodology

The baseline assessment of the 'formal' land use was based on collection of secondary data and plans available from the relevant governmental entities including items such as: (i) formal land use planning for Ras Gharib; and (ii) area of critical environmental concern planning. In addition, the ESIA Team reviewed the different studies undertaken for the area.

Understanding and characterising the informal, customary, or actual land use of the Project site was required a detailed land use survey for the Project site and encompassing a 2km radius. This was to enable an understanding of any informal land use activities undertaken in and around the Project site such as physical activities (houses, structures, etc.) or economical activities (such as grazing, agricultural, petroleum activities, etc.). The ESIA Team incorporated consultations with relevant stakeholders to further understand any informal, customary, or actual land use practices as identified throughout the text below.

7.2.2 Formal Land Use

Strategic Planning

Consultations were undertaken with the Ras Gharib Local Unit to understand the formal land use plan set for the Project area. According to such consultations, the specified area for the project is not in the City's plan and based on "Presidential Decree No. 116 of the year 2016", it has been allocated to NREA for the development of wind farm projects. These plots have been allocated to various developers by NREA.

Land Ownership

The Government of Egypt (GoE) allocated to the NREA through "Presidential Decree No. 116 of the year 2016", land for development of renewable energy projects through usufruct rights. The area was proposed by the National Centre for Land-use Planning and was approved by the Council of Ministers. In line with the decree, this includes an area of 1,220 km² in the Gulf of Suez (GoS) with a total capacity of 3,550 MW for wind power projects in which the Project site is located.

Based on the above, NREA has granted the Developer full access rights to the specific Project for the development of a 550 MW Wind Farm Project (i.e. PLOT 1). Therefore, the land is currently under the ownership of NREA.

7.2.3 Informal Land Use

As discussed earlier, a detailed land use survey was undertaken for the Project site to understand any informal land use activities undertaken such as physical activities (houses, structures, etc.) or economical activities (such as grazing, agricultural, etc.).

Few activities may occur and no such structures other than the Buhaira One Dam and decommissioned

petroleum wells and pools were identified (Refer to Section 7.8). No evidence of such activities (e.g. ploughing marks, abandoned structures, livestock remains, etc.) were observed indicating the land's use for herding, recreation nor residence. However, various infrastructure elements were recorded within the Project site and which are discussed in further details under "Section 8.8". This includes telecommunication towers, closed oil wells, high voltage lines, etc.

In general, Bedouin tribes claim rights to lands within the GoS based on their knowledge of the area and the alleged history of their family living there for generations, even though they do not have official documents to support such claims. This practice is followed up by "Urfi" contracts however such documents are not considered by the GoE as official documents and are not considered to be supported legally.

However, a key point to be considered under informal land use is related to Bedouin Groups. The key Bedouin group known in the area is the Tabbna and the Hamadin families. In general, local Bedouin tribes do not abide to the legal process required to own land. Therefore, Bedouins apply a type of customary ownership which is not an official process known as Urfi Contracts and Ghafra System.

Bedouin tribes claim rights of these lands based on their knowledge of the area and the alleged history of their family living there for generations, even though they do not have official documents to support such claims. This practice is followed up by "Urfi" contracts however such documents are not considered by the GoE as official documents and are not considered to be supported legally. Furthermore, aiming at declaring their possession of the lands, separate houses are built and scattered in such lands. The residents construct the houses with no legal license.

Consultations were undertaken with the head and elders of such Bedouin families (refer to Section 4.5.) Key outcomes are summarised below:

- There are no stable Bedouin communities in or near the Project site (i.e. Bedouin communities that settle either permanently, temporarily or nomadically). The only settled villages in the desert for Bedouin families are in Zaafarana and Wadi Dara Which is at least 50 km away from the Project site; and
- The Project site or the surrounding areas does not have any key land use activities for them such as grazing or farming activities. However, the area in general is subject to their Ghafra System that is divided between two families, the Tabbna and the Hamadin families as discussed earlier. Responsible for the Ghufrah of the project sites is Hamadin family.

7.3 Geology, Hydrology and Hydrogeology

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to geology, hydrology, and hydrogeology.

7.3.1 Baseline Assessment Methodology

The assessment was based on review of secondary data to include literature review of previous publications and studies related to geology, hydrology and hydrogeology. In addition, a site assessment was undertaken to confirm and verify the outcomes of the literature review and document conditions on the ground.

7.3.2 Geology

Site geology is one of the most important fundamentals concerning the base line study of the project. The area lies on a wide coastal plain southeast of the southern Galala plateau (Figure 17). The content, herewith, considered the stratigraphy of exposed rock units, the soil and the important structure

anomalies detected in the area. In general, the hazard of seismic activity indicated in the “Egyptian Code of Loads and Forces in Structural and Building Works” for structures in the area of Ras Ghareb city, a peak round acceleration of 0.20 g should be adopted in the seismic design of the project structures. Given the soil conditions, the soil layers below foundation level of the wind turbines could be classified as Soil Class B.

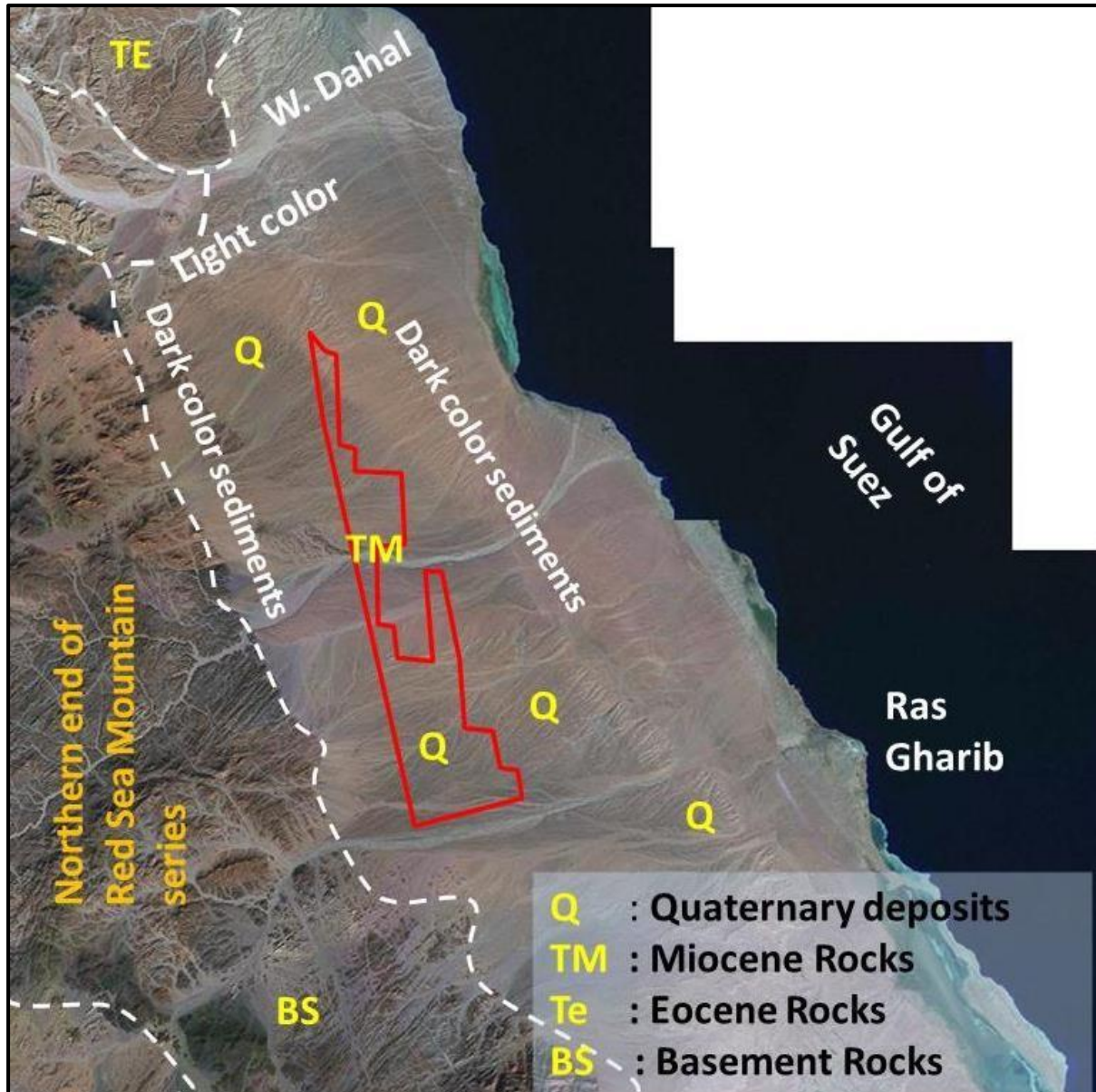


Figure 23 Land sat image showing the location of the project site to the east of the Red Sea mountain series. Note that the ground surface of whole project area is covered by Quaternary deposits

The Gulf of Suez Region forms a distinct structural unit that was involved throughout time in movements that brought it under the sea for almost the entire length (Figure 18). The gulf area was subjected to tectonic movements that led to the accumulation of a great thickness of sediments in this continuously subsiding area (Said, 1962). According to the “Uniform Building Code” (1997), the soil profile type does not indicate geologic hazards (such as soil liquefaction) in the event of an earthquake as no groundwater was encountered.

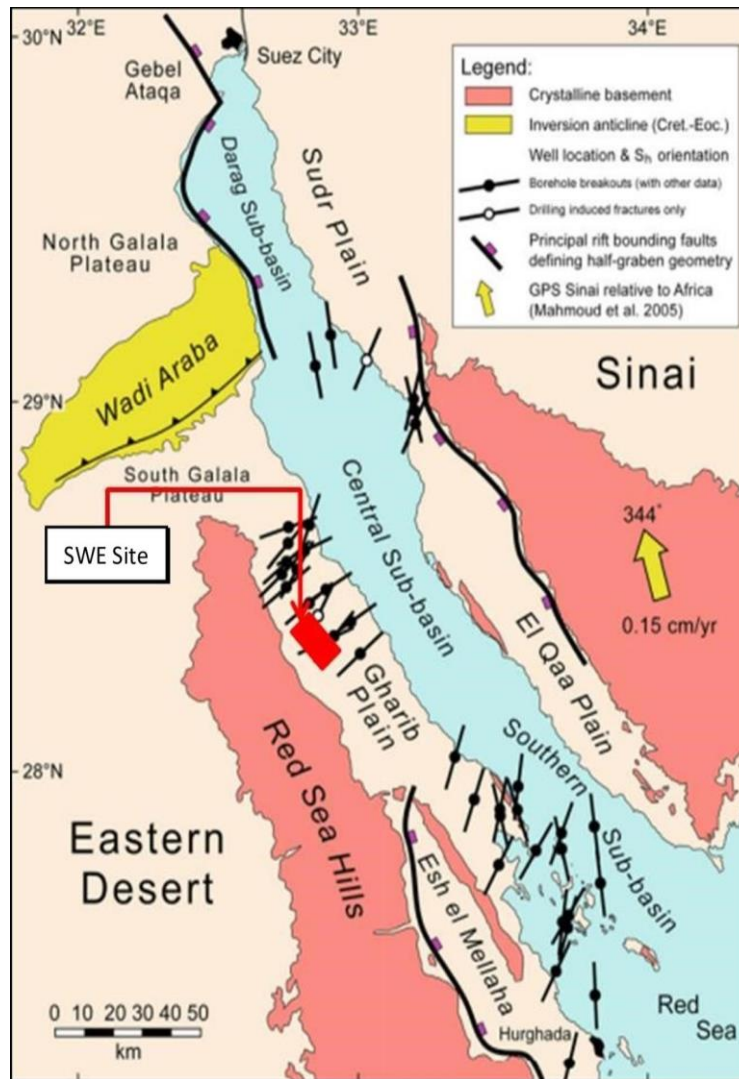


Figure 24 The structure domains of the Gulf of Suez. The project is located in Gharib plain. (Bosworth and Durocher 2017).

Geological Setting

The project site is a part of Gharib plain (Figure 18). The plain extends NE-SW parallel to the Gulf of Suez and bounded from the west by the higher mountainous range, the northern part of Red Sea mountainous series which composed of igneous and metamorphic rocks, and from the east by western coast of the Gulf of Suez.

Geologically site is located in the sedimentary basin called West Bakr that has many productive petroleum wells. Based on Conoco and the Egyptian general petroleum company (EGPC) 1987 and Conoco 1989, the basement (Igneous and metamorphic rocks of Precambrian age) outcrops to the west where the Quaternary deposits (Post-Miocene) are the main exposed sediments covering the whole project sit (Figure 28).

Stratigraphy

The exposed rock units in the site area and its surroundings (Figure 28) are represented by various lithologic associations ranging in age from Late Paleozoic to Quaternary. The exposed rock units in the project site are mainly of Miocene and Quaternary.

Basement Rocks

The exposed rock units of the basement rocks close to the project site are the two types of granitic rocks; older and younger granites.

Older granite or gray granite: forming low relief bodies with gray and whitish gray colors, medium to coarse grained equigranular and sometimes contains zenolithies in different sizes (Figure 20b,c). It is composed mainly of diorite, quartz diorite tonalities and granodiorites. It is highly weathered and easily eroded by running water. So, fragments in different sizes of this granite are much distributed in the surface deposits cover the whole surface area of the project site.

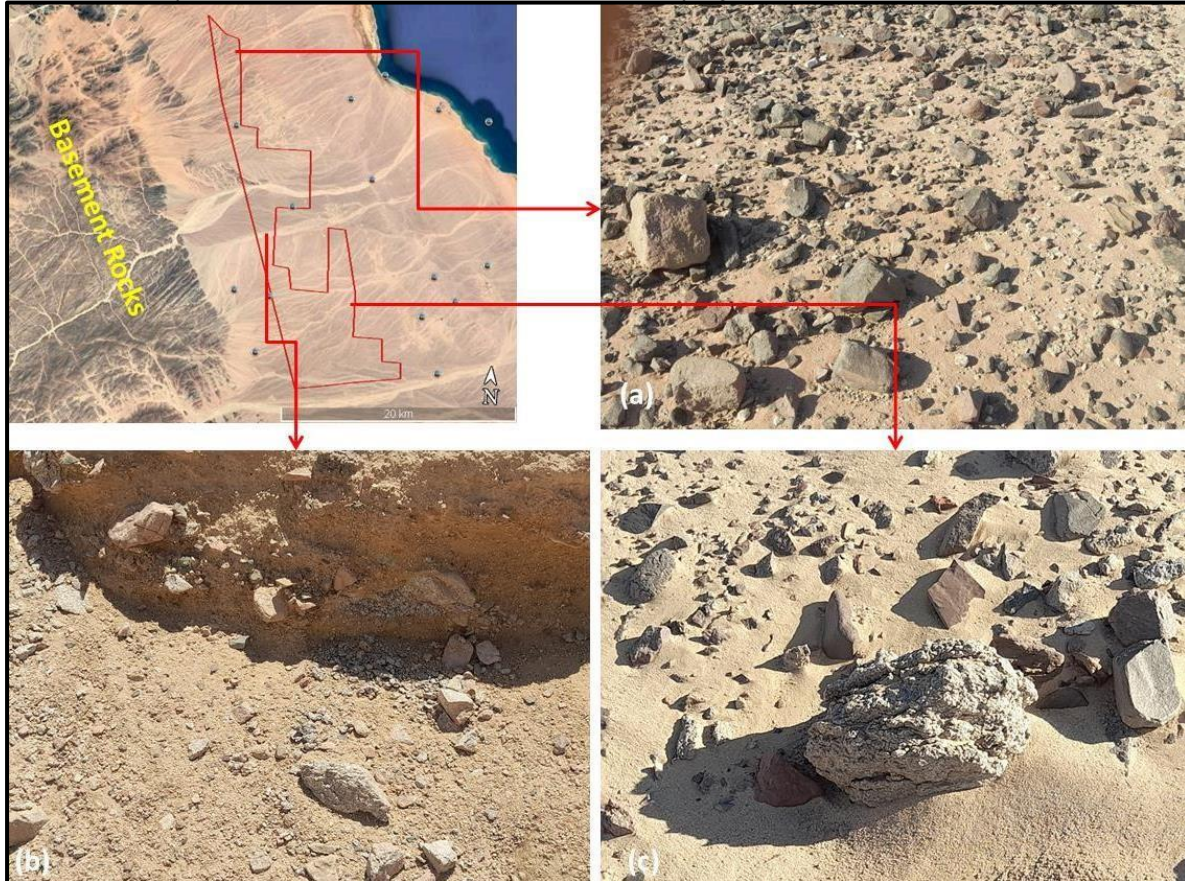


Figure 25 The high peaks of the basement rocks to the west of the site. Highly weathered boulder of older granite (light color) and younger granite (dark color) in addition to some basalt fragments from basic dykes intruded through the basement rocks.

Younger granite or red granite: forming highly elevated conspicuous peaks with sharp contacts with the adjacent rock units (Figure 20– a and c). It is composed of oligoclase feldspar, quartz, K-feldspar, and mafic minerals like biotite. Weathered fragments of this granite are distributed in the surface deposits in whole area of the project.

Lower Miocene clastics

These deposits exposed in the northern part of the site especially at the upstream part of Wadi Hawashya and composed of fined grained argillaceous sand and greenish shale (Figure 21). The deposits appear as a terrace form (elevated land) along the sides of wide drainage lines.

Upper Miocene Evaporites

These deposits exposed in the northern part of the site especially at the upstream part of Wadi Hawashya and composed of fined grained argillaceous sand and greenish shale. They have been

recognized by dark color and cavernous terraces of highly weathered evaporites dissected by wide and shallow drainage lines.

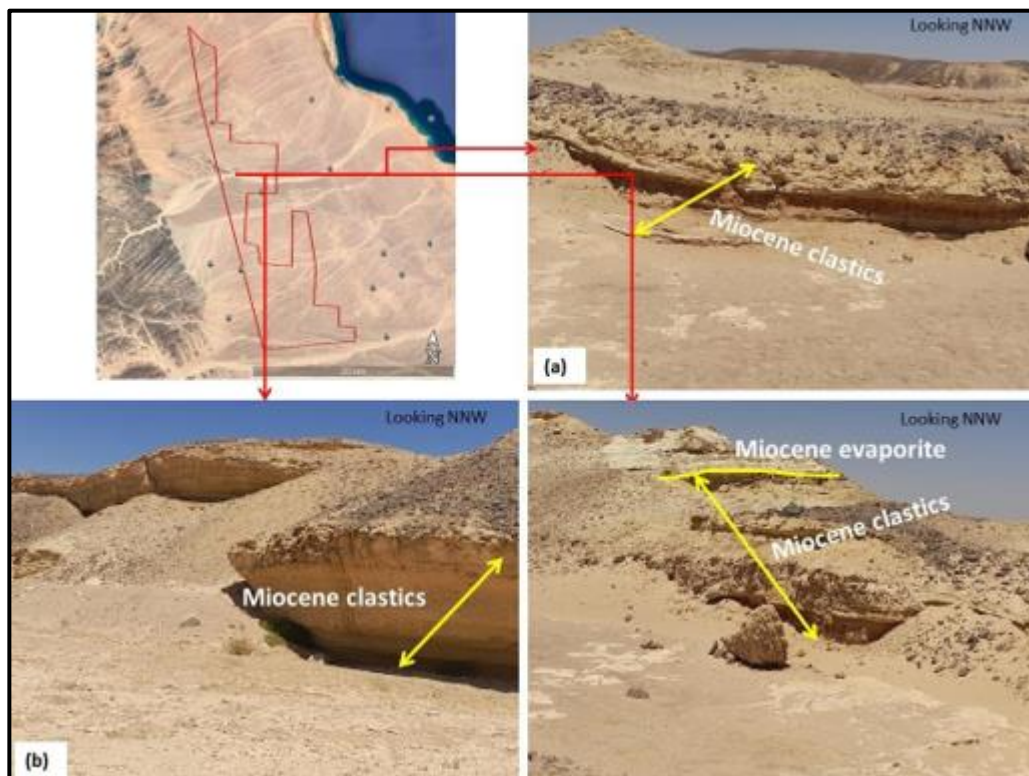


Figure 26 Lower Miocene clastics overlay

Quaternary Deposits (Post Miocene)

The Quaternary deposits (Post – Miocene) cover all the area of the project site. These deposits composed of gravels, sand, clay, aeolian sand sheets and sand accumulations. They are mainly clastic sediments of different textures ranging from silt to gravel size. The Quaternary sediments are the main cover of the project area on which all construction works are to be built. During the field survey, with the help of geological maps and aerial photographs, the different types of soil, characteristics and their location in the project area were investigated.

The soil (Quaternary deposits) covers almost all the projects area. They appear in the form of two alluvium terraces which have been described in the whole project site and in the surrounding area during the site visit; T1, and T2. T1 (the oldest terraces) differ in their height from the floor of the wadi in addition to the type and size of their components. Their elevation above the ground surface ranges from 0.5 to about 2 meters. They composed of very coarse to coarse gravels surrounded by low percentages of fine sand, silt and clay. These terraces are exposed as elevated lands between the courses of the wide drainage lines. Going to east the drainage lines become very wide and the elevation of the T1 terrace decreases.

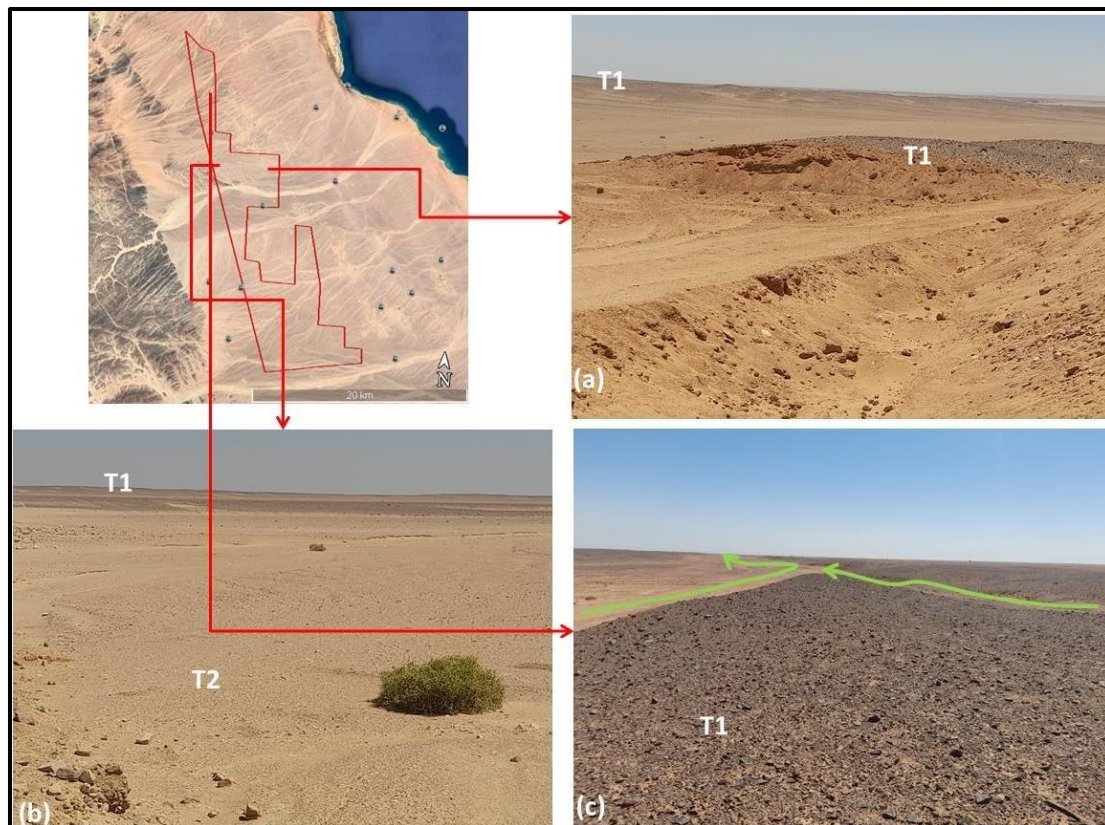


Figure 27 The T1 and T2 terrace exposed at the middle part of the site. Note that the well sorted surface of T1 because of surface water flow and wind carry fine sediments to the low laying terrace T2, (b)

T1: The older terrace

These terraces are exposed along the whole area of the site and dissected by numerous shallow and wide tributaries drain eastward to the Gulf of Suez. The maximum elevation of these terraces at the west part is about 2 m above the level of T2 (Figure 22 Figure 23 Figure 24) The thickness and the extension of these terraces gradually decrease towards the east through the project site. These terraces composed of vary sized rock fragments and chert nodules impeded in fine clay and sand. They are multi cyclic deposits where each depositional cycle stars with coarse grain conglomerates and going finer upward. The fine clay and sand fraction is lower than that in the preceding terrace (T2).

T2: Older Terrace and Sand-Clay Fractions

These terraces are exposed along the floor of the tributaries cutting through the T1 terraces (Figure 22, Figure 23, Figure 24). This terrace composed of medium sized chert nodules, fragments igneous rocks impeded in fine clay and sand (Figure 22). The fine clay and sand fraction are greater than that in the previous terrace (T1). Vertical variation in grain size (graded bedding) is well defined in the soil profile of these deposits (Figure 25 and Figure 26).

The following figures are field photographs show the distribution of these terraces in the project site and their variation in size and extension are well distinguished.

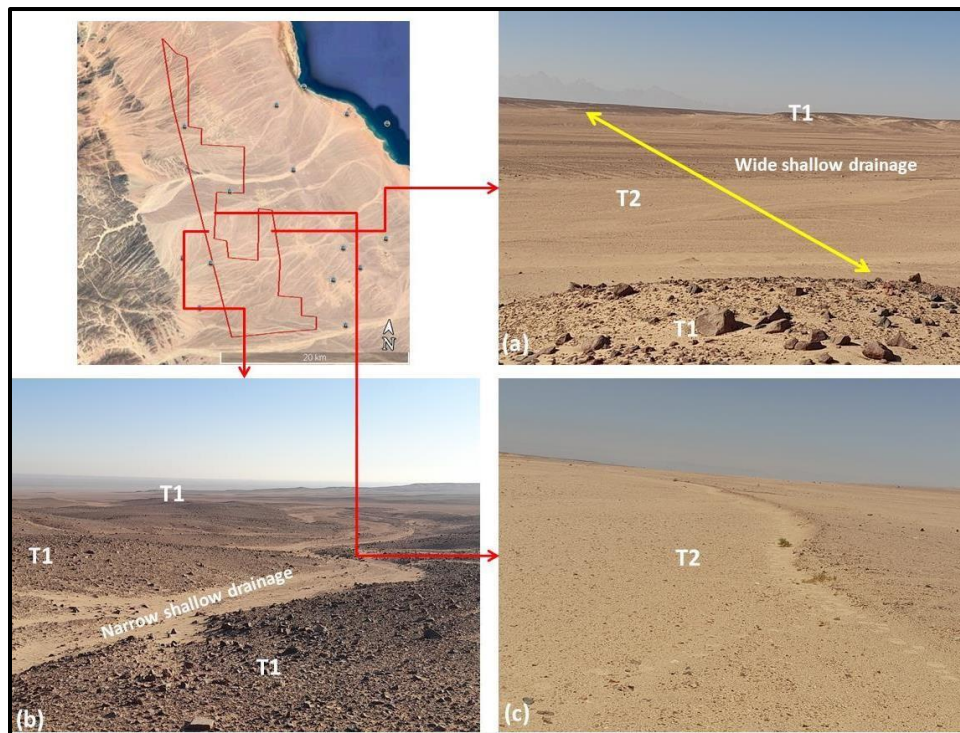


Figure 28 T1 and T2; (a&b) at the middle part, c) at the eastern part.

The thickness of the T2 terraces not specified because it represents the final base level of the drainages crossing the site. The T2 terraces composed of multi sized grain fragments impeded in fine silt and clay matrix. The deposits rich in fine clay and silt more than T1 deposits. The surface layer of these terraces rich in fine grain more than T1. The terraces are of multi cyclic deposits where each cycle started at the base by very coarse grain fragments with fining upward. This texture reflected the potential and duration of fluvial flood that responsible for the deposition of each cycle – refer to figures below.

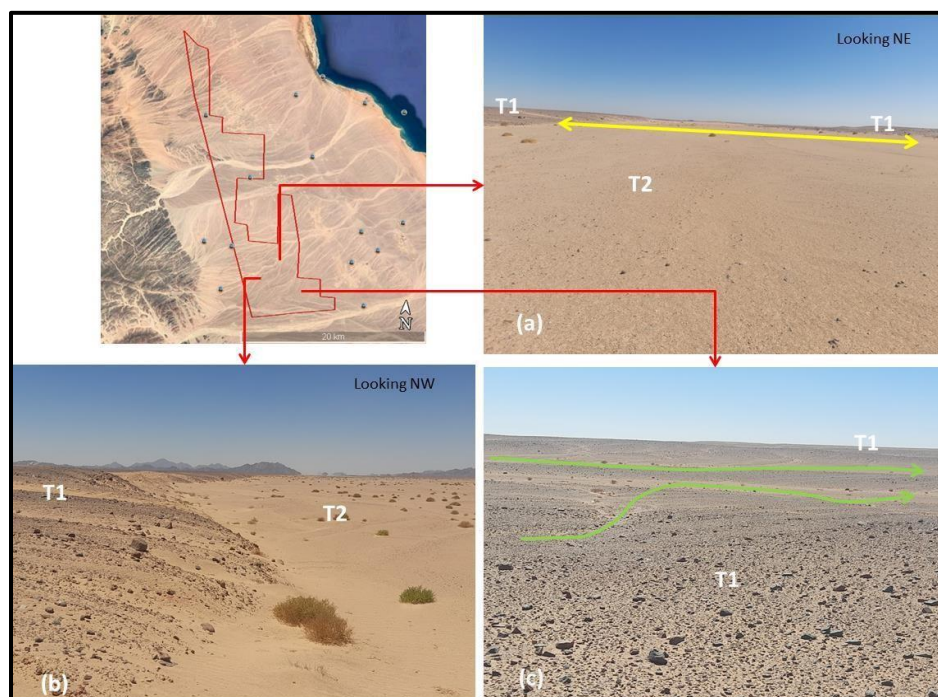


Figure 29 T1 and T2 at the southern part of the site. Note the appearance texture of the T1 (very Coarse)

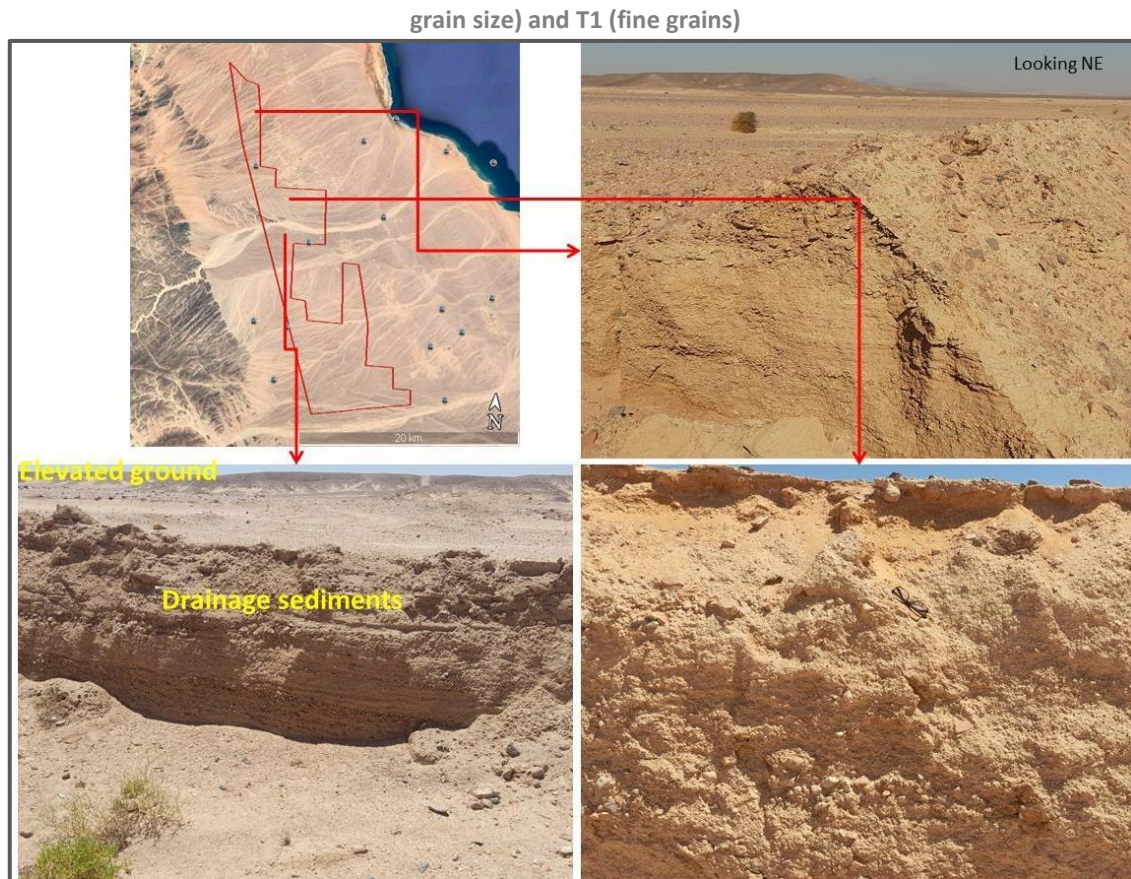


Figure 30 Texture and depositional condition of the T2 terrace in the northern part of the site. Note the grain size distribution and depositional cycles of the T1 terraces

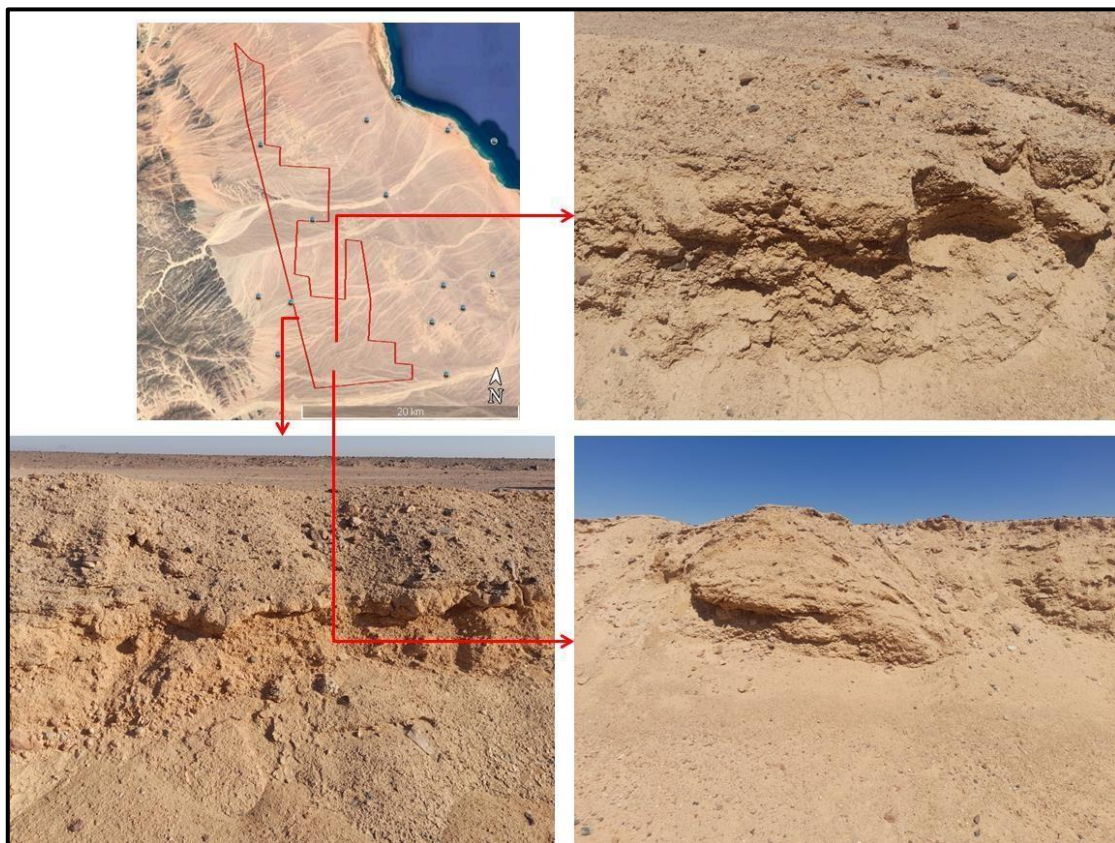


Figure 31 Texture and depositional condition of the T2 terrace in the middle part of the site. Note the grain

size distribution and depositional cycles of the T1 terraces.

Subsurface Geology

The project site located in a sedimentary basin called West Bakr that has many productive petroleum wells. These wells tap two aquifers; Post-Miocene and Miocene aquifers. Based on Conoco and the Egyptian general petroleum company (EGPC) 1987 and Conoco 1989, the basement outcrops to the west and southwest, while the Quaternary deposits (Post-Miocene) are exposed a in the whole area as shown in (Figure 17).

The Post-Miocene deposits (Mainly of Quaternary) which is composed mainly of gravels and sands are represented by large thickness in the basin. This thickness ranges from 100m in the west to about 450 m in the east (Masoud et al., 2012). The east–west geoelectrical cross section shows that the whole succession consists mainly of alluvial deposits with different grain sizes and porosities, (Figure 27).

The thickness of the alluvium in the main channel of Hawashya basin ranges from 80 to 200 m, and the thickness are thinning at the edge of basin to the west. The clay beds (the second and the lowermost geoelectrical layers) together with the overlying alluvium deposits reflect marked sequential cycles of deposition throughout the history of the basin development. The layers show regular regional dip towards the east. Four major normal faults have been found to affect the whole succession (Figure 27).

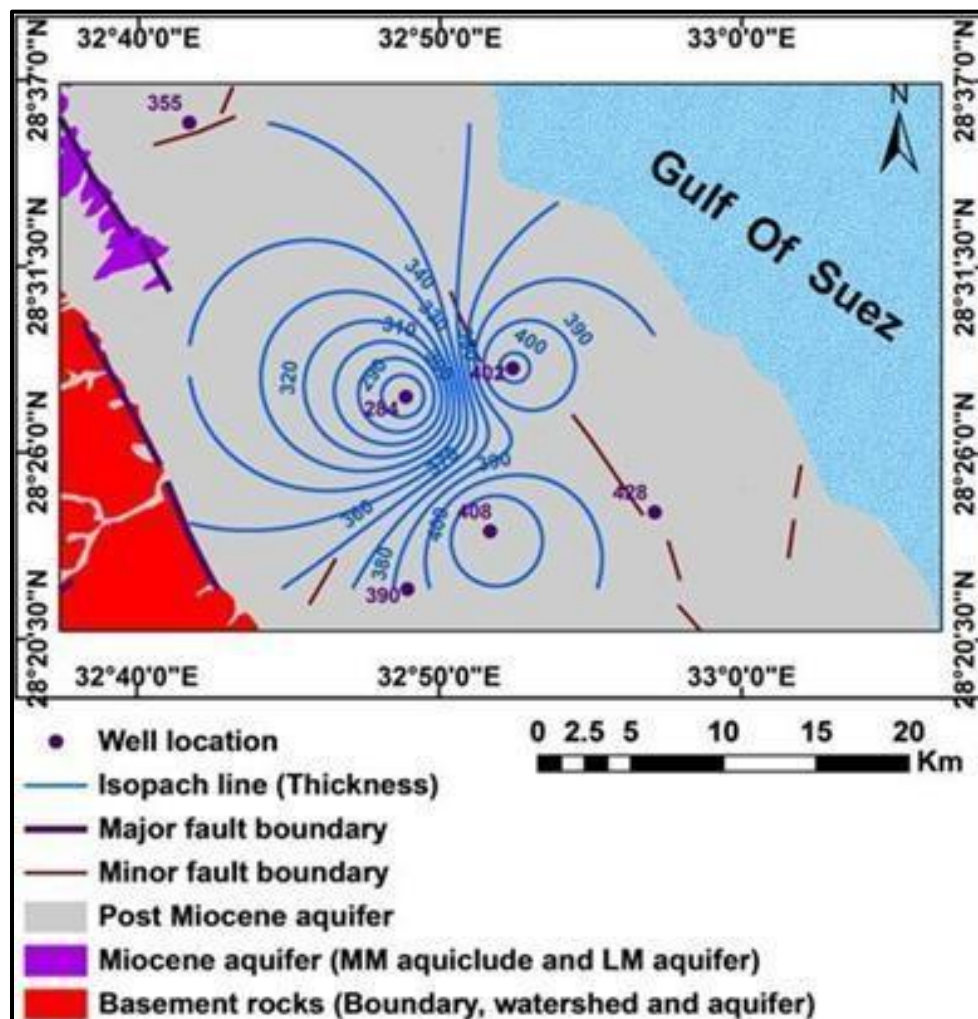


Figure 32 The thickness distribution map of the Post-Miocene deposits in El Hawashya basin, (Masoud et al.,

2012). Note the thickness of the Quaternary (Post-Miocene) deposits increase toward east.

7.3.3 Hydrogeology

As noted in the figure below, the project site is located in an area of wadi deposits, surrounded by local moderately to low productive aquifers with insignificant surface and limited sub-surface recharges.

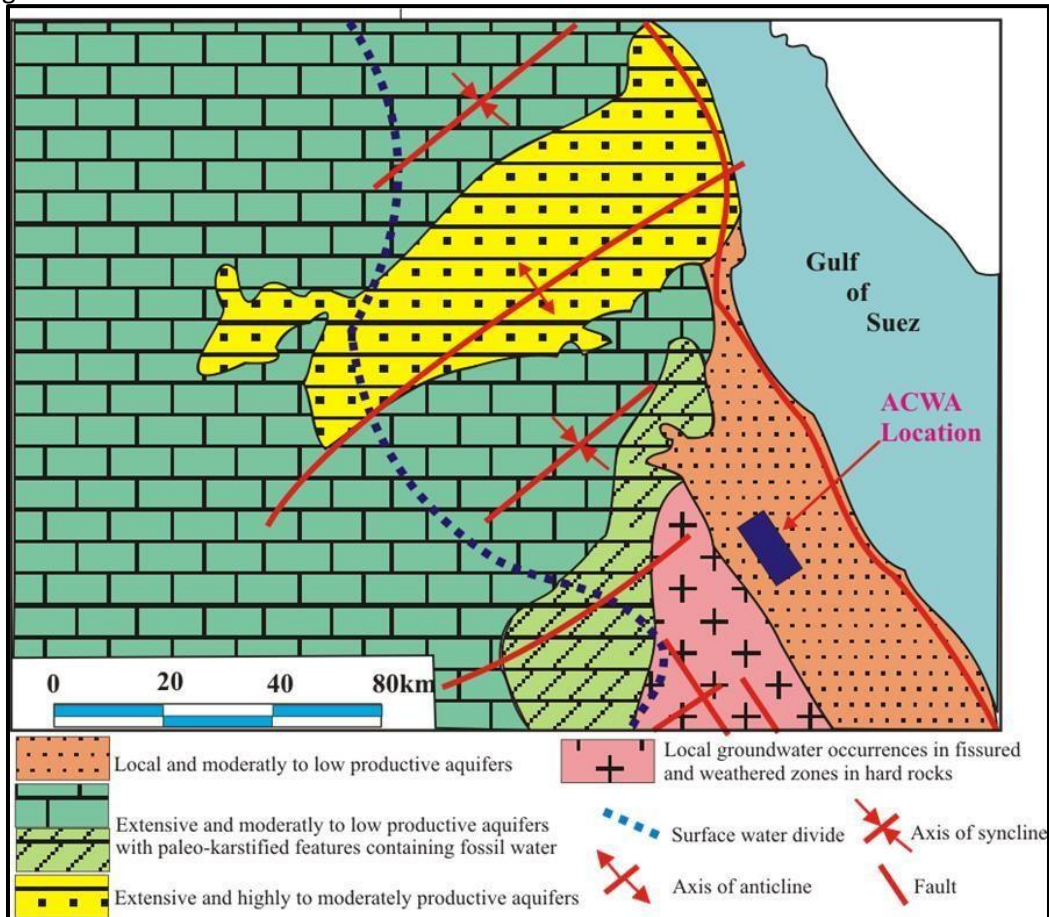


Figure 33 The hydrogeological map of the area around the project site.

Masoud et al., (2012) estimated the groundwater recharge in Wadi Hawashiya basin in the study area. He stated that the Post-Miocene deposits which are composed of gravels and sands are the main groundwater aquifer in the area. The thickness of these deposits ranges from 100 m in the west to 450 m in the east. From the available scarcity data, it is noticed that the water table level in the Post Miocene strata in Hawashiya basin have the same shape of the topography, this reflects that the groundwater aquifer in this area is unconfined aquifer (Figure 29).

The east-west geoelectrical cross section (Figure 29) shows that the whole succession consists mainly of alluvial deposits with different grain sizes and different porosities. The thickness of the alluvium in the main channel of Hawashiya basin ranges from 80 to 200 m, and the thickness are thinning at the edge of basin. The layers show regular regional dip towards the east. Four major normal faults have been found to affect the whole succession.

This means that the main recharge source of the aquifer is through the downward infiltration of rain water. This leakage water is kept in the upper layer of the wadi fill sediments as a result of the presence of impermeable clay bed at the bottom. Since the general dipping of these layers is toward the east and the absence of subsurface natural barriers to stop the flow of groundwater, its fate is finally to

the Gulf. Therefore, there is no chance of an effective groundwater aquifer in this region. Concerning the lower layers (below the clay bed), the conditions of charging them with rain water is low even if water comes from faraway places or through faults in the area. This water eventually reaches the Gulf; therefore, the existence of fresh groundwater aquifer in this area is unexpected due to the limited rain water falling on the area in addition to the general dip of the subsurface layers to the east and the absence of natural barriers to stop the flow of groundwater.

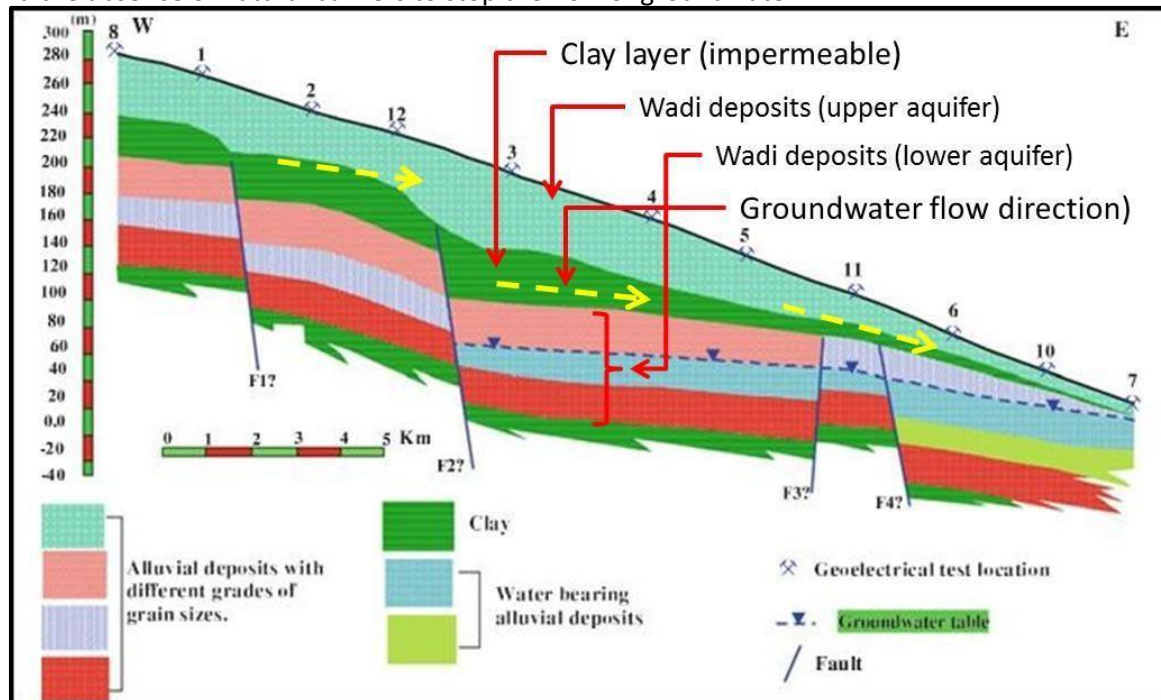


Figure 34 Hydroelectrical cross section along the main channel of the Delta Wadi Hawashiya basin showing the facies layering of the Post-Miocene sediments (DRC Internal report 2001 in Masoud et al., 2012).

Fresh groundwater is not an important source of water in the project area.

- There is no existence of shallow groundwater aquifer with a continuous source of fresh water recharge. This is due to the scares of rainwater to recharge the shallow wadi fill sediment aquifer.
- However, the unconfined condition of the wadi deposits together with their high porosity and permeability ratios, the regional eastward dipping and the absence of subsurface layers resulted in no accumulation of groundwater even in case of heavy rain fall with high infiltration volume expected.
- The absence of any activities related to the utilization of groundwater in the project site, even with the oil companies operating in the region, which has many drilling activities in the project area.
- No available information about the hydrogeological condition of the project site or even the closes areas. This is due to the lake of studies related to the groundwater aquifers.

7.3.4 Hydrology

Surface water hydrology in the area of the project concerned mainly about the accumulation of rain water in the watershed areas of dray wadies and the nature of flow along the main streams of them. The total land area that drains surface water to a common point (or common body of water) is called a watershed (also called a river basin, drainage basin, and catchment). The project site is dissected by five main streams of drainage basins (Figure 30). The watershed area of Wadi Hawashya is the largest

among the others. Therefore, the volume of rainwater accumulated in the drainage basin of Wadi Hawashya is big enough to be considered if we consider the possibility of flooding in the project area.

The width of the drainage lines that cross the project area, in addition to their depth, depends on the volume and speed of rainwater that passes through them during rainy periods. Due to the topography of the project area and the existing of two the fluvial sediments in the form of two terraces T1 and T2, the depth and width of the drainage lines are slightly difference. In the elevated lands (T1) that cover large areas of the project site, these drainage lines appear very shallow, strong irregular and vary in width. This means that the rainwater accumulated and flow across these drainage lines is considered weak so that the course of these valleys can be deepened. The great sinuosity of these drainage lines is also evidence of the weak velocity of water flow in these valleys in event of rainfall (Figure 30).

On the surface of the T2 the drainage lines are very wide and shallow (Figure 36 and Figure 37). These drainage lines are very wide and shallow ((Figure 36 and Figure 37). The only exception is at the upstream part of Wadi Hawashya where the main stream of this wadi is wide and slightly deeper than the other wadies (Figure 37c). In Figure 37c, this is Wadi Abu Had which is completely out of the project site to the south. This valley was shown to illustrate the difference between the effect of surface flow on the surface of T2 in this wadi compared to similar wadies at the project site. The effect of surface flow appears much stronger in Wadi Abu Had. This indicates that the quantity and speed of surface flow in the main streams of the drainage basins within the site is weak, even in Wadi Hawashiya.

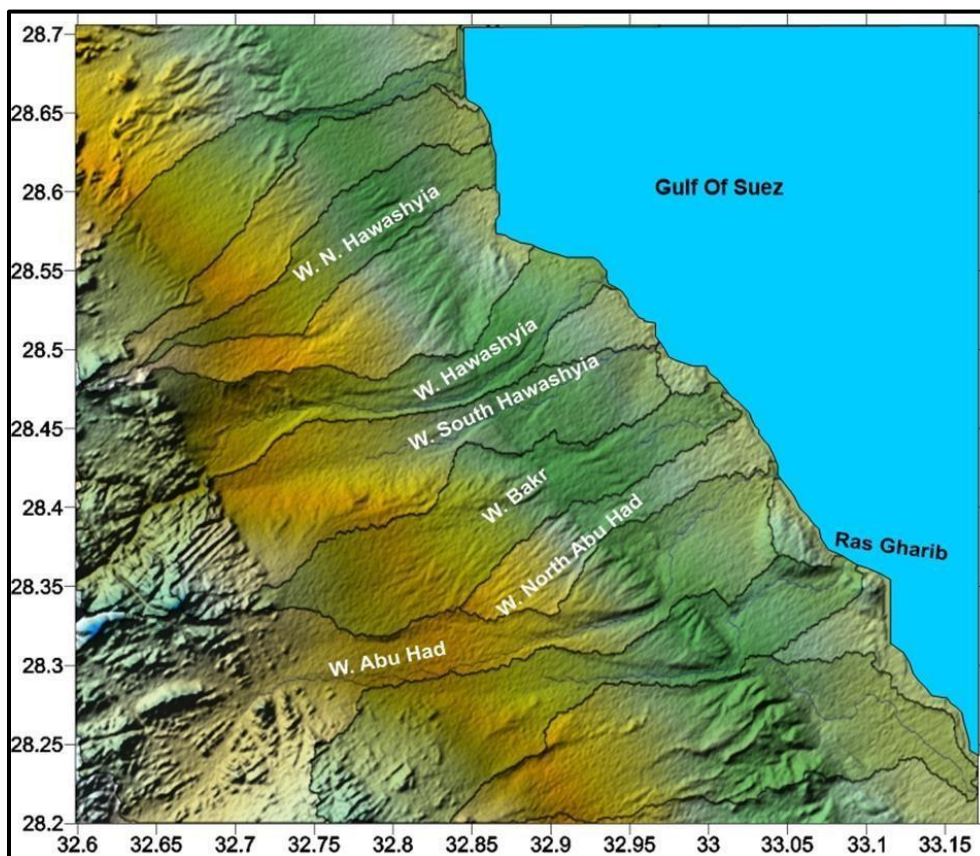


Figure 35 The drainage basins crossing the project site.

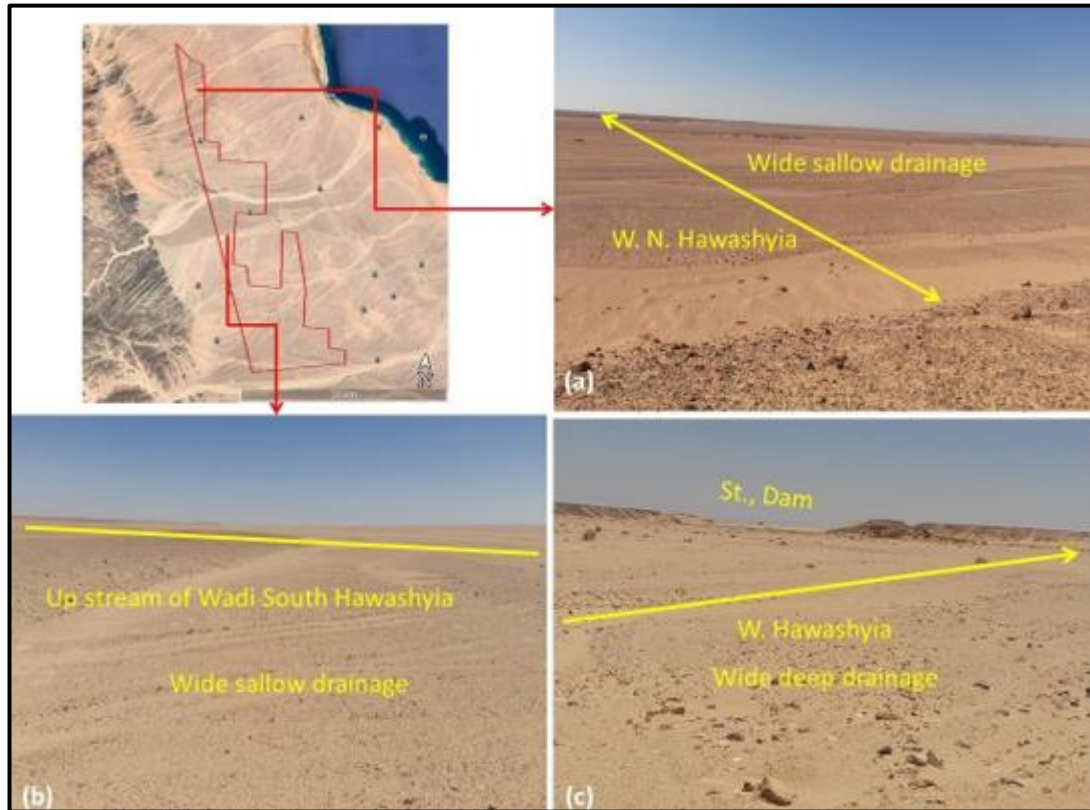


Figure 36 The drainage lines on the surface of the T2 terrace. Not they are shallow and wide

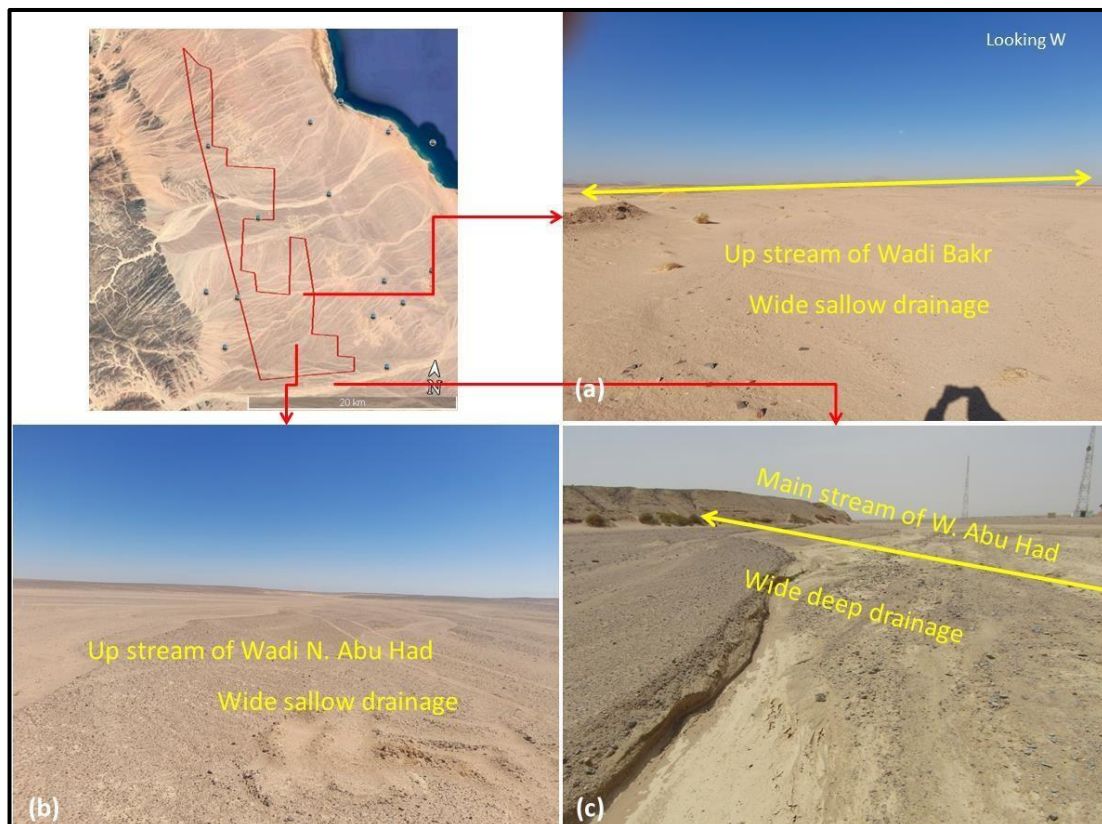


Figure 37 The drainage lines on the surface of the T2 terrace. Not they are shallow and wide.

Based on the history of flooding practiced in Wadi Hawashyia, three successive dams were built after the

flash flood disaster in 2016, and they are as follows:

The first dam (located within the Project site): located at the far west just below the foot slope the high lands (watershed area). An artificial lake was constructed in upstream part of the dam. The average dimension of the dam and artificial lake are provided below.

The Dam	The artificial lake:
Length: 250 m Width: 70 m Height: 5 m	Length: 450 m, Width: 250 m, Depth: 3 m

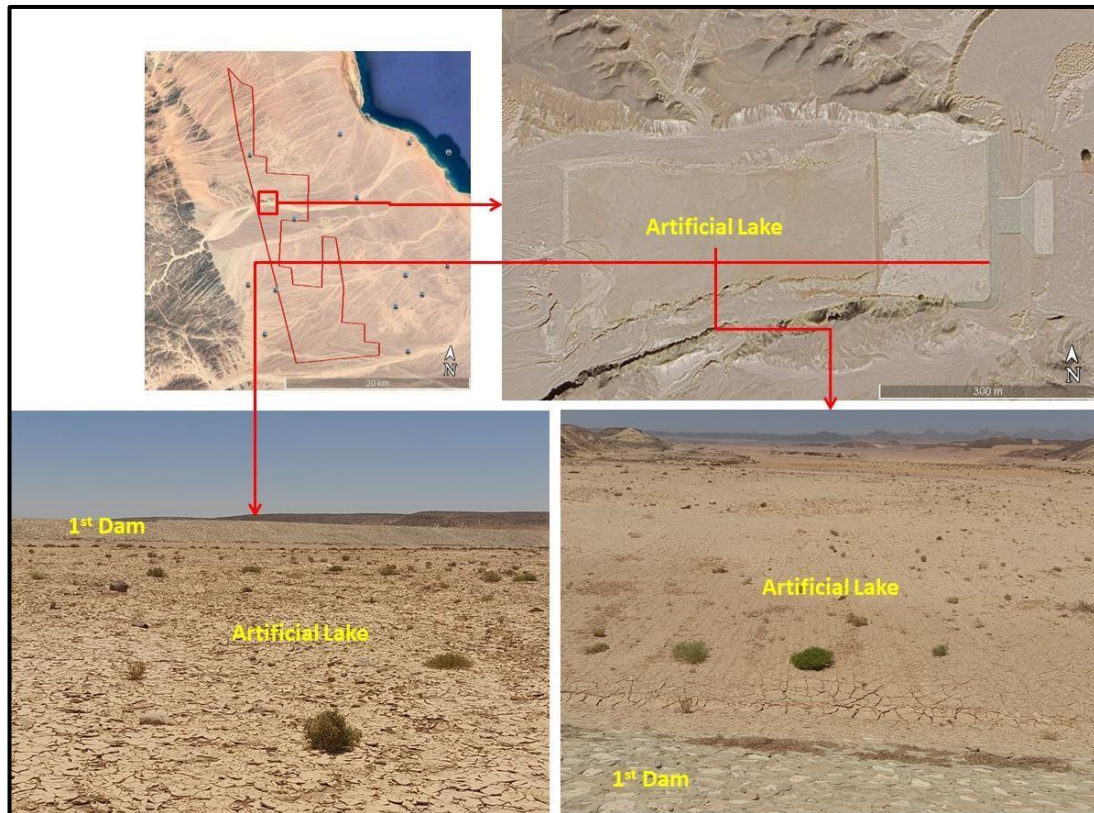


Figure 38 The 1st dam at the west of Wadi Hawashiya. Note that the rain water accumulated in front of the dam seasonally in rainfall events

The second dam: was built to the east of the first one by about 6 km just to the east of the site border. The average dimension of the dam and the artificial lake are provided below.

The Dam	The artificial lake:
Length: 350 m, Width: 70 m, Height: 5 m	Length: 450 m, Width: 350 m, Depth: 3 m

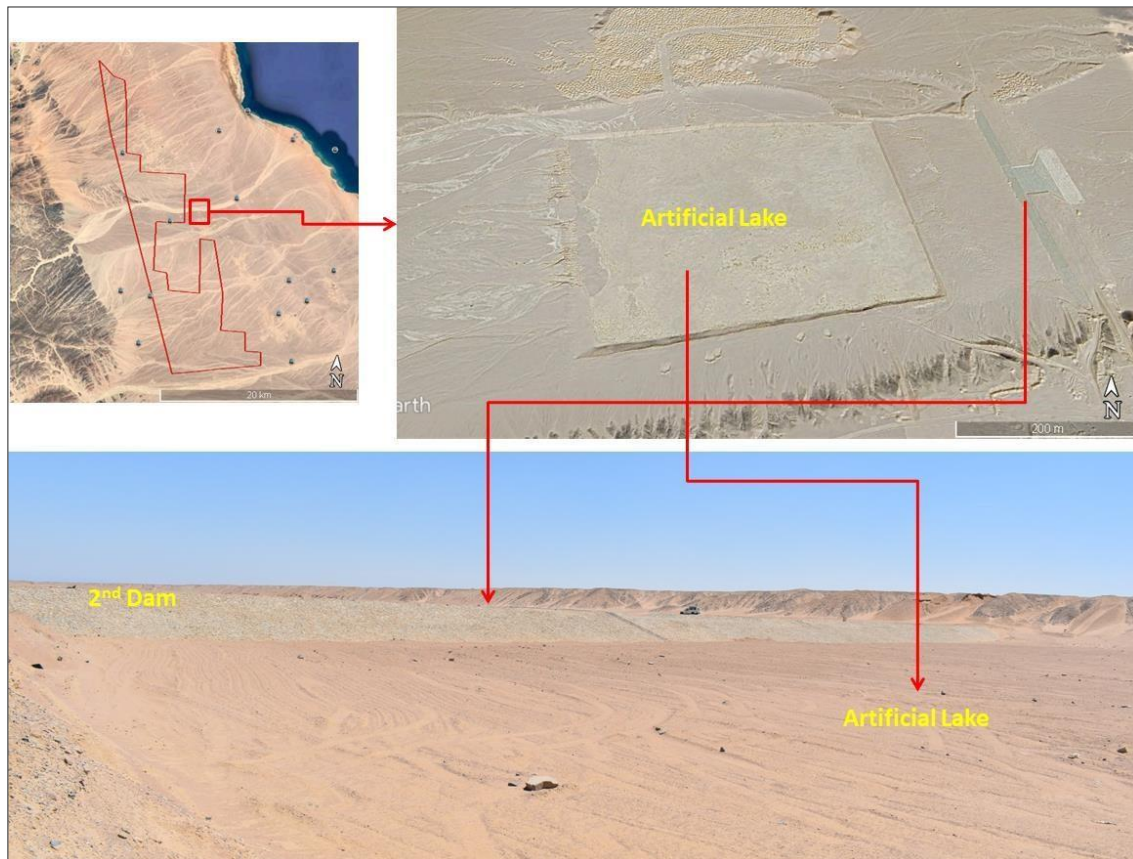


Figure 39 The 2nd dam at the west of Wadi Hawashiya. Note that no field evidence of rain water in the upstream part of the dam since 2016.

The third dam: was established down the second dam by about 7 km to the east. The average dimension of the dam and the artificial lake:

The Dam	The artificial lake:
Length: 450 m, Width: 70 m, Height: 5 m	Length: 400 m, Width: 350 m, Depth: 3 m

The hydrological system pertaining to Plot 1 is directly relevant to the potential flood risk emblematic of this area in the northern part of the GoS. As discussed in greater detail in the following Subsection.

7.4 Climate

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to climate.

Generally, the climate of Ras Gharib area is semi-arid, characterized by hot dry summers, moderate winters and very little rainfall. The climatic data in this study was collected from the world meteorological weather organization and from Hurghada Weather Airport Station (the nearest weather station to Ras Gharib).

7.4.1 Temperature

The average maximum temperature in 30 years (1971-2000) is 46°C, while the average maximum temperature is 27.0°C. The mean minimum temperature is 18.74°C. Table 17 shows the average monthly temperature in both areas.

Hegazy and Effat (2010) reported that the mean range of the monthly percent of sunshine hours was 65% to 70% in winter months and 80–85% in summer months as given by for the period 1987-1996 at Suez Marine Meteorological Station. Also, they mentioned that their investigated area including Ras Gharib has a high solar radiation intensity ranging from 1.900 to 2.600 Wh/m²/year. The mean sunshine during the period 1971-2000 at Hurghada was 320.33hr/month.

Table 27 The meteorological parameters during the period 1971-2000 at Hurghada, the nearest weather station.

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Av. annual
Av. Highest temp. °C	30	32	35	40	43	46	44	42	43	43	35	32	46
Av. lowest temp. °C	11	11.4	14	17.8	21.9	24.8	26.4	26.2	24.2	20.9	16.6	12.5	18.74
Av rainfall mm.	0.4	0.02	0.3	1	0.04	0	0	0	0	0.6	2	0.9	5.26
Av RH%	48	46	46	43	42	41	45	46	48	53	51	51	46.67
Sun rise Hs	279	290	310	300	341	360	403	372	330	310	270	279	3844

The range of temperature was 16°C during January and 30°C in May 2019 and the mean monthly temperature was 26°C (Table 18). The mean high temperatures reached 26 °C, while the average minimum temperatures were 21°C in 2016.

Table 18 The values of monthly averages for temperature, humidity, wind speed, rate of precipitation, visibility and pressure at sea level during the months of 2019 as recorded in the weather station in Hurghada International Airport

Parameter	Max	Avg	Min	Sum
Max temperature	42 . °C	352 . °C	28 °C	--
Mean temperature	32. °C	30 . °C	23 . °C	--
Min temperature	32 . °C	24 . °C	18 . °C	--
Heating degree days (base 65)	10	1	0	199
Cooling degree days (base 65)	60	15	0	5561
Growing degree days (Base 50)	75	30	5	10859
Dew point	21 . °C	5. °C	-7 . °C	--
Precipitation	0.00 mm	0.00 mm	0.00 mm	0.00 mm
Wind speed	51 km/h	13 km/l	0 km/l	--

7.4.2 Rainfall (Precipitation) and Evaporation

Data taken from meteorological station at Hurghada International Airport indicated that the highest monthly total annual rain reached 40.89 mm during October 2016 and the mean lowest one was 0.1 mm in most months of the year (Table 18), while the total mean annual rainfall during the period 1971-2000 reached about 2 mm/year (Table 17).

The annual evaporation reaches 300 mm, and the maximum evaporation rate occurs in June and July reported during the period 1987-1996 at Suez Marine Meteorological Station. The following figure displays

an illustration of the varying temperatures and precipitation volumes in the project site.

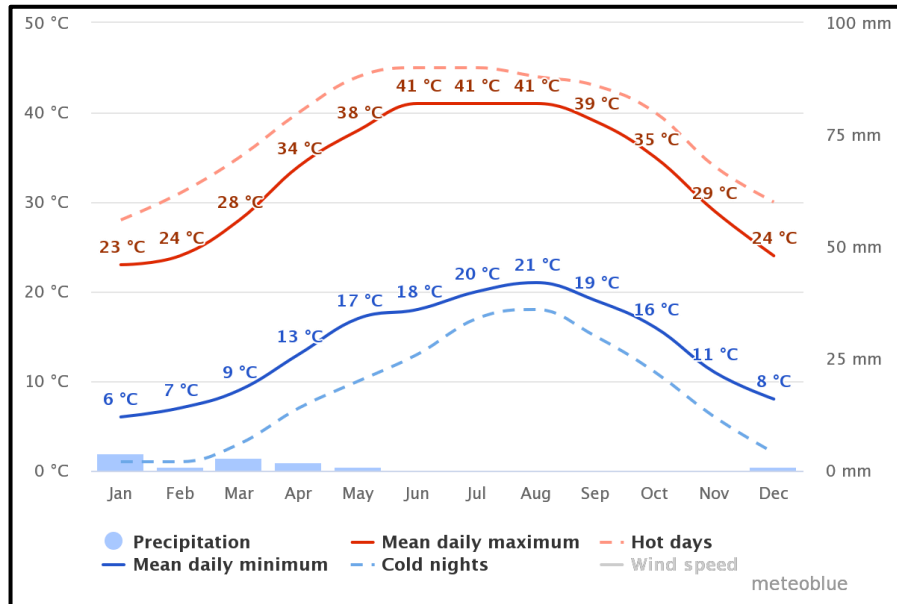


Figure 40 Average rainfall data in the Project Area (based on data from 30 days of observations). Source: Meteoblue

7.4.3 Humidity

The mean annual Relative Humidity (%) ranged from 41% to 51% with a total annual average equal 46.67% during the period 1971-2000 as shown in Table 18. The air humidity decreases sharply when the country is exposed to the Khamaseen winds during the period March and June which is hot, dry and dusty that leads to stirring fine sand with a degree that may obscure the vision, in addition to low humidity, and it is associated with depressions from the Mediterranean and North Africa, or associated with the occurrence of weather conditions that are accompanied by instability situations in spring.

7.4.4 Wind Speed

The highest wind speed recorded during 2016 at Hurghada weather station was 74 km/hr, with an average of 19 km/hr (Figure 52). From the study of the wind directions of Hurghada International Airport meteorological station, it is clear that the prevailing winds blowing on Ras Gharib in the Red Sea Governorate are the N or NE winds summer and autumn or S in winter.

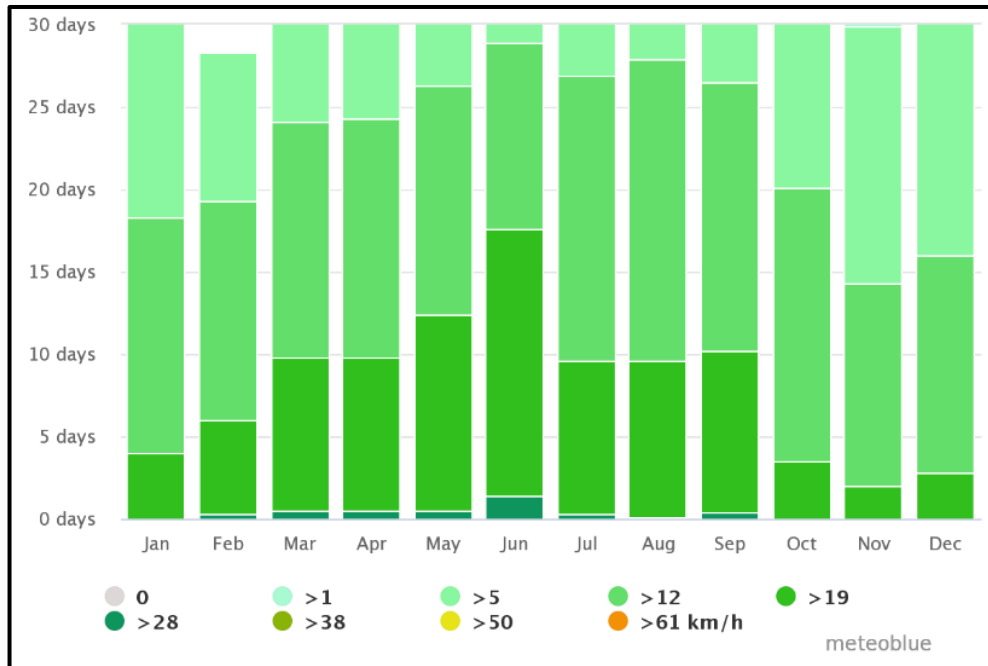


Figure 41 Average monthly wind speed and direction in the Project Area (based on data from 30 days of

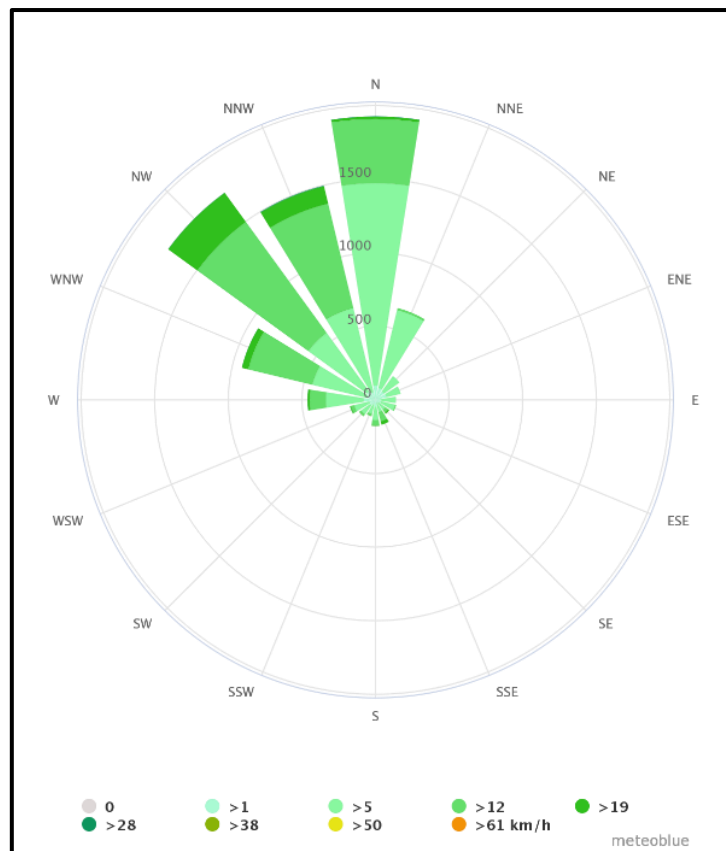


Figure 42 Wind-Rose in the Project Area (2016)

7.5 Biodiversity

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to biodiversity.

7.5.1 Desktop Review

Protected Areas

The location of Protected Areas within 50 km of the site boundary were taken from a range of sources including, but not limited to, Protected Planet¹, IUCN², Birdlife Datazone IBA³ and Key Biodiversity Areas⁴. The results of the search are as follows:

Current Protected Areas:

- Gebel El Zeit KBA IBA
- El Qa Plain KBA IBA

Potential Protected Areas:

- Wadi Qena
- El-Galala El-Qebalya
- Malahet Ras Shukeir

Gebel EL Zeit IBA and KBA

Gebel El Zeit is designated as both an IBA and a KBA and lies approximately 12km east from Plot 1 at its closest point and consists of a narrow, 100km long strip extending along the Gulf of Suez and Red Sea Coast. Gebel El Zeit is a mountain reaching 457m while the IBA/KBA itself extends from Ras Gharib to the bay of Gubbet El Gamsa. Habitats include mountains, coastal plain, saline bays, intertidal mud, saltmarsh and small vegetated wadis.

IBA Designation

The Gebel El Zeit area is a very important migration corridor for soaring migrants, particularly birds of prey and storks. Because of the geography of the Gulf of Suez as a whole and the micro-geographic configuration of the Gebel El Zeit area, which is the narrowest point in the southern part of the Gulf of Suez, over 250,000 White Stork (*Ciconia*) and many other migrant soaring birds are funnelled through this stretch of coast on both spring and autumn migrations. Birds of prey, storks and pelicans migrate through and usually land, rest or roost near the coastline and on the surrounding desert plains and hills. Resting and roosting storks, especially, utilize the two bays of Ghubbet El Zeit and Ghubbet El Gamsa and the saltmarsh at Sabkhet Ras Shukheir.

Information on bird species which trigger the IBA Criteria is shown in the table below.

¹ <https://www.protectedplanet.net>

² <https://www.iucnredlist.org>

³ <https://datazone.birdlife.org>

⁴ <https://www.keybiodiversityareas.org>

Table 28 Populations of IBA Trigger Species

Species		IUCN Category	Season	Year(s) of Estimate	Population at Site	IBA Criteria Triggered
Common Name	Scientific Name					
White-Eyed Gull	<i>Larus leucophthalmus</i>	LC	Nonbreeding	1998	common	A1
Eastern Imperial Eagle	<i>Aquila heliaca</i>	VU	Passage	1992-1994	19 Individuals	A1
Pallid Harrier	<i>Circus macrourus</i>	NT	Passage	1992-1994	4 individuals	A1
Lesser Kestrel	<i>Falco naumanni</i>	LC	Passage	1998	Uncommon	A1
A4iv Species Group – Soaring birds/cranes	n/a	n/a	Passage	1989-1998	250,000 individuals	A4iv

In terms of other fauna There are seven species of sea grass in the bay of Ghubbet El Zeit forming one of the most diverse and extensive sea-grass beds in the northern Red Sea. These beds are potential feeding grounds for Dugong (*Dugong dugon*), an IUCN VU species, and endangered marine turtles.

KBA Designation

This site qualifies as a Key Biodiversity Area of international significance because it meets one or more previously established criteria and thresholds for identifying sites of biodiversity importance (including Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, and Key Biodiversity Areas).

Oil pollution from onshore and offshore oil facilities, as well as passing vessels is the most immediate threat to birds. It is recommended that development in this area is carried out with careful consideration of migratory birds. Information on bird species which trigger the KBA Criteria is shown in the table below.

Table 29 Populations of KBA Trigger Species

Taxonomic Group	Scientific name	Common name	IUCN Red List Category	KBA Criteria	Legacy Criteria
Birds	<i>Aquila heliaca</i>	Eastern Imperial Eagle	VU		Y
Birds	<i>Circus macrourus</i>	Pallid Harrier	LC		Y
Birds	<i>Falco naumanni</i>	Lesser Kestrel	VU		Y
Birds	<i>Larus leucophthalmus</i>	White-eyed Gull	VU		Y

El Qa Plain IBA and KBA

El Qa Plain lies approximately 45km east from Plot 1 and is both designated as an IBA and KBA.

IBA Designation

El Qa Plain lies across the Gulf of Suez and consists of a wide plain that flanks the South Sinai Mountain massif on the west and separates it from the Gulf of Suez. The IBA is mostly concerned with the coastal portion of the plain, and extends from Wadi Feiran in the north to Ras Mohammed in the south, where migratory birds tend to concentrate and often land in vast numbers. The plain is dissected by many wadis that flow from the mountains of Sinai into the Gulf of Suez. To the north of El Tor a narrow mountain range separates the plain from the Gulf of Suez. This mountain, immediately overlooking the Gulf, is thought to be a very important departure point for many of the soaring birds that attempt to cross the Gulf of Suez in autumn. Sparse scrub vegetation and scattered Acacia trees cover sizeable sections of the plain. The town of El Tor is located within the area of concern and is the only major human settlement in the region.

Information on bird species which trigger the IBA Criteria is shown in the table below.

Table 30 Populations of IBA Trigger Species

Species		IUCN Category	Season	Year(s) of Estimate	Population at Site	IBA Criteria Triggered
Common Name	Scientific Name					
Eastern Imperial Eagle	<i>Aquila heliaca</i>	VU	Passage	1998	Present	A1
Pallid Harrier	<i>Circus macrourus</i>	NT	Passage	1998	Uncommon	A1
Lesser Kestrel	<i>Falco naumanni</i>	LC	Passage	1998	Uncommon	A1
A4iv Species Group – Soaring birds/cranes	n/a	n/a	Passage	1998	200,000 individuals	A4iv

The mammal fauna present within the IBA is limited to Dorcas Gazelle (*Gazella dorcus*) which is categorised as IUCN Vulnerable and is thought to be the largest remaining population of this species in Sinai.

KBA Designation

This site qualifies as a Key Biodiversity Area of international significance because it meets one or more previously established criteria and thresholds for identifying sites of biodiversity importance (including Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, and Key Biodiversity Areas).

Threat from tourism and development is the most immediate threat for this KBA, particularly for migratory birds in the Spring. Details on bird species which trigger the KBA are shown in the table below.

Table 31 Populations of KBA trigger species

Taxonomic Group	Scientific name	Common name	IUCN Red List Category	Legacy Criteria
-----------------	-----------------	-------------	------------------------	-----------------

Birds	<i>Aquila heliaca</i>	Eastern Imperial Eagle	VU	Y
Birds	<i>Circus macrourus</i>	Pallid Harrier	LC	Y
Birds	<i>Falco naumanni</i>	Lesser Kestrel	VU	Y

Proposed Protected Areas

Wadi Qena

Wadi Qena has been a proposed Terrestrial and Inland Waters Protected Area since 1999. It overlaps Plot 1 and is designated on a national level. Its reported area is 8006.56 km². The reason for designation is not clear. The IUCN category of this site is not reported and accordingly it is assumed to be of lower importance than sites meeting criteria within lenders environmental standards.

El-Galala El-Qebalya

El-Galala El-Qebalya has been a proposed Terrestrial and Inland Waters Protected Area since 1999. It overlaps Plot 1 and is designated on a national level. Its reported area is 4814.86 km². The reason for designation is not clear. The IUCN category of this site is not reported and accordingly it is assumed to be of lower importance than sites meeting criteria within lenders environmental standards.

Malahet Ras Shukeir

Malahet Ras Shukeir has been proposed Terrestrial and Inland Waters Protected Area since 1999. It lies 30km south-east of Plot 1 and is designated on a national level. Its reported area is 107.19 km². The reason for designation is not clear. The IUCN category of this site is not reported and accordingly it is assumed to be of lower importance than sites meeting criteria within lenders environmental standards.

7.5.2 Ecology Site Visit

In April 2023 Turnstone Ecology completed a Site Visit to the Project Aol. During the Scoping Survey all bird Vantage Points were visited and viewsheds verified, static bat detectors surveys were set-up with locations for static detectors agreed and detectors placed around the site to commence the survey effort. Turnstone Ecology also undertook training sessions in the use of SM4BAT detectors and data management.

7.5.3 Habitats and Flora

Methods: Habitats and Flora

A standard sampling method was applied across the project Aol. Sixty sampling points were chosen across the Aol, with a minimum distance of 1km between each sample to maintain comprehensive coverage and to avoid double sampling.

For the floral survey, a protocol was devised and surveys consisted of five 10 x 10m sample plots (quadrats) in a radius of 50m from each sampling point as shown in Figure 39. All plant species present within each quadrat were recorded (including their abundance and % of cover), in particular, threatened species, weeds and invasive species. For each sample plot, photographs of the landscape and plants were taken using a digital camera.

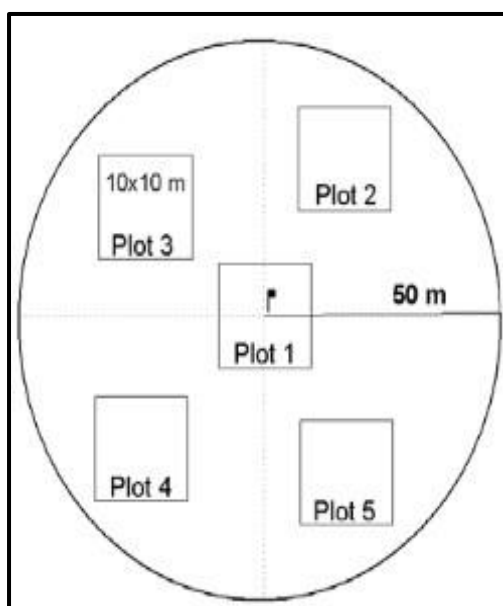


Figure 43 Floral Quadrat Survey Sampling Methodology

Following field sampling, calculations to account for the Shanno-Wiener Biodiversity Index and Importance Value Index of the flora of species per site were undertaken and pooled for the entire Aol. Refraction curves were created to ensure adequate coverage of the Aol.

Results: Habitat and Flora

During the 2023 surveys a total of 32 plant species were recorded across the Project Aol (Table 23). The majority of these species were in the herb and shrub communities with *Acacia tortilis* and *Tamarix nilotica* representing the tree community in low numbers.

Table 32 Results of Spring 2023 Survey

Species Scientific Name	Total Abundance	Frequency	IUCN Status
<i>Acacia tortilis</i> subsp. <i>raddiana</i> (Savi) Brenan.	1	1	LC
<i>Anabasis articulata</i> (Forssk.) Moq. In A. DC.	1	1	LC
<i>Artemisia judaica</i> L.	2	9	LC
<i>Astragalus vogelii</i> (Web) Bornm.,.	23	1	LC
<i>Atriplex halimus</i> L.	1	1	LC
<i>Atriplex</i> sp	1	1	LC
<i>Calligonum polygonoides</i> L.	5	3	LC
<i>Diploaxis harra</i>	2	1	LC
<i>Euphorbia granulata</i> Forssk.	2	2	LC
<i>Fagonia arabica</i> L.	54	18	LC
<i>Fagonia bruguieri</i> DC.	2	1	LC
<i>Fagonia mollis</i> Zohary.	217	38	-
<i>Haloxylon salicornicum</i> (Moq.) Bunge ex Boiss.	4	4	-

<i>Heliotropium strigosum</i> Boiss	94	19	-
<i>Morettia philaeana</i> Delile.	1	1	-
<i>Neurada procumbens</i> L.	11	2	-
<i>Ochradenus baccatus</i> Delile.	2	2	-
Species Scientific Name	Total Abundance	Frequency	IUCN Status
<i>Orobanche cernua</i> Reut.	4	2	-
<i>Pergularia tomentosa</i> L.	1	6	-
<i>Pulicaria incisa</i> (Lam.) DC.	55	1	-
<i>Pulicaria undulata</i> (L.) C. A. Mey.	1	1	-
<i>Reseda muricata</i> C. Presl.	2	1	-
<i>Salsola imbricata</i> Forssk.	9	5	-
<i>Stipa</i> sp.	377	29	-
<i>Stipagrostis</i> sp.	22	6	-
<i>Tamarix nilotica</i> (Ehrenb.) Bunge.	2	1	-
<i>Tribulus macropterus</i> .	5	3	-
<i>Trichodesma africanum</i> (L.) Sm.	11	9	-
<i>Trichodesma ehrenbergii</i>	1	1	-
<i>Zilla spinosa</i> (L.) Prantl in Engl. & Prantl.	40	16	-
<i>Zygophyllum coccineum</i> L.	139	19	-
<i>Zygophyllum simplex</i> L.	25	10	-

No species that are listed on the IUCN Red List as Critically Endangered, Endangered, Vulnerable or Near Threatened were recorded during the survey. Species such as *Stipa* sp. and *Zilla spinosa* were noted as having high value for local livestock.

The collective Shannon-Weiner Biodiversity Index for the Aol was 2.25, while the same calculated for each sampling site ranged from 0.03 to 1.89. The species count for the Aol was 32 species, which ranged from one species to nine species between sampling sites with the species richness across the Aol being 3.85. This shows significant spatial diversity between sites within a small geographical range.

The floral diversity and species richness across the Aol was highest in the north and lowest in the southern areas, with a decline in diversity between the two areas.

The habitats present on the site do not meet any of the criteria for Annex I or Priority Habitats and were assessed by botanists as being of Low to Moderate Sensitivity.

7.5.4 Reptiles and Amphibians

Methods: Reptiles and Amphibians

Field studies were carried out according to generally accepted zoological methods for identifying species composition. No amphibian species are known to be present within the Aol. Three survey methods were undertaken for reptiles and amphibians:

Diurnal Active Searching – thorough searches of suitable basking spots and resting places such as rocks, logs, within soil and leaf litter, soil cracks and holes. Areas surrounding trees and large shrubs, primarily Acacia,

were checked for snakes.

Nocturnal Searching – torchlight surveys for primarily nocturnal species such as geckos and snakes.

Pitfall Trapping – traps made out of plastic buckets placed into pre-dug holes in the ground which are used to catch terrestrial reptiles and amphibians as they travel. No chemical substances are used within the buckets and individuals are captured, identified and released. The pitfall traps remained open for seven consecutive nights at each sampling location. Data recorded within the pitfall trapping was recorded to compute local occupancy of each species.

All reptile and amphibian species were identified to species level according to the national reptiles and amphibians guidebooks.

Results: Reptiles and Amphibians

In general, the composition of the herpetofauna within the Project Aol is characterized as 'low densities of common and widespread species'. Six species of reptile were recorded throughout the survey effort. Of the species recorded, none are of international conservation concern.

No amphibians were recorded and as such amphibians are therefore not discussed further in this report.

Table 33 Results of the Reptile Surveys

Common Name	Scientific Name	RedList Status
Spiny-Tailed Lizard <i>Euromastix aegyptia</i>	<i>Uromastyx aegyptia</i>	<i>IVulnerable</i>
Steudner's Pigmy Gecko	<i>(Tropicolotes steudneri)</i>	Least concern LC
Red-spotted Lizard	<i>(Mesalina rubropunctata)</i>	Least concern LC
Elegant Gecko	<i>(Stenodactylus sthenodactylus)</i>	Least concern LC
Pallid Agama	<i>(Trapelus pallidus)</i>	<i>Not Assessed</i>
Bosc's Fringe-toed	<i>(Acanthodactylus boskianus)</i>	Least concern LC
Gecko sp.	-	-

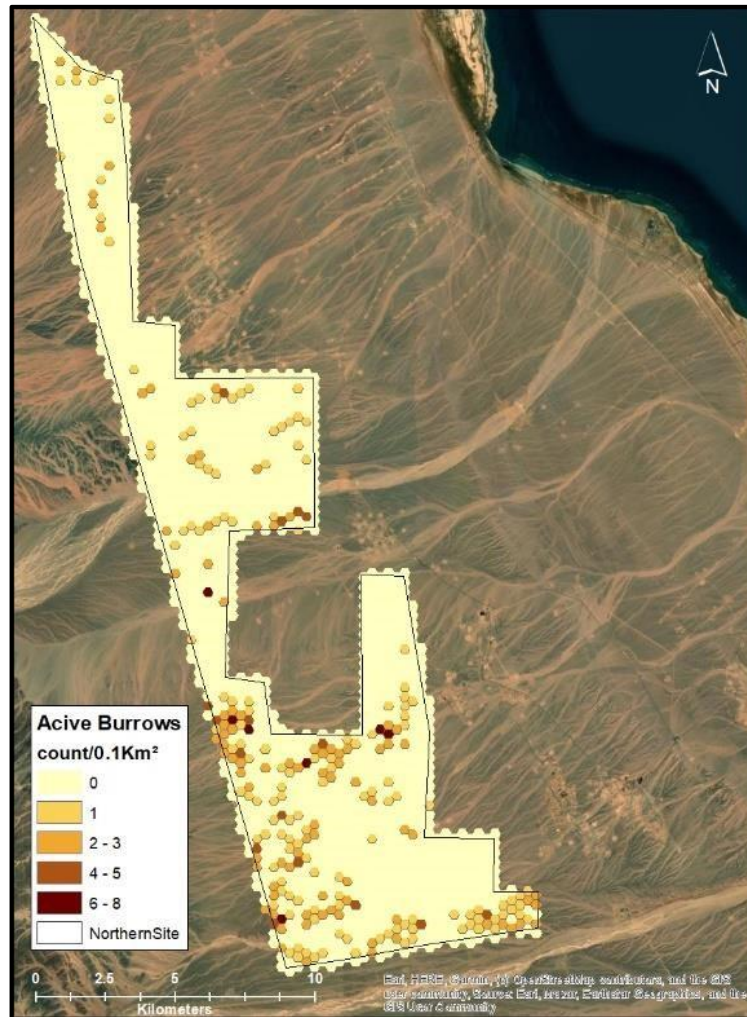
Spiny-Tailed Lizard (Dhab Lizard) Uromastyx aegyptia

Spiny Tailed Lizards (*Euromastix aegyptia*) are recognized as an IUCN Vulnerable species and therefore dedicated surveys were undertaken for this species along with general reptile surveys. These were designed to not just be representative but to cover all individuals and burrows in the AOI.

Surveyors registered 491 locations of both active and inactive burrows of this species which is an average of 2.78 burrows per km² (SD 8.19).

Spatial distribution of burrows was variable across the Aol, with the densest area of burrows being in the southern extent as shown in Figure 40.

Table 34 Spatial Distribution of Spiny-Tailed Lizard Burrows Across Plot 1



7.5.5 Mammals (excluding bats)

Methods: Mammals

Surveys were undertaken by mammal specialists in 2023. The terrestrial mammals survey included a full walkover/drive of the Project AoI during which time any signs of mammals including scat, footprints, direct observations, burrows, or other signs was recorded in full. Where mammals of international or national conservation concern were recorded, they were mapped and their location recorded on to a GPS device. In addition, specific surveys were conducted for both large and small mammal species. Large Mammals

Three survey methods were used for specifically surveying large mammals:

Camera Trapping – camera traps were deployed in four sampling sites for six days in order to photograph any medium or large mammals passing through these areas. Camera trap footage was reviewed, and species identified.

Track Stations – in areas of the AoI where large mammal foraging was expected, track stations were prepared by smoothing a 3m² area of sand and baiting the area (with canned salmon or any bait with a strong odour). The track stations were prepared before dusk each night and fresh tracks were recorded each morning. Track stations were deployed in five sites and monitored for six days.

Line Transects – observers walked 500m transect lines from several locations within the AoI in each direction (N, S, E and W). Observed species were recorded and where possible, photographed.

Small Mammals

In order to survey small terrestrial mammals, live trapping methods were used. Baited Sherman traps of differing sizes were installed randomly at 32 locations across the Project Aol to cover all relevant habitat types, with a higher density of traps allocated to areas where small mammal activity has been previously recorded. Traps were regularly checked to ensure the safety and well-being of each animal. Captured individuals were identified to species level and relevant morphometric measurements were recorded. Mammals were then released into the site it was trapped.

Results: Mammals

Large Mammals

Only Red Fox (*Vulpes vulpes*) was recorded throughout the three surveying methods. Red Fox is an IUCN Least Concern Species. Results of these surveys are shown in the figure below.

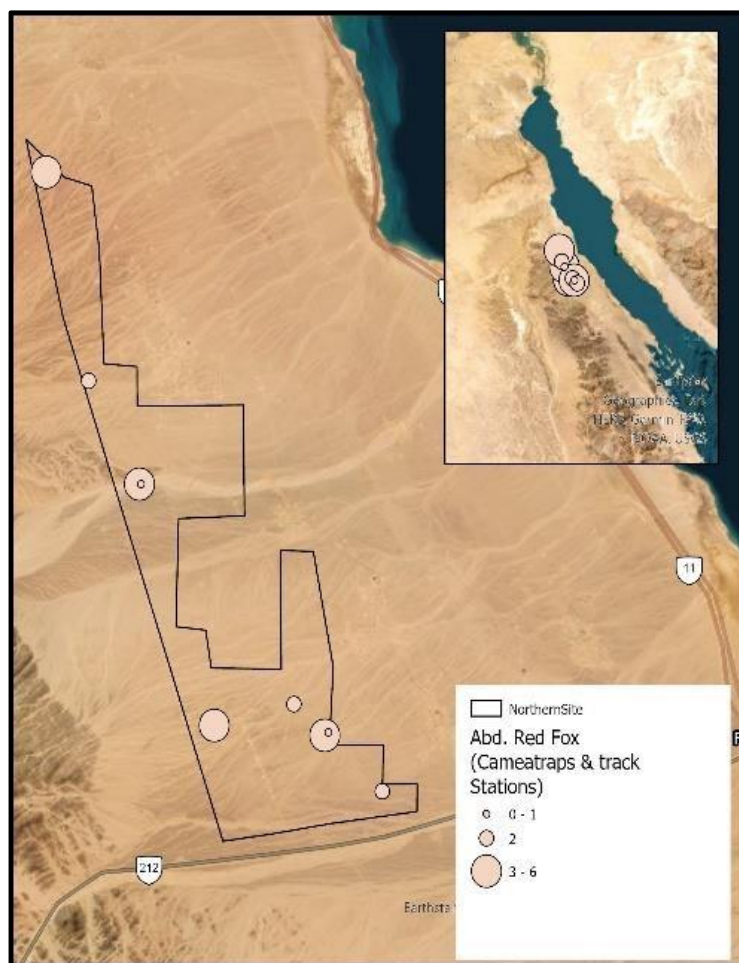
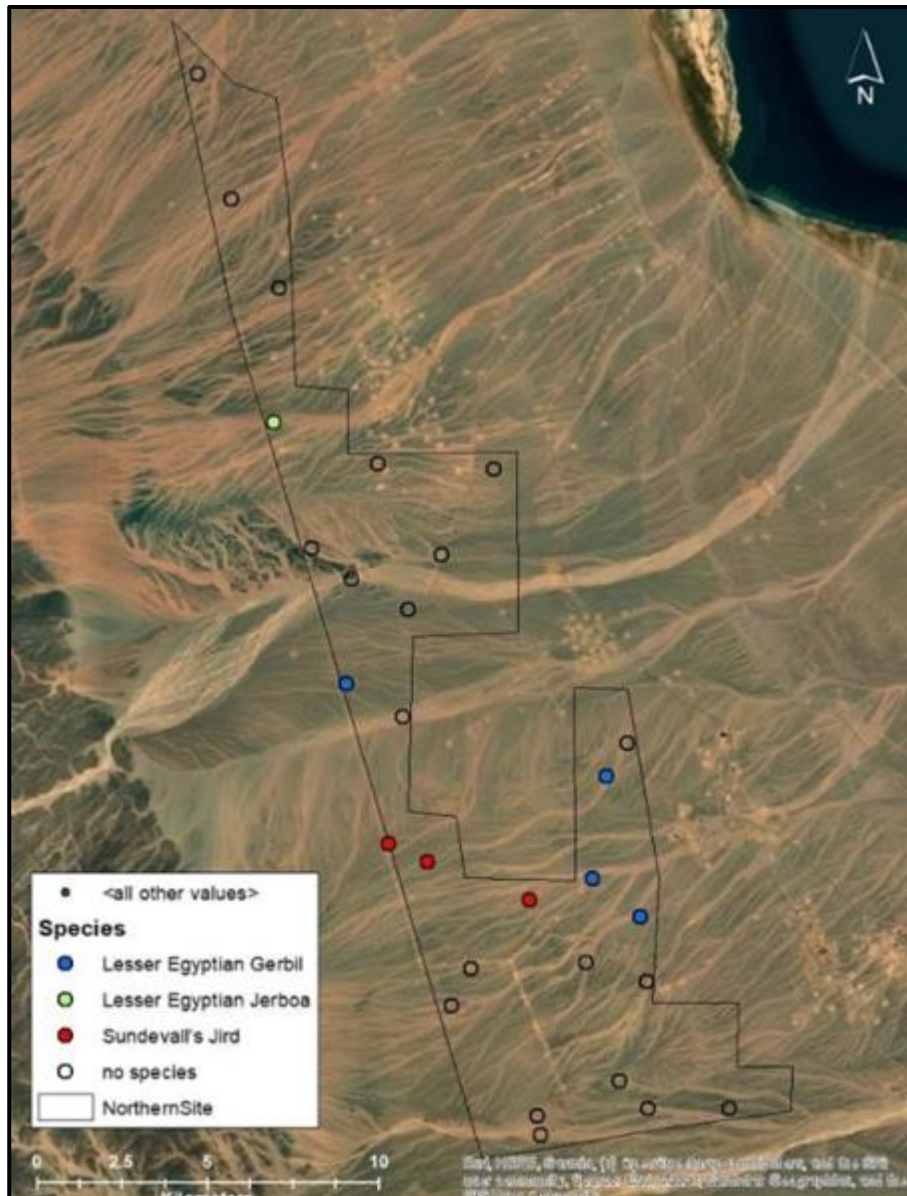


Figure 44 Location of Red Fox recordings throughout the three survey methods.

Small Mammals

Of the 32 sampling sites, nine returned positive records. Three species of small mammal were recorded during the live trapping surveys: Sundevall's Jird / Silky Jird (*Meiones crassus*), Lesser Egyptian Gerbil (*Gerbillus gerbillus*) and Lesser Egyptian Jerboa (*Jaculus jaculus*). Two of these species are listed as IUCN Least Concern, while one has an Unknown status. Results of these surveys are shown in the figure below.

Figure 45 Location of Rodent Species caught in live traps



7.5.6 Bats

Methods: Bats

Bat surveys consisted of Nocturnal Acoustic Survey along with a search for suitable roosting features within the Project Aol. Due to the size of the Project Aol it was considered that the use of static detectors would give robust data pertaining to the bat species present within the Aol, along with a reasonable estimation of the amount of flight activity.

Eight Wildlife Acoustic SM4BAT detectors were deployed at 24 ground locations (see Figure 43) a total of five times per location between 25th May 2023 and 20th November 2023 (to date data up to 25th October has been analysed). The survey protocol adapts methods protocols set out in guidelines published by Nature Scot 2021 (formerly Scottish Natural Heritage) and Eurobats Publication 6, 2015. The detector locations were targeted at a number of WTG locations as well as at locations providing useful contextual information. At the time of deployment 18 locations were at known WTG locations, four were throughout the wider AOI to ensure coverage of the whole AOI was considered and two were at features of interest (a cave and the wadi dam). The detectors were programmed to start recording 30 minutes before sunset until 30 minutes after sunrise. Data was downloaded approximately once per month and batteries changed as necessary.

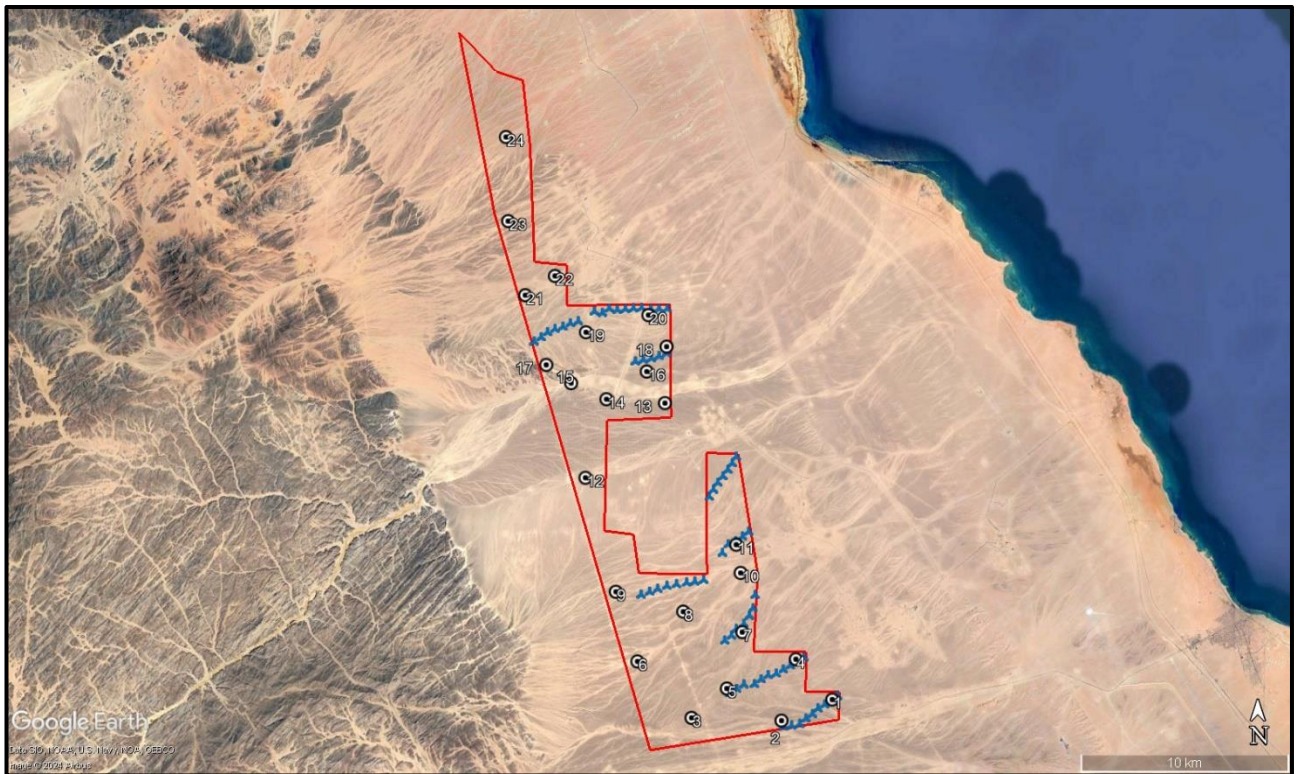


Figure 46 Recording locations

The total amount of recording nights completed to date, and corresponding size of data files collected are shown on the tables below.

Table 35: Recording Nights and Data

	May		June		July		August		September		October		November	
Static Location	Number of Survey Nights	Number of Files	Number of Survey Nights	Number of Files	Number of Survey Nights	Number of Files	Number of Survey Nights	Number of Files	Number of Survey Nights	Number of Files	Number of Survey Nights	Number of Files	Number of Survey Nights	Number of Files
Whole Site	7	543	120	90437	120	58799	120	64245	80	20000	-	-	-	-
1		-	5	1547	5	1101	5	3548	5	6124	-	-	-	-
2	7	543	5	3364	5	1793	5	4	5	1027	-	-	-	-
3		-	5	2294	5	2035	5	2026	5	2397	-	-	-	-
4			5	8068	5	1952	5	1689	5	2472	-	-	-	-
5			5	5149	5	3526	5	6284	5	2018	-	-	-	-
6			5	3881	5	4317	5	2524	5	594	-	-	-	-
7			5	4310	5	2698	5	5479	5	1338	-	-	-	-
8			5	999	5	2149	5	6714	5	2990	-	-	-	-
9			5	2356	5	1184	5	5008	5	132	-	-	-	-
10			5	1665	5	1728	5	1597	5	96	-	-	-	-
11			5	2179	5	3203	5	5332	5	38	-	-	-	-
12			5	6305	5	1732	5	3320	5	93	-	-	-	-
13			5	6229	5	3930	5	1579	5	214	-	-	-	-
14			5	2692	5	1601	5	1419	5	154	-	-	-	-
15			5	972	5	2093	5	864	5	4	-	-	-	-
16			5	7410	5	651	5	2190	5	309	-	-	-	-
17			5	4413	5	4483	5	2456	-	-	-	-	-	-
18			5	2748	5	0	5	0	-	-	-	-	-	-
19			5	4704	5	4072	5	3542	-	-	-	-	-	-
20			5	4487	5	2853	5	1916	-	-	-	-	-	-

21			5	3810	5	3988	5	3346	-	-	-	-	-	-
22			5	6092	5	4445	5	2637	-	-	-	-	-	-
23			5	2207	5	2063	5	364	-	-	-	-	-	-
24			5	2556	5	1202	5	407	-	-	-	-	-	-

Results: Bats

There are 21 species of bat known to occur within Egypt and neighbouring countries and have the potential to occur within the Project Aol (Qumsiyeh, B., 1985).

The Project Aol consists of flat open desert with generally low suitability for bats due to the lack of suitable roosting features within the Aol and also lack of permanent waterbodies. There are no buildings or trees within the Aol nor are there bridges, culverts or wells which could support roosting bats.

Four known and two unknown species of bat were recorded across the survey period. The known bat species were Arabian Barbastelle *Barbastella leucomelas*, European Free-Tailed Bat *Tadarida teniotis*, Botta's Serotine *Epitesicus bottae* and Desert Long-Eared Bat *Otonycteris hemprichii*. The details of these records can be seen in the table below:

Table 36 Species recorded throughout the survey period

Species	Scientific Name	Location	Number of records	Record Date	Time	IUCN Conservation Status
Arabian Barbastelle	<i>Barbastella leucomelas</i>	7	1	18/07/2023	00:35:34	Least Concern
European Free-Tailed Bat	<i>Tadarida teniotis</i>	7	1	20/07/2023	00:16:34	Least Concern
European Free-Tailed Bat	<i>Tadarida teniotis</i>	2	1	16/10/2023	19:23:21	Least Concern
European Free-Tailed Bat	<i>Tadarida teniotis</i>	22	1	26/07/2023	21:46:13	Least Concern
Serotine species	<i>Epitesicus sp</i>	15	1	21/10/2023	22:47:12	-
Serotine species	<i>Epitesicus sp</i>	12	1	25/08/2023	19:27:56	-
Unknown	-	15	1	23/08/2023	22:44:40	-
Serotine species	<i>Epitesicus sp</i>	9	1	17/06/2023	00:32:33	-
Serotine species	<i>Epitesicus sp</i>	7	1	16/07/2023	21:30:33	-
European Free-Tailed Bat	<i>Tadarida teniotis</i>	6	1	19/07/2023	21:51:27	Least Concern
Unknown	-	7	1	16/09/2023	21:55:00 - 00:37:00	-
Desert Long-Eared Bat	<i>Otonycteris hemprichii</i>	16	1	22/08/2023	19:10:00 - 22:07:00	Least Concern
Arabian Barbastelle	<i>Barbastella leucomelas</i>	16	1	25/08/2023	18:49:00 - 01:11:00	Least Concern
Botta's Serotine	<i>Epitesicus bottae</i>	1	3	18/08/2023	18:06:13	Least Concern

Bat Call Analysis

Wave data recorded by “Song meter SM4” was explored by a special sound analysis software (Kaleidoscope 5.6.2) a file by file to determine the presence of bat calls in a spectrum of sound frequencies ranging from 10 to 120 KHz.

Bat activity can be determined by the recording time by the song meter and species by the frequency and speed cycles of the calls. The Figures below show a bat calls analysis technique.

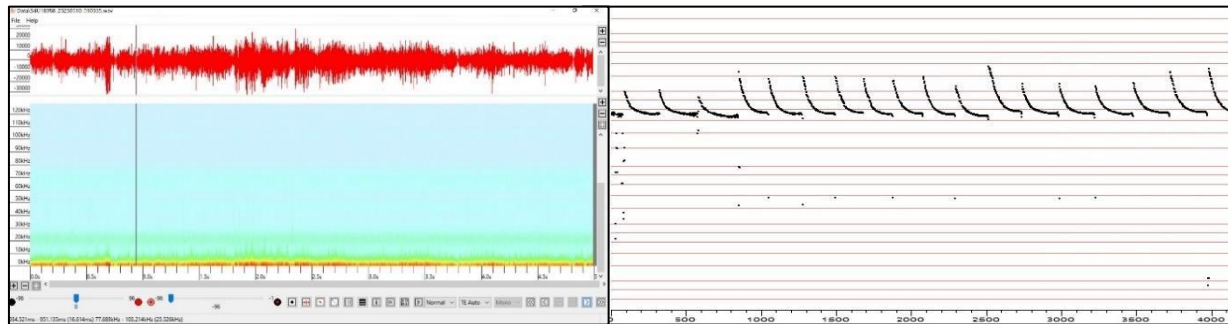


Figure 47 Bat Call Analysis Techniques: at left - technique analyzes the frequency of calls, at right - the speed of calls

Results: Invertebrates

No species of national or international conservation concern were recorded within the Project AoI and no species considered to be range-restricted, endemic or near-endemic were recorded. The invertebrate assemblage is considered typical for the area and the habitats present within the AoI and are of negligible sensitivity.

7.5.7 Avifauna

Note: this section presents an overview of the avifauna methodology and results. A detailed avifauna assessment report is presented in Anne I.

Methods: Avifauna

Bird surveys have been completed in order to quantify the impact of the project on key Avifauna species to subsequently inform final turbine layout, to develop additional mitigation (e.g. turbine shut down, habitat/species management plan) and to form the baseline for any future required supplementary surveys and operational monitoring. Survey information has also been used to inform a Collision Risk Model.

The following surveys have been undertaken:

- Spring Bird Surveys - 9th March to 20th May 2022 &
- Autumn Bird Surveys – 10th August to 10th November 2022
- Spring Bird Surveys – 20th February to 20th May 2023
- Autumn Bird Surveys - 10th August to 10th November 2023

Bird surveys have been undertaken involving Vantage Point (VP) surveys and, where necessary, specialist

surveys. Whilst specific breeding bird surveys were not carried out across the site, coverage during the majority of the year and over the whole site ensured that there is no risk of the presence of breeding birds of international conservation concern being missed during the surveys.

The protocols for surveys at VPs has been based on methodologies from the following documents:

- “Environmental Impact Assessment Guidelines and Monitoring Protocols for Wind Energy Development Projects along the RVRSF with a particular reference to wind energy in support of the conservation of Migratory Soaring Birds (MSBs)” (2013)
- “Strategic Environmental and Social Impact Assessment (ESIA) for an Area of 300 km² of potential wind farms at the Gulf of Suez (2013)”
- Strategic and Cumulative Environmental and Social Assessment Active Turbine Management Program for Wind Power Projects in the Gulf of Suez (2019)”

Additionally, methodology developed by Scottish Natural Heritage “Survey Methods for Use in Assessing the Impacts of Onshore Wind farms on Bird Communities” (2005, and most recently updated in 2017) was used. However, where appropriate, the protocol has been adapted to be suitable for the location of the site and the additional risks of impacts the project may have on birds.

Wind farms present four main potential risks to birds:

- Direct habitat loss and disturbance through construction of wind farm infrastructure;
- Displacement (sometimes called indirect habitat loss) if birds avoid the wind farm and its surrounding area due to turbine construction and operation. Displacement may also include barrier effects in which birds are deterred from using normal routes to feeding or roosting grounds;
- Death through collision or interaction with turbine blades (*i.e.* collision risk).
- Interactions with transmission lines associated with wind energy projects which could result in mortality due to collision or electrocution.

For each of these three risks, detailed knowledge of bird distribution and flight activity is necessary in order to predict the potential effects of the wind farm on birds.

Vantage Point (VP) Survey

Background

Vantage Point survey is designed to quantify the level of flight activity and the distribution of birds over the survey area. Its primary purpose is to provide input data for the Collision Risk Model (CRM), which is used to inform the Collision Risk Assessment (CRA) to predict likely mortalities from collision with operational turbines. Data can also be used to provide an overview of bird usage of the site to further inform an assessment of the likely impacts of habitat loss, disturbance, displacement and barrier impacts.

Surveyors

A team of suitably experienced ornithologists undertook the surveys and were able to identify all birds seen and heard within the Project Aol. During the surveys they used the following equipment:

- Field survey sheets;
- Weatherproof Clipboard;
- Binoculars (at least 8x magnification);
- Anemometer;
- First aid kits; and
- Digital camera

VP Selection

Turbine layouts were not finalized during the migration period therefore eighteen Vantage Points were selected for use during the surveys which aimed to cover the entire project area and the location of these points is shown in Figure 45.

The selection of the VPs for a monitoring day the surveyors attempted to minimise the potential of double counting birds by ensuring no overlap of VPs. For example, the VPs selected on Day 1 included VP1, VP3, VP5 and VP7, etc. instead of VP1, VP2, VP3, etc.

Previous survey methodology has required eight hours of observation time however for this site, the requirement for surveys was to start a minimum of one hour after sunrise and end one hour before sunset. This resulted in an average of ten hours survey time at each Vantage Point (VP). During Ramadan monitoring was undertaken for eight hours/day because of health and safety considerations for bird observers.

Eighteen VPs were covered per day with two observers at each VP to ensure full coverage. Due to the large scale of the site, a rotational system was implemented to provide targeted, temporal coverage. Each monitoring day was divided into morning and afternoon shifts, typically with a break between shifts. Breaks were staggered to ensure two surveyors were present at each VP so coverage was constant. The transportation of observers from the morning to the evening shift occurred during this break. Where significant bird activity was noted during a break of one observer, survey effort was resumed by both surveyors to ensure full data coverage.

The monitoring program provided survey coverage, in the form of a qualified backup team, at all times including public holidays (e.g. Eid) or unexpected events. Suspension of monitoring was only undertaken due to potentially dangerous situations which could affect the health and safety of bird observers (e.g. sandstorms).

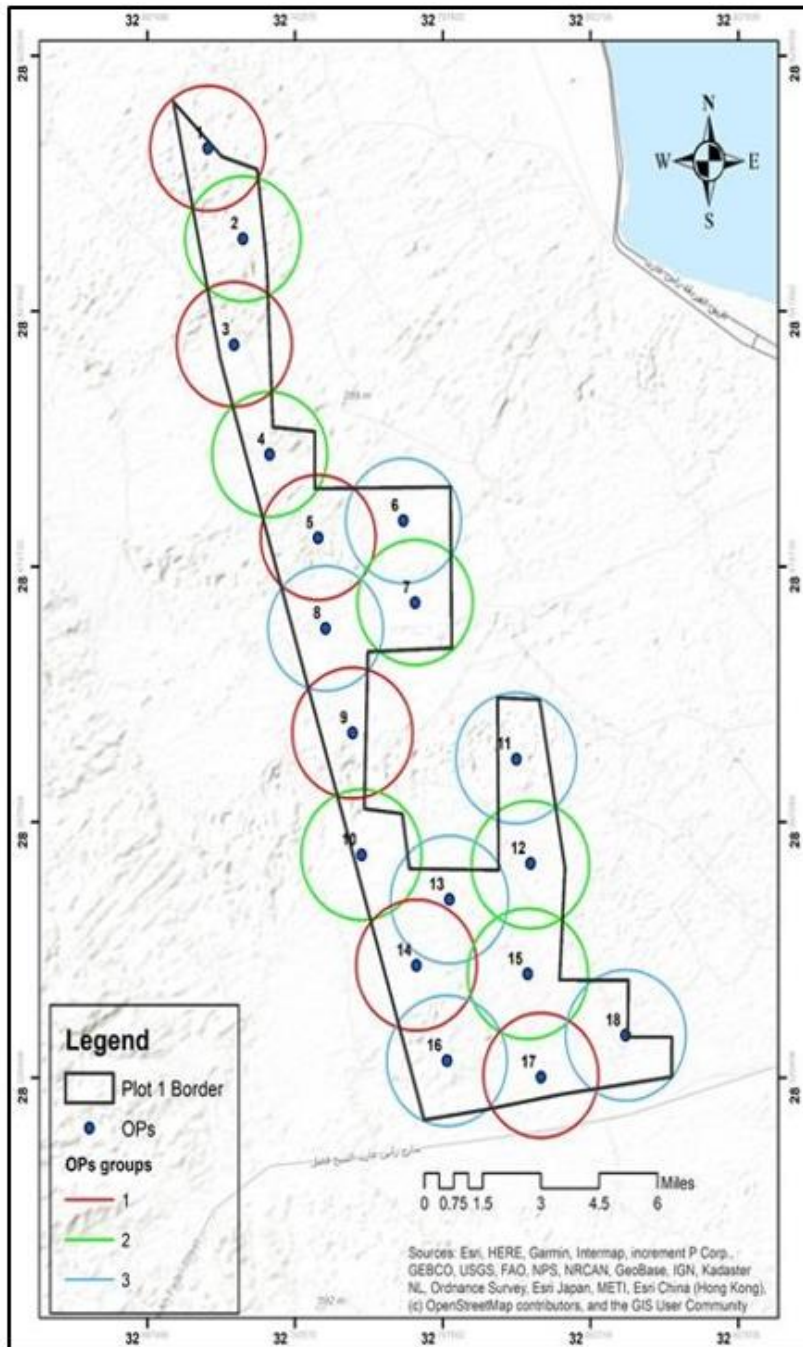


Figure 48 Location of Vantage Points

Target Species and Secondary Species

Target species were all Migratory Soaring Birds (largely made up of birds of prey but also including a range of waterbirds. These species) represent the species of greatest sensitivity and/or conservation concern as well as likely impact from WTG.

Focal Bird Sampling

The area in view was scanned until a Target Species was detected at which point it is followed until it ceases flying or is lost from view.

The time the target bird was detected, and the flight duration were recorded and the route the bird followed was plotted in the field onto the maps. The bird's flight height is estimated at the time of detection and then at 15 second intervals thereafter.

Flight heights were recorded in height bands, i.e. below the rotor- swept area, the rotor-swept area and above the rotor-swept area, allowing for observer error. Height bands were updated during the two year survey period to reflect changes in likely WTG specification. Height bands were as follows:

2022:

- 0 – 120m
- 120 – 150m
- 150 – 200m
- 200m+

2023:

- 0 – 120m
- 120 – 150m
- 150 – 200m
- 200 – 240m
- 240m+

Data Recording Methods

Data for *Target Species* was recorded on to survey forms and mapped onto field maps specific to each Vantage Point and the following information was recorded:

- The location of the VP used.
- Date of survey.
- Surveyor name.
- Start and End time of the VP session.
- Flight lines of target species
- Reference number of each flight line corresponding to that on the form.
- Species

- Age / sex (if known)
- Estimation of flight height
- Duration of at-risk flight

The data from the Vantage Point surveys has been collated on to seasonal Excel workbooks and the data used to inform the Collision Risk Model and subsequent assessment.

Features of Environmental Interest Survey

General

Migratory birds may be attracted to particular landscape features of interest including waterbodies or sources of food. As these features may be routinely used by migratory birds, long term risks could be elevated through the construction of the windfarm and therefore these constraints should be considered when assessing risks as part of the planning and consenting process.

Methods

Features of environmental interest were identified and included:

- *Plot 1 dam-formed artificial pond* – the artificial pond (Latitude 28.465359° Longitude 32.750984°) was previously formed as a result of the accumulation of rainfall during the 2021/2022 overwinter rainy period which was impounded behind a dam. This feature has the potential to act as a source of attraction for some migratory birds, particularly storks, pelicans and other waterbirds when water is present during the migration seasons. Throughout the 2023 survey, each feature of environmental interest was surveyed for a period of two hours per day. All species of bird using these features were recorded.

In 2022, 17 monitoring intervals were completed between 1st April and 18th May. Observations were for one hour. In autumn, 93 monitoring intervals were completed at the artificial pond/dam site during resulting in 93 hr and 10 minutes of censuses. Between August and November, there was no water present at this site. Only isolated observations of Red-Footed Falcon, Osprey, and Western Marsh Harrier were recorded during this season's surveys.

Results: Avifauna General

During each season the average number of hours of VP survey undertaken at each VP was:

- Spring 2022 – 185.9 hours per VP (3345.3 total hours)
- Autumn 2022 – 264.9 hours per VP (4768 total hours)
- Spring 2023 - 247.5 hours per VP (4455 total hours)
- Autumn 2023 – 266.6 hours per VP (4798.5 total hours)

Migration Surveys

During the two-year survey period, 31 migrating soaring bird species were recorded during Vantage Point monitoring, including eight species with elevated IUCN status. These were:

- Steppe Eagle (IUCN EN)
- Egyptian Vulture (IUCN EN)
- Eastern Imperial Eagle (IUCN VU)
- Greater Spotted Eagle (IUCN VU)
- Red Footed Falcon (IUCN VU)
- Sooty Falcon (IUCN VU)
- Pallid Harrier (IUCN NT)
- Dalmatian Pelican (IUCN NT)

The table below provides a summary of Vantage Point Data for the surveys and includes details of relevant species conservation status, total number of individuals recorded, and total number of at-risk flights recorded.

All remaining species recorded during the surveys were classified as IUCN Least Concern (LC).

Table 37 Results of Vantage Point Surveys

Species	Scientific Name	IUCN Status	National Status	Spring 22		Spring 23		Autumn 22		Autumn 23	
				Total Number	At risk height	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height
Levant Sparrowhawk	Accipiter brevipes	Least Concern	Passage migrant	1128	1105	999	335	117	87	14	3
Sparrowhawk	Accipiter nisus	Least Concern	Passage migrant	44	29	29	27	5	5	11	5
Bonelli's eagle	Aquila fasciata	Least Concern	Passage migrant / resident	1	1	0	0	0	0	0	0
Eastern Imperial Eagle	Aquila heliaca	Vulnerable	Passage migrant	24	11	41	36	0	0	1	1
Steppe Eagle	Aquila nipalensis	Endangered	Passage migrant	2055	871	18793	14501	2	2	6	3
-	Aquila spp.	-	-	641	163	896	446	3	2	0	0
Steppe Buzzard	Buteo buteo vulpinus	Least Concern	Passage migrant	42904	27293	83900	38761	158	151	166	119
Long-legged Buzzard	Buteo rufinus	Least Concern	Passage migrant / winter visitor	240	155	123	108	4	4	5	3
-	Buteo spp.	-	-	2314	1179	3504	726	100	89	1	1
White Stork	Ciconia ciconia	Least Concern	Passage migrant	135042	112394	114690	104660	1512	1511	8964	8964
Black Stork	Ciconia Nigra	Least Concern	Passage migrant	1183	864	1108	845	2	0	0	0
Short-toed Eagle	Circaetus gallicus	Least Concern	Passage migrant / summer breeder	706	444	1738	1037	1	1	1	1
Marsh Harrier	Circus aeruginosus	Least Concern	Passage migrant	39	36	40	36	108	108	78	65

Pallid Harrier	Circus macrourus	Near Threatened	Passage migrant / winter visitor	21	21	16	14	21	20	27	26
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Species	Scientific Name	IUCN Status	National Status	Spring 22		Spring 23		Autumn 22		Autumn 23	
				Total Number	At risk height	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height
Montagu's Harrier	Circus pygargus	Least Concern	Passage migrant	13	12	10	10	20	19	38	35
-	Circus spp.	-	-	15	15	6	6	37	35	32	30
Greater Spotted Eagle	Clanga clanga	Vulnerable	Passage migrant	12	5	16	12	0	0	0	0
Lesser Spotted Eagle	Clanga pomarina	Least Concern	Passage migrant	860	586	649	424	0	0	4	4
Lanner Falcon	Falco biarmicus	Least Concern	Passage migrant	2	2	5	3	0	0	4	0
Sooty Falcon	Falco concolor	Vulnerable	Passage migrant summer breeder	0		1	1	21	21	15	15
-	Falco spp.	-	-	25	18	7	4	43	40	19	11
Hobby	Falco subbuteo	Least Concern	Passage migrant	0		1	1	0	0	1	1
Kestrel	Falco tinnunculus	Least Concern	Passage migrant	82	78	243	206	79	78	117	80
Common Crane	Grus grus	Least Concern	Passage migrant	888	98	626	289	0	0	88	65
Griffon Vulture	Gyps fulvus	Least Concern	Passage migrant	1	1	3	3	0	0	0	0

Booted Eagle	Hieraaetus pennatus	Least Concern	Passage migrant	310	228	315	225	7	6	6	3
Black Kite	Milvus migrans	Least Concern	Passage migrant	9312	6356	12088	7228	190	180	256	231
Egyptian Vulture	Neophron percnopterus	Endangered	Passage migrant	84	58	260	182	0	0	0	0
Osprey	Pandion haliaetus	Least Concern	Passage migrant	15	12	22	19	2	1	3	3

Species	Scientific Name	IUCN Status	National Status	Spring 22		Spring 23		Autumn 22		Autumn 23	
				Total Number	At risk height	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height
Dalmatian pelican	Pelecanus crispus	Near Threatened	Passage migrant / winter visitor	1	1	0	0	0	0	0	0
White Pelican	Pelecanus onocrotalus	Least Concern	Passage migrant	138	99	11091	10947	535	164	1978	611
Honey Buzzard	Pernis apivorus	Least Concern	Passage migrant	7675	5756	12761	6916	5195	2246	5764	4451
Raptor Sp.	Raptor spp.	-	-	2594	668	2588	474	78	21	18	6
Lesser Kestrel	Falco naumanni	Least Concern	Passage migrant	1	1	0	0	0	0	0	0
Peregrine	Falco peregrinus	Least Concern	Passage migrant / resident	0		0	0	1	1	2	2
Red-footed Falcon	Falco vespertinus	Vulnerable	Passage migrant	0		1	1	3	3	0	0

For all Migratory Soaring Bird (MSB) and target species, including unidentified species, the highest extrapolated passage rates were at VP12, with high rates also clustered in the central portion of the site (VPs 10,8,6,5 and 4). During Spring 2023, VP12 showed the highest amount of activity, by time, of all MSB and target species flocks, including unidentified species. The central areas of VP 10, 9 and 7 followed the next highest level of activity. VP3 in the northern section of site also showed high levels of activity.

Flight Analysis

Detailed analysis of flights has been undertaken for Spring 2022 and 2023. Analysis of Autumn data has not been fully undertaken due to timing of receiving the data (with surveys only just completed in Autumn 2023). Analysis of Spring seasons is shown below.

Flight Height

Summary of Notable Records from Vantage Point Survey and Incidental Surveys

The following section provides a summary of registrations of species of national or international conservation concern recorded during the Spring Migration Vantage Point Surveys.

- **Steppe Eagle (IUCN EN)** A total of 18,835 individual Steppe Eagle were recorded during the Spring 2023 surveys. The highest activity was recorded in the center of Plot 1 and generally above 240m. A total of 2,611 individuals were recorded within the at-risk flight zone.
- **Egyptian Vulture (IUCN EN)** A total of 261 individual birds were recorded with 207 flying within the at-risk zone. During 2023 the highest activity was at VP 11 in the center of the site however activity was spread throughout the different areas.
- **Eastern Imperial Eagle (IUCN VU)** A total of 41 birds were recorded during the spring 2023 surveys and all 41 birds were within the at-risk flight zone. In 2022, Imperial eagles spent a very small proportion of time within the 0-120m band, with the majority spent at altitudes over 200m. During 2023 records were spread throughout the site but highest activity present in the central section. The highest level of activity was between 150-200m.
- **Greater Spotted Eagle (IUCN VU)** A total of 16 individual Greater Spotted Eagle were recorded during the Spring 2023 surveys and all of these were recorded within the at-risk flight zone.
- **Red Footed Falcon (IUCN VU)** A single registration of a single bird in the Spring 2023 surveys
- **Sooty Falcon (IUCN VU)** A single registration of a single bird in the Spring 2023 surveys
- **Pallid Harrier (IUCN NT)** – A total of 16 birds were recorded during the spring 2023 surveys and all 16 birds were within the at-risk flight zone.

Notable Records of Other Species

Notable records of LC species recorded during the Spring Migration period include:

- **White Stork** – the most frequent species recorded during the survey period with a total of 132,261 individuals registered. White Stork spent a large proportion of time between 0-120m height bands. There were fewer passages in the south of the site. During 2023 the highest activity was in the center of the site and a range of height bands were used.
- **Black Kite** appeared to occur in greater numbers in the south-east of the site (VP11,12,15), and spend a greater proportion of time at lower altitudes (0-120m) in the southern area of the plot (VP12, 14, 17, 18 particularly). During 2023 the higher use of the site was in the southern part of

- the centre of site at VP's 11, 7 and 8. Black Kite spent a similar proportion of time above and below 240m during this season with the greatest time spent below 240m at the southern central section.
- Steppe Buzzard** were recorded across the site, with no clear spatial patterns. Across the site, flight heights were relatively evenly spread across the height bands, with no clear spatial patterns in flight height. In 2023 higher activity was recorded in the central portions of site with the highest level of activity above 240m.
- European Honey Buzzard** A total of 12,869 birds were recorded however only 302 birds were within the at-risk flying zone.
- White Pelican** spent the majority of time at low altitudes (0-120m), with highest passage rate at VP1, 3, and 15. Sample sizes were too low to investigate spatial variation in flight heights. During 2023 again there were no clear spatial patterns and there was a good spread of height bands used.
- Levant Sparrowhawk** During 2022 and 2023 Levant sparrowhawks were recorded in a small number of groups at a range of VP's. During 2023 more birds were recorded in the southern section however, sample sizes of observations were not large enough to identify flight height patterns.

Temporal Distribution

Plot 1 exhibited low migratory or avian movement during February to late March, when a sharp increase was recorded. Activity spiked throughout April, with one late spike of activity late May. Following this, activity steadily reduced. In both 2022 and 2023, White Stork was the most abundant species across this time period.

On average, the number of birds passing through Plot 1 spiked daily between 13:00 and 14:00. Activity broadly increased and decreased either side of this peak although higher activity was recorded between 09:00 and 10:00 and 17:00 and 18:00 which is likely based around activity of birds associated with roosting behaviour at the start and end of the day. This is in contrast to results from 2022 which showed there were two daily peaks in activity – one in the mid-morning and another in the early afternoon, which coincides with the pattern observed in other similar seasonal migration monitoring studies completed in the region.

Roosting

Numbers of birds roosting within the survey area were recorded by surveyors from the vantage points used for VP surveys. The results of these roosting numbers are below, with the spring and autumn results in the tables below.

Table 38 Bird numbers roosting on site in Spring 2022 and 2023.

Spring 2022			Spring 2023		
Species	Month	Number	Species	Month	Number
Black Kite	Total	96	Black Kite	Total	211
	March	71			
	April	19		April	211
	May	6			
Black Stork	Total	19	Black Stork		
	April	19			
Raptor Species	Total	1	Raptor Species		
	April	1			
Steppe Eagle	Total	15	Steppe Eagle	Total	41
	March	15		March	41
White Stork	Total	10069	White Stork	Total	9187
	March	20		March	9000
	April	10049		May	187

White Pelican			White Pelican	Total	52
				April	52
Aquila sp.			Aquila sp.	Total	5
				April	5
Marsh Harrier			Marsh Harrier	Total	1
				April	1
Steppe Buzzard			Steppe Buzzard	Total	3
				April	3
Total		10200			9500

Table 39 Bird numbers roosting at on site in Autumn 2022 and 2023.

Autumn 2022			Autumn 2023		
Species	Month	Number	Species	Month	Number
Common Kestrel	Total	11	Common Kestrel		
	Oct	11			
Honey Buzzard	Total	9	Honey Buzzard	Total	1
	Sep	9		September	1
Marsh Harrier	Total	6	Marsh Harrier	Total	4
				September	4
	Oct	6			
Pallid Harrier	Total	16	Pallid Harrier	Total	4
				September	4
	Oct	16			
Unidentified Harrier	Total	13	Unidentified Harrier		
Long Legged Buzzard			Long Legged Buzzard	Total	2
				September	2
Lesser Spotted Eagle			Lesser Spotted Eagle	Total	9
				September	9
Steppe Buzzard			Steppe Buzzard	Total	3
				September	3
Sooty Falcon			Sooty Falcon	Total	2
				September	2
Total		55	0	0	25

Fourteen (14) species of soaring bird were recorded roosting on site during the survey periods 2022 and 2023 and this was a total of 10200 birds in Spring 2022, 9500 birds in Spring 2023 along with 55 birds in Autumn 2022 and 25 birds in Autumn 2023. This shows how the site is considerably more used for roosting in Spring than during Autumn.

White Stork dominated the use of the site for roosting during each spring and this species accounted for 98.7% of birds recorded roosting during 2022 and 96.7% during 2023. Black Kite were present in the next highest number with 211 birds. For all other species the use of the site for roosting is an incidental behaviour of movement though the region rather than a key feature of the nature of the site. White Stork were present in higher numbers and heavily used the dam area for roosting with around 7.4% of birds recorded passing through the area in 2023 roosting there and around 8.0% in 2023.

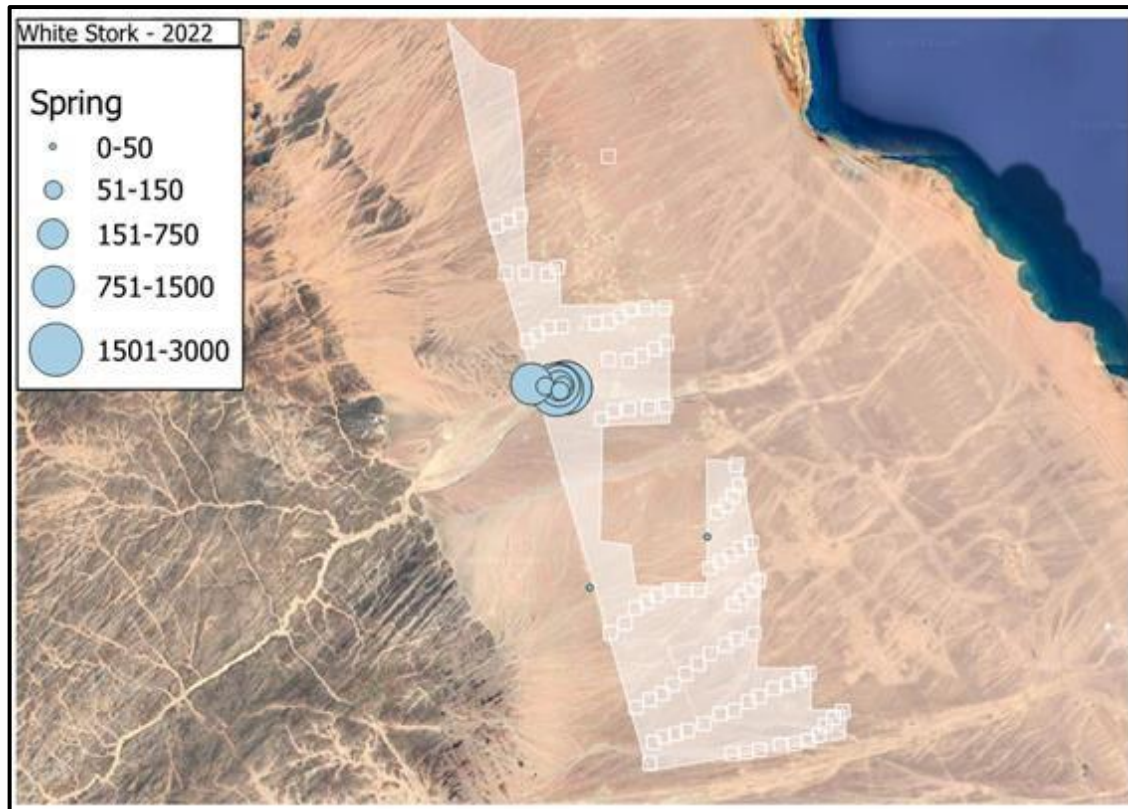


Figure 49: White Stork roosting locations across site during Spring 2022.

Features of Environmental Importance

Along with roosting surveys across the whole site surveys were undertaken during the day at the main feature of importance on site: the dam. The dam is thought to hold water once every four years. No water was present in the dam location during the Spring 2023 survey period. Surveys previously undertaken in Spring 2022 noted water within the dam. In 2022, a peak count 6,000 White Stork were recorded using the dam on a single observation day, with over 15,000 individuals (representing around 11.2% of individuals recorded migrating through that season) at the dam over the survey period. No White Stork were recorded using the dam in 2023 at a time of no water. Whilst this area is used by roosting birds when water is not present it is only low numbers with no species reaching double figures over the course of the season.

Several other species were noted during surveys of the dam and these are shown in Table 29 below.

Table 40 Number of individuals recorded during surveys performed of the artificial pond/dam located within Plot 1 during spring 2022 and 2023 as well as autumn 2023.

Common Name	Spring 2022	Spring 2023	Autumn 2023
White Stork	15076	0	0
Black Stork	64	0	0

White Pelican	59	0	0
Common Crane	1	0	0
Egyptian Vulture	2	0	0
Black Vulture	1	0	0
Osprey	2	0	0
Steppe Eagle	11	0	0
Booted Eagle	3	0	0
Short-toed Snake-eagle	11	1	0
Black Kite	160	2	2
Western Marsh-harrier	4	2	1
Pallid Harrier	1	0	1
Montagu's Harrier	1	0	1
Steppe Buzzard	3	4	0
Grey Heron	22	0	0
Squacco Heron	3	7	0
Cattle Egret	7	0	0
Honey Buzzard	0	1	0
Kestrel	0	9	5
Sparrowhawk sp.	0	8	5
Pallid Harrier	0	0	1

Sensitive Receptors

A table is provided below which details the sensitivities of the receptors recorded within the Project AoI that may be impacted by the construction and operation of the proposed wind farm and will therefore be considered within the impact assessment.

Any species recorded during surveys, but which are not listed in the sensitive receptor table are considered to be of Low/lower value.

- Impacts on Low/Lower value species are expected to be of low to moderate magnitude and are therefore not significant; and
- Mitigation for higher value receptors will also alleviate impacts on these lower value receptors.

Therefore, these Low/lower value species have not been listed out in detail and the impact assessment section will not include assessments on these receptors.

Species identified as Priority Biodiversity Features (PBFs) are also identified in the table below.

Table 41 Priority Biodiversity Features

Receptor	Conservation Status		Justification	PBF (Yes or No)	Sensitivity
	IUCN				
Natural Habitat	--		Not listed in Annex I or included as a Priority Habitat.	-	Medium

			No plant species present of international or national conservation concern and no endemic or range-restricted species present. However, not modified heavily by human activity such as farming and native species are present and the habitat is largely performing its natural function.		
Spiny-Tailed Lizard	VU		Present across the Aol in high population density. Species is IUCN and UzRDB VU	Yes	High
Migratory Birds	Various		Large numbers of raptors and storks were recorded flying at an at-risk flight height during the surveys. Species included IUCN VU species including Steppe Eagle and Egyptian Vulture.	Yes	High

7.6 Archaeology and Cultural Heritage

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to archaeology and cultural heritage.

7.6.1 Baseline Assessment Methodology

The baseline assessment of the Project site was based on a literature review and a field survey, each of which is discussed below.

(i) Literature Review

Literature review included a comprehensive review of archives, publications, and studies on previous archaeological and cultural heritage work and surveys undertaken in the area, and which are available through desktop review as well as through the Red Sea Antiquities Inspection Office and Suez Antiquities Inspection Office. Such literature review included information available through the French Institute for Oriental Archaeology, French Institute in Cairo, and data published by the French mission working at in Sukhna city.

(ii) Field Survey

A field survey was undertaken by an archaeology and cultural heritage expert. The objective of the field survey was to ascertain the presence of any surface archaeological or cultural heritage remains within the Project site. The survey covered the entire Project site boundary. The monitoring equipment used were GPS devices, digital cameras and data loggers. The surface area was walked by the expert in order to inspect the entire ground surface. Based on the survey, should any sites of interest be discovered, the following actions are to be undertaken:

- Sketch plans and /or a photograph as appropriate
- GPS coordinates for the area
- Undertake an analysis to categorize the sites and archaeological features and making an assessment of their significance.

(iii) Stakeholder Consultation

The consultant to conduct meetings with relevant governmental entities to include: (i) Red Sea Antiquities Inspection Office; and (ii) Egyptian Antiquities Sector Office at the General Authority for Antiquities. The objective was to discuss the results and outcomes of the assessment, and identify any key issues of concern or additional requirements they might have.

7.6.2 Results

This section presents the results in accordance with the methodology discussed above. Based on the literature review, it is concluded that there are no registered archaeological sites within the Project area itself and the area adjacent to the Project area. The closest sites that are considered of great archaeological, historical and cultural heritage value are described in the table below and presented in the figure that follows.

Table 42 Nearest Archaeological Sites

Site	Description	Distance to Project
Wadi Jarf / Red sea coast	A harbour complex which was used regularly during the second half of the Old Kingdom and the Middle Kingdom (from 2550 to 1700 b.c.e.). It was used by the expeditions seeking turquoise and other products from south Sinai. Moreover, it's also known for its very famous wadi jarf papyrus which dates to the reign of king khufu and which describes the organization of labour under the supervision of their leader Merer who recorded the diary of the mission on a long papyrus sheet.	31.9 km to the north
Saint Anthony Monastery (Deir el Qidis Antun)	Saint Anthony's disciples founded the monastery between 361 and 36 (Starkey.2012:205)	47.8 km to the north
Saint Paul Monastery (Deir el Qidis Nulus):	The monastery is located in front of Mount el Galala. The caves in this area were used by Christian monks who used the limited resources available in the harsh desert for living, while the cave and chapel of Saint Paul in particular were considered the base for the current monastery (Starkey.2012: 207).	30.0 km to the north
Gebel El Zeit	The mountain itself is located within an Important Bird Area of the same name and located within the internationally recognized important corridor for soaring birds.	81.4 km to the south
El Qusayr	A historical sit, city and port located on the Red Sea. The site dates back 5,000 years as a gathering place for Muslim pilgrims from Egypt and western Mediterranean region.	289 km to the south



Figure 50 Locations of Archeological Sites in the GoS Area

In addition, the site survey undertaken indicated no evidence of any archaeological or cultural heritage resources within the Project site

7.7 Air Quality and Noise

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to air quality and noise.

7.7.1

7.7.2 Baseline Assessment Methodology

Assessment of baseline conditions was based on an onsite air quality and noise monitoring program undertaken at the Project site. Additional details are discussed below.

(i) Selection of Parameters

Monitoring was undertaken for the following parameters: (i) gases to include Carbon monoxide (CO), Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂), (ii) Suspended Particulate Matter to include Total Suspended Particulate (TSP) and Respirable Particulates (i.e. Particulate Matter smaller than 10.0 (PM₁₀) and 2.5 microns (PM_{2.5}) in diameter); and (iii) Noise Pressure Levels (NPL). These parameters were selected based on the following rationale:

Such parameters are likely to be present within the Project site given its characteristic and attributes. Suspended particulate matter is expected given the barren nature of the site. On the other hand, pollutants (such SO₂, NO₂,) are expected onsite but rather at minimal concentrations as the site is relatively in a remote area; nevertheless, motor emissions particularly from vehicles passing casually through the site (or from the main road) could be a source of such pollutants. Finally, noise levels are expected from vehicular movement and to some extent from onsite and surrounding areas and activities.

Such parameters are likely to be affected mainly during the Project's construction and operational activities. All air pollutant parameters selected are expected to be slightly impacted and increase specifically during the Project's construction activities. Emissions from vehicles and machinery used onsite and their movement onsite will increase gaseous emissions, suspended particulate matter, as well as noise pressure levels.

(ii) Selection of Locations

To assess the air quality and noise baseline conditions within the Project area, 3 monitoring points were selected as shown in the figure below. Monitoring was undertaken for 24 hours at each point respectively. The coordinates for the monitoring points and location are presented in the table.

Table 43 Coordinates of Measurement Location for Gabal El Zeit Site

Measurement Locations	N coordinates	E coordinates
Point 1 (P1) Gharb Bakr	28°35' 37.73"N	32°42' 35.78"E
Point 2 (P2) Gharb Bakr	28° 27' 27.40"N	32° 46' 40.00"E
Point 3 (P3): Gharb Bakr	28° 19' 35.48"N	32°48'52.83"E

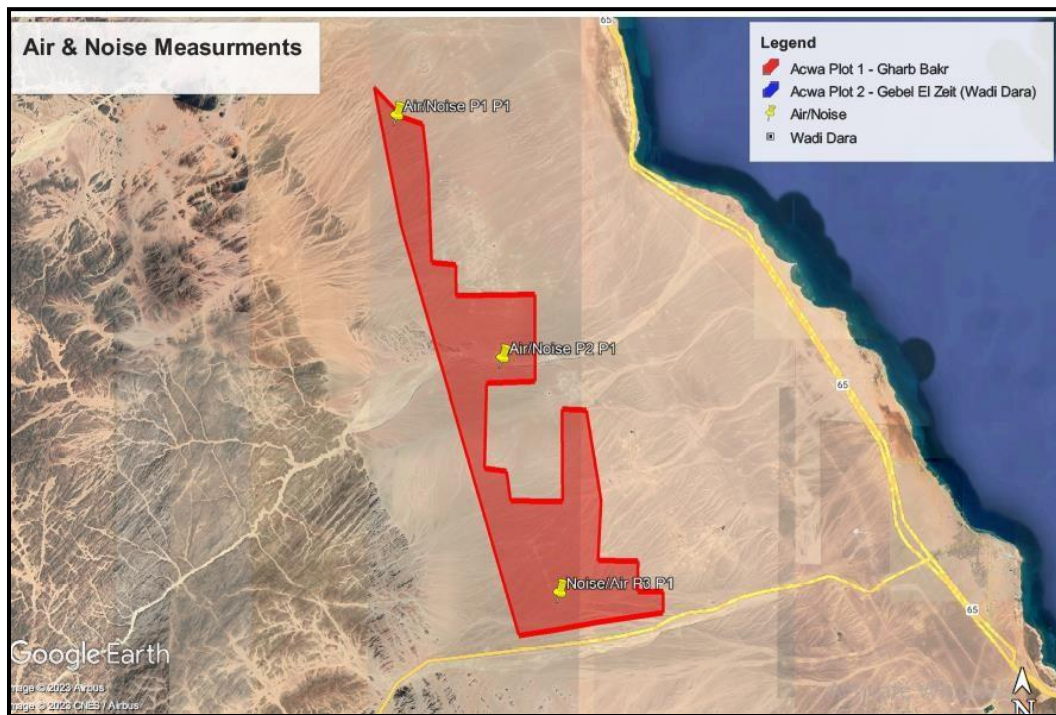


Figure 51 The coordinates and location of the 3 measurement locations

(iii) Equipment

Ambient Air Quality Monitoring equipment is an integrated system of which includes several analysers with data recording devices as follows:

- Ambient Particulate Matter TSP-PM2.5 And PM10 sampler
- Sulphur Dioxide SO2 Analyzer
- Nitrogen Oxides NO, NO2 & NOX Analyzer
- Carbon Monoxide CO Analyzer

The following devices have been used during the measurement activities of noise level:

- Integrated Sound Level Meters, Type I (precision grade), compliant with IEC 1672 Class 1 standard.
- Outdoor Weatherproof Microphone Kit

(iv) Legislative Requirements

With regards to air quality, the results of the measurements were compared to the national limits as set within Annex 5 of the Executive Regulation (D1095/2011) for ambient air quality. The table below identifies the corresponding applicable national ambient air quality permissible limits. The limits included for 'industrial' areas were used for comparison given the industrial nature of the site that includes petroleum activities and wind farms.

Table 44 Applicable National Ambient Air Quality Permissible Limits (Annex 5 of the Executive Regulation)

Pollutant	Location	Maximum Limit ($\mu\text{g}/\text{m}^3$)			
		1 Hour	8 Hours	24 Hours	1 Year
Sulfur Dioxide (SO_2)	Urban	300	---	125	50
	Industrial	350	---	150	60
Carbon Monoxide (CO)	Urban	30 mg/m^3	10 mg/m^3	---	---
	Industrial	---	---	---	---
Nitrogen Dioxide (NO_2)	Urban	300	---	150	60
	Industrial	300	---	150	80
Total Suspended Particles (TSP)	Urban	---	---	230	125
	Industrial	---	---	230	125
Respirable Particulates (PM_{10})	Urban	---	---	150	70
	Industrial	---	---	150	70
Solid Particulates < 2.5 μm	Urban	---	---	80	50
	Industrial	---	---	80	50

With regards to noise, the results were compared to the national limits set in Annex 7 of the Executive Regulation (D710/2012) for the 'Day' and 'Night' intervals. The table below lists the different area classifications and their corresponding applicable permissible limits for noise. Similarly, the limits included for 'industrial' areas were used for comparison given the industrial nature of the site that includes petroleum activities and wind farms, which is set at 70dB(A) for both night and day.

Table 45 Applicable National Permissible Limits for Noise (Annex 7 of the Executive Regulation (D710/2012))

Type of Area	Permissible Limit for Noise Intensity [dB (A)]	
	Day (7 am to 10 pm)	Night (10 pm to 7 am)
Sensitive areas to noise	50	40
Residential suburb with low traffic and limited activities service	55	45
Residential areas in the city and have commercial activities	60	50
Residential areas are located on roads less than 12 m and have some workshops or commercial activities or administrative activities or recreational activities ... etc.	65	55
Residential areas located on roads equal or more than 12 m, or industrial zones with light industry and some other activities	70	60
Industrial areas (heavy industries)	70	70

In addition to the above, identified below are the limits as included within the IFC General EHS Guideline which are also considered applicable for this Project. Similar to rationale above, limits included for 'industrial' areas were used for comparison given the industrial nature of the site that includes petroleum activities and wind farms, which is set at 70dB(A) for both night and day.

Table 46 IFC and EU Limits for Noise and Air Quality

Parameter	(SO_2)	(PM_{10})	($\text{PM}_{2.5}$)	Noise
Maximum Permissible Limits	125 $\mu\text{g}/\text{m}^3$ (interim Target 1)	150 $\mu\text{g}/\text{m}^3$ (interim Target 1)	75 $\mu\text{g}/\text{m}^3$ (interim Target 1)	70 $\text{LA}_{\text{eq}}/\text{dB A}$
IFC General ESH Guidelines	50 $\mu\text{g}/\text{m}^3$ (interim Target)	100 $\mu\text{g}/\text{m}^3$ (interim)	50 $\mu\text{g}/\text{m}^3$ (interim)	

	2)	Target 2)	Target 2)	
Parameter	(SO₂)	(PM₁₀)	(PM_{2.5})	Noise
	20 µg/m ³ (guideline)	75 µg/m ³ (interim Target 3) 50 µg/m ³ (guideline)	37.5 µg/m ³ (interim Target 3) 25 µg/m ³ (guideline)	
EU Ambient standards AQ	350 µg/m ³ (1 hour) 125 µg/m ³ (24 hours)	50 µg/m ³ (24 hours)	25 µg/m ³ (Stage 1) 20 µg/m ³ (Stage 2)	

7.7.3 Results:

Air Quality

The table below presents the overall results for the air quality monitoring that was undertaken. As noted in the tables below, at all monitoring points and for all parameters monitored, the results are significantly lower than the maximum allowable ambient air levels indicated within the legal limits.

In particular, there was no key source of pollutant emissions or activities throughout the monitoring period which could affect or impact air quality levels as presented in the table below.

Table 47 36 24-hourly results (µg/m³) for location (P1)

Parameter in µg/m ³		(CO)	(SO ₂)	(TSP)	(PM ₁₀)	NOX
Concentra tions (µg/m ³)	P1	2.34	38.04	71.6	55.4	31.58
	P2	2.50	38.18	69.3	54.7	31.74
	P3	2.30	40.10	74.1	55.90	33.09
National Maximum Permissible Limits (µg/m ³)		-	150	230	150	-
International Maximum Permissible Limits (µg/m ³)		-	125	-	150	-
IFC General ESH Guidelines						

Noise

The following tables present the overall results for the noise monitoring that were undertaken. As noted in the tables below, the results are within national limits during day and night-time. No key source of noise emission or activity were noted during the monitoring period. Therefore, the measurements of noise levels are namely representative of the intensity and speed of the wind at the measurement sites, despite efforts to mitigate the effect of wind speed on measurements.

Table 48 Outcomes of Noise Monitoring Points

Maximum Permissible Noise Limits		
Point #	Day Time (7:00am10:00pm)	Night Time (10:00pm7:00am)

P1	62.5	59.8
P2	60.9	59.9
P3	60.5	58.8
National limits (LAeq/dBA)	70	60
IFC limits (LAeq/dBA)	70	60

7.8 Infrastructure and Utilities

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to infrastructure and utilities.

7.8.1 Baseline Assessment Methodology

Assessment of baseline conditions was based on an onsite survey undertaken for the Project and surrounding areas as well as consultations with relevant entities that are managing such infrastructure and utility elements as applicable. Additional details are discussed below.

7.8.2 Existing Roads and Networks

Based on the survey undertaken in the area, the following main roads are noted within the area:

- The access to the Project area is via the Suez-Hurghada road, a major four-lane highway that runs throughout the Red Sea coast and throughout various Governorates in Egypt. The highway is located around 15km to the east of the Project site and is considered a main highway that is fit for heavy transports;
- From the Suez-Hurghada road an exit is taken to the Ras Ghareb-El Shaikh Fadel road, an asphalt road with two lanes, running less than 1km from the southern border of the Project site. This road has very little traffic load compared to its capacity and is fit for heavy transports.
- The Project site itself can be accessed through unpaved tracks that were established by the General Petroleum Company for their exploration activities within the site that are no longer ongoing. As noted in the figure below, there are dirt and paved roads leading into the project area from Suez-Harghada Road and Ras Ghareb-El Shaikh Fadel Road. that goes into the Project area.

The figure below presents the main roads within the area in relation to the Project site.





Figure 52 Road Networks

7.8.3 Water Management

Based on consultations with Ras Ghareb Water Company there are no existing or planned water connections to the Project area. In addition, it was indicated that developments in such areas in general have to rely on water trucks and tankers from Ras Ghareb to deliver water requirements to the site while the drinking water is mostly bottled water.

7.8.4 Waste Management (solid waste, wastewater and hazardous waste)

With regards to wastewater, this is disposed through the Ras Ghareb Water Company whom have tankers that collect wastewater and dispose it at the Ras Ghareb Wastewater Treatment Plant (WWTP).

Regarding solid waste management, the Red Sea Governorate has only one controlled dumpsite for the disposal of solid waste. This is known as the Ras Gharib Public dumpsite, owned and operated by the Ras Ghareb City Council.

In addition, concerning waste recycling, there are facilities available for collecting and recycling various waste streams. One such facility is HEPCA, located in Hurghada, which specializes in recycling materials such as cardboard, plastic, metal, and glass. Another entity, Geocycle, operates a processing facility in Sokhna, where they recycle diverse waste streams, including both hazardous and non-hazardous materials.

Finally, with regards to hazardous waste management, in Egypt there are currently 2 approved hazardous waste disposal facilities in Alexandria and Helwan which are about 600 km and 400 km respectively from site. The hazardous waste facilities are managed by the Nasiriya Hazardous Waste Treatment Centre (NHWTC) in Alexandria and in Arab Abu Saed the 2 facilities are privately owned and managed by First and EcoConServ Services.

7.8.5 Civil and Military Radars and Aviation

Based on a survey undertaken for the Project area and its surrounding, five (5) military posts have been identified as noted within Table 38 and figure below along Sheikh Al Fadl Road to the south of the Project site. However, no additional details could be obtained on radar systems in the area. In addition, no details are available on civil aviation radars in the area.

Table 49 Nearby Military Sites

Point	Description of the land use
1	Army unit #1. The unit is inactive and abandoned.
2	Army unit #2 that seems to be abandoned. However, no additional details could be obtained. The unit is currently being demolished and is no longer in use.
3	Air defense unit that seems to be active. However, no additional details could be obtained.
4	Army unit #3 that is likely to be active. However, no additional details could be obtained
5	Army unit #4 that is likely to be active. However, no additional details could be obtained

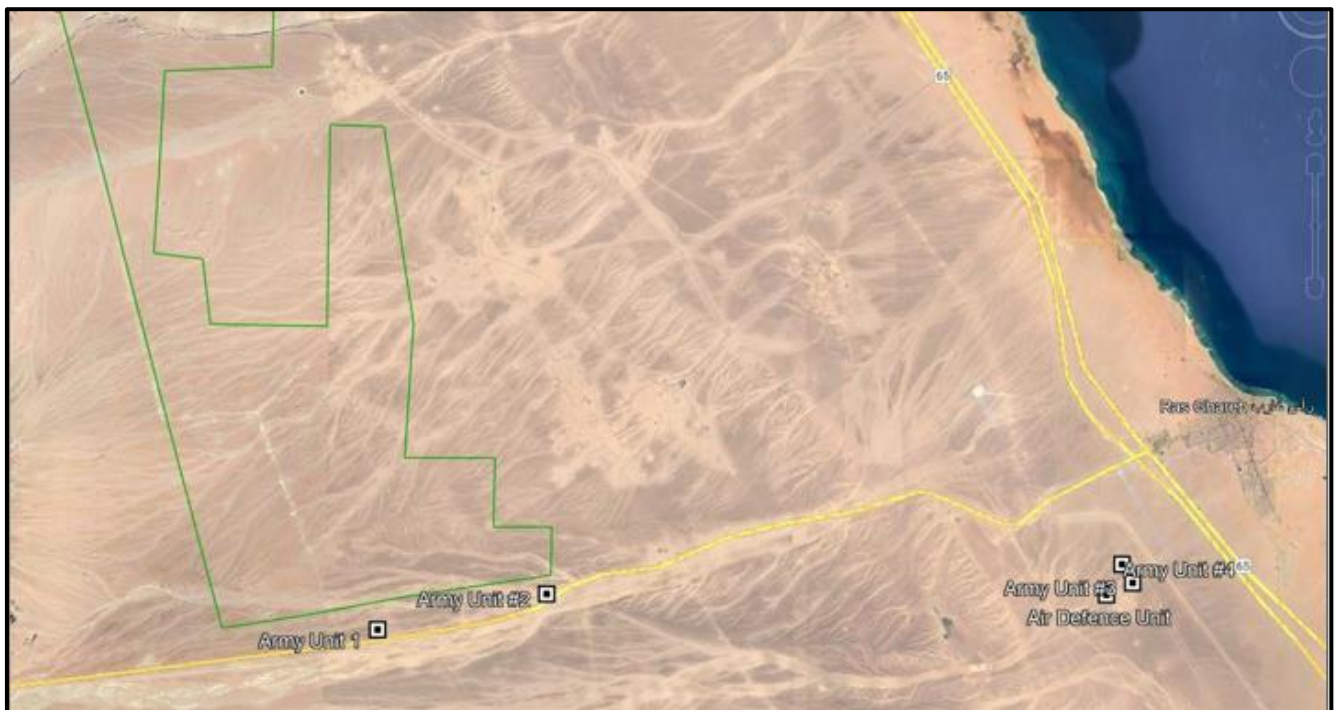


Figure 53 Nearby Military Sites

7.8.6 Radio, TV and Telecommunication Infrastructure

Based on a survey undertaken for the Project area and its surrounding, two (2) telecommunication tower have been identified as noted within Figure 53 which belong to Orange and Etisalat Misr ("Section 4.5"). Those are located close to the site at the plot's southern border.

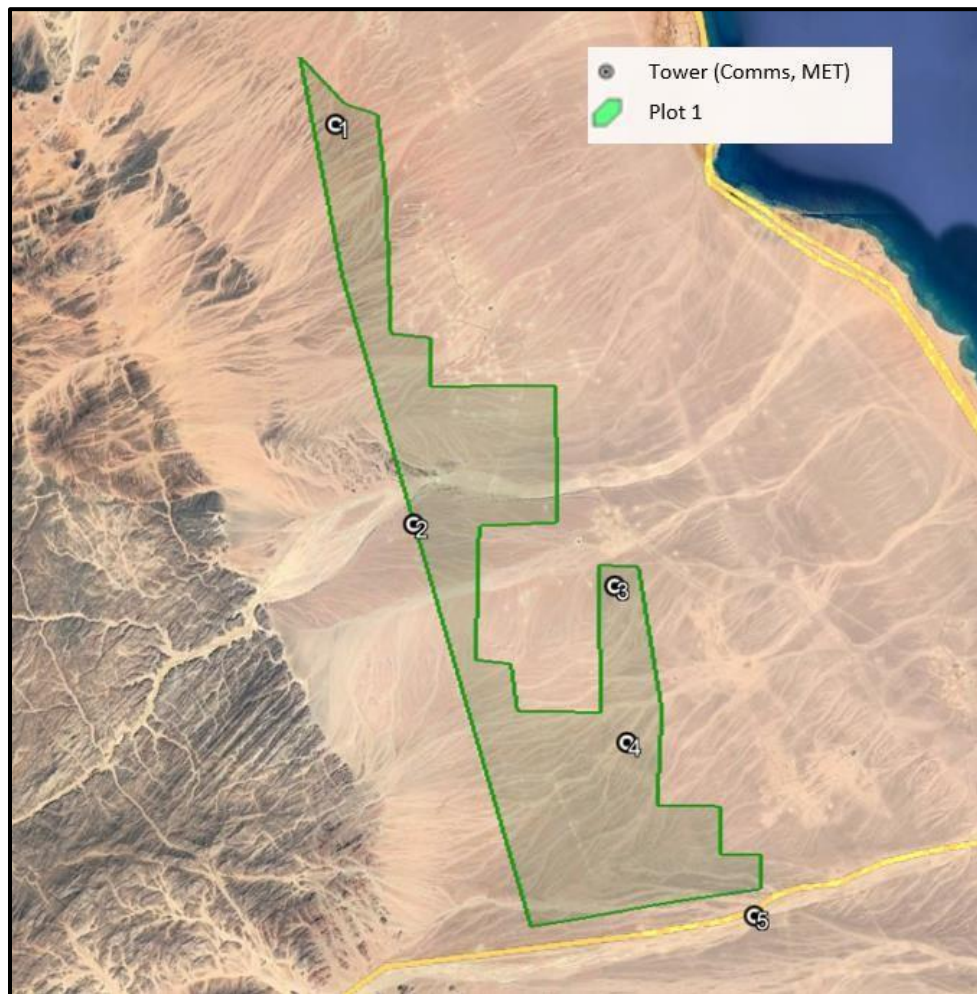


Figure 53 Locations of Communications Towers in and near the Project Site

Table 50 Coordinates of Communications Towers and MET Masts

#	Lat.	Long.	Facility
1	28.497576	32.759593	Met Mast
2	28.428248	32.824738	Met Mast
3	28.343374°	32.824050°	Met Mast
4	28.591791°	32.712221°	Met Mast ⁵
5	28.311540°	32.880818°	Communication Tower

An official letter was sent to conduct a meeting with officials in NTRA. NTRA stated that communication on this matter should be through NREA and not the ESIA consultant. Therefore, no additional information could be obtained on this issue.

The ESIA consultant established formal communication with the Radio and Television Union in Cairo. They indicated that they have studied the site and therefore there is no impact from the Project on radio and TV infrastructure in the area. The official letter is provided in the below.

⁵ ACWA stated that the 4th Met Mast does not belong to ACWA but belongs to another wind energy developer. However, during the discussion, ACWA confirmed that, SWE has informed the Met Mast owner (the other developer) that SWE notify the tower owner that the tower will be removed as it is old and out of service. This should be fully coordinated through NREA and the other developer. Before construction began.

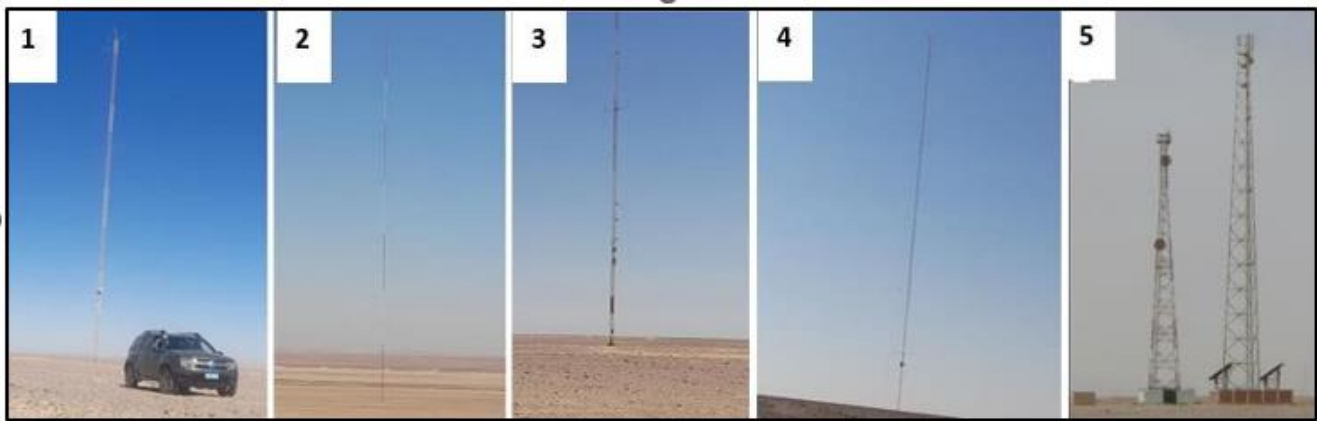


Figure 54 Communications and Measurement Towers within and near the Project Site

The ESIA consultant established formal communication with the Radio and Television Union in Cairo. They indicated that they have studied the site and therefore there is no impact from the Project on radio and TV infrastructure in the area. The official letter of no objection that was received as a result is provided in Figure 57.

7.8.7 Petroleum Facilities

Based on a survey undertaken for the Project area and its surrounding, several petroleum units were located in the Project Site area including closed exploration wells around the Project site (refer Figure 52). That includes what seems like closed exploration wells and /or seismic exploration sites. In addition, such location was supported by an internal road network to provide access to the site.

Table 39 below presents the location of the petroleum units (closed) operating oil stations (outside the Project site) while Figure 49 presents the road network. Please note that road network was mapped based on satellite image review and is not considered official or representative.

A Work Coordination Agreement was signed between NREA and the General Petroleum Company in 2005 for an area of 700km² in which wind farm developments are to take place (including the Project site). The Agreement includes several articles for the development projects to include:

- The General Petroleum Company has agreements for oil exploration and utilized within concession areas located within the agreed area.
- Wind turbines are to be allocated in rows with a distance of 1km between each row and the next
- A distance of around 260m are to be respected between each wind turbine
- The tower height of the turbines should be around 100 m above ground
- The dimensions of the concrete foundation should be around 20m×20m and depth of 4m below ground
- Cables should be laid out next to the rows of turbines at a depth ranging from 1.5-2m and enclosed within special pipes with a diameter of around 15cm that connects to a substation that are to be constructed on an area of 500m×500m
- Within the same trench, communication cables are to be included that are to connect with a control room in the main administrative building
- The wind rows are to be serviced with internal roads with a width of 4m located adjacent to each row and these roads should be designed without an asphalt layer and should be able to withstand a load of

- 15ton/axle
- Other requirements are to include an administrative building, service buildings, accommodation facilities, etc.

General Petroleum Company has the right to undertake surveys, measurements or any other exploration activities along with any other company associated with it. The agreement identifies several provisions that should be met for any well drilling or survey activities some of which include: (i) ensure appropriate areas are available within the wind farms for installation of equipment and machinery to undertake required surveys; (ii) turn off turbines when required for security reasons or reduce noise impacts on survey results; (iii) provide the General Petroleum Company with final, detailed and accurate as built drawings for all infrastructure elements above and underground (e.g. cables, roads, etc.).

A meeting was held with General Petroleum Company in Ras Gharib to discuss and obtain additional information on the wells onsite. Consultations indicated that there are exploratory wells in the Project land and nearby sites, that are currently closed. A map of active sites was obtained as a result of the consultation and is included in an aforementioned “Section 4.5”. Coordination with General Petroleum should be sought prior to construction activities.



Figure 54 Closed Oil Well

The most important facilities and infrastructures distributed in the areas around the project site which the team was unable to visit and take photographs, while the coordinates are listed in Table 49.

Table 51 The coordinates of the facilities that were identified from Google maps

#	Facility	Lat.	Long.
1	Closed oil well	28.493481°	32.761128°
2	Closed oil well	28.573945°	32.726597°
3	Oil storage tanks	28.509411°	32.763599°
4	Petroleum companies complex	28.545908°	32.923280°
5	Dara Petroleum Company	28.412776°	32.962833°
5	West Bakr oil collection station K	28.368564°	32.920650°
6	West Bakr Oil Company	28.382221°	32.933988°

7	Petrojet Camp, Ras Gharib	28.349288°	33.049770°
8	Petroleum Unit	28.323961°	32.953603°

7.8.8 Buhaira One Dam

The Buhaira One Barrier Dam was constructed in the Year 2017 at the outlet of Wadi Abu Had with an artificial lake to store rainwater to reduce the risk of the City of Ras Gharib from dangerous flooding. The dam and its lake lie are located near center of the site.

	Facility	Lat.	Long.
See Figure 59	Buhaira One Dam	28.297955°	33.006994°

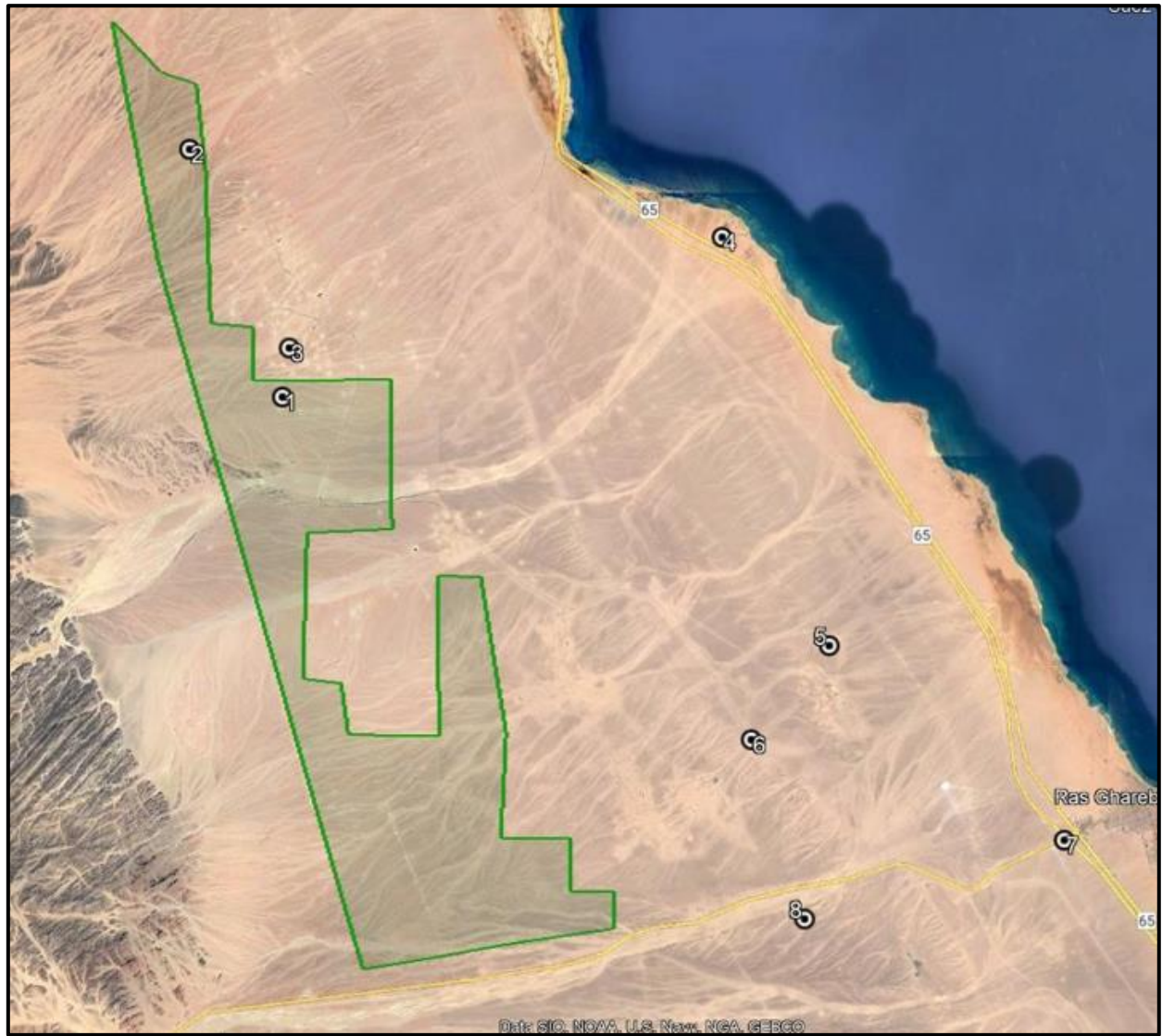


Figure 55 Locations of Petroleum Facilities and Sites



Figure 56 Buhaira One Dam

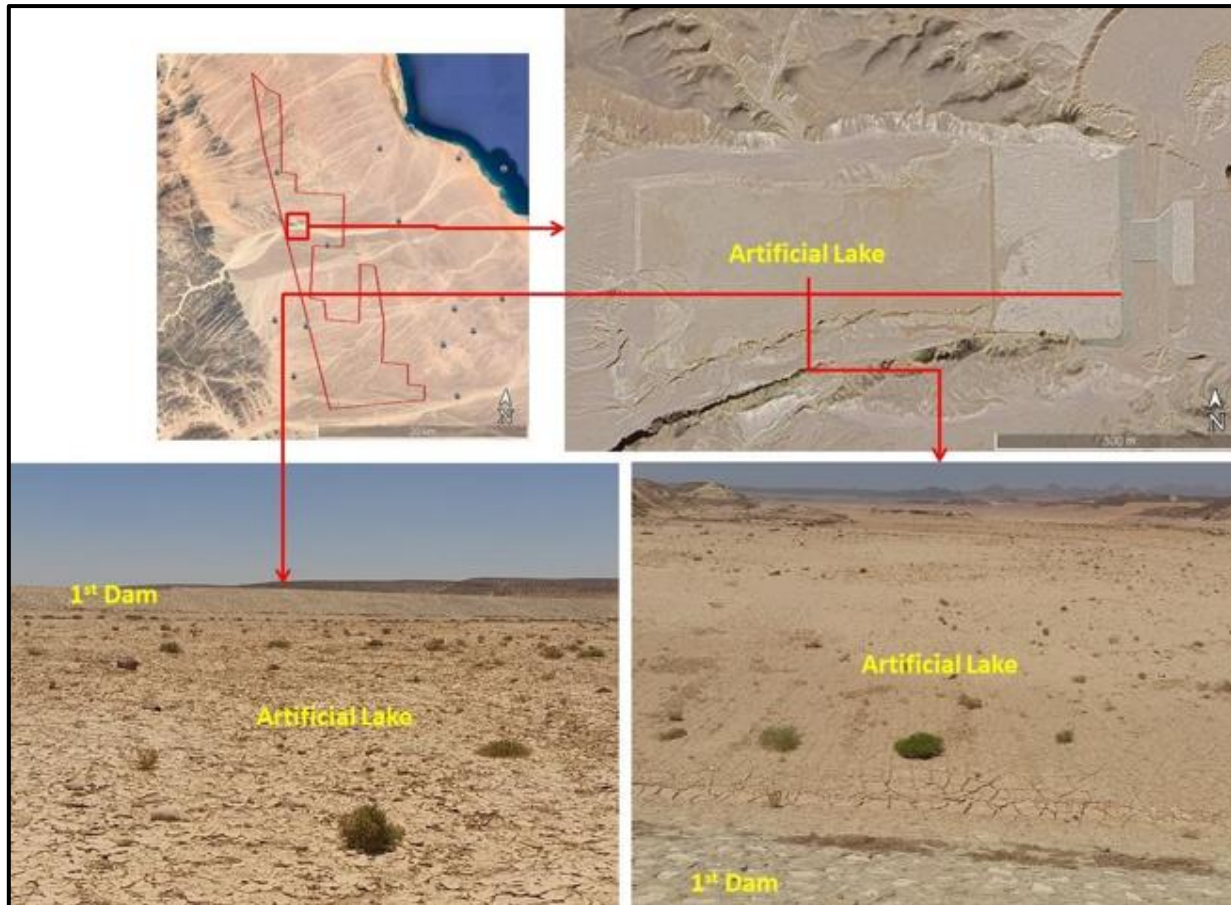


Figure 57 Buhaira One Dam is at the west of Wadi Hawashiya. Note that the rain water accumulated in front of the dam seasonally during rainfall events

The average dimension of the dame and the artificial lake:

The Dam	The artificial lake:
Length: 250 m	Length: 450 m
Width: 70 m	Width: 250 m
Height: 5 m	Depth: 3 m

7.8.9 High-voltage Power line and Substation

The Suez Gulf 22/200/500 KV GIS Substation located to the Southeast of the site by about 3km.

High voltages power line runs parallel to Gharib-Sheikh Fadl Road along the course of Wadi Abu Had. The line is close to the South border of the site at a distance of 200m.

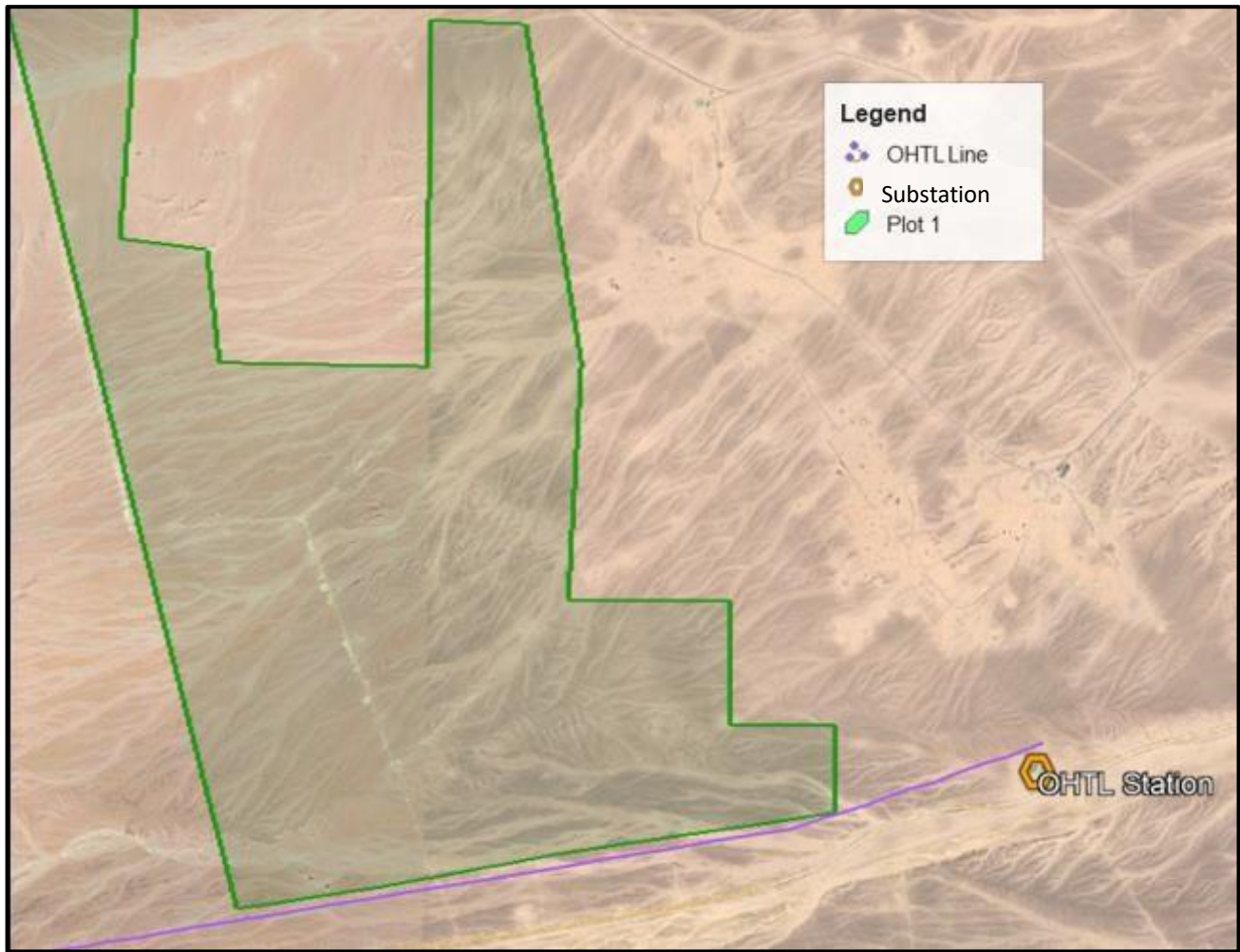


Figure 58 60 OHTL Line running adjacent to the Project Site's southern border

7.8.10 Other Wind Farms

Within the Project area, there are four existing and planned wind farms and one additional proposed wind farm present in the surrounding area of the proposed Project location.

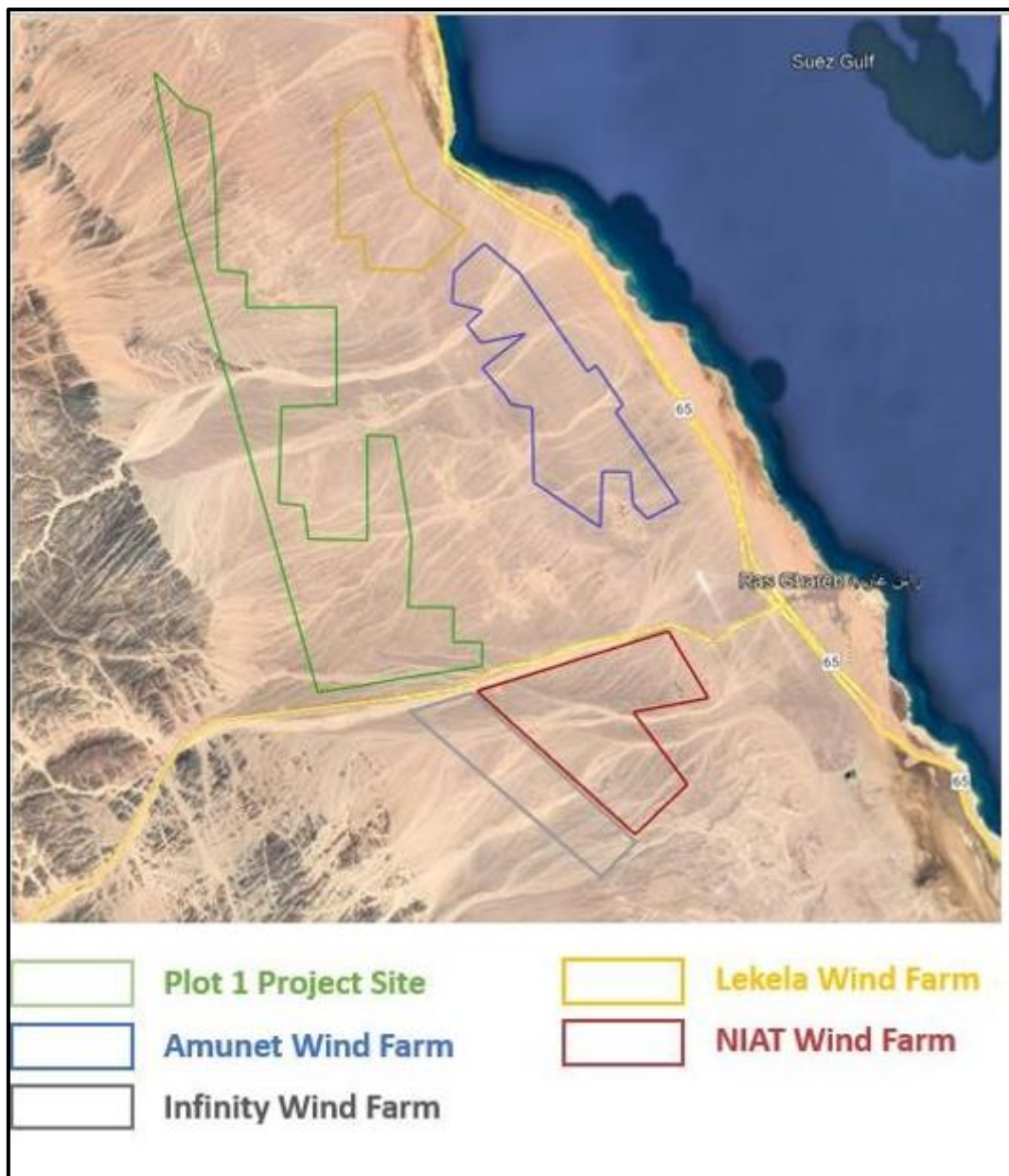


Figure 59 Neighboring Wind Farms

Wind Farm Name	Details
Amunet Wind Farm	This project consists of 77 wind turbine generator, each of which houses a 6.5MW Envision wind turbine.
Lekela Wind Farm	This project consists of 96 wind turbine generators, each of which also houses a Gamesa SG 2.6-114 IA wind turbine.
Infinity Wind Farm	This proposed project consists of 228 wind turbine generators, each of which will house one 7.2 MW Wind Turbine.

NIAT Wind Farm	This proposed project consists of 173 wind turbine generators, each of which will house one 3.05 MW Wind Turbine.
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7.9 Public Health and Safety

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to public health and safety.

As discussed earlier, the closest human settlement to the Project site is located 19.3 km to the east (Ras Gharib city); of which is considered at a distance from the area. These are considered sensitive receptors.

In addition, as discussed within the land use section (refer to “Section 7.2”) it was concluded that the Project site in particular is uninhabited and vacant with no indication or evidence of any physical or economical land use activities. Therefore, there are no additional receptors to be considered.

7.10 Socio-economics

This section provides an assessment of baseline conditions in relation to socio-economics.

7.10.1 Baseline Assessment Methodology

Socioeconomic conditions were assessed mainly through collection of secondary data on key socio-economic indicators of local communities as available – such as Central Agency for Public Mobilization and Statistics, Red Sea Governorate Information Centre and other. Such baseline was also verified through consultations with relevant stakeholders to include Red Sea Governorate official, Ras Gharib City Council officials and Wadi Darai Village.

7.10.2 Results

Basic Demographic Characteristics

Administrative Division:

Egypt is divided into 27 Governorates. The Project site is located within the Red Sea Governorate that is bordered by the Red Sea Coast to the east and Beni Suef, Minya, Assyut, Sohag, Qena, Luxor and Aswan Governorates to the west, Suez Governorate to the North, and North Sudan to the south (refer to Figure 62 below). Red Sea Governorate’s total area is around 120,000 km², forming 11.9% of the country’s total area.

Administratively, the Red Sea Governorate is divided into 7 Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 100km south of the Project site.

The Project site is located within the Ras Gharib City (or District) and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib town as well as 2 rural (village) local units (Zaafarana and Wadi Dara). The closest community settlement to the Project site is Ras Gharib city (located 18km to the east).

Ras Gharib City is the second-largest city in the Red Sea Governorate, and the most important Egyptian city

in terms of oil production.

As discussed earlier, the Project is located within a 300km² area that has been allocated by the GoE to NREA for development of wind farms. Within this, a land area of 37.5km² has been allocated to the Developer by NREA for the development of this Project.



Figure 60 Administrative Borders of the Red Sea Governorate, Source: The official website of the Red Sea

Population Profile:

Based on information from the Statistical Yearbook2022, the total population of the Red Sea Governorate was 396,000, which represents around 0.4% of the total national population. Further information about the population in the Project area is presented in the following table. As noted, the population of Ras Gharib in particular was estimated at around 68,020.

Table 52 Population (Red Sea Governorate Information Centre, 2022)

Area	Households	Population		Total Population
		Male	Female	
Red Sea Governorate	100,500	205,583	190,417	396,000
Ras Gharib	16,125	35,987	32,033	68,020
Hurghada	25,930	52,138	49,875	102,013
Safaga	18,500	37,444	36,136	73,580
Quseir	18,644	72,806	36,541	74,579
Marsa Alam	5,500	11,509	9,294	20,903
Shalateen	7,777	15,700	13,656	29,556
Halayeb	7,196	14,465	12,683	27,348

Ras Gharib represents 17% of the total population of the Red Sea Governorate, where the majority of population is located in Hurghada, due to the large-scale touristic activities in the city. However, services and population activities are concentrated in Ras Gharib City. The following figure shows the distribution of the population in the Red Sea Governorate according to each city.

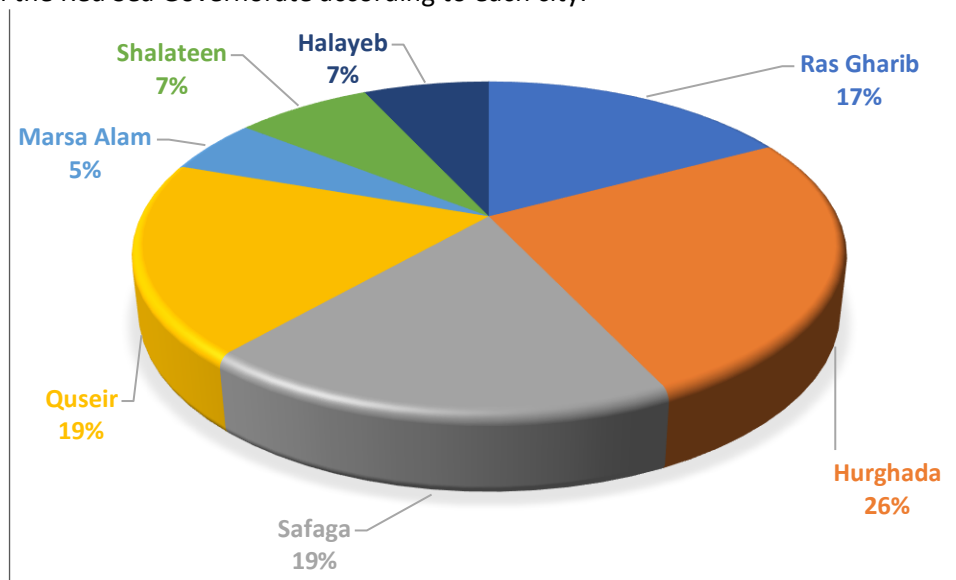


Figure 61 Distribution of Population Density According to Districts in the Red Sea Governorate

Bedouin communities in Ras Gharib are mostly unsettled, and live deep in the desert, away from the city and the villages. They currently settle permanently in Ras Gharib city, Zaafarana and Wadi Dara. Such Bedouin groups generally engage in traditional economical activities such as agriculture and animal husbandry and in addition, they are also employed in the development projects in the area (mainly the petroleum companies) either as guides, security guards, or contractors (more details in are provided throughout this section).

The demographic trend also includes migrant workers from neighbouring governorates. The predominant majority of these migrant workers work for oil companies located in the area, and a very small number work

in farms in Wadi Dara village.

Age and Gender Distribution

Data from CAPMAS Statistical Yearbook 2020 indicate that the population in the Red Sea Governorate is predominantly young. Based on the outcomes of the 2020 population consensus, up to 79 % of the population of the Red Sea Governorate are under the age of 45. With respect to gender, statistical data indicates a male/ female ratio in the Governorate (205,583: 190,417).

Rate of Natural Increase

The total population in the Red Sea Governorate has grown by 21.00/1000 (*Red Sea Governorate Information Centre, Statistical Yearbook of Red Sea Governorate, 2020-2022*). The growth rate in the governorate decreased from the previous rate in 2020, but despite this, the current growth rate is considered one of the highest rates during the past five years in terms of the rate of natural increase. However, it is considered one of the 10 lowest governorates in terms of birth rate.

The following table illustrates demographic trends in the Red Sea Governorate:

Table 53 Demographic Trends (Statistical Yearbook of Red Sea Governorate, 2019-2020)

Demographic Trends	Value
Average Household Size (persons)	3.8
Natural Growth Rate (per 1,000 persons)	25.30
Urban Population (% of total Egyptian population)	0.39
Birth Rate (Births per 1,000 persons)	28.70
Mortality Rate (Deaths per 1,000 persons)	4.10

Labour Profile

CAPMAS statistical data indicates that the official unemployment rate decreased to 9.9% in the second quarter of 2018, marking the lowest rate in the past eight years. The job outlook has improved due to steadily accelerating economic growth, with Gross Domestic Product (GDP) growing by 5.4% year-on-year in the third quarter of the year 2017/2018 (January-March), according to data issued by the Ministry of Planning, Monitoring and Administrative Reform.

This followed a growth of 5.2% and 5.3%, respectively, in the first and second quarters, and despite low household incomes and high inflation rates, more of the country's unemployed youth are being absorbed by the labour market, despite the low wages. Workforce research results for the second quarter (April – June) of 2018 in Egypt are provided in the table below.

Table 54 Workforce Research (CAPMAS, Workforce Research Results for the Second Quarter of 2018)

Workforce 6	Total No. of Employed Persons 26.161 Million		Total No. of Unemployed Persons 2.875 Million		Unemployment Rate 9.9%		Labour Force (by Occupation)		
	Males 80.8%	Females 19.2%	Males 53.1%	Females 46.9%	Males 7	Females 8	Agriculture	Industry	Service
29.036 Million	21.138 Million	5.023 Million	1.527 Million	1.348 Million	6.7%	21.2%	28.2%	24.7%	47.1%

The table above shows that the service sector forms the biggest part of the employment sector in the Governorate which accounts for around 47% of the workforce. The agriculture sector constitutes around 28% of the total workforce, while the industry sector constitutes the lowest percentage of the working population, accounting for around 25%. In addition, the data shows that the rate of unemployment is higher amongst females compared to males.

The table below shows data from the Directorate of Manpower in the Red Sea Governorate, excluding the informal sector. The Governorate's workforce—as a percentage of the local population is estimated at 34.61%.

Table 55 The Distribution of the Project Area's Population by Work Status & Sex – Red Sea Governorate (Directorate of Manpower in the Red Sea Governorate, 2018-2020)

Workforce	Total No. of Employed Persons 89.20 Thousand		Total No. of Unemployed Persons 25.7 Thousand		Unemployment Rate 21.7%	
	Males	Females	Males	Females	Males	Females
116.60 Thousand	77.5%	22.5%	59.8%	40.2%	17.6%	27.3%

According to the Statistical Yearbook 2018 of the Red Sea Governorate, the service sector constitutes 60.3% of the Governorate's workforce. Hurghada City represents the largest proportion of employment, due to the presence of coastal touristic areas, followed by Safaga City.

According to Ras Gharib City Council officials, the majority of the workforce can be divided into three main categories: Government/Public Sector, Oil and Gas (O&G) Petroleum Sector, and Fishing.

There is also a percentage of waged workers. Agricultural activities are relatively minor, compared to petroleum-related activities. In addition, tourism-related activities are limited in Ras Gharib, even though some residents work in the tourism sector in other cities in the Governorate, such as Hurghada and Safaga.

Based on discussions with City Council officials, it was indicated that there is a rise in the unemployment rate in Ras Gharib City due to the limited tourism in the Governorate during recent years, which increased the lack of employment opportunities.

On the topic of the prevalence and or occurrence of child labor in areas and communities near the Project area, statistical data indicating the prevalence, absence or percentage of child labor were not available. During the course of site visits and field surveys conducted by the consultant team, there was no indication nor observance of child labor.

Table 56 Labour Status of Ras Gharib & Zaafarana (CAPMAS Poverty Map, 2018)

Employment Information	Ras Gharib City	Zaafarana Village
Male Workforce (aged 15+) from Total Population	46%	57%
Female Workforce (aged 15+) from Total Population	25%	12%
% of Employed Adults (aged 24+) from the Total Workforce	57%	58%
Distribution of Workforce by Sector		
Self-Employed Males	49%	19%
Self-Employed Females	24%	33%
Male Workers in the Agricultural Sector	1.6%	37.2%

Female Workers in the Agricultural Sector	0.05%	84.2%
Workers in the Public Sector	57%	19%

Ras Gharib City attracts many migrant workers from neighbouring governorates, such as Beni Suef, Minya, Assyut, Sohag, Qena and Luxor. Workers also come from the Delta Governorates and Sinai, and the majority of them work for oil companies, while few of them work on poultry farms, as construction workers, and in agriculture in Wadi Dara village.

Economic Activities and Well Being

Economic activities in the city of Ras Gharib and its affiliated villages include oil and gas production, in addition to agricultural reclamation activities, poultry and livestock farms in the Wadi Dara region. According to a Ras Ghareb City Council representative, tourism is not a major economic activity in the city compared to other areas in the Red Sea Governorate.

Cultivated Lands: The area of cultivated lands in the Red Sea Governorate in 2012/2013 is almost 0.02% of the total nationwide cultivated lands. The Red Sea Governorate relies on rain and underground water in agriculture, which causes fluctuations in cultivated areas.

The division of land in Wadi Dar village (the village closest to the project site) includes lands allocated for agricultural reclamation projects. The number of existing farms at the time is approximately (50) farms. The status of these farms varies in terms of agricultural production and continuity in agriculture because the majority of them are still trying but facing obstacles with arable water due to the high salinity in groundwater in the area.

Fisheries: The Red Sea Governorate contributes to supplying fish, since the Governorate's coastline extends across 1,080 km and 240 km wide. The southern part of the Governorate is rich in fish resources.

The coastal area in Ras Gharib is not designated for fishing. There is no fishing port in Ras Gharib because the area is designated for oil exploration, therefore there is no scope for the fishing activities on the coast near the project site.

Livestock: 78.74% of the total number of livestock is butchered in state-owned slaughterhouses. The Red Sea Governorate has no livestock feed or poultry feed plants. Heifers account for 35% of cattle butchered in state-owned slaughterhouses.

According to the site visits and consultation activities that took place in the Wadi Dara area, there are some livestock and poultry breeding farms in Wadi Dara, some of which have begun production and others are still in the construction stage. In addition to 3 factories under construction to produce feed.

Industrial Activity: The total number of registered industrial firms is 53, operating in four industrial zones. The total number of workers in registered industrial firms is 4,340 workers (*Source: Red Sea Governorate Official Website, 2018*).

Social Services Profiles

Education

Education is one of the most important criteria for measuring the progress of people and their ability to advance and improve their standard of living. According to CAPMAS, September 2018 announced that Egypt's illiteracy rate dropped from 39.4% in 1996 to 29.7% in 2006, and then to 25.8% in 2017.

Ras Gharib City contains 18 schools covering the three basic stages of education (primary, preparatory and

secondary), which include two experimental schools. Additionally, there are two secondary vocational training schools. According to Ras Gharib City Council officials, the main objective of the two secondary vocational training schools is to provide their students with the necessary basic skills that enable them to work in oil companies.

CAPMAS Poverty Map 2018 shows that 20.23% of males and 21.14% of females of Ras Gharib City received basic education. Likewise, the percentage of males and females who finalized their basic education in Zaafarana is approximately 19% and 15% respectively. The following table details the educational status of inhabitants of Ras Gharib and Zaafarana.

Table 57 Education Mapping of Ras Gharib & Zaafarana (CAPMAS Poverty Map, 2018)

Education Information	Ras Gharib City	Zaafarana Village
University Degree Holders/Males	19%	9%
University Degree Holders/Females	15%	0%
Male School Enrolment/Males (age: 6-18)	99.28%	72.2%
School Enrolment/Females (age: 6-18)	99.45%	74.3%
Education Information	Ras Gharib City	Zaafarana Village
School Drop-outs/Males	0.21%	0%
School Drop-outs/Females	0.23%	0%

According to CAPMAS Poverty Map 2018, the illiteracy rate in Ras Gharib City is estimated at 20.4% for males and 16.1% for females, while the illiteracy rate in Zaafarana was 37.15% among males and 45% among females.

Table 58 Education Mapping of Ras Gharib City (The Statistical Yearbook, Ras Gharib City Information Centre, 2018)

Area	University Degrees		Above Intermediate Education		Intermediate Education		Less than Intermediate Education		Workers	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Ras Gharib	133	31	112	39	281	199	301	70	232	68

Health

Data from the Health Affairs Directorate in the Red Sea Governorate showed that the Governorate is free of the following diseases:

- Endemic diseases
- Infectious diseases
- Diseases related to water and air quality

The data indicated that non-communicable diseases include diabetes, and hypertension. Other common diseases include digestive system and cardiovascular diseases. Cancer is also increasing, and the most common cancers include breast, liver, bladder and lymph nodes. In addition, there are other communicable diseases to include diarrhoeal diseases (especially in children), cold and flu, fever and inflammations or

infections of the ear, nose or throat, as well as skin rashes and infections.

The Red Sea Governorate suffers from a lack of specialized health services which are suitable for the middleclass. Furthermore, these services are concentrated in Hurghada City, and are absent in some other cities, such as Shalateen and Halayeb. The following tables show the health services available in the Governorate.

According to the statistics of the Directorate of Health Affairs (DHA) in Red Sea Governorate, there are 7 hospitals in Governorate with approximately 330 beds, they are government hospitals; one of them is a public and central hospital, in addition to 13 Private hospitals with 399 beds.

Table 59 Ministry of Health Hospitals & Other Entities in the Red Sea Governorate (The Statistical Yearbook, Red

Item	Value
Hospitals Affiliated with the Ministry of Health	7
Hospitals of the General Authority for Health Insurance	0
Medical Treatment Institutions	0
Educational Hospitals	0
No. of Public & Central Hospitals	1
No. of Specialized Hospitals	1
Public Sector Hospitals (Including Military Hospitals)	4
Item	Value
Private Sector Hospitals	13
No. of Haemodialysis Centres Affiliated with the General Authority for Health Insurance	0
No. of Ambulance Vehicles	48

Ras Gharib City contains one central hospital, one ambulance station, and one civil defence unit, in addition to a limited number of private clinics and health centres. All health services are concentrated in Ras Ghareb City. The central hospital serves all the areas and villages administratively affiliated with Ras Gharib Local Government Unit (LGU). The hospital is equipped with an Emergency room section, and has outpatient clinics. There is an ambulance unit on Zaafarana–Ras Gharib Road north of Ras Ghareb city, near the Project site; these is the nearest ambulance unit to the project area.

Human resources is one of the main factors for the success and continuity of health services, and the absence of qualified medical staff affects the quality of services provided. The following table illustrates available human resources in the health sector in the Red Sea Governorate.

Table 60 Number & Categories of Health Sector Workers in the Red Sea Governorate (CAPMAS, Census of Population Activities of the Governorates, Arab Republic of Egypt, 2016)

Area	No. of Doctors		No. of Pharmacists		No. of Dentists		No. of Nursing Staff		No. of Assistants	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Red Sea Governorate	255	137	60	170	49	29	79	412	102	0

Infrastructure and Services

According to the data available in the statistical yearbook, Red Sea Governorate, a brief summary of the extent to which access of basic infrastructure services available in the Red Sea Governorate and to the project's area is given in the following tables.

▪ Potable Water & Sanitation

Table 61: Access to potable water and sanitation in the Red Sea Governorate

Item	Unit	Value
Production of potable water	Thousand m ³ /Day	107.57
Consumption of potable water	Thousand m ³ /Day	81.96
Per capita water consumption	Liter. Day/ Person	249.24
Capacity of sanitation	Thousand m ³ /Day	16.57
Per capita sanitation capacity	Liter. Day/ Person	50.39

Source: Red Sea Governorate- Egypt Description by Information, 2020

- 18.00 thousand m³/ day is the total capacity of sanitary drainage treatment plants in the Red Sea Governorate in 2018/2020.
- 92.06 % is the actual capacity of total capacities of sanitary drainage treatment plants in Red Sea Governorate in 2018/2020.
- 76.19 % is the amount of potable water consumption to average produced water in the Red Sea Governorate in 2018/2020.

All houses and facilities in Ras Gharib are connected to water and sanitation services from the local network. There is a limited number of houses (10%) in the city are not connected to the sewage network. They rely on septic tanks that are drained periodically.

▪ Electricity

Access to electricity in Upper Egypt Governorates is 99.0% (Egyptian Human Development Report 2020). Even squatter areas have access to electricity regardless of their legality.

The East Delta Company for Electricity serves governorates of (Damietta- Ismailia- Port Said – Suez- North Sinai- South Sinai- the Red Sea).

Table 62: Access to Electricity in Red Sea Governorate

Item	Unit	Value
Total electricity production	Million kw.h yearly	730.00
Total electricity consumption	Million kw.h yearly	621.90
Electricity consumption for lighting	Million kw.h yearly	424.27
Electricity consumption for industrial utilization	Million kw.h yearly	197.63
No. of subscribers in the electrical grid	Thousand subscribers	157.05
Per capita share of electricity used for lighting	kw.h yearly/ Person	1290.21

Source: Red Sea Governorate- Egypt Description by Information, 2020

All houses and facilities in Ras Gharib are connected to electricity services from the local network.

Investment and Development

There is large focus on investment in the Red Sea Governorate, and many fields of investment are available (touristic, industrial, services), which positively impact comprehensive development in the Governorate.

The following table shows the fields of investment in the Red Sea Governorate and Ras Gharib City

Table 63 Fields of Investment in the Red Sea Governorate & Ras Gharib City (Red Sea Governorate Official Website,

Item	Red Sea Governorate	Ras Gharib
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Mineral Production	The Red Sea is one of the important Egyptian governorates in the field of mineral production, as it contains deposits of most of metallic and nonmetallic minerals, decoration stones and construction materials. The Red Sea Governorate stretches across the larger part of Eastern Desert, which forms one-fourth of Egypt's total area (about 250,000 km²), and contains huge mineral resources.	There are several metal productions sites in Ras Gharib, including: - Gold in Abu-Marwat - Iron in Abu-Marwat - White sands in Dakhl Valley - Gypsum in the northwest of El-Dob Valley - Marble in Al-Shaikh Fadl Road and El-Dob Valley - Granite in Al-Shaikh Fadl Road
Fish Production	The Red Sea Governorate is an important region that can be utilized to increase fish production, as it has a 1,080 km-long coastline, with an average width of 240 km. There are various coral reef sites, with 3-5 square mile-area each. Different kinds of fish pass by these sites in certain	There are several fish production sites in Ras Gharib: - Al-Mallaha fish farm which is located between Ras Gharib and Shoqair, with an area of 15,000 acres and a total annual production of more than 250 tons.
	seasons. Fish food is four times more abundant in the southern part of the Red Sea coast compared to the northern part.	- Suez Gulf fish farm with an area of 12,000 acres, and a total annual production of more than 400 tons. - Gamsha Gulf fish farm with an area of 9000 acres and total annual production of more than 350 tons.
Agricultural & Livestock Projects	Agriculture is a basic element in the regional comprehensive and integrated development in the Red Sea Governorate either through providing the food supply required for the development in the region or taking part in the attraction of new population from the crowded places over the Nile banks and confronting the expected increase in the population and consumption. The southern triangle (Shalateen, Halayeb, Abu-Ramad) is one of the most important places for the agricultural investment in addition to other cities in the Governorate.	Suggested areas for agricultural investment in Ras Gharib include: - Cultivation of 500,000 acres in Wadi Araba (to the south of Zaafarana), which can be irrigated by groundwater from El-Bowerat well. - Cultivation of Gharib basin using groundwater in the area, as it is possible to extract 4,000 m³ of medium-salinity water per day, which can be used in irrigating citrus fruits and barley. - Cultivation of Wadi Dara village.
Touristic Investment	The General Tourist Planning of the Red Sea Governorate Red Sea Governorate contains a number of planned touristic zones.	- Zaafarana Sector - Gamsha Sector

	Available Elements for Supporting the Establishment of Touristic Projects in the Red Sea Governorate: ▪ A colourful, rocky mountain range extends along the Red Sea coast, providing a wonderful backdrop to the beach. The area is teeming with mines that had been exploited during ancient ages; mines that once rendered Egypt as one of the richest nations in ancient times, which were used to excavate gold, diamonds and valuable stones like Schist, white granite, etc. ▪ The beaches of the Red Sea coast are renowned for their clear blue waters, calm waves, and a paradise of colourful underwater coral reefs, which contains a multitude of rare and colourful fish. ▪ The yearlong moderate climates attract tourists both in summer and in winter to Red Sea Governorate resorts. ▪ The Governorate hosts various national parks, which contain a multitude of biological diversity. ▪ The Governorate contains valleys and archaeological, religious and curative sites. ▪ The Red Sea is also renowned for its black sands, which are used to cure rheumatoid and psoriasis.
	Touristic Projects Proposed for Implementation in the Governorate: ▪ Touristic villages, hotels, motels and camps in Safaga, Qoseir and Marsa Alam, the southern triangle (Shalateen, Abu-Ramad & Halayeb), as well as Zaafarana. Project lands are allocated according to vacant areas. ▪ Cinemas, amusement parks and malls proposed to be established in Hurghada, Safaga, Qoseir & Marsa Alam. ▪ Fairs, aquariums, sports centres, golf courses, billiard halls and bowling alleys proposed to be implemented in Hurghada, Safaga, Qoseir, Marsa Alam & Zaafarana.
	▪ Centers for providing diving equipment in Hurghada, Safaga, Qoseir & Marsa Alam. ▪ Tourist companies that provide safari trips in Hurghada, Safaga, Qoseir & Marsa Alam. ▪ Shipyards in Hurghada, Safaga, Qoseir & Marsa Alam. ▪ Internal shipping lines connecting the ports of Hurghada, Safaga & Marsa Alam with the ports of Al-Tour, Nuweiba, Taba & Sharm El-Sheikh, as well as Port Tawfik in Suez. Additionally, an international shipping line is proposed to connect the Governorate's ports with the ports the Red Sea and the Arabian Gulf. ▪ Establishing integrated projects for underwater imaging in Hurghada and Marsa Alam. ▪ An international conference centre in Hurghada. ▪ A hotel school in both Hurghada and Qoseir. ▪ Schools for teaching diving and swimming, drawing on graduate divers and specialized trainers in Hurghada, Safaga & Marsa Alam. ▪ Utilizing the islands in the construction of suitable projects in accordance with environmental laws. ▪ Small and medium industries for providing hotel equipment.

8. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

This Chapter provides an overview of the strategic environmental and economic impacts related to the Project development followed by an assessment of anticipated impacts resulting and or influenced by the Project throughout its phases (construction, operation and decommission) on Environmental and Social receptors and attributes. The mitigation measures proposed in this section are organized per ESIA category and elaborated based on the assessments contained in Section 7. These assessments informed on the significance of the risk as well as mitigation measures.

8.1 Overview of Strategic Environmental and Economic Impacts

8.1.1 Governmental Vision for the Energy Sector

The GoE has taken steps to adopt an energy diversification strategy underscored by increased development of renewable energy and the implementation of energy efficiency, including assertive rehabilitation and maintenance programs in the power sector (IRENA, 2018).

To this extent, in 2013, the Arab Republic of Egypt (through the Supreme Council of Energy) had developed and adopted the Integrated Sustainable Energy Strategy (ISES) 2015 – 2035, which outlines the nation's roadmap to increase the contribution of renewable energy to 42% of the country's electricity mix by 2030.

To promote renewable energy sources and in order to open the way for the private sector to effectively participate in the implementation of renewable energy project, the Renewable Energy Law (Decree Law 203/2014) was issued. The law facilitates investors in developing renewable grid-connected electricity production through the BOO scheme as discussed earlier in "Section 1.1".

8.1.2 Energy Security

Recently, most policy makers around the world are grappling with issues related to energy security, energy poverty, and an expected increase in future demand for all energy sources – and Egypt is no exception. Almost certainly, the most spoken words by policy makers and government bodies in Egypt in the last couple of years revolved around 'energy security'.

Through various strategies and visions, Egypt has emphasized the importance of energy security. This includes for example the Egypt Sustainable Development Strategy, Egypt Vision 2030, in which the sustainable development targets include energy and in which Goal I specifically address security of supply to ensure the availability of reliable energy supplies to satisfy the future development needs of the country through adoption of a more diverse energy mix. Similarly, the ISES 2015 – 2035 addresses energy import dependence and diversification of electricity generation.

In line with the above, the Project in specific is to contribute to increasing energy security through reliance on an indigenous, inexhaustible and mostly import-independent energy resource. The estimated electricity generation from the Project (i.e. Plot 1) is estimated at around 2,500 Gigawatt hours (GWh) per year on average; which may serve the annual electricity needs of around 900, 000 local households.

The above has been calculated based on statistics obtained from Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). The total household electricity consumption in Egypt for 2016 – 2017 (latest statistics available online) was 64,100 GWh (CAPMAS, 2018). In addition, in 2016 – 2017 the total number of household beneficiaries from the public electricity network was 23,383,521 Households (CAPMAS, 2017). Therefore, average electricity consumption per household per year can be assumed to be around 2,700 (kWh/household).

8.1.3 Environmental Benefits

The negative environmental impacts from generating electricity through conventional fossil fuel burning at thermal power plants are very well known. This most importantly includes air pollutant emissions such as ozone, Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Particulate Matter (PM), and other gases which are the cause of some serious environmental concerns such as smog, acid rain, health effects, and many others.

In addition, the burning of fossil fuels results in carbon dioxide emissions; a primary greenhouse gas emitted through human activities which contributes to global warming. The main human activity that emits CO₂ is the combustion of fossil fuels for electricity production and transportation. Concurrently, global climate change has become an issue of concern and so reducing greenhouse gas emissions have also emerged as primary issues to be addressed as the world searches for a sustainable energy future.

Generating electricity through wind power is rather pollution-free during operation. Compared with the current conventional way of producing electricity in Egypt through thermal power, the clean energy produced from renewable energy resources is expected to reduce consumption of fossil fuels, and is to aid in reducing GHG emissions, as well as air pollutant emissions. The Project is to displace around 1.1 million metric tons of CO₂ annually.

The above has been calculated based on statistics obtained from Egyptian CAPMAS. Carbon Dioxide (CO₂) emissions for 2016 – 2017 (latest statistic available) was 210 million tons, in which the electricity sector accounted for 43.3% of (i.e., around 91 million tons) (CAPMAS, 2019). In addition, the total electricity generated for 2016 – 2017 was around 190,000 GWh (CAPMAS, 2018). Therefore, CO₂ emissions (Tones) per kWh is around 479g per kWh.

In addition, there is an important benefit in relation to wind farm developments related to water conservation because unlike certain power generation methods, wind projects do not require significant amounts of water for cooling or steam generation. Conservation of water is particularly important in arid regions like Egypt, where water scarcity is a significant challenge.

8.2 Landscape and Visual

This section identifies the anticipated impacts on landscape and visual from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.2.1 Potential Impacts during the Construction Phase

Site preparation activities which are to take place onsite by the EPC Contractor for installation of the wind turbines and the various Project components to include substation, transmission cables, access roads and internal road network, buildings, etc. are expected to include land clearing activities, levelling, excavation, grading, etc.

Construction activities would create a temporary effect on the visual quality of the site and its surroundings and may disturb the natural appearance of the desert terrain. The visual environment during the construction phase would include the presence of elements typical of a construction site such as equipment and machinery to include excavators, trucks, front end loaders, compactors and others.

However, as discussed in “Section 7.1”, there are no key sensitive visual receptors within the Project site and

surrounding vicinity with the exception of Ras Gharib city which is located 19.7km from the Project site. However, such impacts during construction will not be visible from the city due to the distance from the Project site.

The visual environment created during the construction period would be temporary, of a short-term duration, limited to the construction phase only. For the duration of construction, the visual impacts will of a negative nature and be noticeable, and therefore of a medium magnitude. As there are no key sensitive visual receptors which would be affected, the receiving environment is determined to be of a low sensitivity. Given all of the above, such an impact is considered to be of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the EPC Contractor during the construction phase and which include:

- Ensure proper general housekeeping and personnel management measures are implemented which could include:
 - Ensure the construction site is left in an orderly state at the end of each work day.
 - To the greatest extent possible construction machinery, equipment, and vehicles that are not in use should be removed in a timely manner and kept in locations to reduce visual impacts to the area.
 - Ensure proper storage, collection, and disposal of waste streams generated as discussed in detail in “Section 8.4.2”.
- Implement restoration and rehabilitation measures to restore the site’s visual quality through for example re-contouring the land and removing temporary structures (e.g. batching plant).

Following the implementation of these mitigation measures, the significance of the residual impact is 159tilized159ed as not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by EPC Contractor during the construction phase:

- Inspections of the works should be carried out on a daily (maximum on a monthly basis) as part of site inspections to maintain Project-site housekeeping to ensure the above measures are implemented.

8.2.2 Potential Impacts during the Operation Phase

Visual impacts associated with wind energy projects typically concern the turbines themselves (e.g. colour, height, and number of turbines) and impacts relating to their interaction with the character of the surrounding landscape and the visual receptor which might be present.

Turbines are tall structures (maximum of 220 m in the case of the Project) that can be seen from several kilometres away and impose a change on the landscape of the area where they are installed. However, visual impacts depend on several factors such as distance, size, visibility, landscape and geography, and the presence of potential sensitive visual receptors.

Nevertheless, visual impacts created from the development of the Project are not considered an issue of concern due to the following:

- There are no critical or sensitive visual receptor within the Project area and the 10km radius. The closest sensitive receptor would be Ras Gharib city which is located at around 19km from the Project site. At such a distance there are no relevant impacts from the turbines in terms of visibility.
- Project area is considered a barren and desert area and in general is located within an industrial area with petroleum activities for which its aesthetical value loses some importance.
- There are several existing and under construction wind farm developments in the area as well as several electricity distribution and transmission lines so the addition of this Project will not be a significant impact to the visual and landscape characteristics of the area.
- Being visible is not necessarily the same as being intrusive. Aesthetic issues are by their nature highly subjective. For some viewers, a Wind Farm could be regarded as manmade structures with visual burdens while to others it represents a positive impact in the sense that they introduce a break in the otherwise dull and monotonous view.

In addition to the above, the rotating blades will be visible from vehicles passing across the Ras Ghareb – El Sheikh Fadl Road which is located less than 1km south of the Project site (refer to Figure 64). The turbines can attract visual attention and potentially distract drivers passing along the highway.

Given all of the above, the potential impacts on landscape and visual are of a long-term duration throughout the Project operation phase. The impacts will be of a negative nature, and medium magnitude given that such elements of the Project will be visible. However, given the key visual receptors in the project route and its surroundings the receiving environment is considered of low sensitivity. Given all of the above, such an impact is considered of low significance.



Figure 64 Project site in relation to Ras Gharib – Sheikh Fadl Road.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Project Operator during the operation phase and which include:

- In coordination with the Traffic and Transport Authority, install clear and informative signage in Arabic and English language at Ras Ghareb – El Sheikh Fadl Road to alert drivers of the wind farm ahead and provide guidance on safe driving practices.

Following the implementation of these mitigation measures, the significance of the residual impact is considered as not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by Project Operator during the operation phase:

- Inspections on highway to ensure signage is installed.

8.3 Land Use

This section identifies the anticipated impacts on land use from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.3.1 Potential Impacts during the Planning and Construction and Operation Phase

As noted earlier, the Project site location does not conflict with any of the relevant governmental entities formal planning context. Therefore, there are no impacts on formal land use from the Project.

With regards to informal or ‘actual land use’ as discussed earlier, the following is concluded:

- The Project site itself in general is uninhabited and vacant and does not include any physical or economical land use activities (with the exception of the petroleum activities as discussed further below in “Section 8.8”). Therefore, physical and economical displacement impacts are considered irrelevant.
- While the Project site is owned by NREA and will be utilized for the Development of the Project it is still a conventional understanding that Bedouin Groups have, in the past, utilized the land under the Ghafra system, under which such land areas traditionally included the Project site. Therefore, the Developer should be aware of Al-Ghafra system, and other aspects of Bedouin culture. The Developer’s understanding of Bedouin culture plays a major role in regulating the relationship with the tribes in the region. Inappropriate management of such issues could result in potential conflicts with such groups.

Nevertheless, should the above issues not be taken into account as part of the planning phase of the Project, it could result in impacts that are considered of long-term duration, of negative nature, and of medium magnitude and medium sensitivity given that it could result in land use impacts and disputes with both Bedouin Groups and the General Petroleum Company. Given all of the above, the impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer during the planning phase and which include:

- Establish coordination with the Bedouin Groups for inclusion and engagement in employment and procurement opportunities as part of the employment and procurement procedure.
- Implementation of SEP that includes specific references for engagement and coordination with Bedouin groups. Please refer to SEP for additional details. The SEP itself will be disclosed to tribal leaders by way of scheduling and implementation targeted meetings with tribal group leaders. The SEP, the framework, as indicated in its name, for engaging and communicating with stakeholders, indicates time-based communications and reporting responsibilities to be conducted to inform stakeholders. With regards to mitigation measures within this section, SEP communications and engagement would be developed and targeted to reinforce a high level of safety and awareness among staff and potential stakeholders. As such, on a quarterly basis (and in accordance and defined within the SEP), the Developer is to distribute leaflets which will include relevant updates, notifications and means of contacting the Developer at a minimum

Following the implementation of these mitigation measures, the significance of the residual impact is categorized as not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractors during the construction phase and which include:

- Monitoring the effectiveness of the grievance mechanism that allows the Bedouin community to raise concerns, provide feedback, and seek resolution for any perceived impacts or conflicts. Regularly review the mechanisms' accessibility, transparency, and responsiveness.
- Submission of employment and procurement procedure that includes references for Bedouin groups; and
- Submission of proof of coordination and agreement with Bedouin groups as part of the SEP such as engagement records.

8.4 Geology, Hydrology and Hydrogeology

This section identifies the anticipated impacts on hydrology and hydrogeology from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.4.1 Potential Impacts from Flood Risks on the Project Site

In general, it is important to investigate potential risks of local flood hazard from the wadi systems (as discussed previously under "Section 7.3.4.") during the rainy season and especially during flash flood events which in turn could affect the Project components. Such risks must be taken into consideration throughout the planning phase of the Project as they could inflict damage to the Project and its various components.

Nevertheless, should the above issues not be taken into account as part of the planning phase of the Project, it could result in impacts that are considered of long-term duration, of negative nature, and of medium magnitude and high sensitivity given that it could result in infrastructure damage as well as impacts on health

and safety. Given all of the above, the impact is considered of moderate significance.

Taking the above into account, the Developer is currently undertaking a flood risk assessment for the Project site. The study is to rely on the design of many simulated models based on multi-source data such as climate satellite images, rainfall data collected from the nearest meteorological stations, and the digital elevation models for the region and processing them by ARC-GIS software. Site visits will be conducted to investigate the results of the studies and verify the models that have been designed. The study also takes into account climate change impacts and risks.

Following the implementation of these mitigation measures, the significance of the residual impact is categorized as not significant.

8.4.2 Potential Impacts from Improper Management of Waste Streams during Construction and Operation

Given the generic nature of the impacts on soil and groundwater for both phases of the Project (construction and operation) those have been identified collectively throughout this section. Generally, this includes potential impacts from improper housekeeping practices (e.g. improper management of waste streams, improper storage of construction material and of hazardous material, etc.).

Improper housekeeping practices during construction and operation (such as illegal disposal of waste to land) could contaminate and pollute soil which in turn could pollute groundwater resources. This could also indirectly affect flora/fauna and the general health and safety of workers (from being exposed to such waste streams). Generally, such impacts can be adequately controlled through the implementation of general best practice housekeeping measures as highlighted throughout this section, and which are expected to be implemented by the EPC Contractor throughout construction phase and Project Operator during the operation phase.

The potential impacts from improper management of waste streams could be of a long-term duration throughout the construction and operation phase. Such impacts are negative in nature, and could be noticeable and are therefore of medium magnitude. However, they are considered of low sensitivity as they are generally controlled through the implementation of general best practice housekeeping measures. Given all of the above, such an impact is considered to be of minor significance.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance can be reduced to not significant.

Solid Waste Generation

Solid waste is expected to be generated from construction and operational activities. Solid waste generated will likely include construction waste (such as debris) and municipal solid waste (during construction and operation such as cardboard, plastic, food waste, etc.).

Municipal solid waste and construction waste generated will likely be collected and stored onsite and then disposed to the closest approved dumpsite (Ras Gharib Public Dumpsite) or, if possible, reused in the construction activities.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Waste that is collected is to be sorted and stored according to its category into solid non-hazardous and hazardous wastes. Hazardous wastes are to be collected by a licensed contractor through a contractual agreement and disposed of at the approved hazardous waste landfills. Solid non-hazardous wastes may be collected by the municipality according to an agreement with them or by a Waste Contractor.
- Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite (the closest dumpsite being Ras Gharib Public Dumpsite) or for recycling (as discussed in further details below);
- Prohibit fly-dumping of any solid waste to the land;
- Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste";
- Adhere to waste hierarchy principles with associated mitigation measures to include prevent, minimize, reuse, recycle, recover and dispose.
- EPC Contractor only - during construction, distribute a sufficient number of properly contained containers clearly marked as "Construction Waste" for the dumping and disposal of construction waste.
- EPC Contractor only – during construction, it is recommended that recycling measures are implanted. It is recommended that recycling is undertaken in the following approach: (i) separation and disposal of recyclables in a separate container (cardboard, paper, glass, metal, etc.); and (ii) separation and disposal of non-recyclable materials in a separate container (e.g. food waste). Each container must be clearly marked. In addition, EPC Contractor must seek ways to reduce construction waste by reusing materials (for example through recycling of concrete for road base coarse);
- Implement proper housekeeping practices on the construction site at all times; and
- Maintain records and manifests that indicate volume of waste generated onsite, collected by contractor, and disposed of at the landfill. The numbers within the records are to be consistent to ensure no illegal dumping at the site or other areas.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Inspection of waste management practices onsite;
- Review of records and manifests for volume of waste generated to ensure consistency; and
- Regular environmental reporting on implementation of the waste management practices onsite.

(ii) Wastewater Generation

Wastewater is mainly expected to include black water (sewage water from toilets and sanitation facilities), as well as grey water (from sinks, showers, etc.) generated from workers during the construction and operation phase. Wastewater quantities are expected to be minimal. It is expected that wastewater will be collected and stored in fully contained septic tanks and then collected and transported by transportation tankers to be disposed at the closest Wastewater Treatment Plant (WWTP) (being Ras Gharib WWTP).

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC

Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of waste water from the site to the closest WWTP (being Ras Gharib WWTP);
- Prohibit illegal disposal of wastewater to the land;
- Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP. The numbers within the records are to be consistent to ensure no illegal discharge at the site or other areas;
- EPC Contractor only - ensure that constructed septic tanks during construction and those to be used during operation are well contained and impermeable to prevent leakage of wastewater into soil; and
- Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Inspection of wastewater management practices onsite;
- Review of records and manifests for volume of wastewater generated to ensure consistency; and
- Regular environmental reporting on implementation of the wastewater management practices discussed above.

(iii) Hazardous Waste Generation

Hazardous waste is expected to be generated throughout both the construction and operation phase and this could include consumed oil, chemicals, paint cans, etc. Hazardous waste generated will likely be collected and stored onsite and then disposed at the approved hazardous waste disposal facilities managed by the Hazardous Waste Management Project and supervised by the governorate and the EEAA.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Coordinate and hire a private contractor for the collection of hazardous waste from the site to the approved hazardous waste disposal facilities;
- Ensure that hazardous waste is disposed in a dedicated area that is enclosed; of hard surface; with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste.
- Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available.
- Prohibit illegal disposal of hazardous waste to the land;
- Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste;

- Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing; and
- Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities. The numbers within the records are to be consistent to ensure no illegal discharge at the site or other areas.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Inspection of hazardous waste management practices onsite;
- Review of records and manifests for volume of hazardous waste generated to ensure consistency; and
- Regular environmental reporting on implementation of the hazardous waste management practices onsite.

(iv) Hazardous Material

The nature of construction and operational activities entail the use of various hazardous materials such as oil, chemicals, and fuel for the various equipment and machinery. Improper management of hazardous material entails a risk of leakage into the surrounding environment either from storage areas or throughout the use of equipment and machinery.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Ensure that hazardous materials are stored in proper areas and in a location where they cannot reach the land in case of accidental spillage. This includes storage facilities that are of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another;
- Maintain a register of all hazardous materials used and accompanying Material Safety Data Sheet (MSDS) must present at all times. Spilled material should be tracked and accounted for;
- Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.);
- Regular maintenance of all equipment and machinery used onsite. Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material;
- Ensure that a minimum of 1,000 liters of general-purpose spill absorbent is available at hazardous material storage facility. Appropriate absorbents include zeolite, clay, peat and other products manufactured for this purpose; and
- If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Inspection for storage of hazardous materials to include inspections for potential spillages or leakages; and
- Report any spills and the measures taken to minimize the impact and prevent from occurring again.

8.4.2 Potential Impacts from Erosion and Runoff during the Construction Phase

Site preparation activities which are to take place onsite by the EPC Contractor for installation of the various Project components to include wind turbines, substation, cables, etc. are expected to include land clearing activities, excavation, grading, etc.

The nature of construction activities discussed above could disturb soil, exposing it to increased erosion during rainfall events. If onsite erosion and runoff are not controlled, they can result in siltation of surface water. Generally, such impacts can be adequately controlled through the implementation of general best practice housekeeping measures as highlighted throughout this section, and which are expected to be implemented throughout construction phase.

The potential impacts from erosion and runoff are of short-term duration as it is limited to the construction phase. Such impacts are negative in nature, and could be noticeable and are therefore of medium magnitude. However, they are considered of low sensitivity as they are generally controlled through the implementation of general best practice housekeeping measures. Given all of the above, such an impact is considered to be of minor significance.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance can be reduced to not significant.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase:

- Avoid executing excavation works under aggressive weather conditions.
- Place clear markers indicating stockpiling area of excavated materials to restrict equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas.
- Erect erosion control barriers around work site during site preparation and construction to prevent silt runoff where applicable.
- Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase:

- Inspection for erosion and runoff control to include inspections for implementation of mitigation measures.

8.5 Biodiversity

This section identifies and assesses the anticipated impacts from the Project activities on identified ecological receptors during the construction and operation phase. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

Impact assessment summary tables are relevant, however for some impacts the assessment is provided within the accompanying text and where impact significance is clear (e.g. similar impacts affecting multiple receptors), no table has been provided to avoid significant levels of repetition.

All mitigation measures contained in this section will be included in a Project specific construction Biodiversity Management Plan which will also include details of pre-clearance, pre-construction, and during construction monitoring.

- Cumulative Effect Assessment (CEA)

The process has identified 13 species, which had an Overall Risk of Major or Moderate, are considered priority bird VECs for the Projects. Some of these were already identified by the Lekela CEA and all within the IPH CEA. Whilst peak counts have been updated for two species there are no changes to risk status from the IPH document.

- Cumulative Habitat Assessment (CHA)

Critical Habitat has not been triggered for this project but there are a number of PBFs that will need to be safeguarded during the construction and operational phase to ensure no net loss of these features.

There are species of bird and reptile that are considered to be PBFs and mitigation and monitoring for these species will be included in a Biodiversity Management Plan.

Monitoring will need to be completed to ensure no net loss of PBFs during the operational phase.

Pre-clearance and pre-construction surveys, at appropriate times of the year, will need to be completed to establish presence/absence in proposed works areas and if mammals and reptiles are found to be present in these areas or considered likely to occur in these areas during construction, additional mitigation (e.g. limited translocation to a suitable receptor site) will be required.

It is considered that the Project has met the requirements as set out in IFC PS6 Paragraph 17 and the measures detailed above will be included in the management plan and BMP documents. These documents will also set out measures designed to achieve No Net Loss for those species defined as PBFs.

PS: CEA & CHA studies has been conducted and submitted with ESIA study

8.5.1 Potential Impacts during the Construction Phase

Habitat Loss, Fragmentation and Degradation

Site clearance and subsequent construction activities will result in the direct loss of areas of natural habitats over the full construction footprint of the Project including internal site roads, turbine bases, crane pads, substations, and permanent site structures (e.g. offices). Natural habitats are valued as being of Medium Sensitivity as they are not listed as Annex 1 or Priority Habitats. There is also likely to be temporary habitat loss and degradation of habitats as a result of temporary lay-down areas and other temporary facilities (e.g. worker accommodation) as well as cabling and communication routes.

The list of terrestrial fauna present on site from surveys is presented below. All species are IUCN Least Concern other than Spiny-Tailed Lizard (Vulnerable) which has specific individual mitigation measures in place to ensure no harm comes to the species during works.

- Red Fox (LC)
- Sundevall's Jird / Silky Jird (LC)
- Lesser Egyptian Gerbil (LC)
- Lesser Egyptian Jerboa (LC)
- Naked-rumped Tomb Bat (LC)
- Steudner's Pigmy Gecko (LC)
- Red-spotted Lizard (LC)
- Elegant Gecko (LC)
- Pallid Agama (LC)
- Bosc's Fringe-toed Lizard (LC)
- Spiny-Tailed Lizard (VU)
- Invertebrates (typical assemblage for region – all LC)

Habitat loss of terrestrial species can lead to a negative impact on overall population viability. In the situation here the impact is reduced due to the nature of the development meaning that habitat loss is spread in small areas over a wider project site. This means that connectivity is maintained through the area and no barriers to movement put in place or wide areas of specific interest will be lost. Given habitats are found through the area the small loss of habitat (1.5% of the project area) it is considered that there will be no impact on conservation status of these species.

Despite this there will be mitigation for all these species in the form of provision of alternate habitat due to the enhancement of around 2.0 km² using appropriate, native planting in suitable parts of the Project Area. This will ensure no loss the area available to use for these widespread species. Planting within these areas is being monitored and accordingly the success of habitat provision will be ensured.

Details of habitat loss associated with infrastructure other than WTG bases cannot be fully assessed at this stage due to no confirmed infrastructure layout. It is assumed that habitat loss associated with access from the main road will be minimized by following existing vehicle access routes. Assumed areas for infrastructure are provided at this stage in order to best assess the project impact.

The potential impacts on habitat loss, fragmentation and degradation would be negative in nature yet short-term in duration. Such impacts would be medium in magnitude yet deemed irreversible. Considering the ecology of the site, the receiving environment is determined to be of medium sensitivity. Given the above, the impact is considered overall of minor significance.

Mitigation Measures

The following mitigation measures will be employed to reduce the significance of habitat loss, fragmentation, and degradation during the construction period. Mitigation measures are largely based on avoidance of impact through selection of the working areas to favour areas of degraded natural habitat or those areas where habitats have been modified. Where impacts cannot be avoided the following will be completed

- All site workers will undertake a Project induction before working on site. The induction will include a comprehensive biodiversity element where the baseline ecological value and sensitivity of the site will be discussed.
- Prior to construction works, working areas will be clearly demarked (using temporary fencing (e.g. orange netting attached to wooden posts)) so that site workers fully understand the working area. Encroachment into areas outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Ecologist to check enforcement of working areas.
- On completion of phased construction works the EPC Contractor will be responsible for habitat rehabilitation works in all areas that have been subject to temporary disturbance.
- Following construction an area of around 2.0 km² will be enhanced using appropriate, native planting in suitable parts of the Project Area, this will ensure that no net loss of habitat as a result of the works. Any areas of additional planting will be monitored as part of the biodiversity monitoring program and any species which do not establish will be replaced.

Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora

It is possible that non-native or introduced flora could be imported in to the AoI on vehicles or within any imported soil material. The impacts of non-native and introduced flora could potentially be significant in absence of any mitigation as these species could become established and out-compete native flora.

Impacts associated with non-native, invasive or introduced flora could result in long-term negative impacts, irreversible (if allowed to become established) and potentially significant.

Mitigation Measures

- Prior to construction works, working areas will be subject to a botanical walkover survey to identify areas of non-native or invasive species. Any specimens will be clearly marked, and the area avoided and if this is not possible the specimen will be removed and disposed of.
- Areas of soil in proximity to these species will be stored separately and not used further on the site. It will be collected from the site and disposed of or used as deep sub-soil fill (to reduce the chance of seed germinating).
- Areas of non-native or invasive species will be mapped and a programme of mechanical control will be completed over the construction period in order to remove these species from the AoI. Chemical control will be avoided however if necessary, will be used but in accordance with national and international guidelines as well as those applied by the Lenders (e.g specific risk assessment and Lender agreement prior to use).
- Soil imports to be taken from local quarries or borrow pits to avoid importing non-native and invasive species.
- Adequate wheel-washing facilities to be constructed at the entrance to the site (e.g. at the eastern end of the access road) and any wastewater will be disposed of correctly to prevent spread of undesirable species.
- Regular site walkover surveys throughout the construction period by a suitably qualified botanist to check to the presence and abundance of non-native or invasive species.

Direct Impacts on Sensitive Receptors (Vertebrates) - Site Clearance and Earthworks

As well as impacts to habitats it is near-certain that site preparation works and construction activities will negative impact sensitive ecological receptors (e.g. reptiles, mammals, breeding birds) as a result of direct mortality.

Egyptian Spiny Tailed Lizard (IUCN VU) are likely to be particularly exposed to impacts during construction as they are a diurnal species meaning they will be mobile while site works are active. Unmitigated impacts on Egyptian Spiny Tailed Lizard could potentially be medium-term and irreversible (e.g. loss of breeding habitat and mortality).

Mitigation Measures

A summary of mitigation measure to avoid and mitigate for direct impacts on sensitive vertebrate receptors is included below. These measures will be included (and expanded upon) in a Construction Biodiversity Management Plan/Biodiversity Action Plan.

- All site workers will undertake a Project induction before working on site. The induction will include a comprehensive biodiversity element where the baseline ecological value and sensitivity of the receptors within the Aol will be discussed.
- Prior to construction works, working areas will be clearly demarked (using temporary fencing (e.g. orange netting attached to wooden posts)) so that site workers fully understand the working area. Encroachment into areas outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Ecologist to check enforcement of working areas.
- Working areas should avoid trees / shrubs as these are likely, due to their sporadic distribution across the Aol to be of importance to breeding birds (e.g. passerines, raptors).
- A pre-construction walk-over survey will be undertaken of all working areas to check for the presence of ground nesting birds. Surveys will be completed by an appropriately qualified ecologist and surveys will be undertaken in the hours after sunrise (up to 10:00). The surveyors will aim to identify behaviour indicative of breeding activity (e.g. carrying food / nesting material / faecal sacs, presence of nests, eggs or chicks (both nidifugous and nidicolous)).
- Where nests are found they will be recorded in full and their locations mapped, with the data transferred to Excel master sheets and Google Earth. Mapping will then be circulated to the project team along with details of a works exclusion zone. Exclusion zones will be dependent on the species of bird nesting along with its conservation status and be agreed with the qualified Project Ecologist.
- Mitigation during construction will include timing work to remove suitable nesting habitat outside of the most sensitive times of year for ground nesting species, and for all clearance work within this time period to be done under the supervision of an on-site ecologist.

Pre-construction surveys for sensitive species (i.e. those qualifying Priority Biodiversity Features) of herpetofauna have taken place. The locations of known/active burrows used by Egyptian Spiny-tailed Lizard have been marked throughout the Project Area.

Prior to the start of construction suitable sites for the release of relocated Egyptian Spiny-tailed Lizards will be identified and mapped. A suitable translocation receptor site must;

- Be within 10 km of the Project site.
- Contain appropriate vegetation (both for food and cover).
- Have suitable soil types to allow animals to dig and create new burrows.
- Not already be close to carrying capacity for this species.

Capture and movement of Spiny-tailed Lizards will only be completed as a last resort. All works will aim to be completed at least 50m from active burrows. Locations where burrows are present between 50 and 100m of construction will be monitored throughout the construction period and if significant negative impacts (i.e., abandonment of burrows or increased mortality) are observed the remaining burrows in closest proximity will be excavated and the animals translocated to holding areas in accordance with the below protocols for the duration of the construction window in that location.

- Detailed design for the final infrastructure layout will take into account the results of the preconstruction surveys and Project infrastructure will be sited to avoid the identified burrows. Where this is not possible, or where fresh burrows are identified at the commencement of clearance works, these burrows will be excavated by hand and the animals captured and translocated, details of this are provided below.
- Prior to work in an area containing Spiny-tailed Lizard burrows any remaining burrows within 50m of proposed works will be re-checked by the Ecologist using an endoscope and if empty dug out and destroyed. If any animal is found back in the working areas the burrow will be dug out carefully by hand and the animal captured and placed in a secure box before taking to a cool location ready for translocation to the receptor site. Once the lizard is removed from the burrow the hole will be collapsed and made unsuitable for future use.
- If areas suitable for translocation exist within the Project Area these will be prioritized as this minimizes the impacts of transporting animals away from the Project site.
- Studies have shown that soft releasing Spiny-tailed Lizards leads to a better survival rate than simply releasing the animals into a new site so any animal which is translocated will be soft-released into an individual mesh enclosure within an area of suitable habitat. The pen will measure at least 2m x 2m and be covered to provide shade and prevent attack from above. A “starter hole” will be dug using a 20cm auger to a depth of approximately 30cm to provide some initial shelter. Supplementary feeding will also be undertaken and after a period of seven days the enclosure will be removed to allow the lizards to move and forage naturally.
- After the relocation period, a report will be prepared which will include the following information:

Survey dates and timing of capture and release

- Weather conditions during survey and relocation effort
- Location of captured individuals
- Number of captured individuals during each relocation effort
- Number of juveniles, mature males and mature females
- Release sites used for relocation of each effort
- Number of males and females released at each site
- Number of mortalities during relocation effort

Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions

Vehicle related collision is possible for all vertebrate species present within the Project’s Aol and this will result in direct mortality on receptors of low to high sensitivity. Any such impact would be negative, longterm and irreversible and would be of medium to high magnitude and therefore of minor to major significance (depending on the receptor killed).

Both small and large vertebrate species are at risk of vehicle collisions throughout construction. Species such as Egyptian Spiny Tailed Lizard are at higher risk of collision with vehicles and machinery as they are active in the day.

It is possible that carcasses on the road could attract scavenging animals, including birds of prey which in turn would increase their risk of collision with vehicles and machinery.

Mitigation Measures

- Speed limits of 20 kph are to be enforced by the EPS Contractor
- Regular signage will be installed along the site access roads and internal roads informing all drivers of the speed limit
- A gated entrance will be staffed and any visitors or locals using the site roads will be informed of the speed limits and that there are regular checks of vehicle speeds
- A ban of driving at night will be enforced and if absolutely necessary the speed limit will be reduced to 15kph
- Ban against off-road driving at all times of the day

Regular checks of the road for carcasses and if found these will be moved to at least 10m from the road to reduce the likelihood of hitting scavengers, including birds of prey.

A incidental / chance find procedure will be included in the BMP so that all workers report any road collisions so that any such incident can be investigated in full.

Direct Impacts on Sensitive Receptors (Habitats, Vertebrates) – Poaching, Collection etc.

It is possible that site worker may poach or take plants and animals from the site, either for firewood or in the case of the Spiny-Tailed Lizard for food, trophy or to be sold. Species such as Red Fox could also face persecution.

Any of the identified receptor are potentially at risk from this long-term, irreversible negative impact. The likelihood of this occurring is possible and the magnitude of this impact ranges from Low to High depending on the receptor affected.

Mitigation Measures

- The Project will enforce strict controls on hunting, gathering, poaching and otherwise disturbing flora and fauna within the Project AoI. Any breaches of this ban will be strictly enforced, and any workers found in breach of this control measure will be subject to disciplinary procedures.
- The ban on hunting etc. will be included in the site induction along with discussions about the sanctions for breaches of this control measure.
- A chance find procedure will be implemented should any site worker find a wild animal, especially one that has become a nuisance (e.g scavenger in the works camp, presence of small mammals in worker accommodation, presence of snake or scorpion on the works site) and the EPC Ecologist will arrange for an appropriately qualified person to capture and relocate. Where scavengers have been identified within the works site additional housekeeping measures may be required.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Disturbance

The presence of site workers and machinery can result in disturbance related impacts to all terrestrial ecological receptors present within the Aol. These impacts are not certain, and the magnitude of such impacts will vary depending on the sensitivity of each receptor to disturbance. The significance of any such disturbance impacts is likely to range from Low to Moderate / Major, depending on the sensitivity of the affected receptor. The duration of impact will also likely vary from very short-term (e.g running away from a vehicle using the access road) to short to medium term in areas adjacent to construction areas or worker accommodation. It is likely that any disturbance impacts, irrespective of duration will be reversible once the disturbance event has passed.

The main feature of interest within the AOI is the dam which is used by roosting birds during spring as well as feeding birds during spring seasons where water is present. The design of the project has ensured a 2km buffer away from this feature to ensure no disturbance to birds present takes place. This is the case for WTG and must also be the case for associated infrastructure.

Mitigation Measures

- Site wide induction to include information regarding disturbance of ecological receptors.
- Chance find procedure to report sightings of potentially sensitive receptor and investigation of any such sightings by the EPC Contractor in order that additional buffer areas can be agreed, where necessary.
- Continued monitoring of the dam to understand use of the area by staging and roosting birds.

Direct and Indirect Impacts on Sensitive Receptors (Protected Sites)

Protected sites in the vicinity of the project that require consideration due to IUCN category are Gebel El Zeit KBA and IBA, and El Qa Plain KBA IBA. Due to the distance from the proposed works no direct or indirect impact is predicted on either site. Soaring birds (as designated within the IBA/KBAs) may travel through the works area however listed mitigation measures will ensure that no negative impact on the IBA features takes place.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Reduced Air Quality / Dust

The habitat across the Aol is very sandy. It is likely that constructed related ground disturbance will likely increase the amount of dust in the air which in turn could result in negative impacts on plants and vertebrate receptors. In addition air pollution from site vehicles from the concrete batching plant could also result in negative impacts on valued receptors. These impacts are possible, short-term and reversible and are considered to be of minor to moderate significance.

Mitigation Measures

- Where necessary tracks will be damped down to reduce the risk of dust. Damping down will also include areas adjacent to roads. These measures will be implemented where necessary.
- Vehicles will be properly maintained to reduce emissions.

Direct Impacts on Sensitive Receptors (Vertebrates) – Noise

Noise as a result of construction can result in direct impacts on valued ecological receptors (vertebrates) due

to acoustic masking, disturbance and displacement thereby reducing survivorship and reproductive success.

Any impacts are likely to be short- to medium term (for the duration of construction) and reversible. The magnitude of impact ranges from low to medium and is likely to be of low to moderate significance.

Mitigation Measures

- Vehicles will be properly maintained to noise emissions.
- Use of available technology and management practices with construction methodologies to reduce noise.
- Regular monitoring of noise levels within works compounds and works areas as far as possible and apply corrective measures as necessary.

Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting

Lighting could impact foraging and commuting routes for bats.

Any impacts are likely to be short- to medium term (for the duration of construction) and reversible. The magnitude of impact is low and is likely to be of low significance given the lack of bats present. Mitigation measures will help all nocturnal site use by other animals.

Mitigation Measures

- Limit the amount of lighting, especially within the wider AoI (e.g at turbine construction sites). This will be achieved by ensuring that night-time working is limited.
- Where lighting is required within worker compounds, site offices etc. ensure that any lighting is shielded and protected to reduce light-spill and glare. Low intensity lighting should also be used, where possible, to further reduce light spill.
- For external security lights PIR trigger units should be used and these should be timed to automatically switch off after five minutes.
- No lighting will be installed along the access roads.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Littering, Waste Management

Unmitigated it is possible that poor waste management could result in the proliferation of litter across the Project AoI including plastic containers, plastic bags and glass. This waste could result in negative impacts to sensitive receptors through ingestion or entanglement. Any such impact could be long-term and irreversible, and the significance of this impact would be low to high depending on the receptor effected.

In addition poor management of other solid wastes, including food waste could result in the presence of pest species such as rats and mice, which could outcompete wild rodents and feral cats and dogs which could increase the risk of predation of wild rodents and other prey species.

Mitigation Measures

- A Waste Management Plan will be prepared by the EPC Contractor

- Waste Management will be included in the Site Induction so that all site workers understand their responsibilities to maintaining a clean and tidy site. Where possible all materials than can be recycled will be.
- Zero tolerance to littering on the works site and within the worker compound. This zero-tolerance approach should also be applied to smoking and workers must use appropriate smoking areas (supplied with 'butt bins') at all times, even when on construction sites. Litter must not be thrown out of vehicle windows when driving to and from or around the site.
- Daily inspections of working areas and worker compound should be completed, and corrective actions applied, where necessary.
- Additional mitigation measures for pest species, including feral cats and dogs are included below.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species

As discussed above it is possible that pest species become established within the Project as a result of increased littering or poor waste management as well as the propensity of certain species (e.g. rats, cats and dogs) to associate with human habitation.

An increase in pest species could result in long-term negative impacts on wild animals through direct and indirect competition for food resources, direct mortality through predation, and direct impacts as result of disturbance impacts. Such impacts could be reversible or irreversible, will be between low to high magnitude and as such significance will vary from minor to major depending on the receptor being affected.

Mitigation Measures

Where pest species are identified the EPC Contractor / Ecologist will be notified and an appropriate course of action taken. For small mammal pest's live traps will be used, in order to reduce the risk of bycatch. Poison baits should be avoided, unless it can be certain that non-target species will be affected, and any such use should be in accordance with national and international best practice. If poison baits are to be used it must be certain that any poisoned animal cannot move out on to the wider Aol to reduce the risk of natural predators eating poisoned animals. Any chemical control of pest must only be undertaken in accordance with national and international guidelines as well as following Lender guidelines including risk assessment and prior agreement with the Lender.

8.5.2 Potential Impacts during the Operation Phase

(i) Direct Impacts on Sensitive Receptors (Vertebrates and Birds) – Habitat Fragmentation and Barrier Impact

The Project Aol is on a major migration route for birds with large numbers of birds travelling through the area during both Spring and Autumn migration seasons.

This number of birds passing through Plot 1 indicates that the impact on migratory bird species will be significant if unmitigated.

Mitigation Measures

It is recommended that Plot 1 operates an observer-led Shut Down on Demand during both Spring and Autumn bird migration periods (between late February and the end of May and between early August and late November).

- Active Turbine Management Program (ATMP)

Bird Monitoring and Active Turbine Management Program (Shutdown On-Demand and Predictive Fixed Shutdown Programs)

BMP & ATMP consultant(s) on behalf RCREEE will implement a robust and appropriate post-construction BMP, breeding and migratory birds during spring and autumn migration periods over the Project's duration at the SWE project north site (Plot 1). The SOD program involves the shutdown of all or some WTG and/or Predictive Fixed Shutdown of all or some WTGs located at sensitive areas to birds in response to a potential bird collision risk. WTG shutdown is subject to certain criteria being met and ensures a high level of energy generation while protecting biodiversity. Shutdowns are generally short term in nature. The program will be implemented by a Visual Observations (VOs) Approach and may be assisted by the combination of VOs with use of a Radar Systems (RSs) Approach Prior to the operational phase, specification for the implementation of BMP & SOD-Program under VOs and the combination of VOs with use of RSs, will be prepared building on the findings of the ESIA, CHA and CEA of the project. Detailed information will include identification of key species, key periods for monitoring, observation points, team composition, observation schedule, data collection observations, shutdown criteria, shutdown on-demand procedures and communication protocol, curtailment losses, risk management, standard data form, maps and data storage, data analysis, communication, required resources and equipment, breakdown of cost. The ATMP will include:

- Defining/delimiting key flight activity periods at the SWE project north site (Plot 1);
 - Use of Radar and other high-tech monitoring technology if available;
 - Drawing on bird monitoring data both historic and real time from RSs, VOs, bird behavioural variables, site-specific characteristics and weather data and other relevant data;
 - Identifying high-risk areas and times; defining the groups of SWE's (Plot 1) WTGs by zones for the SOD Program and achieve effective coverage throughout the SWE (Plot 1);
 - Adopting a reactive/responsive approach to mitigation but which will be informed and refined through a predictive approach;
 - Determining strategically located vantage points for monitoring flight activity and to facilitate effective turbine shutdown; and
 - Improving effective communication networks between bird observers and SWE's (Plot 1) wind turbine operators
- Fatality Monitoring Program (FMP)

FMP consultant on behalf RCREEE will implement systematic fatality surveys (i.e. carcass searches) by trained experts which have become the main means of monitoring collision victims and estimating collision rates at wind power plants worldwide. Through applying the suitable survey design to be implemented at the project site, it is the most reliable and accurate approach for determining the number of birds killed in a certain wind farm, for monitoring bird fatalities over time, for analyzing the factors that cause variations in fatalities among turbines or analyzing the effectiveness of measures designed to reduce collision risk.

When conducting systematic carcass searches experts walk along pre-defined transects 260x260 m² under each turbine (e.g. within a 260m radius around each turbine). All found carcasses (in this case a bird/bat or parts of a bird/bat) are recorded and carefully examined (any evidence of fatality, carcass complete or dismembered, type of injuries evident, scavenging evident, distance and direction to turbine etc.).

Estimates of fatality rates are biased in relation to searcher efficiency. Furthermore, other factors such as proportion of searched areas and carcass persistence should be taken into consideration when estimating fatality rates. When carcasses are located, observers will record species' name, distance from the turbine

tower, direction to the nearest turbine, and predation evidence or other observations. Carcasses will be then used in carcass persistence trails. Notes should be made of any tags, rings or transmitters that might be on such birds.

Besides, carcass search surveys will also be undertaken along associated Overhead Transmission Line (OHTL) during bird migration seasons. In general, the same approach on standardized carcass searches can be applied. Data collection and data analysis of the monitoring at OHTL will be coordinated at wind farms in the GoS.

- **Barrier Effect Study**

It is recommended that RCREEE undertake at the cumulative level for all wind farms within the GoS region a barrier effect study. The study should assess potential impacts of wind farms as disruptive barriers to the migration route at the cumulative level within the GoS region and identify any additional mitigation measures to be considered. This could include for example spacing/buffer requirements between wind farms. The study should take into account the Project and all surrounding wind farms and the variations in the turbine heights of such projects. The study should be undertaken once all wind farms have confirmed their turbine specifications. for full list of wind farm projects within the GoS region.

(ii) Direct and Indirect Impacts on Sensitive Receptors (Birds) – Collision with Turbines

Collision Risk Modelling Methodology

Whilst it is clear from the number of birds moving through the area that there is a risk of impact to migrating birds Collision Risk Modelling (CRM) is completed to further inform the magnitude (extent) of collision impacts on bird populations recorded flying within the proposed Wind Farm area. The collision risk model used in this assessment has been developed by Scottish Natural Heritage (SNH) and the British Wind Energy Association (BWEA) and has been accepted as representative of industry best practise^{9,10,11}. In depth details of the model are given in the cited publications but a brief description is provided below.

The model runs as a two-stage process. Firstly, the risk is calculated assuming that flight patterns and behaviours are unaffected by the presence of the WTGs i.e. that no avoidance action is taken. This is essentially a mechanistic calculation, with the collision risk calculated as the product of (i) the probability of a bird flying through the rotor swept area, and (ii) the probability of a bird colliding if it does so. This probability is then multiplied by the estimated numbers of bird movements through the WTG rotors at the risk height (i.e. the height of the rotating rotor blades) in order to estimate the theoretical numbers at risk of collision if they take no avoiding action. Given the site is a clear migration corridor and the high majority of activity of birds through the area are associated with this activity Stage 1 has been completed using the method directly designed for migrating birds.

A bird is simplified in shape to a flying cross with length, wingspan, and speed, and always flying perpendicularly towards the rotor. A bird may be 'gliding' i.e. with the arms of the cross fixed, or 'flapping' i.e. with the arms of the cross flapping so as to occupy a space similar to that of a spinning top, with the length of the bird being the axis of spin. 'Gliding' flight has a marginally lower collision risk than 'flapping' flight – notably for passage at points level with the rotor hub, where the wings lie parallel with potentially colliding blades. However, the difference is rarely sufficient to warrant detailed consideration of different bird behaviours. As a 'worst case' scenario, all flight data entered into the collision risk model is set to 'flapping' flight.

The second stage of the collision risk model incorporates the probability that the birds, rather than flying blindly into the WTGs, will actually take a degree of avoiding action. The most recent SNH guidelines⁶ advise that the default avoidance rates for all species is 98% with the exception of a small number of species. Golden Eagle is considered to have a moderately higher avoidance rate of 99%, based on the size and flight characteristics Steppe Eagle is also considered to have the same avoidance rates. Common Kestrel and Lesser Kestrel are considered to have a relatively low avoidance rate of 95%. Recent published literature^{7 8 9} based on research at operational wind farms in the UK, Europe and the United States, indicates that the above approach is likely to be conservative and accordingly the figures presented are precautionary. Given the surveys have covered two years a range of collision risks over the two years has been gathered for each species. Tables later in this section present figures for each of the four surveyed migration seasons and then provide two figures for annual collision risk:

- Peak annual collisions – this shows the highest collision risk for each species based on combined data (spring and autumn) from 2022 versus combined data from 2023.

⁶ Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model: SNH (July 2017)

⁷ Vasilakis, D. P., Whitfield, D. P., Schindler, S., Poirazidis, K. S., & Kati, V. (2016). Reconciling endangered species conservation with wind farm development: Cinereous vultures (*Aegypius monachus*) in south-eastern Europe. *Biological Conservation*, 196, 10–17

⁸ Whitfield, D. P. & M. Madders. (2006a). Deriving collision avoidance rates for Red Kites (*Milvus milvus*). Natural Research Information Note 3. Banchory, UK.

⁹ Whitfield, D. P. (2009). Collision avoidance of golden eagles at wind farms under the 'Band' collision risk model. Report to Scottish Natural Heritage.

Natural Research. Ltd. Banchory, UK

- Maximum annual collisions – this shows the highest collision risk for each species based on the sum of the highest spring season output (either 2022 or 2023) plus the highest autumn season output (either 2022 or 2023)

⁹ Percival *et al.* (1999)

¹⁰ Band *et al.* (2005) Developing field and analytical methods to assess avian collision risk at wind farms. In De Lucas, M., Janss, G. and Ferrer, M., eds. *Birds and Wind Power*. www.quercus.pt

¹¹ Scottish Natural Heritage (2014) <https://www.nature.scot/wind-farm-impacts-birds-flight-speeds-and-biometrics-collision-risk-modelling>

Once the avoidance rate is incorporated, the model then predicts the likely number of annual collisions of each particular species.

The number of predicted collisions (i.e. the extent) is then assessed against the total local, national or international populations as appropriate to ascertain the magnitude and hence significance of any impacts along with fatality thresholds for these priority species as appropriate.

Collision Risk Model Input Data

The Collision Risk Model requires data relating to the species of birds occurring at the proposed Project and data on the type and specification of the proposed WTGs.

Collision Risk Modelling (CRM) (and subsequent Collision Risk Assessment (CRA)) has been completed based on the 83-wind turbine layout, which was recently updated to 69 wind turbines.

At the time of reporting and development of the CRM, the proposed scheme is to construct and operate 83 turbines with a hub height of 119m and a rotor diameter of 197m, resulting in a tip height of 217m. The rotation period is variable dependent upon wind speed and its rated speed used in the CRM was taken from comparative turbines. The blade pitch is also variable depending on wind speed, however the worst case of 90° was used in the CRM.

Parameters specific to the Project and survey include the area of the Project, the mean day length during the survey period and the number of day's activity over the length of the survey period. Bird Size and Flight Speed.

Bird Size and Flight Speed

The biometric data, including body size, wing length, as well as flight speed used in the collision risk model has been taken from various sources^{10 11 12 13} and was populated with correct data prior to running the CRM.

Bird Flight Activity and Flight Height

Data on bird flight activity through the proposed Project area and on the proportion of those birds flying at rotor height are taken from the field surveys completed by in-country ornithologists.

Data relating to birds flying above or below the blade swept area was not included in the collision risk analysis. This is considered appropriate given two years data has been used and worst-case additions of the seasons to form annual totals

The results of the CRM are shown on the table below, along with a cumulative prediction for combined winter and summer collisions.

¹⁰ Bird body size data from: The complete birds of the Western Palearctic Cramp (1998)

¹¹ Flight speed data from: A dictionary of birds. Campbell and Lack (1985)

¹² Bird Guide: Collins (2001)

¹³ Birds of the western palearctic / BTO fact sheets

Results of Collision Risk Assessment

The following table shows the results of the Collision Risk Model for soaring birds recorded flying through the wind farm.

Table 64 Results of Collision Risk Model for Soaring Birds

Species	Common Name	Avoidance Rate	Number of seasonal collisions				Number of annual collisions	
			Spring 22	Spring 23	Autumn 22	Autumn 23	Peak annual collisions	Maximum annual collisions
<i>Accipiter brevipes</i>	Levant Sparrowhawk	98%	0.09	0.02	0.14	0.00	0.24	0.24
<i>Accipiter nisus</i>	Sparrowhawk	98%	0.00	0.00	0.01	0.01	0.01	0.01
<i>Aquila fasciata</i>	Bonelli's eagle	98%	0.00	-		-	0.00	0.00
<i>Aquila heliaca</i>	Eastern Imperial Eagle	99%	0.00	0.00	-	0.00	0.00	0.00
<i>Aquila nipalensis</i>	Steppe Eagle	99%	0.09	0.49	0.00	0.00	0.49	0.49
<i>Aquila spp.</i>		99%	0.03	0.02	0.00	-	0.03	0.03
<i>Buteo buteo vulpinus</i>	Steppe Buzzard	98%	3.20	2.18	0.22	0.18	3.43	3.43
<i>Buteo rufinus</i>	Long-legged Buzzard	98%	0.02	0.01	0.01	0.00	0.02	0.02
<i>Buteo spp.</i>		98%	0.18	0.04	0.13	0.00	0.31	0.31
<i>Ciconia ciconia</i>	White Stork	98%	9.92	5.77	2.21	13.10	18.88	23.02
<i>Ciconia Nigra</i>	Black Stork	98%	0.08	0.05	-	-	0.08	0.08
<i>Circaetus gallicus</i>	Short-toed Eagle	98%	0.06	0.07	0.00	0.00	0.07	0.07
<i>Circus aeruginosus</i>	Marsh Harrier	99%	0.00	0.00	0.10	0.06	0.10	0.10
<i>Circus macrourus</i>	Pallid Harrier	99%	0.00	0.00	0.02	0.03	0.03	0.03
<i>Circus pygargus</i>	Montagu's Harrier	99%	0.00	0.00	0.02	0.04	0.04	0.04
<i>Circus spp.</i>		99%	0.00	0.00	0.04	0.03	0.04	0.04
<i>Clanga clanga</i>	Greater Spotted Eagle	99%	0.00	0.00	-	-	0.00	0.00
<i>Clanga pomarina</i>	Lesser Spotted Eagle	99%	0.04	0.01	-	0.00	0.04	0.04

<i>Falco biarmicus</i>	Lanner Falcon	98%	0.00	0.00	-	-	0.00	0.00
<i>Falco concolor</i>	Sooty Falcon	98%	-	0.00	0.03	0.02	0.03	0.03
<i>Falco spp.</i>		98%	0.00	0.00	0.06	0.02	0.06	0.06
<i>Falco subbuteo</i>	Hobby	98%	-	0.00	-	0.00	0.00	0.00
<i>Falco tinnunculus</i>	Kestrel	95%	0.02	0.03	0.29	0.29	0.32	0.32
<i>Grus grus</i>	Common Crane	98%	0.07	0.02	-	0.10	0.12	0.17
<i>Gyps fulvus</i>	Griffon Vulture	98%	0.00	0.00	-	-	0.00	0.00
<i>Hieraaetus pennatus</i>	Booted Eagle	98%	0.02	0.01	0.01	0.00	0.03	0.03
<i>Milvus migrans</i>	Black Kite	99%	0.40	0.23	0.15	0.20	0.56	0.60
<i>Neophron percnopterus</i>	Egyptian Vulture	98%	0.01	0.01	-	-	0.01	0.01
<i>Pandion haliaetus</i>	Osprey	98%	0.00	0.00	0.00	0.01	0.01	0.01
<i>Pelecanus crispus</i>	Dalmatian pelican	98%	0.00	-	-	-	0.00	0.00
<i>Pelecanus onocrotalus</i>	White Pelican	98%	0.01	0.63	0.25	0.94	1.57	1.57
<i>Pernis apivorus</i>	Honey Buzzard	98%	0.63	0.42	3.65	7.24	7.66	7.86
<i>Raptor spp.</i>	Raptor Sp.	98%	0.20	0.03	0.03	0.01	0.23	0.23
<i>Falco naumanni</i>	Lesser Kestrel	95%	0.00	-	-	-	0.00	0.00
<i>Falco peregrinus</i>	Peregrine	98%	-	-	0.00	-	0.00	0.00
<i>Falco vespertinus</i>	Red-footed Falcon	98%	-	0.00	0.00	0.00	0.00	0.00

Collision Risk Assessment – Discussion

The above results show that the majority of species passing through are at a low risk of collision annually. Those species of conservation concern, or showing potentially high levels of collision, are discussed below.

- Steppe Eagle

Steppe Eagle (IUCN EN) is predicted to have a cumulative mortality of 0.49 individuals per year. This would equate to between approximately 12.25 collisions during the operational lifetime of the Project (assuming 25 years of operation).

The global population of Steppe Eagle is declining and is currently estimated to be between 50,000 and 75,000 individuals and the population in central Asia has been estimated to be between at least 22,000 and 35,500 pairs. The area is a clearly important migration route for the species although presence is not expected at any other time of year.

In absence of mitigation, collisions at the rates stated above would result in minor negative impacts for this species over the lifespan of the Project however these impacts would be permanent and irreversible.

- Egyptian Vulture

Egyptian Vulture (IUCN EN) are predicted to have a cumulative mortality of 0.01 individuals per year. This would equate to between approximately 0.32 collisions during the operational lifetime of the Project (assuming 25 years of operation).

The global population is currently estimated to be between 12,400 and 36,000 individuals however the low collision rate means that, in absence of mitigation, collisions at the rates stated above would result in negligible negative impacts for this species over the lifespan of the Project.

- Other species of Conservation Concern

Pallid Harrier (IUCN NT) and Sooty Falcon (IUCN VU) are currently estimated to have up to 0.03 collisions per year. Dalmatian Pelican (IUCN NT), Eastern Imperial Eagle (IUCN VU), Red-footed Falcon (IUCN VU), Greater Spotted Eagle (IUCN NT) all recorded below 0.004 birds per year.

The low collision rates means that, in absence of mitigation, collisions at the rates stated above would result in negligible negative impacts for this species over the lifespan of the Project.

- Least Concern species with notable collision risk

Levant Sparrowhawk (0.24 collisions per year), Steppe Buzzard (3.43), White Stork (23.02), Common Kestrel (0.32), Black Kite (0.6), White Pelican (1.57) and Honey Buzzard (7.86) all have collision per year of note. The populations of these species are typically abundant, and the species are not of conservation concern. Accordingly, mortality at this level is near-certain to not result in significant long-term impacts on any of these species at a population level.

Whilst most species use the site only incidentally for roosting when conditions require, White Stork use the dam area for feeding (during wet years) and roosting during each spring. In order to ensure displacement from this resource does not take place the design of the project has ensured a 2km buffer away from this feature to ensure no disturbance to birds present takes place. This is the case for WTG and must also be the case for associated infrastructure.

Mitigation Measures

- Current WTG layout takes into account a 2km setback distance from the Dam area which is a source of attraction for migratory birds particularly during spring season. The final detailed design should take this into account, otherwise (i.e. if no setback is considered) Critical Habitat (CH) can be triggered for the Project site given potential for key impacts on White Stork in particular. Please refer to the standalone CHA in particular for the outcomes of the site
- Given the high levels of migration activity and based on the outputs of the CRM as well as the results of the surveys completed to date upfront mitigation including Shut Down on Demand is considered necessary as predicted mortality for all species is likely to result in moderate or major negative impacts.
- Shutdown on demand is to take place ensuring the following principles are followed:
 - All of the turbines and a buffer area is to be covered by constant observation.
 - The buffer is to ensure that enough time is available for WTG to be shut down when birds approach
- Should shut down on demand be observer led:
 - Observers are to work in pairs and in shifts to ensure a vigilant effort from observers.
 - Observers are to communicate both with shut down operatives and other observers to ensure effective practices
- Shut down protocol is to be undertaken in discussion with other operatives in the region to discuss best practice for the location
- Operational monitoring is to be completed for at least the first 3 years of operation, with scope to continue depending upon results during the first three years, all years of operation to monitor actual levels of mortality. Post construction fatality monitoring is to be completed at all of the turbines and the programme of post construction monitoring is to include carcass searching, searcher efficiency trials and carcass persistence trials. The results of the post-construction fatality monitoring are to be used to inform a GenEst Analysis. Such effort is to be in line with the Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries – Good Practice Handbook and Decision Support Tool (2023)
- An adaptive management strategy is to be developed, and additional mitigation is to be undertaken if the results of the post-construction fatality monitoring indicate higher than predicted mortality, especially in relation to species of elevated conservation concern.

- A chance find procedure is to be implemented and any carcasses seen by site workers is to be reported to the Project Ecologist so that they can investigate. In addition any prey species carcasses found on on-site (e.g. on roads) is to be removed to reduce the likelihood of scavenging birds landing within the Project site.

(iii) Direct and Indirect Impacts on Sensitive Receptors (Protected Sites)

The proposed project is within the vicinity of two IBAs. Operation of WTG will not directly impact the topographical reasons for the protected sites interest. Impacts on individual birds are covered within other sections.

(iv) Direct Impacts on Sensitive Receptors (Bats) – Collision with Turbines

Bats are known to suffer negative impacts from wind turbines both through direct contact with turbine blades and through barotrauma and resulting mortality. Certain species are known to be more negatively affected by turbine due to their flight heights and behaviors.

Data from the bat detectors has shown that only one species of bat was recorded most likely a Naked Rumped Tomb Bat (*Taphozous nudiventris*), in extremely low number, and it is considered that the Aol does not support significant species (e.g those of elevated global / national conservation concern) nor will it support significant populations. The Aol does not support trees of sufficient size that could support roosting bats. In addition there are also no settlements within the vicinity of the Aol. The habitats on the site are also sub-optimal for foraging bats and as a result and due to lack of roosting habitats it is considered that the site will not be of importance for migrating bats.

Evidence to support the likely lack of impact comes from a nearby windfarm which has performed operational monitoring of bats. Only two bat carcasses were found from Autumn 2019 to Autumn 2023 showing very low numbers of bats affected by the turbines (of which there are a similar amount at 125 turbines on one plot and 96 at another). The methodology for monitoring included daily surveys six days a week from 20 February until 20 May in Spring and 10 November onwards in Autumn. The search plot for each turbine was a 200 x 200m area around the turbine itself.

Surveys for bats have not been carried out at a time when the Wadi's are wet, and it is possible that there is an increase in acidity at this time. Given the low amount of bat activity recorded on the static detectors at Plot 1 it is not considered any increase would be significant however this is to be adaptively monitored by post construction fatality monitoring to international best practice. The use of methods in accordance with the Postconstruction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries – Good Practice Handbook and Decision Support Tool (2023) is to ensure adaptive management is possible from the results of the monitoring.

(v) Indirect Impacts on Sensitive Receptors (terrestrial mammals and breeding / resident birds) – Disturbance

During the operation of the wind farm disturbance impacts are likely to be very minor as the site will not be subject to regular activity other than occasional vehicle movements and maintenance operations around the site, including turbine locations. Egyptian Spiny-Tailed Lizard may suffer some minor impact to their daily foraging activities. Any such impact will be very short-term (for the duration of the disturbance impact) and reversible and is likely to only result in impacts of minor magnitude. The significance of operational disturbance is therefore considered to be minor, at worst.

Mitigation Measures

- Speed limits to be enforced.
- Sensitive species are to be included in the site induction for all operational staff where additional control measures are to be discussed including allowing animals to move around the site, not chasing after them in vehicles or approaching them on foot and what to do if they observe breeding birds within their works areas.

(vi) Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions

Vehicle related collision is possible for all vertebrate species present within the Project's AoI and this will result in direct mortality on receptors of low to high sensitivity. Any such impact would be negative, long-term and irreversible and would be of medium to high magnitude and therefore of minor to major significance (depending on the receptor killed).

Species such as Egyptian Spiny-Tailed Lizard have a high risk of collision with vehicles due to their diurnal nature.

It is possible that carcasses on the road could attract scavenging animals, including birds of prey which in turn would increase their risk of collision with vehicles and machinery.

Mitigation Measures

- Speed limits of 20 kph will be enforced by the O&M Contractor
- Regular signage will be installed along the site access roads and internal roads informing all drivers of the speed limit.
- A gated entrance will be staffed and any visitors or locals using the site roads will be informed of the speed limits and that there are regular checks of vehicle speeds.
- A ban on driving at night will be enforced and if absolutely necessary the speed limit will be reduced to 15kph
- Ban against off-road driving at all times of the day, and if necessary, the works area will be subject to a walkover by the Project Ecologist.
- Regular checks of the road for carcasses and if found these will be moved to at least 10m from the road to reduce the likelihood of hitting scavengers, including birds of prey.

- A incidental / chance find procedure is to be included in the BMP so that all workers report any road collisions so that any such incident can be investigated in full.

(vii) Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting

Lighting could potentially result in negative impacts of a range of ecological receptors including impacting foraging and commuting routes for bats.

Any impacts are likely to be short- to medium term and reversible. The magnitude of impact ranges from low to medium and is likely to be of low to moderate significance.

Mitigation Measures

- Site-wide lighting is not being implemented so any lighting impacts during operation will be very limited. Night-time working is not anticipated and will certainly not be a regular occurrence.
- Where lighting is required within worker compounds, site offices etc. ensure that any lighting is shielded and protected to reduce light-spill and glare. Low intensity lighting should also be used, where possible, to further reduce light spill.
- For external security lights PIR trigger units should be used and these should be timed to automatically switch off after five minutes.
- Turbines will not be lit and any aviation lights will be shielded to minimize visibility from ground level to reduce the attractiveness of lights to night flying insects which in turn could attract bats.
- Lighting above turbine doors will be PIR controlled and timed so that it switches off automatically after five minutes. Again, this measure will be implemented to reduce night-flying invertebrates in proximity to turbines.

(viii) Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora

It is possible that non-native or introduced flora could be imported in to the Aol on vehicles or within any imported soil material. The impacts of non-native and introduced flora could potentially be significant in absence of any mitigation as these species could become established and out-compete native flora.

Impacts associated with non-native, invasive or introduced flora could result in long-term negative impacts, irreversible (if allowed to become established) and potentially significant.

Mitigation Measures

- Post-construction monitoring will be completed across the Aol to record the presence and distribution of non-native and invasive plant species and a programme of mechanical control will be completed over during the operation period to remove these species from the Aol. Chemical control will be avoided however, if necessary, will be used but in accordance with national and international guidelines and will also be subject to risk assessment and approval from the Lenders. The programme of control will continue until the species are absent from the Project Aol.

- A programme of regular monitoring will be completed with surveys completed in Years 1, 2, 5, 10, 15 to survey for the presence of non-native and / or invasive species and relevant control of these species will be completed, where necessary.

(ix) Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species

It is possible that pest species become established within the Project as a result of increased littering or poor waste management as well as the propensity of certain species (e.g. rats, cats and dogs) to associate with human habitation.

An increase in pest species could result in long-term negative impacts on wild animals through direct and indirect competition for food resources, direct mortality through predation, and direct impacts as result of disturbance impacts. Such impacts could be reversible or irreversible, will be between low to high magnitude and as such significance will vary from minor to major depending on the receptor being affected.

Mitigation Measures

- Where pest species are identified, the O&M Contractor / Ecologist will be notified, and an appropriate course of action taken. For small mammal pest's live traps will be used, to reduce the risk of by-catch. Poison baits should be avoided, unless it can be certain that non-target species will be affected, and any such use should be in accordance with national and international best practice and will also be subject to risk assessment and approval from the Lenders. If poison baits are to be used it must be certain that any poisoned animal cannot move out on to the wider Aol to reduce the risk of natural predators eating poisoned animals.

Monitoring

Long term monitoring of the Project Aol will be completed as set out above and will include:

- Habitat and Flora monitoring within the Aol to measure the success of habitat rehabilitation work to reasonably demonstrate no net loss of Natural Habitat as well as to record the presence of invasive / nonnative flora. Monitoring will be completed in Years 1, 2, 5, 10 and 15. Full site walkover surveys as well as quadrat surveys will be completed.
- Monitoring of mammal and herpetofauna assemblages across the Aol. Repeat of baseline surveys will be completed in Years 1, 2, 5, 10 and 15. Population densities recorded in Year 5 will be compared to baseline levels and if required additional work will be completed.
- Post-construction fatality monitoring to be completed throughout operation to record the actual impact of collisions with the turbines. Additional surveys and or mitigation measures to be implemented as part of an Adaptive Management Strategy.
- All of the above monitoring requirements will be included within Construction and Operational Biodiversity Management Plans which will include KPIs against which the results of the monitoring will be assessed.

8.6 Archaeology and Cultural Heritage

This section identifies the anticipated impacts on archaeology and cultural heritage from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

It is important to note that there are no anticipated impacts during the operational phase of the Project.

8.6.1 *Potential Impacts during the Construction Phase*

Site preparation activities which are to take place onsite by the EPC Contractor for installation of the wind turbines and the various Project components to include substation, transmission cables, access roads and internal road network, buildings, etc. are expected to include land clearing activities, levelling, excavation, grading, etc.

Although such activities are limited to the relatively small individual footprints of these facilities and the actual area of disturbance is relatively minimal, if such activities are improperly managed, they could damage or disturb archaeological remains present on the surface of the Project site. However, the archaeological baseline assessment discussed earlier concludes that there are no archaeological sites or remains within the Project site.

Therefore, there are no anticipated impacts from the Project on surface archaeological remains within the Project site.

In addition, there is a chance that throughout such construction activities, archaeological remains buried in the ground are discovered. Improper management (if such sites are discovered) could potentially disturb or damage such sites which could potentially be of importance. Such potential impacts are of a short-term duration as they are limited to the construction phase, and are irreversible as should sites be discovered then inappropriate management could result in disturbance and/or damage, in which such an impact would be of medium magnitude. The impacts will be of a negative nature and low sensitivity given that the likelihood of such impacts is considered low. Given all of the above, such an impact is considered to be of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the EPC Contractor during the construction phase and which include:

- During excavation activities, Supreme Council of Antiquities (SCA) must be notified to check if they will provide any observers to oversee the process and ensure that no underground archaeological remains of importance are unearthed and/or disturbed.
- Throughout the construction phase, and as the case with any Project development that entails such construction activities, there is a chance that potential archaeological remains in the ground might be discovered. It is expected that appropriate measures for such chance find procedures are implemented. Those mainly require that construction activities be halted and the area fenced along with proper signage, while immediately notifying the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office. No additional work will be allowed before the Ministry/Inspection Office assesses the found potential archaeological site and grants a clearance to resume the work.

Construction activities can continue at other parts of the site if no potential archaeological remains were found. If found, same procedures above apply.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Wind Farm EPC Contractors during the construction phase and which include:

- Submission of formal letter of communication with SCA; and
- For chance find procedure, inspection of actions taken in case of new discoveries, including fencing, limiting access to site, and contacting the Ministry of Tourism and Antiquities/ Red Sea and Suez Antiquities Inspection Office. Report should be prepared and submitted to the Ministry in such a case which details the above.

8.7 Air Quality and Noise

This section identifies the anticipated impacts on air quality and noise from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.7.1 Potential Impacts during the Construction Phase

Site preparation activities which are to take place onsite by the EPC Contractor for installation of the wind turbines and the various Project components to include substation, transmission cables, access roads and internal road network, buildings, etc. are expected to include land clearing activities, levelling, excavation, grading, etc.

Although such activities are limited to the relatively small individual footprints of these facilities and the actual area of disturbance is relatively minimal. Nevertheless, such activities will likely result in an increased level of dust and particulate matter emissions, which in turn will directly and temporarily impact ambient air quality. If improperly managed, there is a risk of nuisance and health effects to construction workers onsite and to a lesser extent to the nearby surrounding receptors from windblown dust (such as nearby petroleum activities). In addition, construction activities will likely entail the use of vehicles, machinery and equipment (such as generators, compressors, etc.) which are expected to be a source of other pollutant emissions (such as SO₂, NO₂, etc.) which would also have minimal direct impacts on ambient air quality.

In addition, all the above activities will likely include the use of machinery and equipment such as generators, hammers, compressors, etc. and which are expected to be a source of noise and vibration generation within the Project site and its surroundings. If improperly managed, there is risk of nuisance and health affects to construction workers onsite and to a lesser extent to the nearby surrounding receptors (such as nearby petroleum activities).

However, it is important to note that there are no key receptors that are anticipated to be impacted

from dust, noise and emission given that the closest receptor / community settlement to the Project site is Ras Gharib city and which is located 18km to the east.

The above impacts are anticipated to be temporary and of short-term nature as they are limited to the construction period only. Such impacts are of a negative nature, and will be noticeable and therefore of medium magnitude. However, the impacts will be dispersed and are reversible as air quality would revert back to baseline conditions after construction works is completed and thus the receiving environment is considered of low sensitivity. Given the above such an impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the EPC Contractor during the construction phase:

- If dust or pollutant emissions were found to be excessive due to construction activities, the source of such emissions should be identified and adequate control measures must be implemented;
- Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Egyptian Codes to ensure that for activities associated with high dust and noise levels, workers are equipped with proper Personal Protective Equipment (e.g. masks, eye goggles, breathing masks, ear muffs, etc.);
- Apply basic dust control and suppression measures which could include:
 - Regular watering of roads for dust suppression;
 - Proper planning of dust causing activities to take place simultaneously in order to reduce the dust incidents over the construction period.
 - Proper management of stockpiles and excavated material (e.g. watering, containment, covering, bundling).
 - Proper covering of trucks transporting aggregates and fine materials (e.g. through the use of tarpaulin). - Adhering to a speed limit of 15km/h for trucks on the construction site.
- Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment to be used throughout the construction phase for early detection of issue to avoid unnecessary pollutant and noise emissions.
- Based on inspections and visual monitoring undertaken, if noise levels were found to be excessive from construction activities, the source of such excessive noise levels should be identified and adequate control measures must be implemented; and
- Apply adequate general noise suppressing measures. This could include the use of well-maintained mufflers and noise suppressants for high noise generating equipment and machinery, developing a regular maintenance schedule of all vehicles, machinery, and equipment for early detection of issues to avoid unnecessary elevated noise level, etc.

Following the implementation of these mitigation measures, the significance of the residual impact is categorized as not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor during the construction phase and which include:

- Dust and noise monitoring should be undertaken on a quarterly basis during the construction phase at key points where active construction activities are undertaken. The monitoring should include TSP, PM10 and PM2.5 and noise levels.
- Periodic inspections should be conducted at nearby sites (e.g. such as nearby petroleum activities) to determine whether harmful levels of dust and noise from construction activities exist; and
- Reporting of any excessive levels of pollutants/dust or noise and the measures taken to minimize the impact and prevent it from occurring again.

8.7.2 Potential Impacts during the Operation Phase

The main foreseen impacts during the operation phase are that related to the noise generated from the operating wind turbines and its potential impact on the health and safety of the nearby surrounding receptors. Given that such impacts are directly related to public health and safety, such impacts have been discussed in details in “Section 8.11 Public Health and Safety” along with other relevant impacts such as shadow flicker.

8.8 Infrastructure and Utilities

This section identifies the anticipated impacts on infrastructure and utilities from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.8.1 Potential Impacts on Road Networks during the Planning and Construction Phase

Wind turbines are manufactured in factories and transported to the installation site where they are assembled. Wind turbine components have big dimensions and weight and their transport poses a challenge to the existing roads and infrastructure. The Project’s wind turbine blades have a length of around 90m and are usually transported in one piece. Tower components can have a transport height of up to 5m. Nacelles are also usually transported in one piece and can have a weight of more than 70 tonnes.

Components for wind energy projects are usually transported by sea from the manufacturing country to the country of installation and are then loaded in existing ports to trucks which manoeuvre their way through existing roads to the installation site.

Given the increasing size, weight, and length of components of the wind turbines, proper transportation and logistical solutions could be required for managing the heavy-load long-haul requirements. If improperly planned and managed, the trucks hauling the various heavy Project components may damage the existing roads, highways and bridges, utility lines (e.g. electricity lines), and could also be a public safety concern for other vehicles on the road.

The table below provides a summary of the peak maximum daily number of vehicles based on the initial route study conducted for the Project. Related to the size and categories of equipment paired with the

size of vehicles fit to transport the equipment that are expected to access the site during the course of the construction period, the below tables, instead, condense the illustration of comparable added traffic into a single day. *However, it is important to note that the figure is based on peak numbers assuming all peak traffic requirements occur on the same day. In reality, actual peak numbers are likely to be much lower given that peak number of workers and peak delivery of materials is not expected to be on the same day nor week.*

Table 65 Summary of Peak Vehicles by category of components

Traffic Source (Delivery of Components)	Maximum Number of Vehicles
Rotor and Nacelle Components	138
Blade Components	207
Tower Tops	345
WTG Accessories (Ventilation hoods, converters, transformers, platforms)	345
WTG Accessories (Lifting spreader for Blades, Nacelle)	77

As noted in the table below, with regards to the Sokhna-Hurghada Highway, the Project-related traffic is considered sizable taking into the existing traffic condition and highway capacity as, in the scenario below, for comparison purposes, transportation of all equipment for the 69 turbines were transported in a single day – equating to 3.6 times the capacity of the existing highway.

Table 66 Project and Existing Traffic

Traffic Source from Project	Max Number of Vehicles / Day	Equivalent Vehicles	Equivalent Vehicles / Hour	Existing Traffic, Project Traffic	Highway Capacity
Rotor and Nacelle Components	138	19,044	793.50	12,904.67	3,500
Blade Components	207	42,849	1,785.38		
Tower Tops	345	119,025	4,959.38		
WTG Accessories (Ventilation hoods, converters, transformers, platforms)	345	119,025	4,959.38		
WTG Accessories (Lifting spreader for Blades, Nacelle)	77	5,929	247.04		
	1,112	305,872	12,744.67		

Other than highway capacity, there several obstacles an route from the Adabiya port, which is 189 km by road away from the Project site, requiring minor civil works to be performed to ensure safety and ease of escort of the equipment. The obstacles include select instances of temporarily removing concrete berries at the port exit and to access a detour route, if necessary.

Taking all of the above into account, the anticipated impacts on road networks are considered of short-term duration during the Project construction phase. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of high magnitude and medium sensitivity. Given the above impact is considered of moderate significance.

Mitigation Measures

It is recommended that EPC Contractor develop a Traffic and Transport Plan before commencement of any transportation activities to ensure that the transportation process is properly and adequately managed and does not pose a risk of damage to the existing roads, highways, overpasses whilst ensuring public safety. The Plan must analyse and study the entire route for transportation of the Project components from the port till the Project site. The assessment must take into account worst case scenarios for transportation of Project components for blade lengths, tower sections, etc. The study must investigate any constraints which need to be considered along the highways leading to the Project site such as bridges, overhead utility cables, slants in roads, etc. and identify accommodations which need to be taken into account (bypasses, adjustments to roads, etc.)

The Plan must take into account the following:

- The Plan must be developed in accordance with relevant local traffic and transportation legislations related to traffic loads and weights, dimensions, speed limits, etc.
- The plan must consider, to the extent possible, the proper planning of generated trips of trucks to ensure they are spread over the course of a workday and hours of day, and which also take into account peak and non-peak commute hours on the highway;
- As part of the Plan, the EPC Contractor must establish coordination with relevant entity to take into account any specific requirements that should be considered and ensure they are aware of the transportation requirements and details related to the Project.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor during the construction phase and which include:

- Submission of Traffic and Transport Plan with proof of coordination with the authorities discussed above for works required as part of the Study.
- Submission of proof of coordination with relevant entities

8.8.2 Potential Impacts on Civil and Military Aviation during the Planning and Construction Phase

Any tall structure could impact aircraft safety if located near airports or known flight paths. In addition, such structures could potentially interfere with certain electromagnetic transmissions associated with air transport, for example primary radar and secondary surveillance radar. Wind turbines have the potential to impact the surveillance systems used to detect and identify aircraft approaching, overlying or leaving Egyptian airspace and for which a Recognized Air Picture (RAP) is produced.

Inappropriate management of planning activities and site locations (e.g. siting of turbines) and construction activities (e.g. excavations) could disturb such aviation practices.

Such issues are generally managed through appropriate setback distances (if applicable) and in addition, regulatory authorities generally include requirements for wind farm developments related to visibility of turbines to include navigational lights and blade paintings

Nevertheless, if such issues are improperly managed and not taken into account as part of the planning phase, they could affect aircraft safety. Therefore, such impacts are considered of long-term duration, of negative nature, and of low magnitude given impact is related to inappropriate management of activities, however given its importance it is considered if high sensitivity. Given all of the above, the impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer during the planning phase and which include:

- Establish coordination with NREA to ensure that the clearance that has been provided by the Ministry of Defence for the area includes in particular approvals from civil and military aviation entities. In addition, based on the that adhere to any specific navigational safety requirements (e.g. navigational lights, blade paintings, etc.)

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Developer during the construction phase and which include:

- Submission of formal non-objection letters from relevant entities

8.8.3 Potential Impacts on the Petroleum Facilities during Construction

As noted earlier, there is one (1) petroleum facility unit located within the Project area along with road networks connecting such unit. In addition, based on the requirements of the Coordination Agreement between NREA and General Petroleum Company, there are specific requirements to be considered for the detailed design of the Project.

Inappropriate management of planning activities (e.g. siting of turbines) and construction activities (e.g. excavations) could damage and/or disturb such facility.

Taking all of the above into account, the anticipated impacts are considered of short-term duration during the Project construction phase. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of medium magnitude and medium sensitivity due to their distance from the Project site. Given the above impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer during the planning phase:

- Establish coordination via NREA with the General Petroleum Company's head office in Cairo to discuss and determine any specific requirements to be taken into account for the detailed design of the Project as well as coordination agreement requirement during the construction and operation phase (e.g. avoidance of such areas, buffer distances to be considered, etc.)

Following the implementation of these mitigation measures, the significance of the residual impact can

be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Developer during the planning phase and which include:

- Submission of proof of coordination with relevant entities

8.8.4 Potential Impacts on Water Resources during Construction and Operation

It is expected that the Project throughout the construction and operation phase will require water for potable usage (drinking, showering, etc.) and non-potable usage (e.g. cleaning of machinery and vehicles).

The Project is expected to require around 70,000 m³ throughout the construction phase (for a total duration of 30 months). This will include around 47,500 m³ for construction requirements (concrete works, minimize dust, cleaning of requirements, etc.) as well as 22,500 m³ as potable water requirements (drinking, washing, etc.).

Similarly, during the operation phase, water will mainly be required for potable use of onsite staff at the Wind farm. Nevertheless, such requirements are expected to be minimal and insignificant.

As discussed earlier, based on consultations with Ras Gharib Water Company there are no existing or planned water connections to the Project area. Water will be supplied through water trucks and tankers from Ras Gharib and stored onsite through water tanks.

Based on the above it is clear that the water requirements for the Project during construction and operation are unlikely to entail any constraints on the existing users. However, the involved entities are required to coordinate with Ras Gharib Water Company to secure water requirements for the Project most likely through tankers.

Taking all of the above into account, the anticipated impacts on the local water resources and utilities are considered of short-term duration during the Project construction phase and of long-term duration during the operation phase. Such impacts are of a negative nature, and are expected to be of low magnitude and of low sensitivity given the temporary nature of such impacts during construction and minimal water requirements of the Project during operation. To this extent, the impact is considered not significant.

Additional Requirements

The following identifies additional requirements to be applied by the EPC Contractor during the construction phase and Project Operator during the operation phase respectively and which include:

- Coordinate with the Ras Gharib Water Company to sector the water requirements of the Project.

8.8.5 Potential Impacts on Waste Utilities during Construction and Operation

The Project is expected to generate the following waste streams during the construction and operation phases:

- Wastewater during construction and operation to include black water (sewage water from toilets and sanitation facilities) and grey water (from sinks, showers, etc.) and industrial effluents (e.g. batching plants onsite). Wastewater during the construction phase from the Project can be assumed by taking into account an 80% wastewater generation factor for potable water requirements which will amount to around 20,000m³ throughout the construction phase. Wastewater generated from the Wind Farm during operation is expected to be minimal and insignificant. Wastewater will be stored onsite though enclosed septic tanks and collected by tankers from the Project to the closest WWTP.
- Solid waste during construction and operation from the Wind Farm will include construction waste (mainly during construction to include dirt, rocks, debris, etc.) as well as general municipal waste (such as food, paper, glass, bottles, plastic, etc.). Solid waste quantities generated are not expected to be significant and are likely to be easily handled by closest landfill facility.
 - Solid waste quantities expected are around 1.25-2.5 tonnes daily for construction waste on average, while municipal waste is expected to be around 937.5 kg per day at peak taking into account the daily per capita waste generation factor in Egypt (*1.25kg/capita/day*¹⁴) and number of 750 workers. During operation, this is only likely to include municipal waste at around 25kg per day for 20 workers.
- Hazardous waste during construction and operation from the Wind Farm will include routine waste generated from such activities to include spent oil, lubricants, paint cans, solvents, etc. Hazardous waste quantities generated are not expected to be significant and are likely to be easily handled by closest authorized facility.
- Hazardous waste quantities are expected to be around 20.5 km per day only.

Taking all of the above into account, the anticipated impacts on waste utilities are considered of short-term duration during the Project construction phase and of long-term duration during the operation phase. Such impacts are of a negative nature, and are expected to be of low magnitude and of low sensitivity given the relatively minimal quantities generated and easy of management by relevant authorities. Given the above impact is considered not significant.

Additional Requirements

The following identifies the additional requirements to be applied by the EPC Contractor during the construction phase and Project Operator during the operation phase respectively and which include:

- Coordinate with the Ras Gharib Water Company and obtain list of authorized contractors for collection of wastewaters from the site to the Ras Gharib WWTP.
- Coordinate with the Ras Gharib City Council to hire a competent private contractor for the collection of solid waste from the site to the Ras Gharib Public Dumpsite.
- Coordinate with Environmental Management at Ras Gharib City Council to obtain list of authorized contractors for collection of hazardous waste from the site to the closest approved facility for final disposal.

¹⁴ [A smart framework for municipal solid waste collection management: A case study in Greater Cairo Region - ScienceDirect](#)

8.8.6 Potential Impacts on Telecommunication and Television & Radio Links during the Planning and Construction Phase

Wind turbines during the construction and operation phase could impact telecommunication, TV and Radio infrastructure. For example, construction activities could damage/disturb underground communication cables (if present within the area), while rotating turbines during operation could disrupt Line of Sight (LoS) connections between telecommunication transmission towers.

Such issues are generally managed through appropriate setback distances (if applicable) from such infrastructure elements. Nevertheless, if such issues are improperly managed and not taken into account as part of the planning phase, they could affect such elements. Therefore, such impacts are considered of long-term duration, of negative nature, and of low magnitude given impact is related to inappropriate management of activities, however given its importance it is considered if high sensitivity. Given all of the above, the impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer during the planning phase and which include:

- Establish coordination via NREA with NTRC to provide information on the Project (to include location and specifications of turbines in specific) and include any specific requirements to be considered as part of the detailed design to include setback distances if required for telecommunication, infrastructure (e.g. from LoS connections)
- In Section 4.5., it is requested that project-related details are made available to the NTRC least six (6) months prior to the start of construction works in order to avoid potential impacts on the communications network.
 - Following the implementation of these mitigation measures, the significance of the residual impact is categorized as not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Developer during the planning phase and which include:

- Submission of formal non-objection letter from NTRC

8.8.7 Potential Impacts on Water Dams during Construction

As noted earlier, there is a water dam located within the Project area. Inappropriate management of planning activities (e.g. siting of turbines) and construction activities (e.g. excavations) could damage and/or disturb such dams.

Taking all of the above into account, the anticipated impacts on the dams are considered of short-term duration during the Project construction phase. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of medium magnitude and medium sensitivity due to their distance from the Project site. Given the above impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the EPC Contractor during the planning phase:

- Submit final design to the entity with the overall responsibility for the dam for approval. Should any specific requirements be identified they should be taken into account.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor during the construction phase and which include:

- Submission of proof of coordination with relevant entities

8.8.8 Potential Impacts on Nearby Wind Farms

As noted earlier, there are several operating and planned wind farm development projects within the GoS area. Within the immediate proximity of Plot 1, there is an existing and operational wind farm – Lekela West Bakr Wind Project (252 MW) approximately 3.5 km from the eastern edge of the project site. Other wind farms are planned (Figure 65).

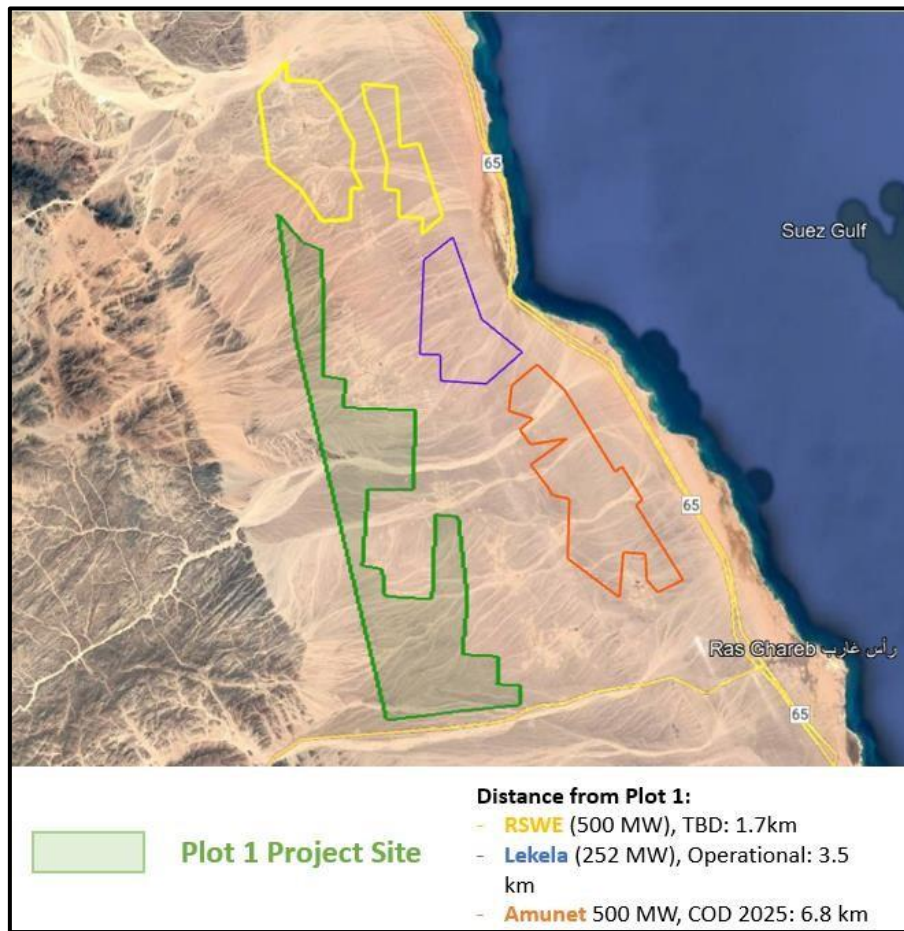


Figure 62 Operating and Planned wind farms in the proximity of Plot 1

Inappropriate management of planning activities (e.g. siting of turbines and proper buffer distance) could affect such nearby wind farms as well as aims to preserve the GoS as a avi-fauna migration corridor.

Taking all of the above into account, the anticipated impacts are considered of long-term duration during the operation phase. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of medium magnitude and medium sensitivity due to their distance from the Project site. Given the above impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer / EPC Contractor during the planning phase:

- Further follow/communication with NREA to ensure if buffer distance of the Project from other nearby wind farm projects is considered sufficient and appropriate from a technical perspective

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Developer/ EPC Contractor during the planning phase and which include:

- Submission of proof of coordination with relevant entities.

8.9 Occupational Health and Safety and Worker Accommodation

This section identifies the anticipated impacts from the Project throughout its various phases on occupational health and safety. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

This section presents the assessment of potential impacts on occupational health and safety collectively during the construction and operation phase for the wind farm, given that they are similar in nature during both phases.

Throughout the construction and operation phase there will be occupational health and safety risks to worker associated with working onsite which is to increase the risk of injury or death due to accidents. The following risks are generally associated with wind farm development projects:

- Slips and falls;
- Working at heights;
- Working with powered and hand-held tools;
- Struck-by objects;
- Moving machineries;
- Working in confined spaces and excavations;
- Exposure to chemicals, hazardous or flammable materials;
- Working in sunny conditions and high temperatures;
- Exposure to electric shocks and burns when touching live components;
- OHS risks from work with nearby operations to include in specific the oil rigs and petroleum storage facilities

Such impacts are considered of short-term duration during the construction phase and of long-term duration throughout the Project operation phase, of a negative nature, and are expected to be of medium magnitude and high sensitivity as in extreme cases they could entail permanent impacts (e.g. permanent disability). Nevertheless, such impacts are generally controlled through the implementation of general best practice. Given the above such an impact is considered of moderate significance.

Mitigation Measures

Occupational Health and Safety

It is expected that the EPC Contractor is to prepare an Occupational Health and Safety Plan (OHSP) regarding the Project's construction, installation and commissioning works as well as the general construction site operations. In addition, the Project Operator is expected to develop an OHSP tailored to

the Project's operation phase.

The objective of the OHSP is to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property of the EPC Contractor and all involved sub-contractors, as well as the Project Operator.

The OHSP for the construction and operation phase should be Project and site specific and must take into account the national requirements mainly the Law 4/1994 and Law 12/2003 on Labour and Workforce Safety and Book V on Occupational Safety and Health (OSH) and Ministerial Decree 211/2003. In addition, it must also be compliant with the IFC PS2, EBRD PR 2 and World Bank's ESS 2 (Labour and Working Conditions) which recognize the importance of avoiding or mitigating adverse health and safety impacts on workers and require the development of a project-specific health and safety plan that is in accordance with Good International Industry Practice (GIIP).

In general, the OHSP should address the following components:

- Identify roles and responsibilities of the personnel involved within the Project to include the EHS manager, construction manager, supervisor, and other subcontractors' responsibilities;
- Identify in details information in relation to formulation of safety committees, communication protocols, first aid personnel and facilities, first aid training programs, occupational health and safety culture, quality system, reporting requirements, competence and job safety training, safety inspections, recruitment procedures, safety audits, risk assessment, etc.;
- Risk assessment, method statement, and job safety analysis procedure;
- permit to work procedure;
- Lock Out Tag Out Procedure;
- Identification of measures to be implemented onsite that ensure hazard elimination or substitution, followed by engineering control requirements.
- Identify in details the hazards which may be associated with various activities to take place and the various measures to be implemented to reduce such risks including the requirements for Personal Protective Equipment (PPE). This includes for example hand tools, access equipment, lifting equipment, mobile working equipment, etc.; and
- Establish training requirements for workers to comply with health and safety procedures and protective equipment.
- Include specific procedures and protocols related to COVID-19 risk to include but not limited to: (i) complying with the World Health Organization (WHO) requirements as well as local Ministry of Health requirements at that time; (ii) identification of requirements for daily temperature checks, provision of relevant PPE equipment (sanitizers, facemask, etc.) and undertaking COVID-19 testing at accredited institutions; (iii) undertake regular sanitization and disinfection arrangements of shared facilities; (iv) identification of requirements for self-isolation in case of suspected COVID-19 symptoms or direct contact with a person with a confirmed COVID-19 infection; (v) continues training and education on COVID-19 issues such as symptoms, procedures to be implemented, etc.

- Include specific procedures and protocols related to venomous species onsite to include but not limited to undertaking awareness sessions on potential presence of key species, measures to be undertaken in case they are found, ensuring medical resources are available to handle incident.
- Incident and investigation procedure.

The EPC Contractor and Project Operator are expected to adopt and implement the provisions of the OHSP throughout the Project construction and operation phase.

Emergency Preparedness and Response

The EPC Contract and Project Operator are also expected to prepare and implement an Emergency Preparedness and Response Plan for the Project construction and operation phase.

The objective is to establish a series of organizational, operational and preventive measures in the event of an emergency that are adapted to the circumstance of such situations, which in turn is to ensure the safety of workers and property within the specific Project site. The plan should take into account the following:

- Inclusion of requirements for an emergency responder team that includes at a minimum first aiders and firefighters that receive appropriate and certified training
- Inclusion of requirements to undertake emergency drills in coordination with external emergency response services if required (e.g. civil defence, nearest hospital, etc.)
- Identify in detail of emergency procedures to be implemented to include first actions, alerting emergency contacts, site evacuation, communicating with external emergency services
- Identification in details of emergency control measures to include but not limited to: (i) fire (including fit for purpose firefighting equipment and PPE given potential electrical fires), (ii) personnel accidents, (iii) spillage, (iv) sandstorms, (iv) heat strokes, (v) war conflicts/security deterioration and other.
- Consider real time emergency communication using radios
- Identification of location of assembly points onsite
- Identification of emergency signs to be implemented onsite
- Identify roles and responsibilities for implementation of plan to include establishment of an emergency committee and assigning roles to an emergency manager

Worker Grievance Mechanism

The EPC Contract and Project Operator are also expected to prepare and implement a worker grievance mechanism for the Project construction and operation phase. The objective is to ensure a robust and comprehensive procedure to capture, document, resolve and close out any worker complaint, whether classified as grievances or not. The plan should take into account the following:

- Identification of a step-by-step process and guideline to ensure that every complaint/grievance made by workers are registered, documented and fully addressed

- The overall outline/structure of the grievance mechanism will be as follows:
 - Workers will be allowed to lodge grievances through various platforms and channels to include grievance boxes distributed onsite, telephone, face to face meetings with responsible personnel, workers representatives and unions. Contact details for all such channels will be identified and provided in detail. - Anonymous lodging of grievances will be allowed.
 - All grievances will be recorded and a case handler will be assigned and who will be determined at a later stage.
 - All grievances will be handled in the shortest possible period. The first approach will be to inform the worker within the first 24 hours after receiving the grievance. The worker will be informed within 7 working days on whether or not the grievance proceeds and what the next steps will be.
 - Once a resolution has been agreed or a decision made, the case handler will monitor the implementation of the response.
 - After the implementation of an agreed resolution has been verified the grievance close-out will take place. It will entail reaching a unanimous agreement, clearly communicated to avoid misunderstandings.
 - A close-out report will be prepared with evidence to support closure (e.g. photos).

Worker Accommodation

It is not clear at this point whether there will be any onsite accommodation for workers. Nevertheless, should the EPC Contractor opt for onsite accommodation unit for workers, it must conform to the national requirements. In addition, it should also confirm to international best practice requirements – this includes mainly the “Workers’ accommodation: process and standards” (EBRD/IFC Guidance Note, 2009). The document provides guidance notes on general living facilities, room facilities, medical facilities, management of accommodation units, etc.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor and Project Operator during the construction and operation phase:

- Inspection to ensure the implementation of the provisions of the Occupational Health and Safety Plan and assess compliance with its requirements;
- Regular Reporting on the health and safety performance onsite in addition to reporting of any accidents, incidents and/or emergencies and the measures undertaken in such cases to control the situation and prevent it from occurring again; and

- If applicable, inspection on workers accommodation to ensure its compliance with the requirements of “Instructions for Prevention of Health Nuisances from Workers Accommodation No. (1) For the year 2013” and “Workers’ accommodation: process and standards” (EBRD/IFC Guidance Note, 2009).
- Submission of an Emergency Preparedness and Response plan
- Submission of a Worker Grievance Mechanism.

8.10 Human Rights

Inappropriate management of the workforce during both the construction and operation phase could entail several human right risks and violations by employing entities such as the EPC Contractor and Project Operator. This could include but not limited to engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.

The above impacts are anticipated to be of short-term nature during the construction period and long-term nature during the operation phase. Such impacts are of a negative nature, and inappropriate management of workforce could result in impacts that are of medium sensitivity and medium magnitude. Given the above such an impact is considered of minor significance.

Mitigation Measures

The EPC Contractor and Project Operator are required to develop and implement a Human Resources (HR) procedure for workers that should be guided by the Local Labour Law as well as the IFC PS 2 / EBRD PR 2 / AfDB OS 2 and ILO Fundamental Labour Conventions covering the following in particular:

- Providing reasonable working conditions and terms of employment to include but not limited to contract management, working hours, salaries/wages, annual and medical leaves, bereavement leaves, accommodation, etc.
- Recognizing workers’ rights to form and to join workers’ organizations and to bargain collectively
- Prohibition of child labour within the workforce
- Overall management of young workers within the labour force
- Prohibition of forced labour
- Non-discrimination throughout the entire work cycle in all its forms
- Providing equal opportunities for all throughout procurement and employment opportunities including women groups. Overall management of daily workers, migrant workers and third-party workers
- Implement robust monitoring and evaluation processes to assess the effectiveness of mitigation measures and address any emerging issues or gaps. By integrating these measures into project planning and implementation, it's possible to minimize potential negative impacts on Bedouin communities and promote their resilience.
- Offer capacity building programs and employment opportunities to Bedouin community members within the project. This could include training in project-related skills, and job placement programs.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor and Project Operator:

- Undertake monthly inspections during construction and quarterly during operation against the developed HR procedure
- Submission of HR inspection report that identifies any corrective measures undertaken

8.11 Public Health and Safety

This section identifies and assesses the anticipated impacts from the Project activities on public health and safety during the various phases to include planning and construction phase and operation phase. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.11.1 Potential Impacts from Noise from Wind Turbines during Operation

Wind turbines produce noise during operation from mechanical and aerodynamic sources. Mechanical noises are mainly limited from the machinery in the nacelle of the turbine (gearbox, generator, auxiliary equipment, etc.) while aerodynamic noise is generated from the movement of air around the turbine blades and tower.

Propagation of the sound from a turbine is primarily a function of distance, but it can also be affected by the placement of the turbine, surrounding terrain, and atmospheric conditions. In addition, noise levels depend greatly on the level of operation of the turbines (percentage of rated power). Nevertheless, in some cases, background/ambient sound already exceeds the sound produced by any wind turbine (e.g. high wind speeds, surrounding activities, etc.). In this case, the sound from the wind turbine blends into the background sound, simply becoming part of the present soundscape without the notice of residences.

As required by the IFC EHS Guideline for Wind Energy, the following is noted in relation to noise assessment for wind farms:

- Receptors should be chosen according to their environmental sensitivity (human, livestock, or wildlife).
- Preliminary modelling should be carried out to determine whether more detailed investigation is warranted. The preliminary modelling can be as simple as assuming hemispherical propagation (i.e., the radiation of sound, in all directions, from a source point). Preliminary modelling should focus on sensitive receptors within 2,000 meters (m) of any of the turbines in a wind energy facility.
- If the preliminary model suggests that turbine noise at all sensitive receptors is likely to be below an LA90 of 35 decibels (dB) (A) at a wind speed of 10 meters/second (m/s) at 10 m height during day and night times, then this preliminary modelling is likely to be sufficient to assess noise impact; otherwise,

it is recommended that more detailed modelling be carried out, which may include background ambient noise measurements.

The IFC EHS Guideline for Wind Energy is based on the on “the Assessment and Rating of Noise from Wind Farms” (ETSU-R-97). ETSU can be regarded as relevant guidance on good practice, it contains a methodology for generating noise limits for a wind turbine and wind farms. ETSU-R-97 is referenced by the United Kingdom (UK) Government as a best practice guide for UK Legislation. The assessment procedure of ETSU-R-97 consists of the following steps for the screening assessment:

- Determine a study area;
- Identify potentially affected properties;
- Predict noise levels from all turbines (existing and proposed) and determine a noise contour boundary of 35dB(A);
- Identify if any noise sensitive receptors are within this boundary.

Taking the above requirements into account, a screening assessment was undertaken for the Project based on the following:

- Noise prediction calculations using Sound PLAN 8.2 software according to the International Organization for Standardization (ISO) 9613 ‘Acoustics – Attenuation of Sound During Propagation Outdoors’ (International Organization for Standardization -ISO, 1996). ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources
- ISO 9613-2 calculates predicted noise levels with the major assumption that the sources are located upwind from the Noise Sensitive Receiver locations (NSR) as this is the worst-case scenario. Therefore, directivity and attenuation due to metrological factors such as wind speed and wind direction upwind from a source are not taken into account
- Screening was based on a worst-case noise scenario (W10 = 10m/s) as required by the guidelines.

Table 67 Turbine and Noise Specifications used in the Software

Manufacturer	Gold wind
Model type	GWH182 7.5 MW
Rated Power	7,500 kW
Rotor Diameter	182 m
Hub Height	100 m
Number of Turbines	83
Maximum Sound Power Level	111.9 dB(A)
Sound Power Level Uncertainty	± 1 dB(A)

- To ensure a comprehensive analysis, a +1 dB correction has been applied to account for uncertainty.
- Determining the extent of the 35 dB(A) contour boundary emitted from the wind turbine generators (WTG).
- Determining if there are any noise sensitive receptors within the calculated contour boundary;

- Model calculation and parameter setting to include the following:

Table 68 Model Calculation and Parameter Setting

Model Parameter	Parameter Setting / Standard																
Calculation Standard	(ISO) 9613 ‘Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Calculation Method’ (ISO, 1996) Application as per IOA GPG																
Wind Speed	10 m/s																
Ground Absorption Coefficient	0.5																
Receiver Height	10 m																
Meteorological Data	Humidity 70% Air Pressure 1013.3 mbar T = 25°C																
Atmospheric Attenuation Coefficients (dB / km)	<table><tr><td>63Hz</td><td>125Hz</td><td>250Hz</td><td>500Hz</td><td>1kHz</td><td>2kHz</td><td>4kHz</td><td>8kHz</td></tr><tr><td>0.1</td><td>0.3</td><td>1.1</td><td>2.8</td><td>5.0</td><td>9.0</td><td>22.9</td><td>76.6</td></tr></table>	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	0.1	0.3	1.1	2.8	5.0	9.0	22.9	76.6
63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz										
0.1	0.3	1.1	2.8	5.0	9.0	22.9	76.6										

The study is based on the following information:

- General arrangement and layout drawings of the wind farm, including topography.
- Wind turbine supplier data (vendor noise data) as provided by the Developer
- Noise Sensitive Receiver locations (NSR) as identified review of identified receptors indicate that the nearest NSR is Ras Gharib City located 19.7 km to the east. It was concluded that the Project site in particular is uninhabited and vacant with no indication or evidence of any physical or economical land use activities. There are several ongoing activities related to infrastructure and utilities such petroleum activities within the surrounding areas as well as empty/abandoned army units. Therefore, such receptors are not considered key sensitive receptors.

A noise contour map for the worst-case noise scenario has been calculated and is presented in the figure below. The map shows both contour lines and noise propagation level areas or 'zones'. The significance of the noise contour map is to allow for an overview of noise levels over a geographic area and therefore allows a quick basic analysis of the noise propagation for identification of the specific NSR.

Table 69 Noise Contour Map Setup Specification

Parameter Description	Noise Map Parameter
Wind Speed (W10)	10 m/s
WTG Operation	Worst Case – All WTGs operating
Mapping Grid Resolution	25 x 25 m
Mapping Result Range	30 - 70 dB(A)

As noted in the figure below, according to the results of the preliminary model undertaken, the nearest NSR (Ras Gharib City) is outside of the LA90 of 35 decibels (dB) (A) at a wind speed of 10 meters/second (m/s) at 10 m as required by the Guidelines. Based on the results of the noise contour map the predicted contribution noise level is negligible. The noise level results did not predict a detectable noise level, and thus, any noise impact from the Plot 1 can be effectively ruled out due to its distance from Ras Ghareb.

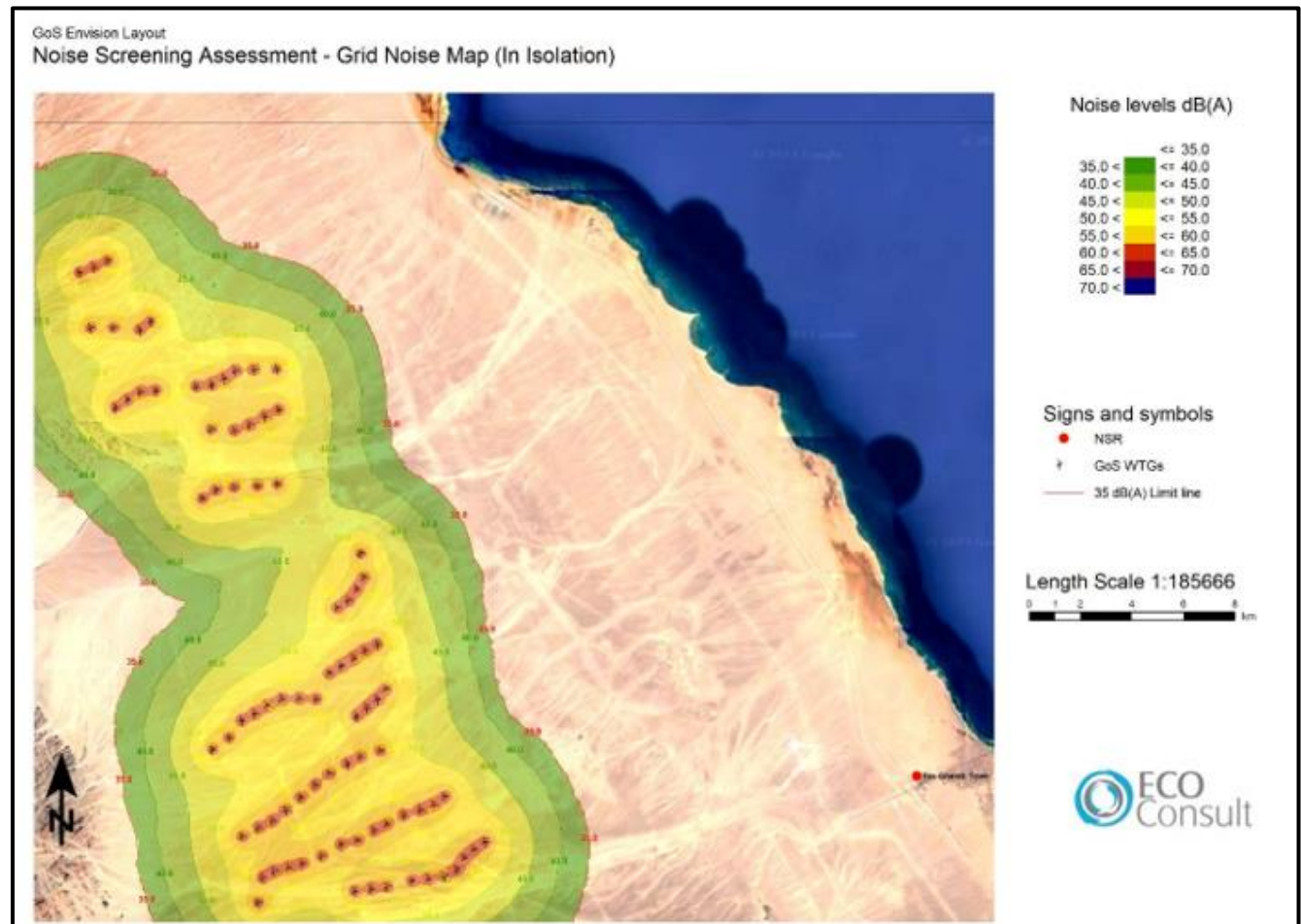


Figure 63 Noise Screening Results in Isolation

Taking the above into account, such impacts are considered irrelevant and no detailed noise assessment is required.

8.11.2 Potential Impacts from Shadow Flicker from Wind Turbines during Operation

Shadow flicker occurs when the sun passes behind the wind turbine and casts a shadow several hundred meters away from the turbine's location. As the rotor blades rotate, shadows pass over the same point causing an effect known as 'shadow flicker'. Shadow flicker only occurs under specific environmental conditions which must also align for flicker to occur which include position and height of the sun, wind speed, direction, cloudiness, and position of the turbine to a sensitive receptor.

Excessive shadow flicker can be a source of nuisance and could create a disturbing indoor environment to the occupants of those buildings especially when casted through windows of buildings that directly face the turbine with no obstructions in sight (trees, hills, etc.).

A companion guide to Planning Policy Statement 22 (PPS22) (2004) and BERR (2007) indicates that shadow flicker is typically limited to occurring within approximately 10 rotor diameters of a wind turbine; at distances beyond 10 rotor diameters shadow flicker effects are essentially undetectable (i.e. equivalent

to 1.8km for this Project). Beyond this distance, the shadow is diffused such that the variation in light levels is not likely to be sufficient to cause annoyance. This is also acknowledged in the Queensland Wind Farm Planning Guidelines, which state that the first step in performing a shadow flicker assessment is to determine the extent of shadows from turbines and suggest a distance equivalent to 265 maximum blade chords (the thickest part of the blade) as an appropriate limit. This limit corresponds to around 800 m to 1,325 m for modern wind turbines, which typically have maximum blade chord lengths of 3 m to 5 m (AECOM, 2016). The maximum shadow flicker expected are likely to occur within 1,800m radius.

The IFC EHS Guideline for Wind Energy states that where there are nearby receptors, commercially available software can be used to model shadow flicker in order to identify the distance to which potential shadow flicker effects may extend.

Based on the above and the fact that the closest proposed sensitive receptor is located 19.3 km from the Project; such impacts are considered irrelevant and no detailed shadow flicker modelling is required.

8.11.3 Potential Impacts from Trespassing of Unauthorised Personnel

Such impact is mainly related to public access of unauthorized personnel to the various Project components. Such access could result in safety issues such as unauthorized climbing of the turbine, safety hazards from substations (electric shock, thermal burn hazards, exposure to chemicals and hazardous materials, etc.), unauthorized climbing of the transmission tower and others.

Such impacts are considered of long-term duration throughout the Project operation phase, of a negative nature, and are expected to be of medium magnitude and high sensitivity given that it entails potential public safety concerns which in extreme cases they could entail permanent impacts (e.g. death or permanent disability). Given the above such an impact is considered of moderate significance.

Mitigation Measures

The following presents the mitigation measures that are to be implemented by the Project Operator during the operation phase of the Project and which include:

- A Security Risk Assessment should be developed for the Wind Farm Project and which takes into account the following:
 - Each turbine to be fitted with locked doors to prevent unauthorized access to the turbines;
 - Substation area to be completely fenced with concrete walls to prevent unauthorized access;
 - Onsite guards within the entire Project site at all times to ensure the safety and security of the Project as well as preventing unauthorized access to any of the Project components. However, it must be ensured that all onsite guards are adequately trained to deal with unauthorized trespassing incidents.
 - Post informative signs on the turbines and substation about public safety hazards and emergency contact information. Signs, especially warnings need to be pictorial as well as written to ensure they are understood by those unable to read

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following presents the mitigation measures that are to be implemented by the Project Operator during the operation phase of the Project and which include:

- Submission of Security Risk Assessment

8.11.4 Potential Impacts from Worker Influx during Construction

During construction the Project a relatively significant number of workers will be expected onsite (around 750 workers) for duration of approximately 30 months.

Nevertheless, the influx of workforce to the area could result in certain community health, safety and security impacts which are discussed below.

Risk of Diseases

Influx of workers may introduce new reservoirs of diseases such as vector-related diseases, water-borne diseases, etc. In addition, there is also a risk of spreading communicable diseases, included sexually transmitted ones. The risk of catching or exchanging communicable diseases (e.g., Virus B, Virus C, and HIV/AIDS) and the lack of awareness on transmission disease can represent a high risk to workers and community health and safety. This could also include in particular risk from COVID-19.

Inappropriate Code of Conduct

Other risks from worker influx include inappropriate code of conduct by workers towards local communities which might result in hostilities and resentment. Such inappropriate conduct could include also disrespecting the traditional culture and social norms of the area and local communities.

Increase in Social Vices

Population influx could result in an increase of social vices including alcoholism, drug abuse, sexual exploitation and harassment (SEAH), particularly in relation to vulnerable groups identified (Section 4.4.) and others.

Such impacts are considered of short-term duration during the construction phase, of a negative nature, and are expected to be of medium magnitude and medium sensitivity. Given the above such an impact is considered of minor significance.

Mitigation Measures

The EPC Contractor is expected to prepare a worker influx plan to be implemented for the construction phase of the Project. The plan must take into account the following:

- Medical examination program. All workers must be subject to a preliminary medical examination before commencement of any job tasks in accordance with local applicable requirements. In addition, routine medical examination for workers (bi-annually) must be undertaken. Such medical examinations must be undertaken at certified centers. Copies of medical examination results of all workers must be retained onsite.
- Details and procedures for ensuring and maintaining hygienic conditions onsite at all times specifically related to toilet and washing facilities, eating areas, etc.

- Development of a code of conduct for workers which takes into account appropriate behaviour by workers and EPC Contractor at all times, religious customs, traditional cultures and social norms in the area. In addition, it must include specifically requirements for social vices including gender-based violence, sexual harassment, alcoholism, drug abuse, etc.
- Induction training and awareness raising sessions on risks associated to the most common contagious diseases (e.g. influenza virus), communicable diseases, general measures for hygiene, code of conduct expected to be implemented and other as appropriate.
- COVID-19 procedures to be implemented onsite for the workforce (e.g. masks, disinfectants, etc.)

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor:

- Submission of the Worker Influx Plan

8.11.5 Potential Impacts from Security Personnel

Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events. Such impacts are considered of short-term duration during the construction phase and long-term duration during the Project operation phase, of a negative nature, and are expected to be of medium magnitude and medium sensitivity. Given the above such an impact is considered of minor significance.

Mitigation Measures

The EPC Contractor and Project Operator are expected to prepare a Security Management Plan to be implemented for the construction and operation phase of the Project.

The plan must identify appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues. The plan must adhere to: (i) IFC PS 4 (Community Health, Safety and Security); and (ii) EBRD PR 2 (Labour and Working Conditions), all of which identify requirements for security personnel. This includes in specific requirements to ensure security personnel are guided by the Voluntary Principles on Security and Human Rights in terms of hiring, rules of conduct, training, equipping and monitoring of such personnel. They also require reasonable inquiries that those providing security measures are not implicated in past abuses, will ensure they are trained adequately in the use of force (and firearms if applicable) and appropriate conduct towards the workers and the local community. Force should only be used when strictly necessary, and to an extent proportional to the threat.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC

Contractor and Project Operator:

- Submission of the Security Management Plan

8.11.6 Potential Impacts from Blade and Tower Glint of Wind Turbines during Operation

Blade or tower glint occurs when the sun strikes a rotor blade or the tower at a particular orientation. This can impact a community, as the reflection of sunlight off the rotor blade may be angled toward nearby residences.

However, as discussed previously, there are no key sensitive receptors located within the surrounding area of the wind farm which could potentially be impacted by blade and tower glint. In addition, according to the IFC EHS Guidelines on Wind Energy (IFC, 2007), blade glint is a temporary phenomenon for new turbines only, and typically disappears when blades have been soiled after a few months of operation.

Taking all of the above into account, such impacts are considered of short-term duration as they will occur only temporary throughout the operation phase of the Project and of a negative nature. However, given that there are no sensitive receptors located within the surrounding areas and the only temporary occurrence (if occurring at all) such an impact is considered of low magnitude and low sensitivity. Given the above, such an impact is considered of not significant.

Mitigation Measures

The following presents the mitigation measures that are to be implemented by the Project Operator during the operation phase of the Project and which include:

- Consideration should be given to the use of non-reflective finishes to ensure potential impacts are not significant.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant

Monitoring and Reporting Requirements

The following presents the mitigation measures that are to be implemented by the Project Operator during the construction phase of the Project and which include:

- Inspections and visual monitoring to ensure that non-reflective finishes have been used.

8.11.7 Potential Impacts from Blade/Ice Throws from Turbines during Operation

There are potential impacts from blade throws and ice throws from the wind turbines, where if such incidents occur, they could affect the public safety of nearby receptors.

According to the IFC EHS Guidelines on Wind Energy (IFC, 2015), a failure in the rotor blade can result in the ‘throwing’ of a rotor blade – however the overall risk of such an event is extremely low. In addition, if ice accretion occurs in blades, which can happen in certain weather conditions in cold climates, then pieces of ice can be thrown from the rotor during operation, or dropped if the turbine is idling. Ice throws

are considered irrelevant given that in general the area does not experience any snow events.

The IFC EHS Guidelines on Wind Energy (IFC, 2015) states a setback distance should be applied between turbines and populated locations. The minimum setback distance is 1.5 x turbine height (tower + rotor radius), although modelling suggests that the theoretical blade throw distance can vary with the size, shape, weight, and speed of the blades, and the height of the turbine.

However, as discussed under “Section 7.1” earlier, there are no populated locations within the Project site and surrounding areas.

Taking all of the above into account, such impacts are considered of long-term duration as they will occur throughout the operation phase of the Project and of a negative nature. However, given that there are no sensitive receptors located within the surrounding areas and given that the risk is extremely low such an impact is considered of low magnitude and low sensitivity. Given the above, such an impact is considered of not significant.

Taking the above into account, there are no applicable mitigation or monitoring measures to be considered.

8.12 Socio-economics

This Section identifies the potential impacts in relation to socio-economic during the various Project phases. For each impact, a set of mitigation measures and monitoring requirements are identified.

Given the generic nature of the impacts on socio-economic development for both phases of the Wind Farm Project (construction and operation) those have been identified collectively throughout this section.

During the construction and operation phases of the Wind Farm, the Project is expected to create the following job opportunities:

- Around 750 job opportunities at peak during the construction phase for a duration of approximately 30 months. This will mainly include skilled job opportunities (to include engineers, technicians, consultants, surveyors, etc.) and unskilled job opportunities (mainly labourers but will also include a number of security personnel).
- Around 20 job opportunities during the operation phase for a duration of 25 years. This will include skilled job opportunities (such as engineers, technicians, administrative employees, etc.) and unskilled job opportunities (such as security personnel, drivers, etc.).

However, the contractors and operators have not been selected at this stage, and therefore there are no details available on the number of job opportunities targeted to local communities, type of jobs, duration, etc. In addition to the above, the local communities could also be engaged in procurement opportunities along different segments of the value chain such as local contractors, local supply of equipment and machinery, cleaning services, etc.

Taking the above into account, the Developer is committed to ensuring that priority for job opportunities and procurement activities where relevant are targeted to the local communities. The above could also entail other indirect positive benefits to the local community from increase in demand for local services, supplies, and businesses. This could include for example possible engagements for supplies and service providers (accommodation services, food, etc.). Such demands could improve the existing local economic activities and impact certain sectors, such as wholesale/retail trade.

Taking all of the above into account, this to some extent could contribute to enhancing the living environment for its inhabitants. The creation of job and procurement opportunities in specific is of crucial importance. However, it is understood that the socio-economic development of the area is not hinged on a single project but rather on implementing collective and coordinated actions, including other development projects and investment within the area.

Nevertheless, proper planning and local community engagement from the start is crucial to understand issues and opportunities which in turn would enable the Project build true sustainable links which will bring maximum benefits to the local communities. Given the above, such impacts are anticipated to be positive.

Recommendations and Required Action

As the impacts discussed are mainly positive, no mitigation measures have been identified. This section provides recommendations which aim to enhance such positive impacts anticipated from the Project throughout the construction and operation phases to the greatest extent possible.

- **Local Recruitment Procedure:** the EPC Contractor under supervision from the Developer should develop a Local Recruitment Procedure that must identify the number of job opportunities targeted for local communities to include skilled and unskilled workers, including Bedouin groups. Such job opportunities shall also take into account employment of local communities in the area around the project to include fresh graduate engineers, technicians, labourers, etc. In addition, the procedure must include details on how job opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all including females. The Procedure should investigate the potential for implementation through a joint collaboration between the Developer/EPC Contractors and the other wind farm developers in the area. Prioritising employment from the community and providing capacity building are considered a key issue and this should be reflected in the EPC Contract and subsequent subcontracts.
- **Local Procurement Procedure:** the EPC Contractor under supervision from the Developer should develop a Local Procurement Procedure that must identify the procurement opportunities targeted for local communities (including Bedouin groups) to include for example local subcontractors, local supplies and services, cleaning services, etc. In addition, the procedure must include details on how procurement opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all. The Procedure should investigate the potential for implementation through a joint collaboration between the Developer/EPC Contractors and the other wind farm developers in the area. Prioritising procurement opportunities from the community is considered a key issue and this should be reflected in the EPC Contract and subsequent subcontracts.
- **Social Responsibility Program:** it is recommended that the Developer implement a social responsibility program which aims to benefit the local communities to the greatest extent possible. In this case, a structured approach must be developed which must identify priority development projects which could benefit local communities (e.g. based on a needs assessment if available). Based on that the social responsibility program can prioritise projects for local communities based on available budget, vision, timeline for implementation and other factors.

8.13 Summary of Anticipated Impacts

The tables below present a summary of the anticipated impacts during the planning and construction and

operation phase of the Project. The information in the tables includes:

- Key and generic environmental attributes (e.g. air quality, noise);
- Impact (textual description);
- Nature of impact (negative or positive);
- Duration (long-term or short-term);
- Reversibility (reversible or irreversible);
- Magnitude (high, medium, or low);
- Sensitivity (high, medium, or low);
- Significance (major, moderate, minor, or not significant);
- Management action – generally management actions describe whether an impact can be mitigated or not. Management actions include: (i) mitigation measures; (ii) compensation measures; (iii) additional requirements which must be implemented at a later stage and which could be required by a governmental entity; (iv) for positive impacts recommendations have been provided which aim to enhance the impact; and

Residual significance after management actions is implemented (major, moderate, minor, or not significant)

Table 70 Summary of Anticipated Impacts during Planning and Construction

Attribute / Issue	Likely Impact – Planning and Construction Phase	Impact Assessment							
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance
Landscape and Visual	Visual and landscape impacts due to presence of elements typical of a construction site such as equipment and machinery.	Negative	Short – Term	Reversible	Medium	Low	Minor	Mitigation Available	Not Significant
Land Use	Project could conflict the formal assigned land uses set by the various governmental entities.	There are no anticipated impacts.						No additional requirements	Not relevant
	There are several land uses onsite which if improperly managed could result in potential conflicts and disputes. This includes the Ghafra system of the Bedouin groups and existing nearby petroleum facilities ¹⁵ .	Negative	Long – Term	Reversible	Medium	High	Moderate	Mitigation Available	Not Significant
Geology, Hydrology and hydrogeology	Potential for flash floods in the Project area.	Negative	Long – Term	Irreversible	Medium	High	Moderate	Mitigation Available	Minor
	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities, spillage of hazardous material, random discharge of waste and wastewater.	Negative	Long – Term	Could be irreversible	Medium	Low	Minor	Mitigation available	Not Significant
Biodiversity	Habitat loss, fragmentation and degradation	Negative	Short – Term	Could be irreversible	Medium	Medium	Moderate	Mitigation available	Not Significant
	Direct impacts on flora and habitats if non-native species are introduced	Negative	Long-term	Could be irreversible	Medium	Medium	Moderate	Mitigation available	Minor
	Egyptian Spiny Tailed Lizard and their exposure to impacts in the Project's Aol	Negative	Short – Term	Could be irreversible	Medium	High	Moderate	Mitigation available	Minor
	Vehicular collisions with animals	Negative	Long-term	Could be irreversible	Medium – high	Medium	Minor – major depending on the receptor(s) killed	Mitigation available	Minor
	Noise impacts on wildlife	Negative	Short / Long-term	Reversible	Low- Medium	Low – Medium	Minor	Mitigation available	Minor
	Air Quality (dust) impacts on wildlife	Negative	Short term	Reversible	Low	Low	Minor - Moderate	Mitigation available	Minor -
	Lighting impacts on wildlife	Negative	Short / Medium	Reversible	Low	Low	Low	Mitigation available	Minor
	Introduction of Pests, Littering and Waste management	Negative	Long-term	Could be irreversible	Medium	High	Low - High	Mitigation available	Moderate
	Disturbance due to vehicular traffic	Negative	Medium-term	Reversible	Medium-High	Low	Minor	Mitigation available	Minor
	Poaching of wildlife in the Site	Negative	Long-term	Could be irreversible	Low-to-high depending on receptor affected	Medium	Moderate	Mitigation available	Moderate
Avi-Fauna (Birds)	Improper management of construction activities could disturb breeding birds and damage relevant habitats	Negative	Short – Term	Could be irreversible	Low	Medium	Minor	Mitigation Available	Not Significant
Bats	Improper management of construction activities could damage	Negative	Long – Term	Could be irreversible	Low	Low	Not Significant	No Mitigation	Not Significant

¹⁵ Coordination with General Petroleum Company should be sought prior to construction activities.

	habitats and disturb species.							Required	
Archaeology	Improper management of construction activities could disturb/damage archaeological remains which could be buried in the ground (if any).	Negative	Short – Term	Could be irreversible	Medium	Low	Minor	Mitigation Available	Not Significant
Air Quality and Noise	Construction activities will likely result in an increased level of dust, particulate matter and pollutant emissions which in turn will directly impact ambient air quality.	Negative	Short - Term	Reversible	Medium	Low	Minor	Mitigation Available	Not Significant
	Possible noise emissions to the environment from the construction activities which will likely include the use of machinery and equipment such as generators, hammers, and compressors and other activities	Negative	Short - Term	Reversible	Medium	Low	Minor	Mitigation Available	Not Significant
Infrastructure and Utilities	Road Networks – if transportation activities of the various project components to the site are not properly managed beforehand, they could entail risk of damage to the existing roads and could be of public safety concerns to other users on the road. In addition, if planning activities are not well managed it could damage/disturb existing onsite road networks. Adequate consideration of road infrastructure is to be accounted for in order to maintain roads and facilities during times of rainfall runoff to mitigate erosion and degradation of infrastructure.	Negative	Short - Term	Reversible	High	Medium	Moderate	Mitigation Available	Not Significant
	Civil and Military Aviation – Improper planning and site selection of the Project could impact aircraft safety and/or could potentially interfere with certain electromagnetic transmissions associated with air transport	Negative	Long – Term	Reversible	Low	High	Minor	Mitigation Available	Not Significant
	Petroleum Facilities – if planning activities are not well managed onsite it could damage/disturb existing the infrastructure of such facilities ¹⁶	Negative	Short – Term	Reversible	Medium	Medium	Minor	Mitigation Available	Not Significant
	Water Resources – water requirements of the Project could entail constraints on the existing resources and users.	Negative	Short - Term	Reversible	Low	Low	Not significant	Additional Requirements	Not Significant
	Waste Utilities – it is important to ensure that existing utilities would be able to handle the amount of waste, wastewater and hazardous materials generated from the Project during the construction phase.	Negative	Short - Term	Reversible	Low	Low	Not significant	Additional Requirements	Not Significant
	Telecommunication, and TV & Radio Links – Improper planning and site selection of the Project could potentially interfere with certain electromagnetic transmissions associated with telecommunications, and radio/television systems in the area ¹⁷ .	Negative	Long- Term	Reversible	Low	High	Minor	Additional Requirements	Not Significant
	Water dam – if planning activities are not well managed onsite, it could damage / disturb the existing dam	Negative	Short-term	Reversible	Medium	Medium	Minor	Mitigation Available	Not Significant
Occupational and Safety Health	There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Negative	Short – Term	Could be Irreversible	Medium	Medium	Minor	Mitigation Available	Not Significant

¹⁶ Coordination with General Petroleum Company should be sought prior to construction activities.

¹⁷ Refer to response letter of Radio and Television Unit of Ras Ghareb and the Red Sea Governorate in Section 4.5.

	During times of potential flash floods, equipment and materials should be well secured and away from noted areas of water collection and movement (to avoid obstruction of roadways and reduce the risk of injury to staff).	Negative	Short – Term	Could be Irreversible	Medium	Medium	Minor	Mitigation Available	Not Significant
Public Health and Safety	Public access of unauthorized personnel to the various Project components (turbines, substation) could result in various public safety hazards (flash floods).	Negative	Long – term	Could be Irreversible	Medium	High	Moderate	Mitigation Available	Not Significant
	Worker influx could result in certain community health, safety and security impacts to include risk of diseases, inappropriate code of conduct by workers towards locals, increase in social vices, etc.	Negative	Short – Term	Reversible	Medium	Medium	Minor	Mitigation Available	Not Significant
	Inappropriate conduct of security personnel towards local communities could result in resentment, distrust and escalation of events	Negative	Short – Term	Reversible	Medium	Medium	Minor	Mitigation Available	Not Significant
Human Rights	Inappropriate management of the workforce could entail several human right risks and violations.	Negative	Short – Term	Reversible	Medium	Medium	Minor	Mitigation Available	Not Significant
Socio-economic Development	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate standards of living, and bring social and economic prosperity to local communities.	Positive	Not applicable.						

Table 71 Summary of Anticipated Impacts during Operation

Attribute / Issue	Likely Impact – Operation Phase	Impact Assessment							
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance
Landscape and Visual	Visual impacts concern the turbines themselves (e.g. colour, height, and number of turbines) relating to their interaction with the character of the surrounding landscape.	Could be Negative or Positive	Long – Term	Reversible	Medium	Low	Minor	No mitigation required	Minor
Geology, Hydrology and Hydrogeology	Risk of soil and groundwater contamination during the various operational activities from improper housekeeping activities, spillage of hazardous material, random discharge of waste and wastewater.	Negative	Long – Term	Could be irreversible	Medium	Low	Minor	Mitigation available	Not significant
Biodiversity	Improper management of operation activities could disturb/damage habitats and fauna. This includes proper management of waste activities (and disposal) across the site to reduce attraction, interaction and disturbance (or nuisance) between staff and wildlife as well as conservation of scarce vegetation.	Negative	Long – Term	Could be irreversible	Medium	Low	Minor	Mitigation Available	Not Significant
	Vehicular collisions with animals	Negative	Long-term	Could be irreversible	Medium- High	Low – High	Major	Mitigation Available	Not Significant

Avi-Fauna (Birds)	Wind turbines are associated with impacts on birds from risks of strikes and collision on both migratory and resident soaring birds. Such impacts depend on several factors but could affect the population levels of certain species especially those with international/national critical conservation status.	Negative	Long Term –	Could be irreversible	Low – High	Medium	Moderate	Mitigation Available	Not Significant
	During times of precipitation, the dam located within the project site collects water and has been shown to be a seasonal attraction for avi-fauna. It's likely that this will contribute to greater risk of avi-fauna collision with wind turbines as they transit, reside and depart from this site.	Negative	Long Term –	Could be irreversible	Low – High	Medium	Moderate due to seasonality	Mitigation Available	Not Significant
	Lighting	Negative	Short-medium term	Reversible	Low – Med	Low	Low	Mitigation Available	Not Significant
	Introduction of Pests, Littering and Waste management	Negative	Long-term	Could be irreversible	Medium	High	Low - High	Mitigation available	Moderate
	Disturbance due to vehicular traffic	Negative	Medium term	Reversible	Medium-High	Low	Minor	Mitigation available	Minor
	Poaching of wildlife in the Site	Negative	Long-term	Could be irreversible	Low-to-high depending on receptor affected	Medium	Moderate	Mitigation available	Moderate
Bats	The potential impacts from the Project during operation are mainly related to risk of bat strikes and collisions with rotors of the operating wind turbines.	Negative	Long –Term	Could be irreversible	Medium	Low	Minor	Mitigation Available / Additional Studies	Not Significant
Infrastructure and Utilities	Water Resources – water requirements of the Project could entail constraints on the existing resources and users.	Negative	Long - Term	Reversible	Low	Low	Not significant	Additional Requirements	Not Significant
	Waste Utilities – it is important to ensure that existing utilities would be able to handle the amount of waste, wastewater and hazardous generated from the Project during the construction phase.	Negative	Long –Term	Reversible	Low	Low	Not significant	Additional Requirements	Not Significant
	Roads – maintenance and safety precautions should be ongoing to ensure infrastructure is maintained particularly prior to and following rain events.	Negative	Long –Term	Reversible	Low	Medium	Minor	Additional Requirements	Moderate
Occupational Health and Safety	There will be some risks to workers health and safety during the operation and maintenance activities of the Project.	Negative	Long Term –	Could be irreversible	Medium	Medium	Minor	Mitigation Available	Not Significant
Public Health and Safety	Operating wind turbines will produce shadow flicker which could be a source of disturbance and nuisance to the receptors and could create a disturbing indoor environment.	There are no anticipated impacts.						No additional requirements.	Not relevant
	Public access of unauthorized personnel to the various Project components (turbines, substation) could result in various public safety hazards.	Negative	Long – term	Could be Irreversible	Medium	High	Moderate	Mitigation Available	Not Significant
	Inappropriate conduct of security personnel towards local communities could result in resentment, distrust and escalation of events	Negative	Short-term	Reversible	Medium	Medium	Minor	Mitigation Available	Not Significant

	Blade or tower glint can impact sensitive receptors as the reflection of sunlight off the rotor blade may be angled toward nearby receptors.	Negative	Short Term	–	Reversible	Low	Low	Not Significant	Mitigation available	Not Significant
	Failure in rotor blade can result in the ‘throwing’ of the blade. Although overall risk of such events is extremely low, it could affect the public safety of nearby receptors.	Negative	Long – term		Could be Irreversible	Low	Low	Not Significant	Mitigation Available	Not Significant
Human Rights	Inappropriate management of the workforce could entail several human right risks and violations.	Negative	Long Term	–	Reversible	Medium	Medium	Minor	Mitigation Available	Not Significant
Socio-economic Development	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity to local communities.	Positive	Not applicable							

8.14 Assessment of Cumulative Impact

As discussed earlier, currently an area of around 300km² in the GoS is being developed for multiple wind farm projects (in which the Project site is located). An Environmental and Social Impact Assessment for an Area of 300km² at the Gulf of Suez (Strategic ESIA) was undertaken. One of the objectives of the Strategic ESIA was to investigate the cumulative impacts of the wind farm developments and identify constraints to be taken into account by the various developers.

This section provides an assessment of cumulative impacts mainly based on the outcomes of the Strategic ESIA. The table below provides the key outcomes of the Strategic ESIA for each attribute, key outcomes of the project-specific ESIA and key additional requirements to be considered.

Table 72 Assessment of Cumulative Impacts

E&S Attributes	Outcomes of Strategic ESIA	Outcomes of Project Specific ESIA	Additional Requirements
Landscape and Visual	Key outcome of the Strategic ESIA is related to visibility of the turbines during operation. The Strategic ESIA concludes that due to absence of people living in the area and very few passengers passing through the area, such issues are not considered to be important. No additional requirements have been identified in the Strategic ESIA.	Key impact is related to visibility of the turbines during operation. No key issues of concern given that no key sensitive visual receptors which are anticipated to be impacted from the Project during operation were identified.	No additional requirements to be considered
Land Use	Key outcome is that the Strategic ESIA area is uninhabited and unutilized; therefore, there are no land use impacts related to physical or economical displacement. No additional requirements have been identified in the Strategic ESIA.	Key outcome is that Project site is uninhabited and vacant. However, Bedouin Bedouins apply a type of customary ownership on the area known as Urfi Contracts and Ghafra System – however, this is not an official process that is acknowledged by the Government.	Site-specific mitigation and monitoring requirement. Refer to “Section 8.3”.

Geology, Hydrology, Hydrogeology	Key outcome of the Strategic ESIA is recommendation to avoid placing turbines within the beds of major wadi systems where there could be flood risks. In addition, the Strategic ESIA calls for earth roads crossing wadi beds to be built at the same level as the wadi bed to minimize serious damage in the event of flash floods and to avoid creating a bottleneck for discharge. In addition, the Strategic ESIA requires routine measures for waste management during construction and operation.	Flood risk assessment was undertaken for the Project site which identifies recommendation to be considered for the detailed design of the Project. There are routine impacts during construction and operation from improper waste management.	Site-specific mitigation and monitoring requirement for flood risks (refer to Section 8.4). Site-specific mitigation and monitoring requirement for waste management (refer to Section 8.4).
Biodiversity	No major issues identified by the Strategic ESIA since the habitats of the area are considered to be of low or no importance. However, special consideration should be given to the globally threatened to the Egyptian Dabb Lizard <i>Uromastyx aegyptia</i> .	Site specific survey concludes that habitats of the area are considered to be of low or no importance. The Egyptian Dabb Lizard <i>Uromastyx aegyptia</i> burrows have been confirmed within the Project site. In addition, please refer to standalone Critical Habitat Assessment (CHA) and Cumulative Effects Assessment (CEA).	Site-specific mitigation and monitoring requirement. Refer to "Section 8.5".

Birds	Significant considerations were provided with the Strategic ESIA regarding impacts on avifauna, specifically during spring migration season while autumn migration was considered to be of low significance since species recorded were of least concern and were relatively low. Furthermore, the Strategic ESIA requires the implementation of a post-construction monitoring program for wind farms, which is critical for ensuring that the shutdown program achieves its objectives and determining whether additional measures are required to reduce or eliminate negative impacts.	Outcomes in general are similar to Strategic ESIA as the numbers of birds recorded were moderate during autumn and high during spring with the highest numbers being for species of low concern. In addition, please refer to standalone Critical Habitat Assessment (CHA) and Cumulative Effects Assessment (CEA).	Site-specific mitigation and monitoring requirements. Refer to “Section 8.5”.
Bats	Bats were not considered specifically by the Strategic ESIA.	The literature review has shown that there are some species that could be of high vulnerability to collision with wind power infrastructures	Site-specific mitigation and monitoring requirements. Refer to “Section 8.5”.
Archaeology and Cultural Heritage	There are no archaeological and cultural heritage sites within the Strategic ESIA studied area. No additional requirements have been identified for site-specific ESIA’s or for developers.	There are no site-specific archaeology or cultural heritage remains. Therefore, there are no anticipated impacts during construction. There is routine chance find impacts related to the construction phase.	Site-specific mitigation and monitoring requirement. Refer to “Section 8.6”.

Air Quality and Noise	Key outcome is that there are no key issues of concern identified within Strategic ESIA studied area due to absence of sensitive receptors which could be affected by air quality and dust during construction phase.	Site specific survey did not identify any key issues of concern.	Site-specific mitigation and monitoring requirement. Refer to “Section 8.77”.
Infrastructure and Utilities	Several infrastructure and utility elements were noted within the Strategic ESIA to include roads, electricity lines, oil exploitation facilities, military posts and other (no key issues of concern identified). Additionally, a waste dumpsite is identified to be within the Strategic ESIA area which requires removal.	Several infrastructure and utility elements have been identified to include roads, petroleum facilities, and other which require proper management measures.	Site-specific mitigation and monitoring requirement. Refer to “Section 8.8”.
Occupational Health and Safety	No key issues of concern are noted. There are routine impacts during construction and operation on occupational health and safety and the Strategic ESIA identifies additional relevant measures to control such impacts.	No key issues of concern are noted. There are routine impacts during construction and operation on occupational health and safety.	Site-specific mitigation and monitoring requirement. Refer to “Section 8.8”.
Public Health and Safety	Key issues include noise and shadow flicker. The Strategic ESIA concludes that due to large distance from any nearby settlement, there are no impacts related to noise and shadow flicker during operation of turbines. No additional requirements are identified in the Strategic ESIA.	ESIA does not identify any key issues related to shadow flicker. However, preliminary noise assessment indicates exceedance of noise levels at Ras Gharib. Additional study is required that considers cumulative impacts from other nearby wind farms as well.	Site-specific mitigation and monitoring requirement for other public health and safety concerns. Refer to “Section 8.11”.

Socioeconomics	Impacts anticipated are positive in nature.	Impacts anticipated are positive in nature.	Project specific recommendations to enhance positive impacts have been provided. Refer to “Section 8.12”.
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8.14.1 Cumulative Noise Effect

There are four existing wind farms and one additional proposed wind farm present in the surrounding area of the proposed Project location. Therefore, even during the screening assessment as undertaken in “Section 8.11”, the assessment should consider all wind turbine noise emissions that have the potential to increase noise levels at noise sensitive receptors.

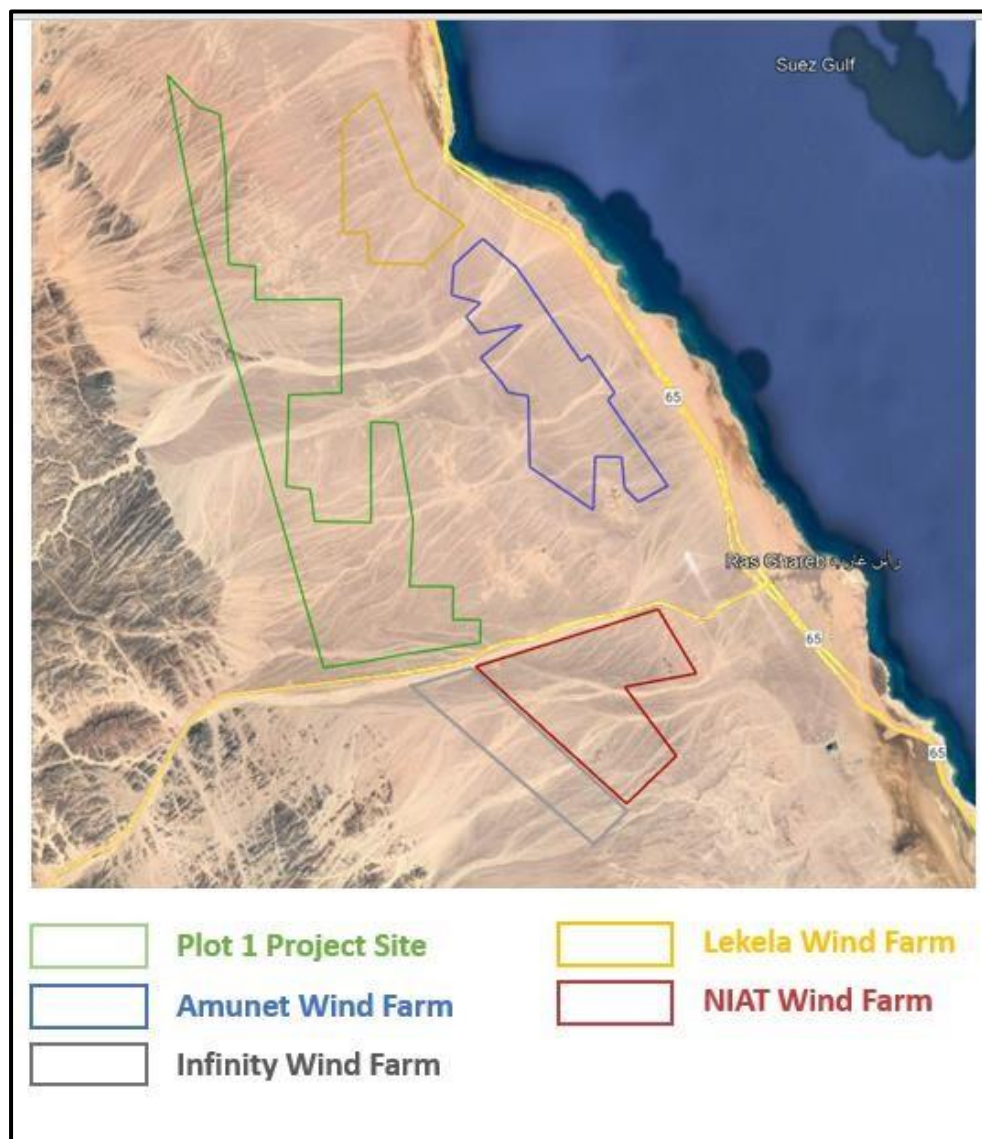


Figure 64 Neighboring Wind Farms

The key wind farms that could result in cumulative impacts are summarized below.

Amunet Wind Farm

This project consists of 77 wind turbine generator, each of which houses a 6.5MW Envision wind turbine. The table below details the basic specifications.

Table 57: Amunet Wind Farm - Gamesa SG 2.9-114 CS Wind Turbine Generator Specification

Manufacturer	Envision
Rated Power	6.5MW
Rotor Diameter	171 m
Hub Height	95 m

Lekela Wind Farm

This project consists of 96 wind turbine generators, each of which also houses a Gamesa SG 2.6-114 IA wind turbine. The table below details the basic specifications.

Table 73 Lekela Wind Farm - Gamesa SG 2.6-114 CS Wind Turbine Generator Specification

Manufacturer	GAMESA
Model Type	2.6-114
Rated Power	2,625 kW
Rotor Diameter	114 m
Hub Height	63 m

INFINITY 200 MW Wind Farm

This proposed project consists of 28 wind turbine generators, each of which will house one 7.2 MW Wind Turbine. The table below details the basic specifications.

Table 74 INFINITY 200 MW Wind Farm – GWH182 7.2 MW Wind Turbine Generator Specification

Manufacturer	Goldwind
Model type	GWH182 7.2 MW
Rated Power	7,200 kW
Rotor Diameter	182 m
Hub Height	110 m

NIAT Wind Farm

This proposed project consists of 173 wind turbine generators, each of which will house one 3.05 MW Wind Turbine. The table below details the basic specifications.

Table 75 NIAT Wind Farm - Gamesa SG 2.6-114 Wind Turbine Generator Specification

Manufacturer	GAMESA
Model Type	2.6-114 (AM+4, 3.05MW)
Rated Power	3,050 kW
Rotor Diameter	114 m
Hub Height	63 m

8.14.2 Results of Cumulative Noise Effect from All Wind Farms in the Region

Noise contour maps for the worst-case noise scenario as part of the Preliminary Noise Assessment have been calculated for the cumulative impact and is presented in the figure below. The map shows noise contour lines as well as the noise contour limit line of 35 dB(A). IFC EHS Guidelines on Wind Energy recommends that modelling should focus on sensitive receptors within 2 km of the nearest wind turbine. The nearest NSR is located 6 km from nearest wind farm (NIAT wind farm). The NSR is located in the suburbs of Ras Ghareb, located within a junction of two main highways (Highway 65 and El-Shaikh Fadel).

As part of a preliminary noise assessment undertaken earlier this year by the consultant, the nearest (Ras Ghareb City), at its baseline level, exceeds the limit of LA90 of 35 decibels (dB) (A) at a wind speed of 10 meters/second (m/s) at 10 m. The noise emissions from the Project site at the identified NSR (Ras Ghareb) is not predicted to exceed the 35 dB(A) noise limit, both in isolation and cumulatively.

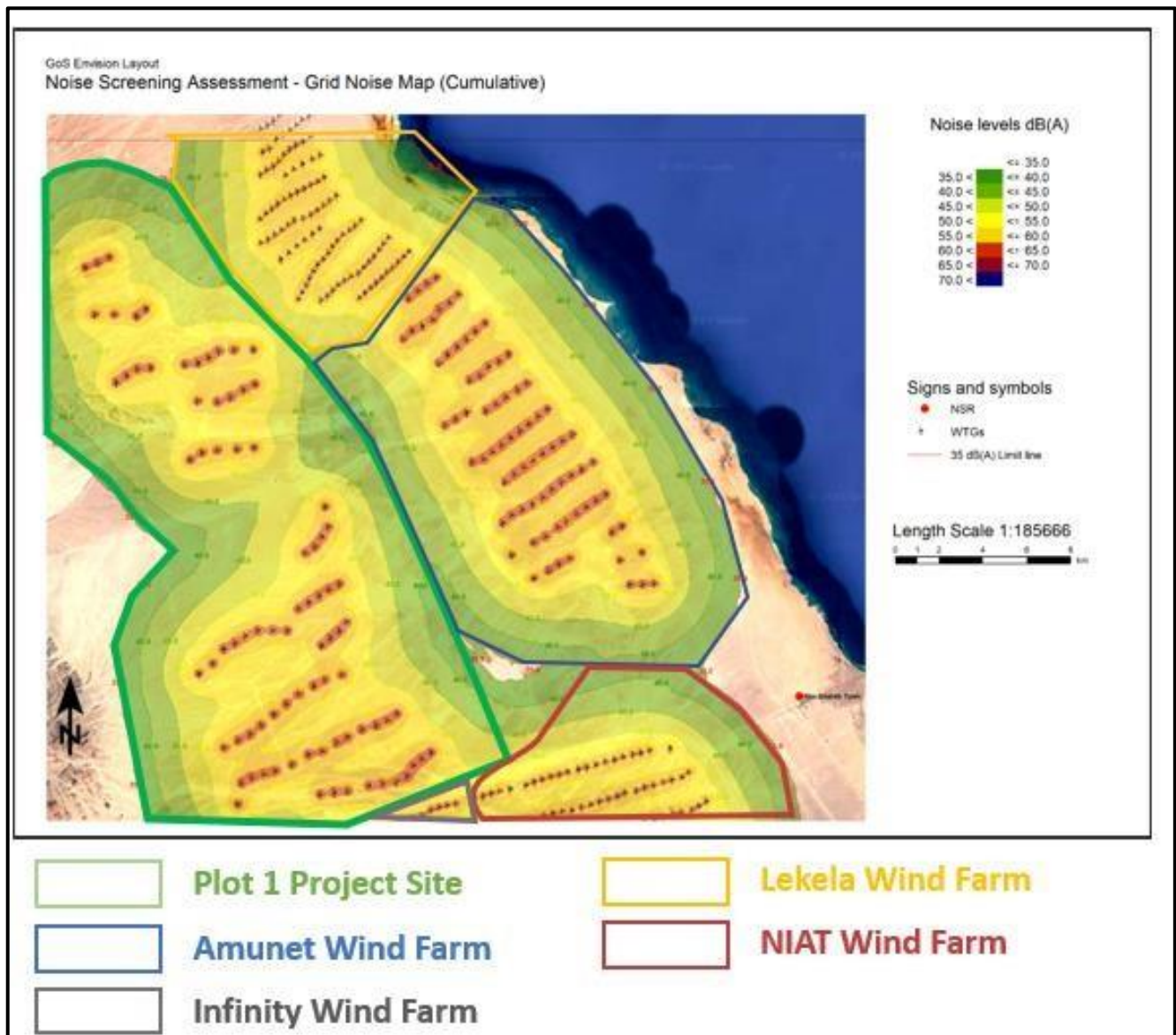


Figure 65 Preliminary Noise Screening Assessment Results (Cumulative)

9. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

9.1 Institutional Framework and Procedure Arrangements for ESMP Implementation

Generally, two main pillars govern the successful implementation of any Environmental and Social Management Plan (ESMP) as well as the Environmental and Social Management System (ESMS) for the project that will be developed at a later stage (as discussed in further details in below). These pillars include:

- Proper identification of roles and responsibilities for the entities involved; and
- Effective control of the process.

All management practices are interlinked, and this section describes how these two pillar criteria could be fulfilled, which in turn helps ensure that the overall objectives are met.

Staffing Requirements

Defining roles and responsibilities of the involved entities identifies where and when each entity should be engaged, their degree of involvement, and the tasks expected of the entity. This in turn eliminates any overlap of jurisdiction or authority and ensures proper communication and effective management of ESMP and ESMS components.

The table below identifies the staffing requirements that are expected for the Project. This should be expanded further in the ESMS Manual that is required as part of the ESMS (as discussed in further details below). This should include an organizational structure that identifies the lines of authority and roles and responsibilities of all involved entities.

Table 76 Roles and Responsibilities of Entities Involved in ESMP

Project Role	Entity	Responsibilities	Staffing Requirements
Project Owner and Developer	SWE	▪ Selection of EPC Contractor and Project Operator; ▪ Implement mitigation and monitoring requirements as applicable for such entity as detailed in the ESMP; and ▪ Ensure overall compliance of EPC Contractor and Project Operator with the requirements of the ▪ ESMP and ESMS	Appoint competent ESMS Manager or as part of Third-Party Employer representative (e.g. Owner's Engineer) Appoint a Community Liaison Officer (CLO)

EPC Contractor	TBD	- Appoint a competent Health, Safety and Environment (HSE) team. - Implement mitigation and monitoring requirements as detailed in the ESMP and ESMS requirements;	For Project nature and duration, this is expected to include at a minimum full-time and onsite HSE Manager and one HSE officer is to be deployed for 50 workers.
Project Operator	NOMAC	- Appoint a competent HSE team. - Implement mitigation and monitoring requirements as detailed in the ESMP and ESHS - MS requirements;	For Project nature and duration, this is expected to include HSE Manager (which is required to be full-time onsite at all times).
EEAA	Granting environmental clearance to the Project	Undertake compliance monitoring	N/A
IESC	TBD	Monitoring on Developer and EPC Contractor to ensure compliance with IFI E&S requirements.	N/A
OE	TBD	Support Developer in implantation of mitigation and monitoring requirements and compliance of EPC Contractor with E&S requirements	Appoint competent ESMS Manager

Training and Awareness

An EHS training plan must be developed and maintained onsite which identifies the type of training that is required for each worker onsite. The plan will ensure that each worker is competent in relation to the tasks to be performed. In addition, signed attendance sheets and training material must be maintained onsite at all times. This should be completed by the EPC Contractor and Project Operator as applicable.

Training should include the following as applicable and as highlighted in the table that follows.

- Basic visitor HSE induction training
- Worker HSE induction training for all workers onsite to include for example EPC Contractor and subcontractor crew
- Emergency response training for all workers onsite to include for example EPC Contractor and subcontractor crew
- Specialized training: there are other specific training requirements that must be adhered to and which are related to specific topics as applicable. This includes for example specific training for Occupational Health and Safety (OHS) issues such as working at height, electrical works, etc.

- Tool Box Talks (TBT): regular TBT meetings must be undertaken with for example EPC Contractors respective crews and subcontractor crew. Topics and frequency are developed and distributed regularly.

Table 77 Training Elements

Training	EPC Contractor	Project Operator
Basic visitor HSE induction training		
Worker HSE induction training		
Emergency response training		
Specialized training		
Tool Box Talks (TBT)		

Inspection and Monitoring

EHS inspection and monitoring must be undertaken to ensure compliance of involved entities with the mitigation and monitoring requirements as detailed in the ESMP and ESMS requirements. This should be completed by the Developer, EPC Contractor, and Project Operator as applicable.

Inspection and monitoring should include the following as applicable and as highlighted in the table that follows.

- Daily HSE inspection and monitoring at the site and preparation of a daily observation report stating therein the corrective measures on observed safety deficiencies, unsafe acts and conditions.
- Weekly site inspections to be carried out using the weekly site inspection checklists template based on requirements of the ESMP and EHSS-MS
- HSE Audits to be undertaken by Developer on EPC Contractor to ensure compliance with ESMP requirement and EHSS-MS. HSE audits should be undertaken monthly during the construction phase and quarterly during the operation phase

Table 78 Inspection and Monitoring Elements

Inspection and Monitoring	Developer	EPC Contractor	Project Operator
Daily HSE Inspection and Monitoring			
Weekly Site Inspections			
HSE Audits			

Meetings

Regular EHS meeting must be undertaken to discuss EHS performance onsite, outstanding issues, key issues of concern and other as applicable. Signed attendance sheets and Minutes of Meeting (MoM) must be maintained onsite at all times. This should be completed by the Developer, EPC Contractor, and Project Operator as applicable.

Meetings should include the following as applicable and as highlighted in the table that follows.

- Weekly HSE meetings
- Monthly HSE meeting
- Quarterly management HSE reviews

Table 79 Required Meetings

Meetings	Developer	EPC Contractor	Project Operator
Weekly HSE Meetings			
Monthly HSE Meeting			
Quarterly Management HSE reviews			

Reporting

HSE reporting will be required to summarize the following:

- Progress in implementing the ESMP and ESMS plans as required. The monitoring mechanism entailed in the ESMP is to be implemented and reported on a monthly basis. These reports will be submitted to the AfDB.
- E&S Audit Report conducted on an annual basis by a third-party, independent Consultant to be submitted to the donor within the Q1 (i.e. by March 15) of each year starting the second year of implementation until Project completion.
- Findings of the monitoring programs, with emphasis on any breaches of the control standards, action levels or standards of general site management
- Outstanding incident report forms
- Relevant changes or possible changes in legislation, regulations and international practices
- Reporting on Key Performance Indicators (KPI).
- Grievances
- Security incidents

Reporting should be submitted to the Developer as applicable by the relevant entities as identified below.

Table 80 Reports

Reporting	EPC Contractor	Project Operator
Reporting	Monthly	Monthly

9.2 Environmental and Social Management System (ESMS)

The ESIA is considered a key document in assessing and managing environmental and social risks related

to the Project. The key output of the ESIA is the ESMP which aims to provide high level mitigations and requirements for managing the environmental and social risks anticipated from the Project.

Throughout the Project's construction and operation phase an ESMS must be implemented by all relevant parties (i.e. Developer, EPC Contractor and Project Operator). The ESMS must be project and site specific and must build on and take into account the requirements of the ESMP. The development and implementation of an ESMS is considered a key requirement under IFC PS1, in addition the ESMS must also be in line with the IFC PSs.

Summarised below is the overall framework, structure and key requirements for the ESMS for the key entities involved in the Project.

Developer

- ESMS Manual that should include: (i) E&S Policy; (ii) Human Resources Policy and Procedures; (iii) E&S Organisational Structure and Responsibilities; and (iv) E&S Training, Monitoring and Reporting Plan
- Stakeholder Engagement Plan;
- Community Grievance Mechanism
- Active Turbine Management Plan (ATMP)

EPC Contractor

- ESMS Manual (in line with Developer) that should include: (i) E&S Policy; (ii) Human Resources Policy and Procedures; (iii) E&S Organizational Structure and Responsibilities; (iv) E&S Training, Monitoring and Reporting Plan
- Water Management Plan
- Waste Management Plan
- Air Quality and Noise Management Plan
- Traffic and Transport Management Plan
- Occupational Health and Safety Plan
- Emergency Preparedness and Response Plan
- Security Management Plan
- Chance Find Procedures
- Worker Grievance Mechanism
- Employment and Procurement Management Plan
- Worker Influx and Accommodation Plan
- Labour and Working Conditions Management Plan

Project Operator

- ESMS Manual (in line with Developer) that should include: (i) E&S Policy; (ii) Human Resources Policy and Procedures; (iii) E&S Organizational Structure and Responsibilities; (iv) E&S Training, Monitoring and Reporting Plan
- Water Management Plan
- Waste Management Plan
- Occupational Health and Safety Plan
- Emergency Preparedness and Response Plan
- Security Management Plan
- Employment and Procurement Management Plan
- Labour and Working Conditions Management Plan

9.3 Compilation of Environmental and Social Management Plan (ESMP)

The tables below present the ESMP for the: (i) planning and construction, and (ii) operation phase respectively and which include the following:

- The environmental attribute (e.g. air quality) that is likely to be impacted;
- A summary of the potential impact and/or likely issue;
- The identified management measures that aim to eliminate and/or reduce the potential impact to acceptable levels. Management measures include mitigation actions, further requirements, additional studies, etc.;
- Monitoring actions to ensure that the identified mitigation measures are implemented. Monitoring actions include: inspections, review of reports/plans, reporting, etc.;
- The frequency for implementing the monitoring actions, which include: once, continuously throughout the construction/operation period (depending on the mitigation measure identified this could include daily, weekly, or monthly), or upon occurrence of a certain issue;
- Parameters and location of monitoring actions as identified and applicable; and
- Responsible entity for implementing the mitigation measures and monitoring actions identified.

Table 81 ESMP for the Planning and Construction Phase

Environmental Attribute	Potential Impact	Management Action	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity	Cost
Landscape and Visual								
	Visual and landscape impacts due to presence of elements typical of a construction site such as equipment and machinery.	Ensure proper general housekeeping and personnel management measures are implemented which could include: (i) ensure the construction site is left in an orderly state at the end of each work day; (ii) to the greatest extent possible construction machinery, equipment, and vehicles that are not in use should be removed in a timely manner and kept in locations to reduce visual impacts to the area. (iii) Ensure proper storage, collection, and disposal of waste streams generated	Mitigation	Visual inspections	At construction active areas	Daily / Weekly	EPC Contractor	Contractor's cost
Land Use								
	There were no specific informal land uses onsite. Regardless, this area of the GoS has traditionally been under the Ghafra system of Bedouin Groups and Petroleum Units. If improperly managed could result in potential conflicts and disputes.	(i) Establish coordination with the Bedouin Groups for inclusion and engagement in employment and procurement opportunities. (ii) Implementation of SEP that includes specific references for engagement and coordination with Bedouin groups. Please refer to SEP for additional details.	Additional requirement	Submit agreement with Bedouin groups	N/A	Once before commencement of construction	Developer	Contractor's cost
Geology, Hydrology and hydrogeology								
Solid waste management	Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite (the closest dumpsite being Ras Gharib Public Dumpsite)	--	Mitigation	Submit contract	N/A	Once before commencement of construction	EPC Contractor	3000-5000 EGP (the cost of having a spill kit on site).

	Prohibit fly-dumping of any solid waste to the land	--	Mitigation	Visual inspections	At construction active areas	Daily / weekly		
	Commitment to adherence to the waste hierarchy principle	--	Mitigation	Visual inspections	At construction active areas	Daily / weekly		Contractor's cost
	Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste"	--	Mitigation	Visual inspections	At construction active areas	Once before commencement of construction		12,000 EGP (cost of the bins)
	Distribute a sufficient number of properly contained containers clearly marked as "Construction Waste" for the dumping and disposal of construction waste	--	Mitigation	Visual inspections	At construction active areas	Once before commencement of construction		
	Implement proper housekeeping practices on the construction site at all times	--	Mitigation	Visual inspections	At construction active areas	Daily / weekly		Contractor's cost
	Maintain records and manifests that indicate volume of waste generated onsite, collected by contractor, and disposed of at the landfill	--	Mitigation	Submit manifests	N/A	Throughout construction period		Contractor's cost
Wastewater management	Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP	--	Mitigation	Submit contract	N/A	Once before commencement of construction	EPC Contractor	5,000-10,000 monthly for private contractor
	Prohibit illegal disposal of wastewater to the land	--	Mitigation	Visual inspections	At construction active areas	Daily / weekly		Contractor's cost
	Ensure that constructed septic tanks during construction and those to be used during operation are well contained and impermeable to prevent leakage of wastewater into soil	--	Mitigation	Visual inspections	At applicable area	Once before commencement of construction		Contractor's cost
	Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing	--	Mitigation	Visual inspection	At applicable area	Daily/weekly		Contractor's cost
	Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP	--	Mitigation	Submit manifests	N/A	Throughout construction period		Contractor's cost

Hazardous Waste Management	Hire approved private contractor for the collection of hazardous waste from the site to the approved hazardous waste disposal facilities	--	Mitigation	Submit contract	N/A	Once before commencement of construction	EPC Contractor	5,000-10,000 monthly for private contractor
	Ensure that hazardous waste is disposed in a dedicated area that is enclosed, of hard surface, with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste	--	Mitigation	Visual inspections	At applicable area	Once before commencement of construction		Contractor's cost
	Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available	--	Mitigation	Visual inspections	At applicable area	Daily / weekly		Contractor's cost
	Prohibit illegal disposal of hazardous waste to the land	--	Mitigation	Visual inspections	At construction active areas	Daily / weekly		Contractor's cost
	Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste	--	Mitigation	Visual inspections	At construction active areas	Daily / weekly		Contractor's cost
	Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing	--	Mitigation	Visual inspections	At construction active areas	Daily / weekly		Contractor's cost
	Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities	--	Mitigation	Submit manifests	N/A	Throughout construction period		Contractor's cost
Hazardous material management	Ensure that hazardous materials are stored in an area that is of hard impermeable surface, flameproof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another, and includes secondary containment systems	Mitigation	Visual inspections	At applicable area	Once before commencement of construction		EPC Contractor	Contractor's cost: 150-400 EGP/drum
	Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for	Mitigation	Visual inspections	At applicable area	Daily / weekly			Contractor's cost
	Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)	Mitigation	Visual inspections	At construction active areas	Daily / weekly			50-300 EGP / dripping pan depending on the material and size

	Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material	Mitigation	Visual inspections	At construction active areas	Daily / weekly			Contractor's cost
	Ensure that a minimum of 1,000 liters of general purpose spill absorbent is available at hazardous material storage facility.	Mitigation	Visual inspections	At applicable area	Daily / weekly			Contractor's cost
	If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste	Mitigation	Visual inspection	At applicable area	Upon occurrence			Contractor's cost
	Avoid executing excavation works under aggressive weather conditions Place clear markers indicating stockpiling area of excavated materials to restrict equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas	Mitigation	Visual inspections	At construction active areas	Upon occurrence		EPC Contractor	Contractor's cost
	Erect erosion control barriers around work site during site preparation and construction to prevent silt runoff where applicable such as silt fences, gravel bas berms, fiber rolls, and other.	Mitigation	Visual inspections	At construction active areas	Daily / weekly			Around 20 EGP/m ² for basic materials (textiles); 150 EGP/m ² or more for specialized barriers such as gabions or riprap
	Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible	Mitigation	Visual inspections	At construction active areas	Upon occurrence			Contractor's cost
Biodiversity								
Construction activities would disturb existing habitats (flora and fauna). In addition, other impacts could be from improper management of the site (e.g. improper conduct and housekeeping practices).	Implement Biodiversity Management Plan (BMP) which is provided as a standalone document.	Mitigation	Refer to BMP	At applicable area	Refer to BMP	Refer to BMP	EPC Contractor	--
	Construction activities should reflect the outcomes of a detailed Egyptian Dabb Lizard survey (such as the survey indicated in "Section 8" by a biodiversity expert. The survey should focus on all construction activities areas and in particular the Wadi systems where such a species is likely to be located. Should burrows and/or records of this species be identified, relocation activities should be undertaken to nearby similar habitats.	Additional Survey	Submission of report	Prior to construction		Once; before construction	EPC Contractor	--
	Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Refer to BMP	Daily / weekly	EPC Contractor	--

	Implement project induction for all workers on site and clearly mark (construction and habitat / botanical areas)	Mitigation	Training; visual inspections and site signage	At construction active areas	Refer BMP to	Training – As needed	EPC Contractor	--
Birds (avi-fauna)								
Construction activities could disturb existing habitats of birds breeding and/or nesting within the Project site.	Current WTG layout takes into account a 2km setback distance from the Dam area which is a source of attraction for migratory birds particularly during spring season. The final detailed deign should take this into account, otherwise (i.e. if no setback is considered) Critical Habitat (CH) can be triggered for the Project site given potential for key impacts on White Stork in particular. Please refer to the standalone CHA in particular for the outcomes of the site	Mitigation	Submission of detailed design	N/A	--	Once	Developer	--
	Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	--	Daily / weekly	EPC Contractor	--
	Develop a protocol to swiftly report and dispose of any dead or injured wildlife or animals recorded onsite.	Mitigation	Submission of report	Prior to construction	--	Prior to construct ion	EPC Contractor	--
Archaeology and Cultural Heritage								
Improper management of construction activities could disturb/damage archaeological remains which could be buried in the ground (if any).	As required by the SCA, during excavation activities, SCA must be notified to check if they will provide any observers to oversee the process and ensure that no underground archaeological remains of importance are unearthed and/or disturbed	Mitigation	Submission of evidence of communication with SCA	N/A	--	Prior to construct ion	EPC Contractor	Contractor’s cost
	If potential archaeological remains in the ground are discovered, appropriate measures for such chance find procedures are implemented typically requiring a pause in construction activities, fencing off the area with signage, immediately notifying the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office. Work resumes after the Ministry/Inspection Office grants a clearance to resume the work. Construction activities can continue at other parts of the site if no potential archaeological remains were found.	Mitigation	Visual inspections and submittal of chance find report	At applicable area	--	Upon occurrence	EPC Contractor	
Air Quality and Noise								

Construction activities will likely result in an increased level of dust, particulate matter and pollutant emissions as well as noise which in turn will directly impact ambient air quality and noise levels.	If dust or pollutant emissions were found to be excessive due to construction activities, the source of such emissions should be identified and adequate control measures must be implemented (as identified below)	Mitigation	Visual inspections	At construction active areas and other receptors to include nearby petroleum activities and internal road networks	--	Upon occurrence	EPC Contractor	Contractor's Cost
	Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Egyptian Codes to ensure that for activities associated with high dust and noise levels, workers are equipped with proper Personal Protective Equipment	Mitigation	Visual inspections	At construction active areas	--	Daily / weekly		Contractor's Cost
	Apply basic dust control and suppression measures which could include: (i) regular watering of roads for dust suppression; (ii) proper planning of dust causing activities to take place simultaneously in order to reduce the dust incidents over the construction period; (iii) proper management of stockpiles and excavated material (e.g. watering, containment, covering, bundling); (iv) proper covering of trucks transporting aggregates and fine materials (e.g. through the use of tarpaulin); and (v) adhering to a speed limit of 15km/h for trucks on the construction site.	Mitigation	Visual inspections	At construction active areas	--	Daily / weekly		Contractor's Cost
	Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment to be used throughout the construction phase for early detection of issue to avoid unnecessary pollutant and noise emissions	Mitigation	Submission of maintenance program	N/A	--	Monthly		Contractor's Cost
	If noise levels were found to be excessive from construction activities, the source of such excessive noise levels should be identified and adequate control measures must be implemented	Mitigation	Visual inspections	At construction active areas and other receptors to include petroleum storage facilities	--	Upon occurrence		Contractor's Cost
	Apply adequate general noise suppressing measures. This could include the use of well-maintained mufflers and noise suppressants for high noise generating equipment and machinery, developing a regular maintenance schedule of all vehicles, machinery, and equipment for early detection of issues to avoid unnecessary elevated noise level, etc.	Mitigation	Visual inspections	At construction active areas	--	Daily / weekly		Contractor's Cost
Infrastructure and Utilities								

Traffic and transport management	Develop a Traffic and Transport Plan to ensure transportation process of turbine components does not pose a risk of damage to the existing roads, highways, overpasses whilst ensuring public safety. The Plan must analyse and study the entire route for transportation of the Project components from the port till the Project site. The study must investigate any constraints which need to be considered along the highways leading to the Project site such as bridges, overhead utility cables, slants in roads, etc. and identify accommodations which need to be taken into account.	Additional study	Submission of Traffic and Transport Plan and approval from local authorities	N/A		Once before commencement of construction	EPC Contractor	Contractor's Cost
Civil and Military Aviation	Establish coordination with the relevant entity to provide information on the Project (to include location and specifications of turbines in specific) and include any specific requirements to be considered as part of the detailed design to include setback distances if required (e.g. from radar systems if applicable) and navigational safety requirements (e.g. navigational lights, blade paintings, etc.)	Additional requirement	Submit of formal nonobjection letter (or similar) with relevant entity	N/A		Once before commencement of construction	Developer	---
Improper planning and design of project could affect petroleum facilities	Establish coordination via NREA with the General Petroleum Company's head office in Cairo to discuss and determine any specific requirements to be taken into account for the detailed design of the Project as well as coordination agreement requirement during the construction and operation phase (e.g. avoidance of such areas, buffer distances to be considered, etc.)	Additional requirement	Submit formal communication letter (or similar) with relevant entity	N/A		Once before commencement of construction	Developer	---
Water Resources Management	Coordinate with the Ras Ghareb Water company to water requirements of the project	Additional Requirement	Submit formal communication letter (or similar) with Ras Ghareb Water company	N/A		Once before commencement of construction activities	EPC Contractor	Contractor's Cost
Waste Utilities	Undertake the following: (i) coordinate with the Ras Ghareb Water Company and obtain a list of authorized contractors for the collection of wastewater from the site; (ii) coordinate with the Ras Ghareb City Council to hire a contractor for the collection of solid waste from the site; and (iii) obtain a list of authorized contractors for the collection of hazardous wastes from the site.	Additional Requirement	Submit formal communication letter to the relevant entities	N/A		Once before commencement of construction	EPC Contractor	Contractor's Cost

Telecommunication and TV/ Radio Management	Establish coordination via NREA / EETC with relevant entities and applicable agencies to provide information on the Project, including the location and specification of turbines, setback distances if required for telecommunications, radio and TV infrastructure (i.e. from LoS connections). This is to be done at least six (6) months prior to the commencement of construction activities.	Additional Requirement	Submit formal communication letter to the relevant entities	N/A		Once before the commencement of construction	Developer	Developer
Nearby Wind Farms	Communicate with NREA to ensure if the Project's buffer distance from other nearby wind farms is sufficient from a technical perspective	Mitigation	Submit a formal communication letter	N/A		Once before commencement of construction	Developer	Developer
Petroleum Facilities	Coordinate with General Petroleum Company prior to Construction works	Mitigation	Submit formal communication letter to the relevant entities	N/A		Once before commencement of construction	Developer	Developer
Occupational Health and Safety								
There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Develop and submit an Occupational Health and Safety Plan (OHSP) that is project and site specific to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property.	Additional study	Submit OHSP plan	N/A		Once before commencement of construction	EPC Contractor	Contractor's Cost
	Develop and submit an Emergency preparedness and Response Plan that is project and site specific and account for all potential emergency situations onsite to ensure the health and safety of all personnel and property onsite.	Additional study	Submit EPRP	N/A		Once before commencement of construction	EPC Contractor	Contractor's Cost
Human Rights								

Inappropriate management of the workforce during both the construction and operation phase could entail several human right risks and violations by employing entities such as the EPC Contractor and Project Operator. This could include but not limited to engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.	Providing reasonable working conditions and terms of employment to include but not limited to contract management, working hours, salaries/wages, annual and medical leaves, bereavement leaves, accommodation, etc. Recognizing workers' rights to form and to join workers' organizations and to bargain collectively Prohibition of child labour within the workforce Overall management of young workers within the labour force Prohibition of forced labour Non-discrimination throughout the entire work cycle in all its forms Providing equal opportunities for all throughout procurement and employment opportunities including women groups Overall management of daily workers, migrant workers and third-party workers	Mitigation	(i) Monthly inspections during construction and quarterly during operation against the developed HR procedure (ii) Submission of HR inspection report that identifies any corrective measures undertaken	At applicable area		Monthly	EPC Contractor	Contractor's Cost
Public health and safety								
Relatively large worker influx could result in H&S issues such as risk of diseases, inappropriate code of conduct, social vices, etc.	Submit a worker influx plan which takes into account the following: (i) medical examination program for workers; (ii) procedures to maintain hygienic conditions onsite; (iii) code of conduct for workers; (iv) induction training and awareness requirements for risk of diseases, etc; (v) consider impacts from workers migration into nearby communities including pressure on rental accommodations and infrastructures	Additional study	Submit worker influx plan	N/A	Once before commencement of construction		EPC Contractor	Contractor's Cost
Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events	Prepare a Security Management Plan that identifies appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues	Additional study	Submit security management plan	N/A		Once before commencement of construction	EPC Contractor	Contractor's Cost
Socio-economics								

The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity	that the Developer implement a social responsibility program which aims to benefit the local communities to the greatest extent possible. In this case, a structured approach must be developed which must identify priority development projects which could benefit local communities (e.g. based on a needs assessment if available). Based on that the social responsibility program can prioritize projects for local communities based on available budget, company vision, timeline for implementation as well as other factors.	Recommendation	Regular reporting on outcomes of Program implementation	N/A		Continuo us	Project Developer/EPC Contractors	Contractor's Cost
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Table 82 ESMP for the Planning and Operational Phase

Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity	Cost
Geology, Hydrology and hydrogeology							
Solid waste management	Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite (the closest dumpsite being Ras Gharib Public Dumpsite)	Mitigation	Submit contract	Not applicable	Once before commencement of operation	Project Operator	Should be included in operator budget
	Prohibit fly-dumping of any solid waste to the land	Mitigation	Visual inspections	At operational active areas	Daily / weekly		
	Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste"	Mitigation	Visual inspections	At operational active areas	Once before commencement of operation		
	Implement proper housekeeping practices onsite at all times	Mitigation	Visual inspections	At operational active areas	Daily / weekly		
	Maintain records and manifests that indicate volume of waste generated onsite, collected by contractor, and disposed of at the landfill	Mitigation	Submit manifests	Not applicable	Throughout operational period		
Wastewater management	Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP	Mitigation	Submit contract	Not applicable	Once before commencement of operation	Project Operator	Should be included in operator budget
	Prohibit illegal disposal of wastewater to the land	Mitigation	Visual inspections	At operational active areas	Daily / weekly		
	Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to	Mitigation	Visual inspection	At applicable area	Daily/weekly		

	avoid overflowing						
	Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP	Mitigation	Submit manifests	Not applicable	Throughout operational period		
Hazardous waste management	Hire approved private contractor for the collection of hazardous waste from the site to the approved hazardous waste disposal facilities	Mitigation	Submit contract	Not applicable	Once before commencement of operation	Project Operator	Should be included in operator budget
	Ensure that hazardous waste is disposed in a dedicated area that is enclosed, of hard surface, with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste	Mitigation	Visual inspections	At applicable area	Once before commencement of operation		Should be included in operator budget
	Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and antispillage trays and a hazardous waste inventory is available	Mitigation	Visual inspections	At applicable area	Daily / weekly		Should be included in operator budget
	Prohibit illegal disposal of hazardous waste to the land	Mitigation	Visual inspections	At operational active areas	Daily / weekly		Should be included in operator budget
	Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste	Mitigation	Visual inspections	At operational active areas	Daily / weekly		Should be included in operator budget
	Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing	Mitigation	Visual inspections	At operational active areas	Daily / weekly		Should be included in operator budget
	Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities	Mitigation	Submit manifests	Not applicable	Throughout operational period		Should be included in operator budget
Hazardous material management	Ensure that hazardous materials are stored in an area that is of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another	Mitigation	Visual inspections	At applicable area	Once before commencement of operation	Project Operator	Should be included in operator budget
	Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for	Mitigation	Visual inspections	At applicable area	Daily / weekly		Should be included in operator budget
	Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)	Mitigation	Visual inspections	At operational active areas	Daily / weekly		Should be included in operator budget

	Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material	Mitigation	Visual inspections	At operational active areas	Daily / weekly		Should be included in operator budget
	Ensure that a minimum of 1,000 litters of general-purpose spill absorbent is available at hazardous material storage facility.	Mitigation	Visual inspections	At applicable area	Daily / weekly		Should be included in operator budget
	If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste	Mitigation	Visual inspection	At applicable area	Upon occurrence		Should be included in operator budget
Biodiversity							
Improper management of the site could disturb existing habitats (e.g. improper conduct and housekeeping practices).	Implement proper management measures to prevent damage to the biodiversity of the site. This includes technical aspects of operation as well as human activities	Mitigation	Inspection	At applicable area	Continuous	Project Operator	Should be included in operator budget
Birds (avi-fauna)							
Wind turbines are associated with impacts on birds from risks of strikes and collision on both migratory soaring birds and resident soaring birds in the area. Generally, such impacts depend on several factors but could affect the population levels of certain species especially those with international/national critical conservation status.	Avi-Fauna Monitoring and OnDemand Turbine Shutdown	Mitigation	Submission of report	At operational active areas	Continuous	Consultant	
	Avi-Fauna Carcass Search during Operation	Additional requirement	Submission report	At operational active areas	At operational active areas	Continuous	
	Carcass Search Surveys	Additional requirement	Submission of report	At operational active areas	Continuous		
Bats							
The potential impacts from the Project during operation are mainly related to risk of bat strikes and collisions with rotors of the operating wind turbines.	Undertake at height bat acoustic surveys for one (1) year during first or second year of operations. Such acoustic surveys will be done at the met masts and should be undertaken by a third-party entity with experience in bat assessments and studies.	Mitigation	Submission of report	At operational active areas	Once during operation	Project Operator	Should be included in operator budget
	Carcass Search Surveys	Mitigation	Submission of report	At operational active areas	Continuous	Consultant	
Infrastructure and Utilities							
Water resources management	Coordinate with the Ras Gharib Water Company to sector the water requirements of the Project.	Additional requirement	Submit formal communication letter (or similar) with Ras Gharib Water Company	Not applicable	Once before commencement of construction	Project Operator	Should be included in operator budget
Waste utilities	Undertake the following: (i) coordinate with the Ras Gharib Water Company and obtain list of authorized contractors for collection of wastewater from the	Additional requirement	Submit formal communication letter with	Not applicable	Once before commencement of construction	Project Operator	Should be included in

	site; (ii) coordinate with the Ras Gharib City Council to hire a competent private contractor for the collection of solid waste from the site; and (iii) obtain list of authorized contractors for collection of hazardous waste from the site		relevant entities				operator budget
Occupational Health and Safety							
There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Develop and submit an Occupational Health and Safety Plan (OHSP) that is project and site specific to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property.	Additional study	Submit OHSP plan	Not applicable	Once before commencement of operation	Project Operator	Should be included in operator budget
Human Rights							
Inappropriate management of the workforce during the construction phase could entail several human right risks and violations by employing entities such as the EPC Contractor and Project Operator. This could include but not limited to engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.	Providing reasonable working conditions and terms of employment to include but not limited to contract management, working hours, salaries/wages, annual and medical leaves, bereavement leaves, accommodation, etc.	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly	EPC Contractor	Should be included in operator budget
	Recognizing workers' rights to form and to join workers' organizations and to bargain collectively	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly		
	Prohibition of child labour within the workforce	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly		
	Overall management of young workers within the labour force	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly		
	Prohibition of forced labour	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly		Should be included in operator budget
	Non-discrimination throughout the entire work cycle in all its forms	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly		
	Providing equal opportunities for all throughout procurement and employment opportunities including women groups	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly		
	Overall management of daily workers, migrant workers and third-party workers	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly		

Public Health and Safety							
Public access of unauthorized personnel to the various Project components.	A Security Risk Assessment should be developed for the Wind Farm Project and which takes into account the following: (i) each turbine to be fitted with locked doors to prevent unauthorized access to the turbines; (ii) substation area to be completely fenced with concrete walls to prevent unauthorized access; (iii) onsite guards; (iv) post informative signs on the turbines and substation about public safety hazards and emergency contact information, and other as applicable.	Additional study	Submit Security Risk Assessment	Not applicable	Once before commencement of operation	Project Operator	Should be included in operator budget
Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events	Prepare a Security Management Plan that identifies appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues	Additional study	Submit security management plan	Not applicable	Once before commencement of operation	Project Operator	
Blade or tower glint can impact nearby receptors in the area	Consideration should be given to the use of non-reflective finishes to ensure potential impacts are not significant	Mitigation	Visual inspection	Turbines	Once before commencement of operation	Project Operator	
Socioeconomics							
The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity	Local Recruitment Procedure: the procedure must identify the number of job opportunities targeted for local communities to include skilled and unskilled workers. Such job opportunities shall also take into account employment of local communities in the area around the project to include fresh graduate engineers, technicians, labourers, etc. In addition, the procedure must include details on how job opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all including females. Local Procurement Procedure: the procedure must identify the procurement opportunities targeted for local communities to include for example local subcontractors, local supplies and services, cleaning services, etc. In addition, the procedure must include details on how procurement opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all.	Recommendation	Regular reporting on outcomes of Program implementation	Not applicable	Continuous	Project Developer/Operator	Should be included in operator budget
	- Social Responsibility Program: it is recommended that the Developer implement a social responsibility program which aims to benefit the local communities to the greatest extent possible. In this case, a structured approach must be developed which must identify priority development projects which could benefit local communities (e.g. based on a needs assessment if available). Based on that the social responsibility program can prioritise projects						

	for local communities based on available budget, company vision, timeline for implementation as well as other factors.						
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10. ANNEX

10.1 Key Outcomes and Responses of the Public Disclosure Session May 24, 2023

Table 83 Key Outcomes of the Public Disclosure Session

Topic	Questions and Concerns	Responses
Dismantlement: End of Operations	Local Community Member: Inquiry on the justification for the 25-year timeline for dismantlement of wind project.	RCREEE: Twenty years (25) represents the expected viability of the project. As technologies age, such as after 20 years, new technologies are needed to maintain viability. At the end of this timeline, the EETC would announce a new tender for the development of what is known as the (Regional Centre for Energy Export). EEAA: The Renewable Energy Authority, which is represented by the Energy Authority, offers project tenders at a timeline of 25 years for solar energy and also 25 years for wind energy initiatives. After the project has completed, the project is dismantled or the equipment is utilized by the same company (under a new contract) or to another company.
	Local Community Member: Another inquiry to clarify the decommissioning of the windfarm; specifically, whether the equipment and land are transferred to the government while the project is still operational is the typical framework for these initiatives.	RCREEE: Dismantling and maintenance are common practices in various industries, including construction, ownership, and operation. In other projects (such as construction, ownership, operation and transportation), it is common for the project to be transferred or handed over.
Negative Impacts: Community Health and Safety	Cleric: Inquiry regarding protection against exposure to electromagnetic waves resulting from operations and the means by which potential impacts could be mitigated.	EETC: There is no evidence that the electromagnetic waves emitted from power generation projects have any negative impact on human health or the environment. RCREEE: All electric currents produce electromagnetic waves, yet the generators used in wind energy projects do not emit significant levels. The project has been designed to minimize impact. Negative impacts are to be monitored closely. If any negative effects are found, the project is to be modified alongside the introduction of applicable mitigative actions. The design of the project in its layout reduces such risks. According to the law for the construction of OHTLs, there is a buffer zone of 50m from the center of the OHTL. Additionally, all wind power stations have passivation cables, which help to reduce the amount of electromagnetic radiation emitted by the turbines.

Topic	Questions and Concerns	Responses
		NREA: Wind turbines have no reported negative impacts on humans or animals as a result of electromagnetic waves produced.
Social responsibility programs	Ras Gharib Educational Administration: Referring to another renewable energy initiative that is affecting subsidies of electricity costs, the attendee asked about the reason subsidies are not more ubiquitous and to the benefit of more local communities.	RCREEE: The private sector is the executor of the project, and the state has an electricity regulatory center for determining the subsidies that are distributed among electricity consumer segments. Since the prices of gasoline and gas have increased, an increase in electricity prices is expected. However, as part of the state's mitigation measures, it is to inject 42% of the energy production from renewable sources.
	Red Sea Bedouin Community Member: Inquiry regarding the entailed tangible returns from wind farm development.	RCREEE: There are plans to provide training for local residents in collaboration with the Regional Center prior to the establishment of the projects. Among the trainees, a team will be formed and responsible for conducting a survey to determine the number of birds in the area. Additionally, there is to be theoretical training for a selected group of Bedouins on bird classification. During the implementation phase, which is to take approximately one and a half to two years, these trainees are to be appointed in the bird classification exercise. Unemployment may be addressed as the project aims to recruit locally.
Positive Impact: Employment Opportunities	Wind Energy Company: Inquiry regarding employment opportunities regarding the opportunities entailed under specialized and non-specialized labor and the employment requirements of such.	RCREEE: The initiative will work on compounding the efforts of other wind farm development projects in the area to support the local community. The initiative is to provide training for the local residents in collaboration with the Regional Center prior to the establishment of the projects. A team will be responsible for conducting a survey to determine the number of birds in the area. The initiative is to host theoretical training for a selected group of Bedouins on bird classification, for example. The implementation phase is to take approximately one and a half to two years, and a group of these young individuals will be appointed for the task.
	General Petroleum Company: Referencing an anticipated workforce	RCREEE: The community will be provided with precise

Topic	Questions and Concerns	Responses
	size of the project, the participant requested that more information be provided to the local community regarding announcements, specializations and required skills.	numbers once the studies and the figures are determined. Red Sea Governorate: In supporting workforce development, the intention is to research the establishment of two classrooms for technical education on clean energy to facilitate local skills development and employability.
	Community Member: Inquiry on the number of jobs to be made available to the residents of Ras Gharib as well as expressed dismay that employment has gone to outside hires (regarding local development, not exclusively renewable energy development projects). Bahari Middle of Egypt Association NGO: Asked to clarify the means by which job opportunities will be communicated.	RCREEE: The study for this project (regarding the number of required staff) has not been completed (i.e. <i>not completed at the time of the Public Disclosure session</i>). The work of the Wind Investors Association is to be implemented. This is a new announcement, and a major branch and office will be established to communicate with the public and respond to questions. ESIA Consultant: The construction phase is the most labor-intensive phase, but it is a temporary phase. The recruitment process will be based on the project's employment needs, both in terms of technical specialization and number. The ESIA includes a comprehensive plan for the communication program. A Community Liaison Officer will be assigned and based in Ras Gharib from the beginning of the construction phase.
	Community Leader: Referencing a protocol established in 2007 between the Red Sea Governorate and NREA to implement a wind energy project, there had been an announcement that technical schools would be established in Ras Gharib to teach and aid the employability of youth. Until now, according to the participant, no such technical school has been established while the lack of employment remains .	NREA: If the government announces appointments in an advertisement, NREA stated that it will comply accordingly. As mentioned previously, the formation of a Wind Energy Investors Association in Red Sea is to aid in linking applicable persons to job opportunities. RCREEE: The current outlook is to support the employment of local as it is established and supported by national decree. The Wind Energy Investors Association is to be the main source of communication regarding this topic.
Baseline – Flood risks	General Administration of Groundwater, Red Sea: The General Administration of Groundwater Water in Red Sea, according to the participant, had conducted a study of the project area in cooperation with the Water Resources	Developer: Prior to the placement of a turbine, there is a thorough inspection undertaken to review all risks including surface water movement. Generally, the turbine is affixed by concrete structures to prevent any erosion.

Topic	Questions and Concerns	Reponses
	Research Institute, to establish a number of artificial lakes, dams and channels to avoid the risks of floods in the area. The participant emphasized the importance of accounting for the potential flood risk inherent in the area.	Climate change is also an important topic, particularly its impact on energy projects. Desk reviews and field surveys are conducted by a team of specialists before construction begins, and their results are taken into account in designing the project site.
Land Use	President of WDCALR: His inquiry was regarding the area of land allocated for agricultural reclamation and animal production in Wadi Dara Village: because the land that was allocated to the association and divided among its members (having become private land owners), the question was whether owners of these lands would receive compensation having had invested in developing (rehabilitating) the land once allocated to them.	RCREEE: The topic would be reviewed with the NREA and the response will be through the NREA.

10.2 Letter of No Objection from Radio and Television Unit of Ras Ghareb and the Red Sea Governorate

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الهيئة الوطنية للإعلام
قطاع الهندسة الإذاعية
القاهرة في ٢٠٢٣/٧/٢٥

السيد الدكتور / طارق جنيته
رئيس مجلس الإدارة والعضو المنتدب لشركة إكوكونسرف

تحية طيبة وبعد ...؛

إيماءة الى خطاب سيادتكم بشأن قرار السيد رئيس الجمهورية رقم ١١٦ لسنة ٢٠١٦ بشأن تخصيص مساحات من الاراضى لصالح هيئة تنمية واستخدام الطاقة الجديدة والمتجددة بمنطقة خليج السويس لاستخدامها في انتاج الكهرباء من مصادر الطاقة المتجددة..

وان شركة إكوكونسرف للحلول البيئية وشركة ايكونسلف هم المكلف باعداد الدراسات البيئية والاجتماعية لانشاء محطات الرياح.. وطلب سيادتكم موافاتكم بمدى إمكانية تأثير المشروعات [اكوا خليج السويس- اكوا جبل الزيت] على شبكات الميكروبيف العاملة بمنطقة رأس غارب طبقا للاحداثيات المرسله من سيادتكم.

نتشرف ان نفيد سيادتكم بأنه طبقا للاحداثيات المرسله من سيادتكم فانه لا يوجد تأثير للمشروع على محطات الارسال الاذاعي والتليفزيونى في منطقة رأس غارب .

وتفضلوا سيادتكم بقبول وافر الاحترام...؛

رئيس قطاع الهندسة الإذاعية
مهندس/ اشرف حامد
١١٣

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