

Environmental & Social Impact Assessment (ESIA)

Shokeir Wind Energy 900 MW, Egypt

Prepared by:



Prepared for:



Regional Center for Renewable Energy and Energy Efficiency
المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

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TABLE OF CONTENTS

Table of Contents	ii
List of Figures.....	iv
List of Tables	vii
Abbreviation and Acronyms	ix
1. Introduction	1
1.1 Background	1
1.2 The Environmental and Social Impact Assessment (ESIA) Report	2
1.3 Project Setup and Responsibilities.....	3
1.4 Document Structure.....	4
2. Project Description	5
2.1 Project Location	5
2.2 Local Communities.....	10
2.3 Project Components	11
2.4 Overview of Project Activities	18
2.5 Project Schedule	19
2.6 Workforce Requirements	20
2.7 Other Wind Farm Developments within Red Sea Governorate	20
3. ESIA Approach and Methodology	24
3.1 Analysis of Alternatives	24
3.2 Stakeholder Consultation and Engagement.....	24
3.3 Delineation of Study Boundaries and Scope of Assessment.....	24
3.4 Impact Assessment Methodology.....	27
3.5 Development of Framework Environmental and Social Management Plan (ESMP).....	30
4. Stakeholder Consultation and Engagement.....	32
4.1 Objectives.....	32
4.2 Stakeholder Identification and Analysis	32
4.3 Stakeholder Consultation and Engagement to Date	37
4.4 Future Stakeholder Engagement and Consultation	60
5. Regulatory and Policy Framework	62
5.1 Environmental Clearance Process in Egypt	62
5.2 Egypt E&S Regulatory Context	63
5.3 International Agreements	64
5.4 Requirements for Project Financing.....	66
6. Analysis of Alternatives.....	83

6.1	Site Alternatives	83
6.2	Technology Alternatives	86
6.3	Design Alternatives	87
6.4	No-Project Alternative	87
7.	Existing Physical, Biological and Social Environment	89
7.1	Landscape and Visual	89
7.2	Land Use.....	95
7.3	Geology, Hydrology and Hydrogeology	96
7.4	Climate and Meteorology	112
7.5	Biodiversity – Excluding Birds and Bats.....	117
7.6	Avifauna	130
7.7	Bats.....	148
7.8	Archaeology and Cultural Heritage	151
7.9	Air Quality and Noise	155
7.10	Infrastructure And Utilities.....	162
7.11	Socioeconomics.....	167
8.	Environmental and Social Impact Assessment.....	184
8.1	Overview of Strategic Environmental and Economic Impacts	184
8.2	Landscape and Visual	185
8.3	Land Use.....	188
8.4	Geology, Hydrology and Hydrogeology	188
8.5	Climate and Meteorology	209
8.6	Biodiversity.....	210
8.7	Avi Fauna	221
8.8	Bats.....	234
8.9	Archaeology and Cultural Heritage	236
8.10	Air Quality and Noise	238
8.11	Infrastructure and Utilities	240
8.12	Occupational Health and Safety and Worker Accommodation	245
8.13	Public Health and Safety	249
8.14	Socioeconomics.....	263
8.15	Summary of Anticipated Impacts.....	265
9.	Assessment of Cumulative Impacts	269
10.	Environmental and Social Management Plan (ESMP).....	272
10.1	Institutional Framework and Procedure Arrangements for ESMP Implementation	272
10.2	Environmental, Health, Safety and Social Management System (EHSS-MS)	275

10.3	Compilation of Environmental and Social Management Plan (ESMP).....	276
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LIST OF FIGURES

Figure 1: Administrative Division of Egypt	6
Figure 2: Red Sea Governorate	7
Figure 3: Administrative Division of Red Sea District	8
Figure 4: Project Distance from Cairo and Ras Gharib	8
Figure 5: Project Site within Land Allocated for Renewable Energy Developments	9
Figure 6: Project Site	10
Figure 7: Project Site and Closest Communities	11
Figure 8: Typical Structural Components of a Wind Turbine and Wind Farm.....	12
Figure 9: Final WTG Layout	13
Figure 10: Typical Substation	14
Figure 11: Typical Mobile Batching Plant	16
Figure 12: Typical Burrow Pit	16
Figure 13: Wind Farm Developments within the Red Sea Governorate in Relation to the Project Site	21
Figure 14: Study Area	25
Figure 15: Newspaper Announcement in El-Akhbar Published on 10/10/25.....	47
Figure 16: Selected Photos from the Public Session	49
Figure 17: FGD with Ibad El Rahman NGO	53
Figure 18: FGD with Youth Educated Females on Public Service	53
Figure 19: Land Plots Provided by Government.....	84
Figure 20: KBAs, IBAs and Protected Areas around the Project Site.....	85
Figure 21: Egypt's Wind Atlas (Source: IRENA, 2018)	87
Figure 22: Distribution of alluvial fan deposits across the Project site	90
Figure 23: General Site Topography and Landscape	91
Figure 24: 3D DEM Modelling of the Project Site	91
Figure 25: Typical Views from the Project.....	92
Figure 26: Visual Receptors within 50km of the Project Site	93
Figure 27: Historical Satellite Image Review	96
Figure 28: Land Sat Image Showing the Location of the Project Site.....	98
Figure 29: Regional Geologic Map of the Area	98
Figure 30: Structure Domains of the Gulf of Suez (Bosworth and Durocher 2017).....	99
Figure 31: Basement Rocks; (a) The Highly Weathered Boulder Of Older Granite (Light Colour), (b) The Low Relief Exposures of Older Granite	100
Figure 32: (a) Sharp Peaks of Younger Granite, (b) Basic Dyke Intruded Older and Younger Granites, (c) The Intrusion of Basic Dyke in Older Granite	100
Figure 33: Upper Cretaceous Sandstone Cross Bedding Sandstone	101
Figure 34: Field photograph of the Miocene Evaporite	102
Figure 35: Sample Images of Quaternary Deposits Covering most of the Project Site.....	103
Figure 36: The Quaternary Deposits Cover the Ground Surface of the Eastern Part of the Site	103
Figure 37: Plate tectonic setting of the Gulf of Suez (Bosworth & Durocher, 2017).....	104
Figure 38: Minimum Horizontal Stress Orientations (Shmin) in the Gulf of Suez Sub-basins	105
Figure 39: Young Fault-line Scarps in Pliocene–Pleistocene Alluvium within the Gharib Plain	106
Figure 40: DEM Showing the Physiography and Drainage Basins around the Project Area	108
Figure 41: 3D DEM of the Project Area Constructed from SRTM Data	108

Figure 42: Hydrogeological Map of the Area around the Project Site	110
Figure 43: Hydrogeological Cross-Section along Wadi Dara Based on Drilled Wells (Nasr, 1990)	110
Figure 44: Location map of the drilled wells at Wadi Dara	111
Figure 45: Average Monthly Maximum and Minimum Temperatures for the Past 30 Years	113
Figure 46: Average Monthly Wind Speeds for the Past 30 Years	113
Figure 47: Wind Speed Patterns in Ras Gharib Over the Past 30 Years.....	114
Figure 48: Wind Rose of Ras Gharib.....	114
Figure 49: Average Monthly Rainfall Distribution in Ras Gharib for the Past 30 Years	115
Figure 50: Temperature within Egypt.....	116
Figure 51: Number of Days in Egypt with Temperatures <0°C and >40°C.....	116
Figure 52: Floral Quadrat Survey Sampling Methodology	123
Figure 53: spatial distribution of presence marks of spiny-tailed lizard (<i>Uromastyx aegyptia</i>) on the site	126
Figure 54: Distribution of line transects over the study.....	127
Figure 55: Observed gazelle and Ibex records on the site and coordinates.....	128
Figure 56: Live trapping locations	129
Figure 57: Location of VP for the spring and autumn seasons 2025	131
Figure 58: Data sheet example.....	134
Figure 59: White Stork: passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval.	141
Figure 60: Steppe buzzard, passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval	142
Figure 61: Honey buzzard, passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval.	142
Figure 62: Black kite, passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval.	143
Figure 63 Passing rates of the Black kite and Eurasian Honey Buzzard (top), Great White pelican and with stork (middle), and distribution of records for all the species (bottom) across the project area per months and weeks.	144
Figure 64 Areas where Golden eagles have been recorded in Egypt during appropriate breeding season. Data from Sullivan et al. (2017).....	145
Figure 65 Distribution map of the Sooty falcon in Egypt. Dark color: breeding, light color: passage.	147
Figure 66: Project Site and Archaeological Sites	153
Figure 67: Project Site and UNESCO WHS.....	154
Figure 68: Satellite Map for Measurements Point Location	156
Figure 69: Average Concentrations ($\mu\text{g}/\text{m}^3$) of Key Air Pollutants Measured at Points P1, P2, and P3....	160
Figure 70: Average Noise Levels Recorded at Each Monitoring Point.....	161
Figure 71: Highway 65 in Relation to the Project Site.....	162
Figure 72: Nearest Communication Towers to the Project Site	163
Figure 73: Project Site Relative to the Closest Wastewater Treatment Plant	164
Figure 74: Existing Transmission Lines and Substations in the Project Area.....	166
Figure 75: Existing OHTLs	166
Figure 76: Existing Substations.....	167
Figure 77: Project Site and Closest Communities	168
Figure 78: Distribution of Population Density According to Districts in the Red Sea Governorate	169
Figure 79: Location of Wadi Dara Farms	177
Figure 80: Delineated Drainage Basins in the Wider Study Area Showing the Project's Location Within Wadi Dara (Modified after Youssef and Hegab, 2005)	189

Figure 81: Regional Flash-Flood Hazard and Vulnerability Classification for the Delineated Drainage Basins	190
Figure 82: Observed Flood Damage in Ras Gharib During the October 2016 Storm Event	192
Figure 83: Proposed Flash Flood Channel Location in the Study Area (After Elnazer et al., 2017)	192
Figure 84: Drainage Basins Intersecting the Project Area Derived From DEM-Based Watershed Analysis	193
Figure 85: 3D Terrain Model Illustrating the Course of Wadi Dara South of the Project Site	194
Figure 86: Topographic Profiles Along the Project Site	195
Figure 87: Topographic Profiles Along the Project Site	195
Figure 88: Grain Size Variation of the Surface Deposits in the Western and Central Parts of the Project Site	196
Figure 89: Grain Size Variation of Surface Deposits in the Eastern Side of the Project Site	197
Figure 90: Shallow and Wide Drainage Lines Crossing the Western and Middle Parts of the Site, Characterized by Thin Surface Flow and Low-Elevation Ground Between Drainage Lines	198
Figure 91: Main Streams of the Drainage Lines Crossing the Eastern Part of the Project Site	198
Figure 92: Sporadic and Weak Vegetation Along the Mainstream of the Drainage Lines	199
Figure 93: Locations of Flood Mitigation Structures Observed Near Existing Infrastructure Close to the Project Site	200
Figure 94: Culverts Installed Under the Main Road to Facilitate Safe Passage of Surface Runoff	200
Figure 95: Simple Fences Applied to Protect the Base of Towers from Surface Flow Erosion	201
Figure 96: The Role of Elevated Hills and Terrain in the Modification of The Direction of Surface Flow ..	202
Figure 97: Proposed Locations of Strong Surface Runoff Along Mainstream Drainage Lines Within the Project Site	202
Figure 98: Noise Sensitive Receptor Locations	253
Figure 99: Noise Contour Map for GOS III Wind Farm Layout - W10: 10 m/s (Isolated Assessment)	257
Figure 100: Noise Contour Map for GOS III Wind Farm Layout - W10: 10 m/s (Cumulative Assessment)	257

LIST OF TABLES

Table 1: ESIA Document Structure	4
Table 2: Region Division of Egypt	5
Table 3: Project Site Coordinates	6
Table 4: Worst-Case WTG Specification	13
Table 5: Footprint of the Project Components	17
Table 6: Determination of Significance	29
Table 7: Identified Groups of Stakeholders	33
Table 8: List of Vulnerable Groups and Their Relevance	37
Table 9: Identified Groups of Stakeholders	38
Table 10: Key Outcomes and Responses of the Public Disclosure Session	49
Table 11: Key Outcomes of FGDs	51
Table 12: National Legislation and Guidelines Governing the E&S Compliance for the Project	63
Table 13: Relevant International Conventions and Agreements	65
Table 14: IFC Performance Standard Requirements	66
Table 15: Overview of Key Points of EBRD Performance Requirements of Relevance to the Project	69
Table 16: Other International E&S Requirements and Standards	81
Table 17: Visual Receptors within 50km of the Project Site	93
Table 18: The Available Data in Wadi Dara Area (Bediar 2015)	111
Table 19: Average Humidity Levels	115
Table 20: Populations of IBA Trigger Species	118
Table 21: Populations of KBA Trigger Species	119
Table 22: Populations of IBA Trigger Species	120
Table 23: Bird Species that Trigger KBA Designation	120
Table 24: IUCN Red List Categories	121
Table 25: KBA Triggering Species	121
Table 26: Results of April-May 2025 Survey	124
Table 27: Results of the Reptile Surveys	125
Table 28: Results of the Mammal Surveys	128
Table 29: Results of the Invertebrate Surveys	129
Table 30: Coordinates of the VPs (UTM 36R)	131
Table 31: Level of Effort from Project Site VP during spring 2025	134
Table 32: Level of Effort from Project Site VP during autumn 2025	134
Table 33: Species Recorded during Vantage Point Monitoring in the spring and autumn 2025 (number of records and individuals)	135
Table 34: Mean flock size per species, number of observations in spring and autumn 2025, and min and max flock sizes recorded. Those highlighted are considered solitary or migrating in small groups.	138
Table 35: Distribution of bird numbers according to wind direction in spring 2025	139
Table 36: Distribution of bird numbers according to wind direction in spring 2025 sorted per species ...	139
Table 37: Nearest Archaeological Sites	153
Table 38: Location for Noise and Air Quality Monitoring Points	155
Table 39: Applicable National Permissible Limits for Air Quality	156
Table 40: Applicable National Permissible Limits for Noise	157
Table 41: IFC EHS General EHS Guideline Noise and Air Quality Limits	157
Table 42: Air Quality Analysis Result	157
Table 43: 24-Hour Ambient Noise Level Measurements and Comparison with National Standards	160
Table 44: Population (Red Sea Governorate Information Centre, 2022)	168
Table 45: Demographic Trends (Statistical Yearbook of Red Sea Governorate, 2019-2020)	170

Table 46: Workforce Research (CAPMAS, Workforce Research Results for the Second Quarter of 2018)	170
Table 47: 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)	170
Table 48: Labour Status of Ras Gharib & Zaafarana (CAPMAS Poverty Map, 2018)	171
Table 49: Education Mapping of Ras Gharib & Zaafarana (CAPMAS Poverty Map, 2018)	172
Table 50: Education Mapping of Ras Gharib City (The Statistical Yearbook, Ras Gharib City Information Centre, 2018)	173
Table 51: Ministry of Health Hospitals & Other Entities in the Red Sea Governorate (The Statistical Yearbook, Red Sea Governorate Information Centre, 2018)	173
Table 52: Number & Categories of Health Sector Workers in the Red Sea Governorate (CAPMAS, Census of Population Activities of the Governorates, Arab Republic of Egypt, 2016)	174
Table 53: Access to potable water and sanitation in the Red Sea Governorate	174
Table 54: Access to Electricity in Red Sea Governorate	175
Table 55: Fields of Investment in the Red Sea Governorate & Ras Gharib City (Red Sea Governorate Official Website, 2018)	175
Table 56: Coordinates of Wadi Dara Farms	177
Table 57: Wadi Dara Suvey Results	179
Table 58: Historical Records of Hazardous Flash Floods in Egypt	190
Table 59: Summary of Sensitive Receptors and Species	210
Table 60: Turbine specifications used for the CRM	224
Table 61: Physical and observational characteristics of each bird species included within the CRM analysis.	225
Table 62: Observational data from the VP surveys used to derive bird density inputs for the spring CRM analysis in spring 2025. For all species shows the percentage and time of flights at risk height.	226
Table 63: Observational data from the VP surveys used to derive bird density inputs for the spring CRM analysis in autumn 2025. For all species shows the percentage and time of flights at risk height.	227
Table 64: Published Avoidance rates (AR) for several bird species	227
Table 65: Collision Risk estimates for a 240m risk height in spring 2025	228
Table 66: Collision Risk estimates for a 240m risk height in autumn 2025	229
Table 67: Goldwind GWH 204-10 MW Specifications	251
Table 68: GWH 204-10 MW Modelling Scenario for Assessment	251
Table 69: Noise Sensitive Receptors	252
Table 70: Model Calculation and Parameter Settings	256
Table 71: Predicted contribution noise levels at NSRs from GOS III Wind Farm (Isolation & Cumulative) (W_{10})	258
Table 72: Summary of Anticipated Impacts during Planning and Construction	266
Table 73: Summary of Anticipated Impacts during Operation	268
Table 74: Assessment of Cumulative Impacts	269
Table 75: Roles and Responsibilities of Entities Involved in ESMP	272
Table 76: Training Elements	273
Table 77: Inspection and Monitoring Elements	274
Table 78: Required Meetings	274
Table 79: Reports	275
Table 80: ESMP for the Planning Phase	278
Table 81: ESMP for the Construction Phase	279
Table 82: ESMP for the Operation Phase	294

ABBREVIATION AND ACRONYMS

Acronym	Definition
AfDB	African Development Bank
Aol	Area of Influence
BOO	Build Own and Operate
CAAs	Competent Administrative Authorities
CBD	Convention on Biological Diversity
CCKP	Climate Change Knowledge Portal
CCRA	Climate Change Risk Assessment
CEA	Cumulative Effects Analysis
CITES	Convention on International Trade in Endangered Species
CSOs	Civil Society Organizations
CSR	Corporate Social Responsibility
DEM	Digital Elevation Model
DHA	Directorate of Health Affairs
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
EMF	Electric and Magnetic Fields
EPC	Engineering Procurement and Construction
EPs	Equator Principles
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EU	European Union
FGD	Focus Group Discussions
GBV	Gender-Based Violence
GDP	Gross Domestic Product
GIIP	Good International Industry Practice
GoE	Government of Egypt
GoS	Gulf of Suez
IBA	Important Birds Area
ICMM	International Council on Mining and Metals
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IFC	International Finance Corporation
IFIs	International Financing Institutions
ILO	International Labor Organization
IRENA	International Renewable Energy Agency
ISES	Integrated Sustainable Energy Strategy
IUCN	International Union for Conservation of Nature
KfW	Kreditanstalt für Wiederaufbau
LGU	Local Government Unit

MoU	Memorandum of Understanding
MSDS	Material Safety Data Sheet
NCE	National Council for Energy
NCW	National Council for Women
NGO	Non-Governmental Organizations
NIEHS	National Institute of Environmental Health Sciences
NREA	New and Renewable Energy Authority
NTRA	National Telecom Regulatory Authority
NTS	Non-Technical Summary
O&M	Operation and Maintenance
OE	Owner's Engineer
OHS	Occupational Health and Safety
OS	Operational Safeguards
PPA	Power Purchase Agreement
PR	Performance Requirements
PS	Performance Standards
RCREEE	Regional Centre for Renewable Energy and Energy Efficiency
SDG	Sustainable Development Goal
SEP	Stakeholder Engagement Plan
SPV	Special Purpose Vehicle
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
VPs	Vantage Points
WHO	World Health Organization
WHS	World Heritage Site
WTG	Wind Turbine Generators

1. INTRODUCTION

1.1 Background

The energy sector is a key driver for the socio-economic development of Egypt, representing around 13% of current Gross Domestic Product (GDP) and thus making economic growth in the country contingent upon the security and stability of energy supply.

Since 2007, Egypt has experienced an energy supply deficit due to the rapid increase in energy consumption and the depletion of domestic oil and gas resources, shifting its position as a net hydrocarbon exporter for the last three decades to that of a net importer. This has brought a set of challenges to the energy sector, including electricity shortages, caused in part by the decline of domestic gas production, as natural gas is the main source of electricity, accompanied by highly subsidized energy prices, with negative financial implications for already dwindling government revenues.¹

Acknowledging the severity of the situation, the Government of Egypt (GoE) has taken ambitious measures 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.²

To this extent, in 2013, 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 electricity generated by the year 2035.³ This target includes approximately 26% from solar energy, 14% from wind energy, and about 2% from hydropower.⁴

In that respect, 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. The law sets the legal basis for the Build, Own and Operate (BOO) scheme to be implemented. 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. In addition, the GoE (through the New and Renewable Energy Authority (NREA)) provides the land for the investors.

In accordance with the Law above, the GoE has made land available for investors in the Gulf of Suez (GoS) to install wind power plants. Therefore, a consortium comprising Aeolus SAS (Aeolus), Kahrabel FZE (ENGIE), and Orascom Construction S.A.E. (OC) (hereafter referred to as the ‘Developer’) is proceeding with developing a new wind power plant project with a capacity of 900 MW under the BOO scheme (hereafter referred to as the ‘Project’) located in the Ras Gharib region within the Red Sea Governorate. Following this, a Power Purchase Agreement (PPA) for a 900 MW Wind Farm between the Developer and the Egyptian Electricity Transmission Company (EETC) has been approved by the Cabinet; however, the PPA has been signed.

¹ [UNIDO – Low-Carbon Hydrogen Assessments in Egypt Highlights \(PDF\)](#)

² [Renewable Energy Outlook, Egypt \(IRENA, 2018\)](#)

³ [Egypt - Countries & Regions - IEA](#)

⁴ [Egyptian State Information Service. \(2023\). Egypt’s efforts in renewable energy and transition to a sustainable energy mix.](#)

1.2 The Environmental and Social Impact Assessment (ESIA) Report

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 Consult and Safe Soar (hereafter referred to as the ‘E&S Team’) to carry out an Environmental and Social Impact Assessment (ESIA) for the Project.

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, which is necessary prior to commencing construction and operation activities.

The Project is seeking 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. Typically, the first step within any ESIA study is the undertaking of the scoping process after which a scoping report is submitted. For the purpose of the ESIA, this will be based on the following requirements:

- European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2024) and associated Performance Requirements (PR);
- 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) Integrated Safeguards System Policy Statement and Operational Standards (2023);
- Equator Principles Association – Equator Principles (EP4), issued in July 2020;
- Japan Bank for International Cooperation (JBIC) Guidelines for Confirmation of Environmental and Social Considerations (2022); and
- Nippon Export and Investment Insurance (NEXI) Guidelines on Environmental and Social Considerations in Trade Insurance (2017).
- The Agence Française de Développement (AFD), Environmental and Social Framework 2018.

Therefore, the ESIA has been prepared to ensure that local EIA requirements in accordance with “Law No. 4 of 1994” are met as well as international E&S standards and requirements.

This report is the ESIA report to be submitted by the E&S Team 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 such as standalone documents which include the following:

- Non-Technical Summary (NTS)
- Stakeholder Engagement Plan (SEP)
- Health, Safety, Social and Environmental (HSSE) Management System (MS) Manual

- Cumulative Effects Analysis (CEA)
- Critical Habitat Assessment (CHA)
- Biodiversity Management Plan.

1.3 Project Setup and Responsibilities

Different entities are involved in the planning and implementation of the Project. Responsibilities of each entity are listed in the text below along with a general description of their roles.

- Shokeir Wind Energy: which consists of a consortium of ENGIE, Aeolus, and Orascom Construction (OC): The owner of the Project (hereafter referred to as ‘the Developer’).
- 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 will provide financing to the Developer for the development of the Project. Such IFIs will ensure that the Project is developed in accordance with international E&S standards and requirements. At this stage, the IFIs have not been selected or appointed yet but to include the reputable and experienced finance institutions in the field.
- Engineering, Procurement, and Construction (EPC) Contractor: will be 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, etc.). EPC Contractor will also be responsible for construction of the associated facilities of the Project to include the access road. 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.
- Lenders’ Technical Advisor (LTA) and Lenders’ Environmental and Social Advisor (LESA): Advisor 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: responsible for Operation and Maintenance (O&M) of the Project. The Project Operator has not been assigned at this stage;
- Egyptian Electricity Transmission Company (EETC): will be the off taker of electricity and is the entity that signed the Power Purchase Agreement (PPA) with the Developer. In addition, they will also be responsible for designing, building and operating the associated interconnection facilities. This will include the OHTL that will connect from 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 (ECO Consult and Safe Soar): hereafter referred to as the ‘E&S Team’ who is the ESIA

Practitioner and the consultant commissioned by RCREEE to prepare the ESIA for the Project in accordance with “Law No. 4 of 1994” as well as GIIP requirements.

1.4 Document Structure

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

Table 1: ESIA Document Structure

Section	Description of Content
Section 1 – Project Introduction	Introduction and background information on the Project
Section 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.
Section 3 – ESIA Approach and Methodology	Presents the methodology and approach that was adopted for the ESIA study.
Section 4 – Analysis of Alternatives	This Section 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.
Section 5 – Policy, Legal, and Administrative Framework	Provides an overview of the environmental and social regulatory and policy framework applicable to the Project.
Section 6 – 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 Section also discusses the future stakeholder engagement and consultation plans which are to take place at a later stage.
Section 7 – Existing Physical, Biological, and Social Environment	This Section 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 and Meteorology (Section 7.4), Biodiversity (Section 7.5), Avifauna (Section 7.6), Bats (Section 7.7), Archaeology and Cultural Heritage (Section 7.8), Air Quality and Noise (Section 7.9), Infrastructure and Utilities (Section 7.10) and Socioeconomics (Section 7.11)
Section 8 – Impact Assessment	This Section assesses the anticipated impacts from the Project throughout its various phases 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 8.8), Air Quality and Noise (Section 8.10), Infrastructure and Utilities (Section 8.11), Occupational Health and Safety (Section 8.12), Public Health and Safety (Section 8.13), Socio-economics (Section 8.14), and Summary of Anticipated Impacts (Section 8.15).
Section 9 – Assessment of Cumulative Impacts	Investigates the cumulative impacts which could result from incremental impacts from other known existing and/or planned developments in the area based on currently available information.

Section 10 – 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 Section describes the institutional framework and procedural arrangement for the ESMP implementation.
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2. PROJECT DESCRIPTION

This section 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 Project Location

Administratively, Egypt is divided into 27 Governorates. Governorates are then divided into Aqsam (singular: Qism⁵) or Marakez⁶ (Districts) which are then subdivided into local units, which are finally divided into cities, villages and hamlets.

The Project site is located within the Red Sea Governorate and is around 280 km to southeast of the capital Cairo. The Red Sea Governorate is bordered by the Red Sea Cost to the east and Bani-Suef, Menia, Asyout, Suhag, Qena, Luxor and Aswan Governorates to the west, Suez Governorate to the North, and North Sudan to the south. 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 seven (7) Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 108 km southeast of the Project site.

Table 2: Region Division of Egypt

Governorate	Legend	Governorate	Legend	Governorate	Legend
Cairo	11	Gharbia	3	Suhag	24
Alexandria	7	Menoufia	2	Qena	25
Port-Said	14	Behera	10	Aswan	27
Suez	12	Ismailia	6	Luxor	26
Damietta	13	Giza	19	Red Sea	22
Dakahlia	4	Bani-Suef	8	El Wadi El Gidid	21
Sharkia	5	Fayoum	18	Matrouh	20
Kalyoubia	1	Menia	17	North Sinai	15
Kafr-El-Sheikh	9	Asyout	23	South Sinai	16

⁵ Qism. In the administrative division of Egypt, the Qism is an urban district made up of neighborhoods and residential blocks (not villages). It usually has more commercial and government services than smaller neighborhoods and functions as the main local administrative unit in urban governorates and large cities.

⁶ Markaz. In the administrative division of Egypt, the Markaz is the main city or village followed by a group of villages in agricultural areas (not urban), and often the most important city is a Markaz for a total of villages. The Markaz has more commercial markets than villages, and there may also be branches of government service institutions and agencies serving villages. Each Governorate of the Delta and Upper Egypt includes a number of Markaz, Cities and villages.

The following table shows the site coordinates, and the following figures show the location of the site.

Table 3: Project Site Coordinates

Point	WGS Coordinates	
	Latitude	Longitude
P1	28.058275°	33.107624°
P2	28.050093°	33.087976°
P3	28.054249°	33.085661°
P4	28.009785°	32.987509°
P5	27.997892°	32.994579°
P6	27.994811°	32.995914°
P7	27.949099°	33.036973°
P8	27.995040°	33.107391°
P9	27.996837°	33.133561°

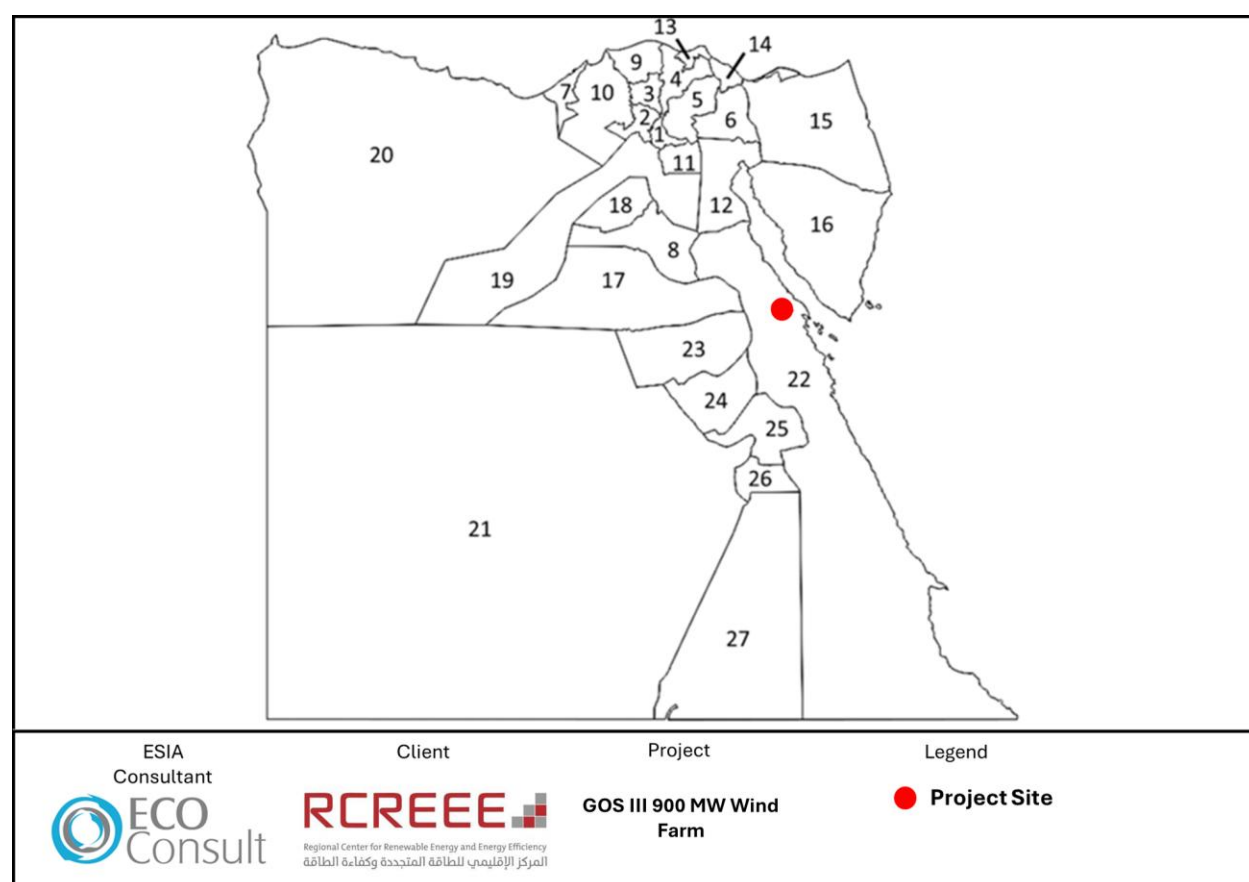


Figure 1: Administrative Division of Egypt

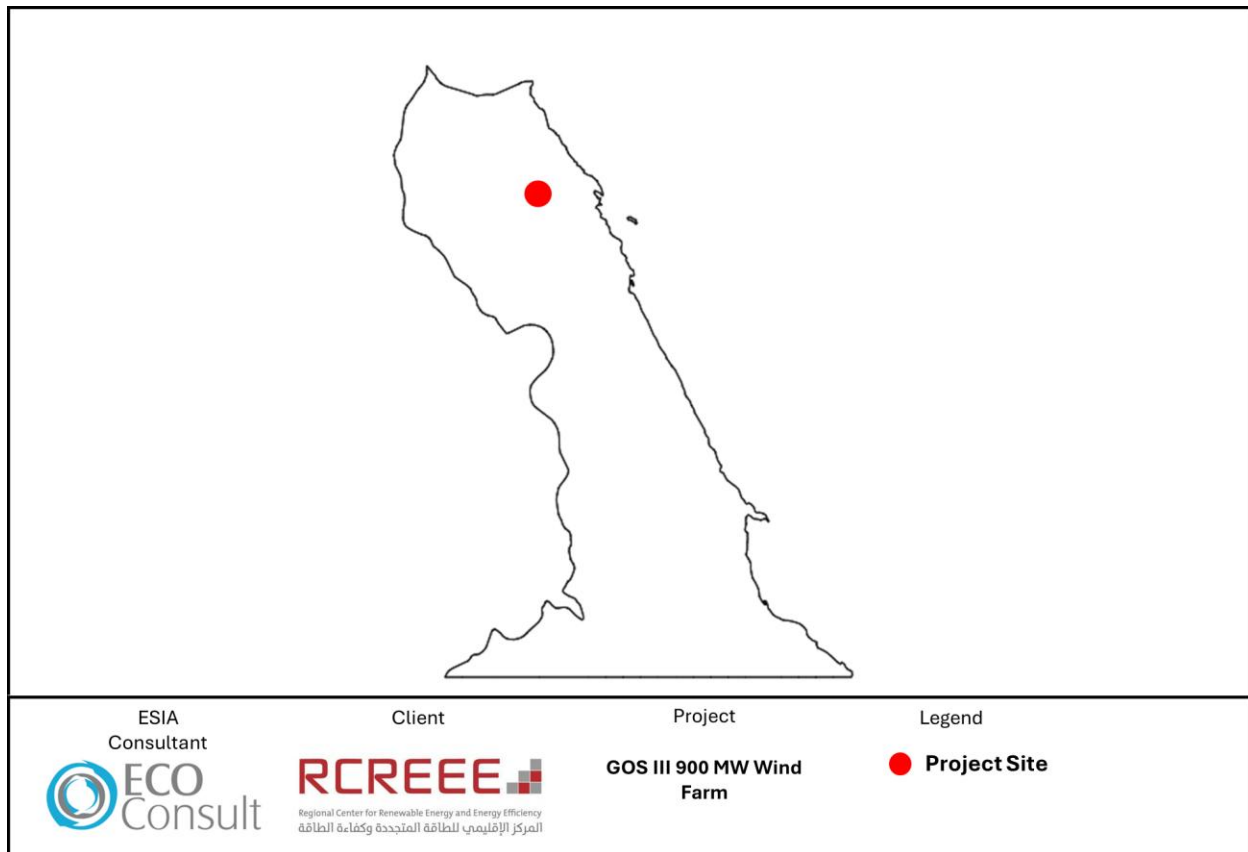


Figure 2: Red Sea Governorate

The Project site is located within the Ras Gharib City (or District) and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib town as well as two (2) rural (village) local units (Zaafarana and Wadi Dara). The closest community settlement to the Project site is Ras Gharib city that is located around 32 km to the northeast. Ras Gharib City is the second-largest city in the Red Sea Governorate, and the most important Egyptian city in terms of oil production.

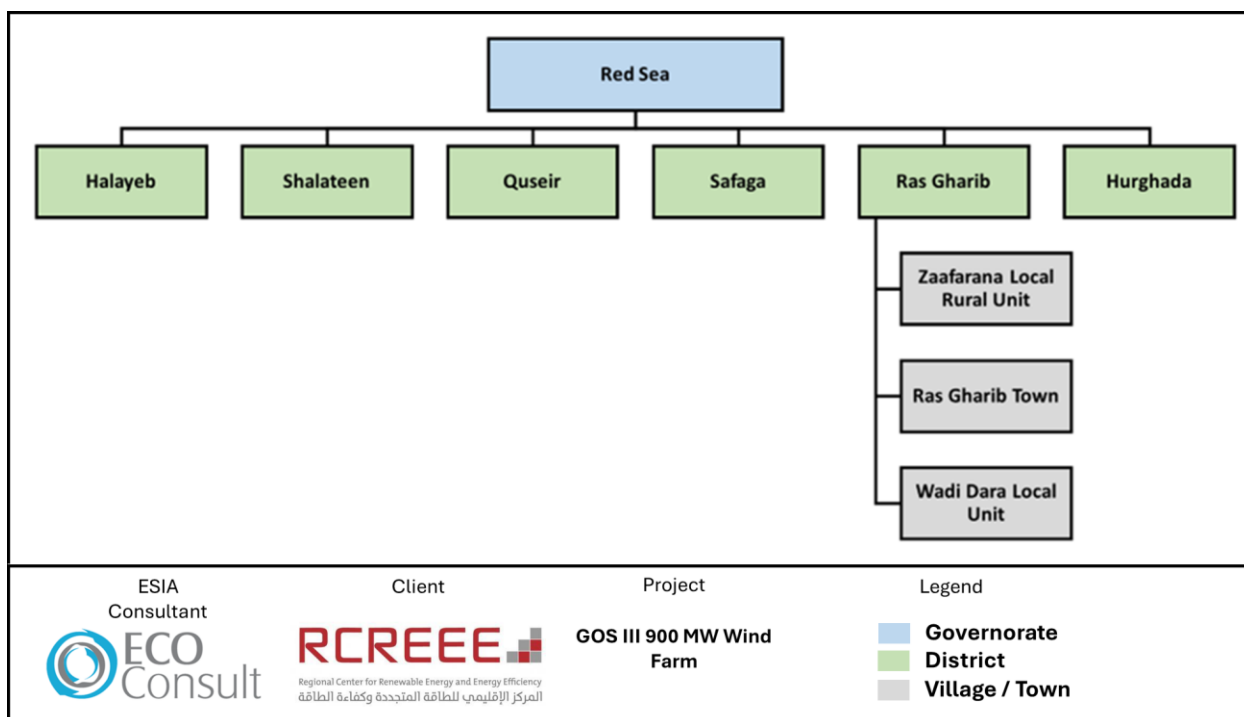


Figure 3: Administrative Division of Red Sea District

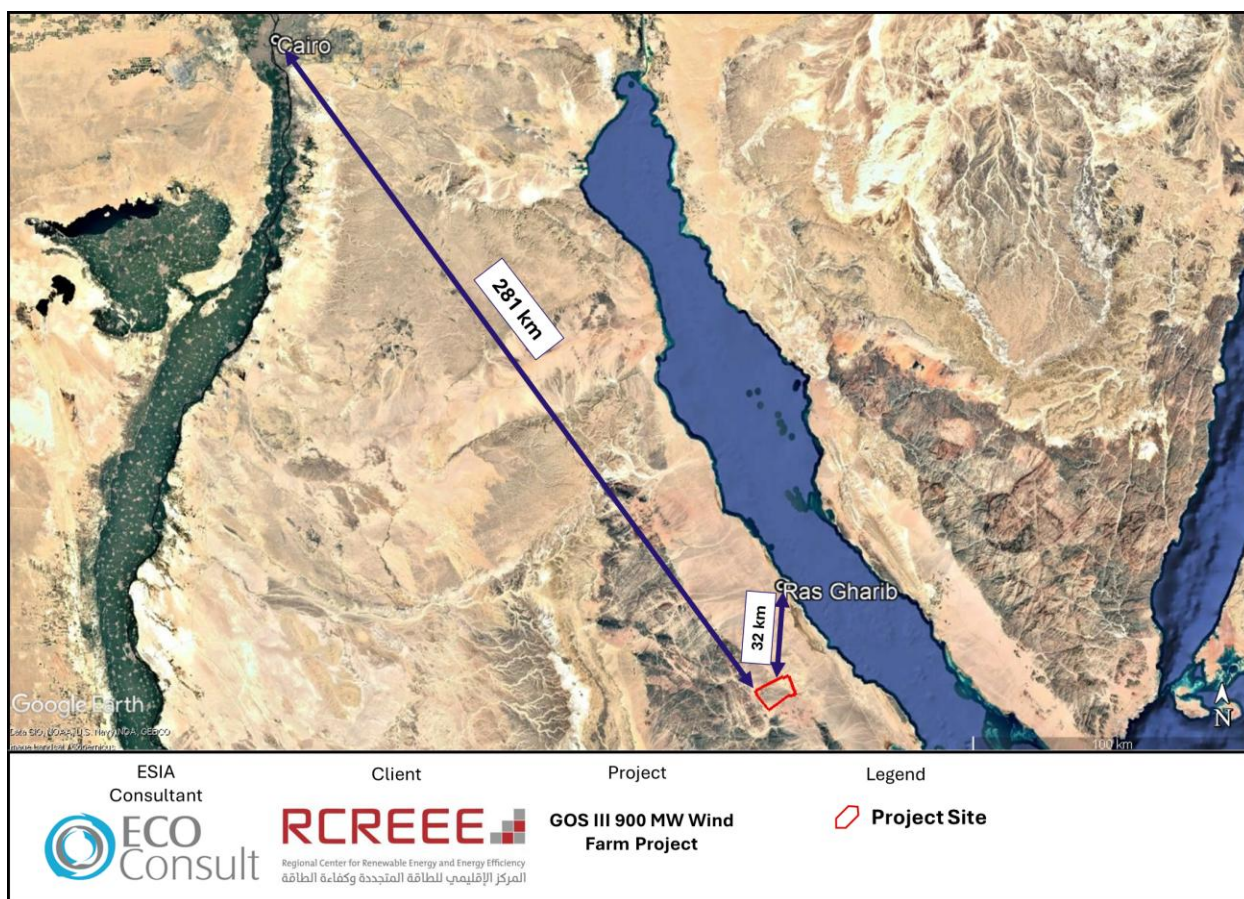


Figure 4: Project Distance from Cairo and Ras Gharib

As discussed earlier, the Project is located within one of several areas in the GoS allocated by the GoE for renewable energy project developments. The Project site has an area of 90 km² and lies within a 350 km² land defined by Presidential Decree No. 628 of 2024 which allocates this state-owned land to the NREA as shown in the figure below.

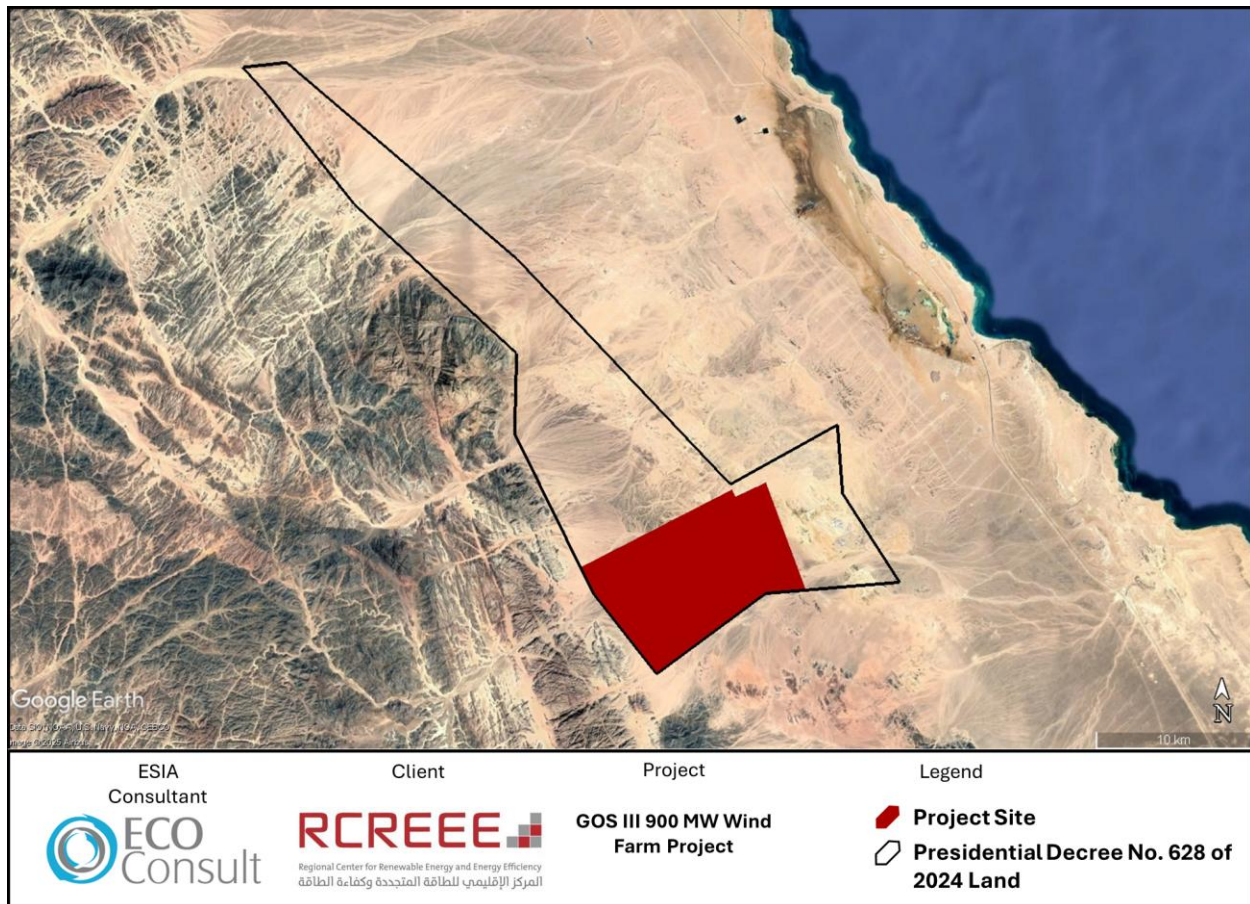


Figure 5: Project Site within Land Allocated for Renewable Energy Developments

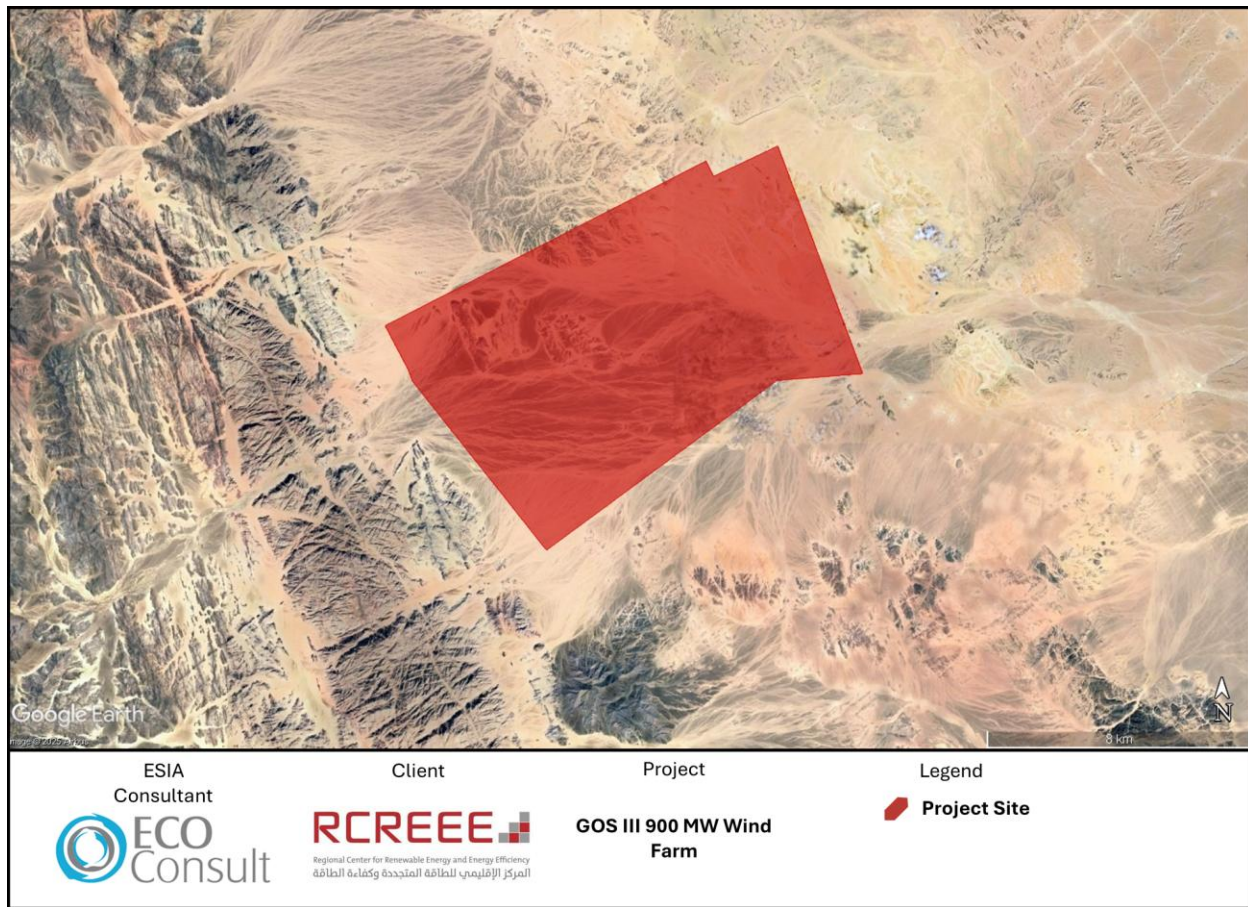


Figure 6: Project Site

2.2 Local Communities

Throughout the ESIA report, the term local communities will be used. This will refer to the following settlements in particular:

- Ras Gharib city is located around 32 km northeast of the Project site; and
- Wadi Dara village is located around 750 m southeast of the Project site. Although it is not considered a residential community area; however, it is an area where local communities engage in economic activities. Community members operate farms within Wadi Dara, and the area plays a significant role in supporting their livelihoods.

The above communities have been selected as affected communities based on the following rationale:

- Administrative Setup: the Project site as explained earlier is located within Ras Gharib District.
- Proximity to Site: the closest settlements were considered as local communities, therefore are the communities that are most likely to be impacted (positively or negatively) in some way by the Project.

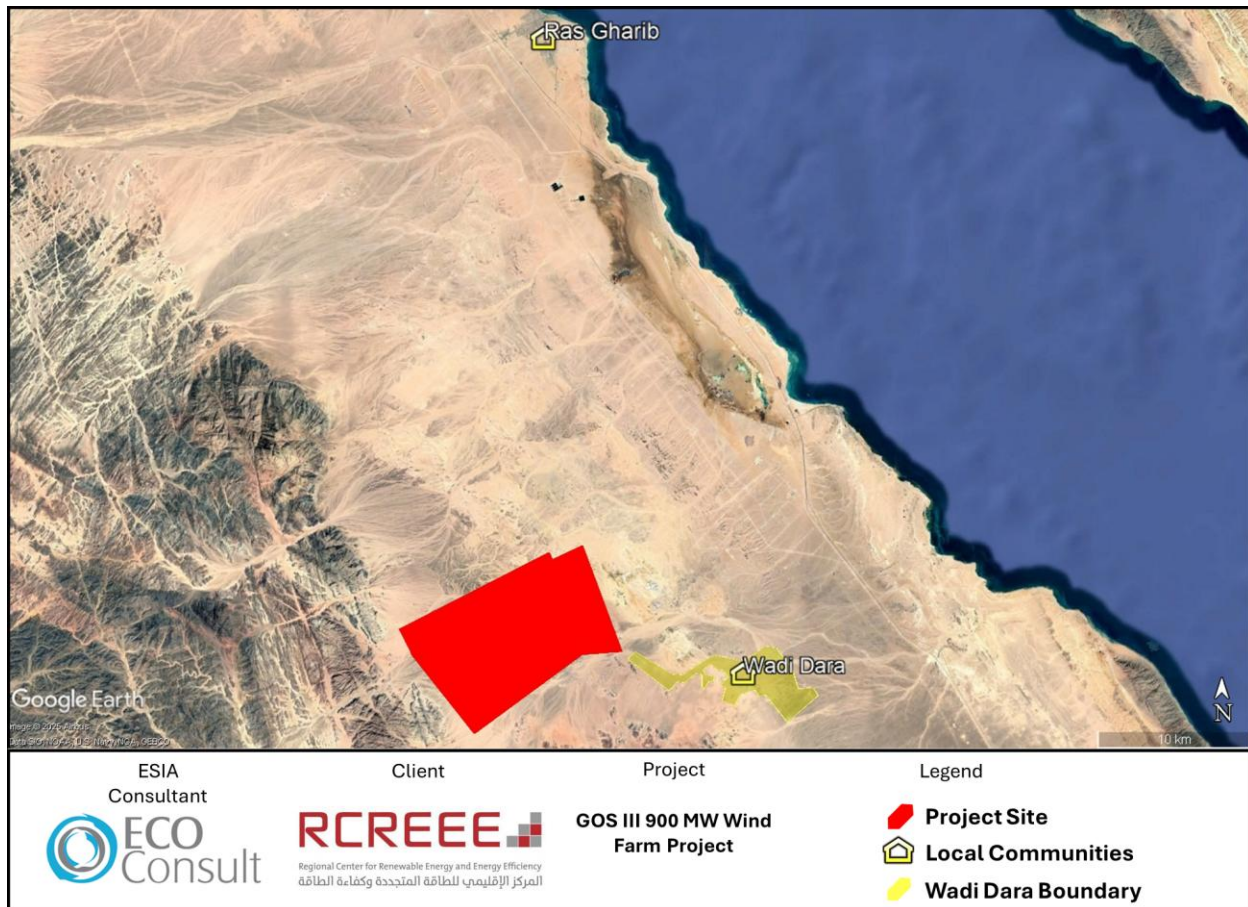


Figure 7: Project Site and Closest Communities

2.3 Project Components

2.3.1 Outline of Wind Turbine Technology

Wind turbines convert kinetic energy from the wind that occurs naturally in the earth's atmosphere into electrical energy. Wind's kinetic energy is converted to rotational energy with the turbine's rotor. This rotational energy is then, inside the wind turbine, transferred to the gearbox to adjust its rotational speed, before it is transformed into electrical energy with the generator. After some rectifications through converter, transformers and substations the electricity is delivered to transmission and distribution systems and then to the end user.

The figure below presents the key components of a wind farm each of which is discussed in further details throughout the subsequent sections.

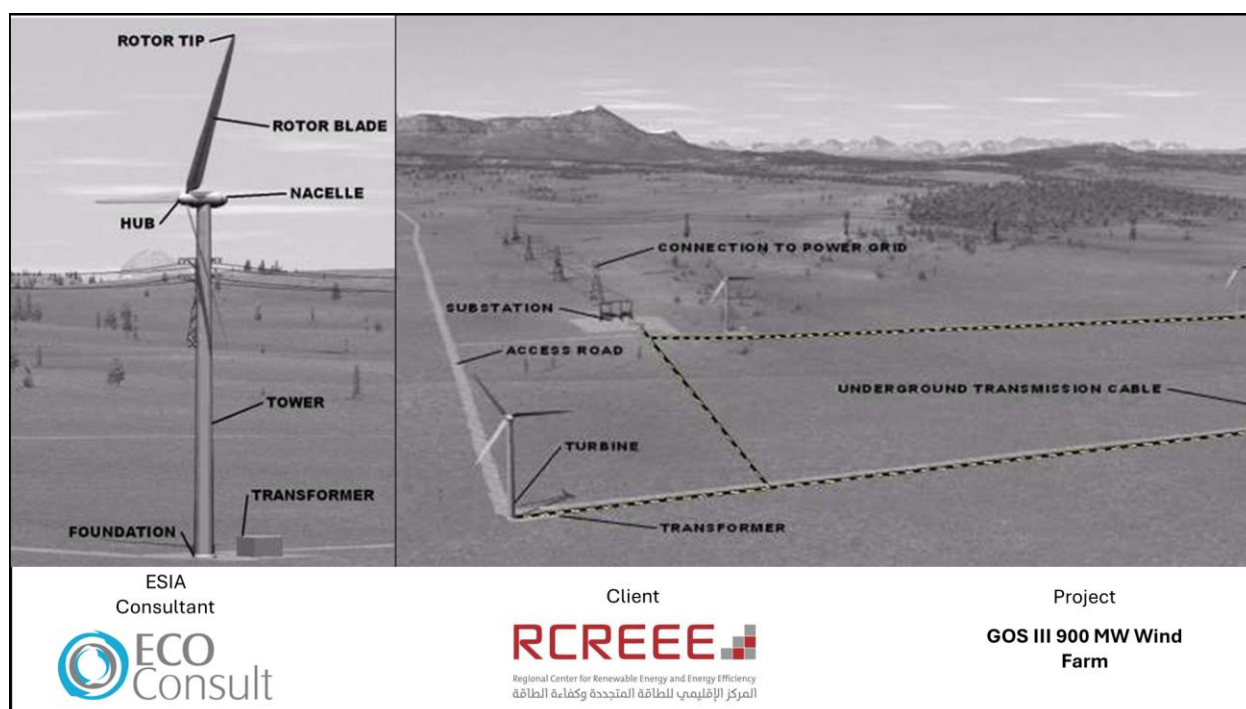


Figure 8: Typical Structural Components of a Wind Turbine and Wind Farm
(Source: EHS Guidelines for Wind Energy, IFC)

2.3.2 Wind Turbine Generators (WTG)

Generally, a WTG consists of a foundation, tower, nacelle, rotor blades, a rotor hub, and a transformer (refer to figure above).

Foundations will be constructed to bolt the tower of the WTG in place (one for each WTG); where in general each foundation consists of a circular footing of around 25m diameter, with a depth of 4m and an elevation of 1m. The foundation will be built with concrete reinforced with structural corrugated steel.

The WTG 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 WTG is equipped with a transformer that converts/steps up the output from the turbine to a higher voltage (from 0.61kV to 33kV) to meet a specific utility voltage distribution level that is appropriate for connection with a substation (explained in detail below).

Finally, next to each WTG will be a crane pad to accommodate cranes for the installation of the turbines and for maintenance activities during operation. The crane pads will 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 4,500 m².

The table below presents the final WTG specifications and the figure that follows presents the final WTG layout.

Table 4: Final WTG Specification

Item	Specification
Turbine Type	GWH204 – 10.5MW
Rotor Diameter (m)	207.7
Hub Height (m)	117.28
Tip height (m)	219.17
Number of turbines	86
Capacity per turbine (MW)	10.5
Area Swept by rotors (m ²)	33,881.52

In addition, the figure below also presents the final layout for the turbine options discussed above as provided by the Developer.

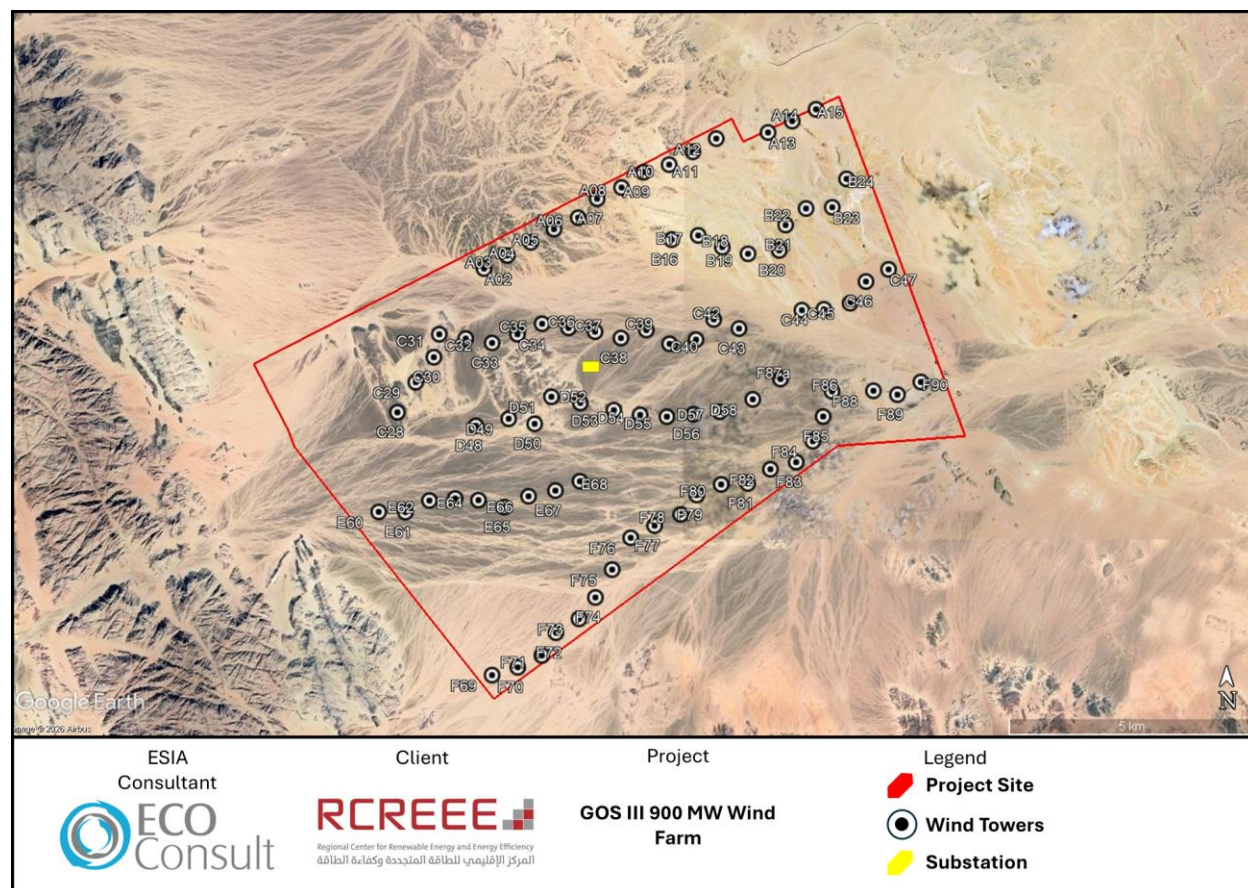


Figure 9: Final WTG Layout

2.3.3 Infrastructure and Utilities

The following highlights the key infrastructure and utility elements that will be required for the Project.

- Medium Voltage (MV) Cables:** The wind turbines will be connected through medium voltage cables (33kV or 35kV) 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 will 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 33kV or 35kV to 500kV) that is appropriate for connection with the High Voltage National Grid (500kV).
- **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:** An internal road network will be required within the Project site for installation of the turbines during the construction process and for ease of access to the turbines for maintenance purposes during operation. It is important to note that the internal road will follow to the greatest extent possible the existing track and dirt roads within the Project site.



Figure 10: Typical Substation

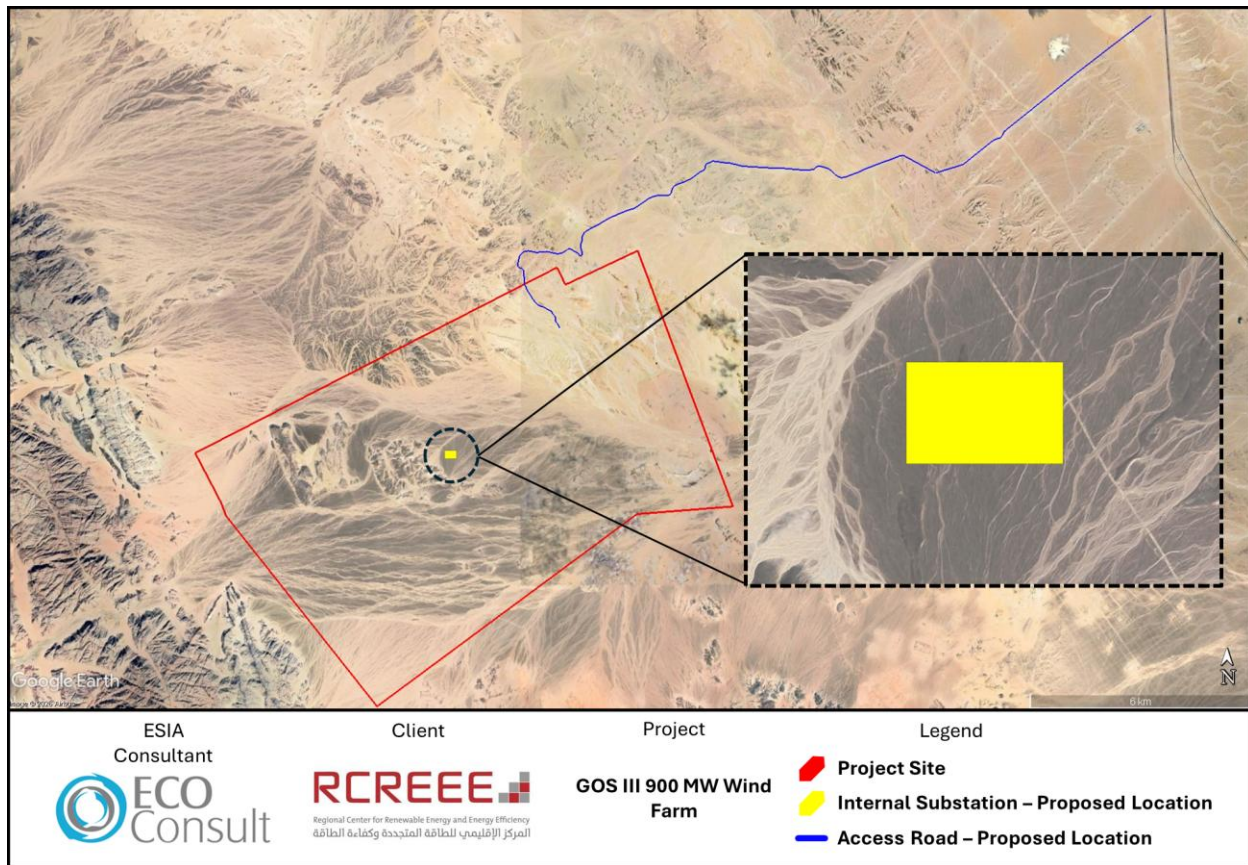


Figure 11: Proposed Locations of the Internal Substation and Access Road in Relation to the Project

2.3.4 Other Temporary Components

There are additional Project components that will be required on a temporary basis throughout the construction phase of the Project in particular. Those are identified below. The location of such components in particular will not be available at this point, nor is it expected to be available during the ESIA preparation phase. Those will be identified once the EPC Contractor is appointed and a detailed design is completed.

- **Site Offices:** temporary offices that will be used by Developer and EPC Contractor staff during the construction phase. It is expected that this will be within the Project footprint.
- **Laydown areas:** this is a temporary storage area where tools, materials, equipment and vehicles are stored when not in use. It is expected that this will be within the Project footprint.
- **Batching Plant:** a mobile concrete batching plant will be established within the Project footprint for preparation of the concrete to be used for foundation installation and other infrastructure requirements (e.g. substation, buildings, etc.). This will reduce transportation requirements compared to an off-site plant which is considered of significance importance given the remoteness of the site. A typical batching plant is provided in the figure below. It is expected that this will be within the Project footprint.
- **Borrow Pits:** borrow pits are used to provide fill materials such as gravel, sand, clay for various construction requirements such as base for road networks, foundations for WTGs, and other. A typical borrow pit is provided in the figure below. Those are expected to be from authorized / approved / licensed quarries that are offsite.

- **Generators:** generators will be used for supply of electricity throughout the construction phase of the Project for various power supply requirements. There will be no temporary power supply lines erected before or during the construction period.

As discussed in further details in “Section 10”, requirements for temporary components will be included within the Environmental and Social Management Plan (ESMP) and Health, Safety, Security and Environment (HSSE) Management System (MS) to be considered by the EPC Contractor when planning for such components.

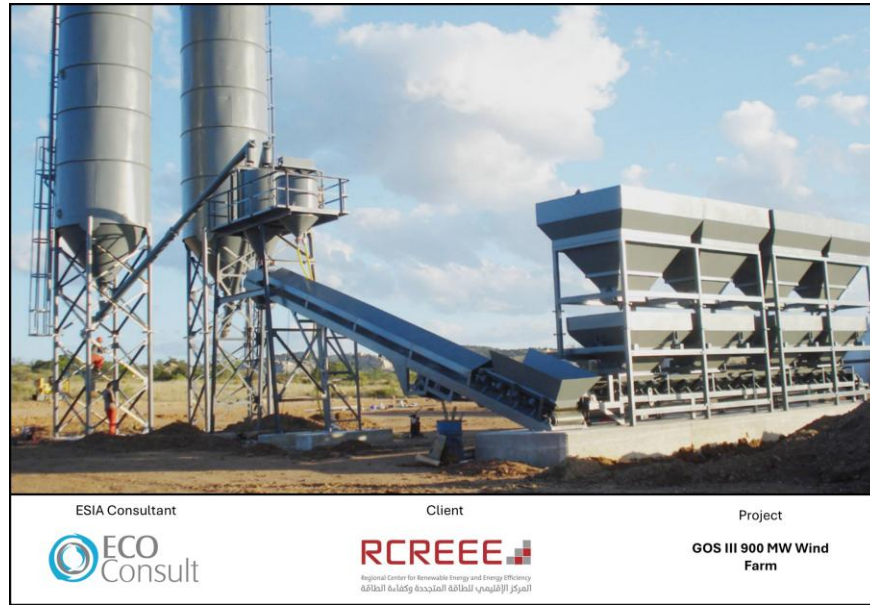


Figure 12: Typical Mobile Batching Plant



Figure 13: Typical Burrow Pit

2.3.5 Associated Facilities

Associated facilities are facilities that would not have been constructed or expanded if the Project did not exist and without which the Project would not be viable. For the purpose of this Project, the key associated facility is the Overhead Transmission Line (OHTL) that will connect from Project until the national grid in order to supply electricity to end users.

EETC is to be responsible for off-site connection works from the onsite substation to the National Grid. This will be through a 500kV Overhead Transmission Line (OHTL). EETC will 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.). A standalone E&S assessment will be undertaken for the OHTL once available.*

2.3.6 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, based on technical input provided by engineers that have prepared the final layout of the Project.

As noted in the table below, the total area of disturbance for the Project is significantly small, calculated at less than 2% of the total boundary of the Project area.

Table 5: Footprint of the Project Components

Component	Footprint	Description
Turbines	0.43 km ²	This includes the footprint for the foundation and the crane pad area for each of the 86 turbines. Typically, each crane pad is around 4,500 m ² in area, whereas each foundation typically consists of a circular footing of 24m diameter
Substation and Warehouse and Storage Facilities	0.1 km ²	Footprint for each substation, warehouse, and building facilities. The Project has 1 internal substation.
Cables	0.09 km ²	This includes MV cables (total length of around 51 km and width of 0.7 m) and telecommunication cables (total length of around 51 km and width of 1.15 m)
Access Road	0.04 km ²	This includes a total length of 5.19 km and width of 8 m.
Internal Road Networks	0.77 km ²	This includes the road network with a total length of around 51 km and a width of 15 m.
Temporary facilities	0.145 km ²	This includes site offices, laydown areas and batching plant. Those will be located within the Project boundary.
Total Project Footprint	1.58 km ²	
Total Project Site Boundary Area	90 km²	Project footprint is around 1.75% of the total boundary of the Project area.

2.4 Overview of Project Activities

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

2.4.1 Planning and Construction Phase

The typical activities that will 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.);
- Site mobilization and will involve transporting construction equipment, materials and personnel to the site. This includes setting up temporary facilities such as site offices and storage areas;
- Incorporation of findings from the comprehensive geotechnical study, which includes recommendations based on site investigations and subsequent laboratory testing and geotechnical analyses carried out in June 2025 for the Project, to inform the optimal placement and foundation design of wind turbines and associated infrastructure;
- 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 and OHTL tower foundations. 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, 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;
- 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); and
- Where possible, the EPC contractor will connect to existing utilities, including the power supply. Where this is not possible, power will be supplied by temporary diesel generators. At the time of writing this ESIA report, the precise number of generators needed has not yet been determined.

2.4.2 Operation Phase

Wind farm projects 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 can take around 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.

On the other hand, OHTL projects generally require extremely limited operational activities as this mainly includes the following:

- Routine maintenance and repair which would be based on a set schedule. This would include towers, conductors and accessories and would include activities such as insulators cleaning, joints tightening, checkup on foundations and its earthing, power conductor and earth wire conductor, etc.
- Non-routine maintenance which is undertaken in case of failure of any of the Project components and could include replacement of equipment such as broken insulators, worn-out cables, damaged cross-arms, etc.

2.4.3 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 or sent for final disposal. The base will be removed and the concrete foundations dismantled, and the area will be restored to the condition in which the Usufruct Land was handed over on the PPA Conditions Satisfaction Date, unless NREA decides otherwise and provides written notice.. Gates and fences (e.g. substation area and onsite offices) will be removed. Tracks used for maintenance vehicles will be restored and can be kept as agricultural routes.

2.5 Project Schedule

Discussed below is the preliminary and tentative schedule for the overall Project development that is available at this point, as provided by the Developer.

- Planning and Design phase: This phase is ongoing and is expected to be completed by July 2026.
- Construction phase: this will involve undertaking of all construction activities as identified earlier for the Project development. This is expected to require around 24 months starting from July 2026.
- Operation phase: is expected to start in July 2028 for the duration of the PPA which is as discussed earlier set for 25 years.

2.6 Workforce Requirements

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

- Around 800 job opportunity at peak during the construction phase for a duration of approximately 24 months. This will mainly include 250 skilled job opportunities (to include engineers, technicians, consultants, surveyors, etc.) and 550 semi-skilled and unskilled job opportunities (such as labourers, security personnel, housekeeping, etc.).
- Around 25 job opportunities during the operation phase for a duration of 25 years. This will include around 20 skilled job opportunities (such as engineers, technicians, administrative employees, etc.) and 5 unskilled job opportunities (such as security personnel, drivers, etc.).

The Developer is committed to adhering to transparent recruitment procedures which include local community members. In addition, the Developer is aiming to hire local community members to the greatest extent possible throughout the construction and operation phase for skilled and unskilled jobs, where community members have the prerequisite skills and qualities for the job. Recruitment will be undertaken in accordance with Egyptian law, on fair assessment of skills and qualities for the job. All employees will be subject to normal human resource practices and will have to conduct themselves in accordance with the Developer's disciplinary code. No discrimination, on ethnicity, gender, race or other such demographic factors will be allowed during recruitment. The only preferential factor shall be the fact that those are directly affected, subject to meeting all the prerequisites for recruitment of the specific job.

2.7 Other Wind Farm Developments within Red Sea Governorate

Within the Red Sea Governorate, there are several other wind farms that are both operational and under development. The New and Renewable Energy Authority (NREA) assigned plots in the GoS, east and west of the Nile, Benban and Kom Ombo regions for renewable energy. This includes a plot with an area of 350km² in the GoS for wind power projects that the Project lies in. The boundaries for all NREA plots can be seen in black in the figure below.^{7,8,9}

⁷ [Environmental and Social Impact Assessment Study 1,000 MW Wind Farms at the Gulf of Suez](#)

⁸ [Environmental Impact Assessment for Wind Energy Power Plant, Gabal El Zeet, Suez Gulf, in Egypt](#)

⁹ [Strategic and Cumulative Environmental and Social Assessment Active Turbine Management Program \(ATMP\) for Wind Power Projects in the Gulf of Suez](#)

The figure below presents the boundaries of these Projects, as well as the Project boundary.

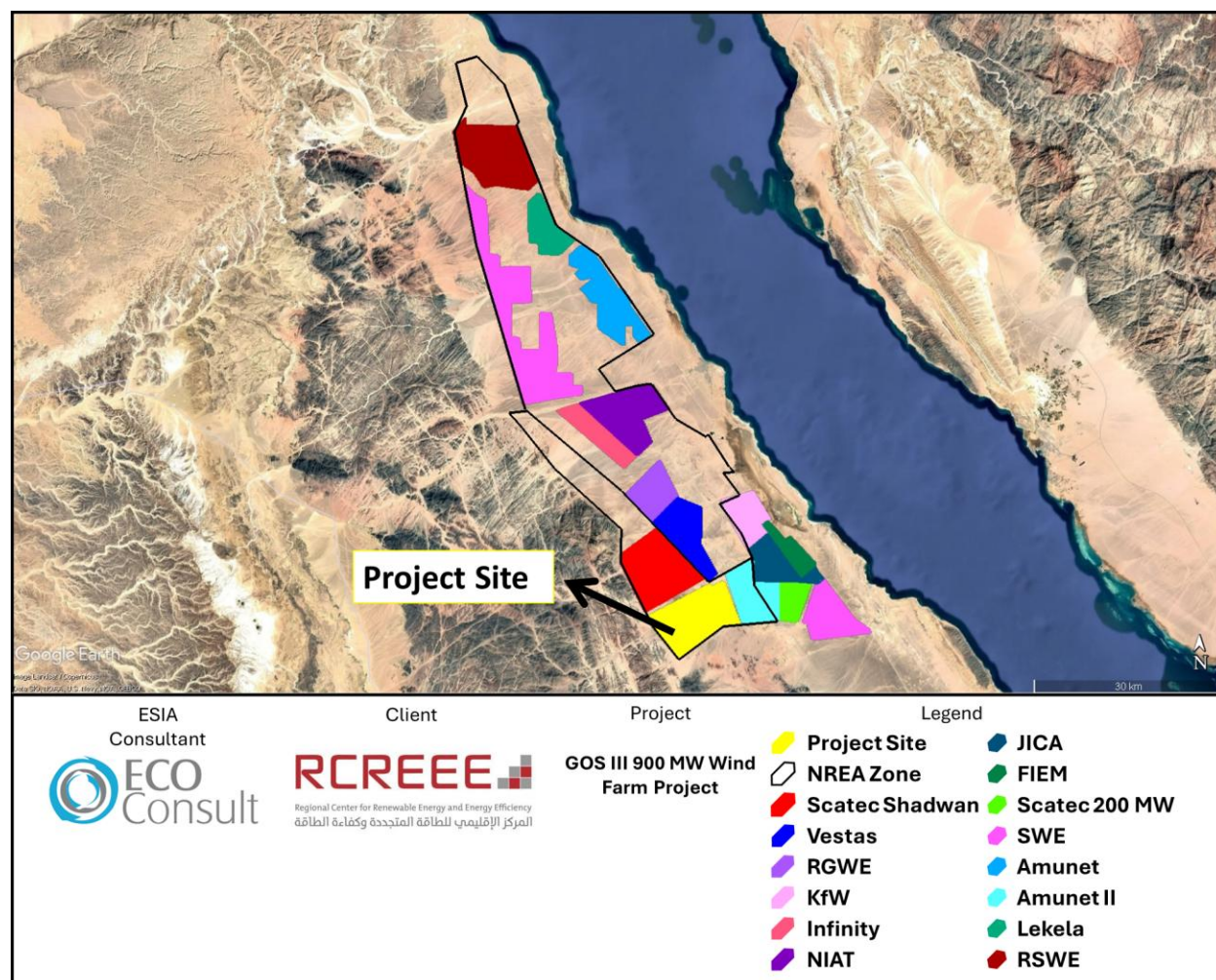


Figure 14: Wind Farm Developments within the Red Sea Governorate in Relation to the Project Site

Red Sea Wind Energy (RSWE) Wind Farm – 650 MW (Operational)

The RSWE wind farm is located approximately 68 km north-northwest of the Project site. It consists of an operational 500MW wind farm and a planned 150MW extension, developed under a BOO scheme by Red Sea Wind Energy S.A.E., for a total capacity of 650MW.

The development covers an area of approximately 75.8km² and comprise 104 turbines. The ESIA for the extension project was completed in 2024¹⁰, and the extension is operational since June 2025.

¹⁰ [BOO Wind Power Plant 500MW + 150MW Extension at the Gulf of Suez](#)

Scatec Shadwan Wind Farm – 900MW (Planned)

The Scatec Shadwan wind farm is located approximately 1 km north of the Project site and is within the NREA wind energy development zone. It covers a total area of approximately 90km² and comprises 83 turbines. The project is expected to be fully operational by June 2028.

Ras Ghareb Wind Farm (RGWE) – 262.5MW (Operational)

The RGWE wind farm is located approximately 14 km northwest north of the Project site and is within the NREA wind energy development zone. It covers a total area of approximately 41km² and comprises 125 turbines. The project is fully operational.

NREA – Governmental Wind Farms – 1332MW (Operational and Planned)

A cluster of five (5) wind farms developed under governmental agreements, located within the NREA wind energy development zone at various distances from the Project site.

- KfW Wind Farm – 240MW (Operational): located around 7km northwest of the Project site, with a total area of approximately 39km².
- JICA Wind Farm – 220MW (Operational): located around 5km east of the Project site, with a total area of approximately 44km².
- FIEM Wind Farm – 120MW (Operational): located around 11km east of the Project site, with a total area of approximately 22km².
- Vestas Wind Farm – 252MW (Operational): located around 470m northwest of the Project site, making it the nearest wind farm to the Project. It comprises 70 turbines and covers a total area of around 57km².
- NIAT Wind Farm – 500MW (Planned): located around 23km north of the Project site, with a total area of 73km² with 173 turbines planned.

Suez Wind Energy (SWE) Wind Farm – 1.1GW (under construction)

Through the BOO mechanism, a direct proposal was submitted by ACWA Power to EETC for the development of a 1.1 GW wind farm in the Gulf of Suez. The project is within the NREA wind energy development zone that will be developed over two geographically separate plots:

- Plot 1 (550MW): located approximately 37km north-northwest of the Project site.
- Plot 2 (550MW): located approximately 10km southeast of the Project site.

The development covers a total area of around 145km² and include 138 turbines (69 per plot). Separate ESIs were prepared in 2024 for each plot^{11,12}. The PPA is signed, and the project is expected to be operational by 2027.

Scatec Wind Farm – 200MW (Planned)

Through the BOO mechanism, a direct proposal was submitted by Egypt Green Hydrogen SAE for the development of a 200MW wind farm in the Gulf of Suez within the NREA wind energy development zone.

¹¹ [SUEZ Wind Energy BOO Wind Power Plant 1.1 GW – SWE North \(PLOT 1\)](#)

¹² [SUEZ Wind Energy BOO Wind Power Plant 1.1. GW – SWE South \(PLOT 2\)](#)

The site is located approximately 13km southeast of the Project site covering an area of approximately 22km² to include 25 turbines. The PPA is signed, and the project is expected to be operational in 2027.

Amunet Wind Farm – 500 MW (Operational)¹³

Through the BOO mechanism, a direct proposal was submitted by Amunet Wind Power Company S.A.E. to EETC for the development of a 500MW wind farm in the Gulf of Suez. The site is almost fully within the NREA wind energy development zone and is located approximately 39 km northwest of the Project site covering an area of 69.4km², with the plan to include up to 77 turbines. The PPA is signed, and the project is in operational since Q3 2025¹⁴.

Amunet II Wind Farm –500MW (Planned)

Through a BOO mechanism, a direct proposal was submitted for the development of a 500MW wind farm in the Gulf of Suez. The site is expected to have around 80 turbines. It is located to the 750m south of the Project site, covering a total area of 54km² within the NREA wind energy allocated development zone.

Infinity Wind Farm – 200MW (Under Construction)

Through a BOO mechanism, a direct proposal was submitted by Infinity Power Holding (IPH) for the development of a 200MW wind farm in the Gulf of Suez. The site is expected to have 26-28 turbines. It is located around 22.3km north of the Project site, covering a total area of 27.5km² within the NREA wind energy development zone. The PPA has been signed, and according to the ESIA timeline¹⁵, the project is expected to be operational in January 2026.

West Baker Wind Farm – 250MW (Operational)¹⁶

Through a BOO mechanism, a direct proposal was submitted by Lekela Power for the development of a 250MW wind farm in the Gulf of Suez within the NREA wind energy development zone, and the PPA was signed accordingly. The site is located around 57km north-northeast of the Project site and has 96 turbines covering a total area of 36km².

¹³ [Amunet Wind Farm 500 MW at Gulf of Suez](#)

¹⁴ <https://www.ameapower.com/786-2/>

¹⁵ [Masdar Infinity Power Holding 200MW Wind Power Project in Gulf of Suez](#)

¹⁶ [ESIA for Lekela BOO Wind Power Plant at Gulf of Suez](#)

3. ESIA APPROACH AND METHODOLOGY

This section presents the overall approach and methodology that was followed throughout the ESIA process for the Project.

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 analyze 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, including the IFC PS 1.

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

3.2 Stakeholder Consultation and 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 international E&S standards and requirements. The previous and future stakeholder consultation and engagement for the Project are summarized below and discussed in detail in “Section 4”.

The Project to date has included extensive stakeholder consultation and engagement with various stakeholder groups such as national governmental entities, regional and local governmental entities, Non-Governmental Organizations (NGOs), local communities, and other as appropriate. This has been undertaken through bi-lateral meetings, Focus Group Discussions (FGD), e-mail communication, phone communication, formal letters, and other.

“Section 4” also discusses future stakeholder engagement and consultations which are to take place at a later stage. This mainly includes: (i) disclosure of Project documentation on Developer’s website; (ii) distribution of Project documentation at key local community platforms; and (iii) 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 Spatial Study or Area of Influence (Aoi)

Before detailing the methodology of the assessment, it is important to delineate the study boundaries and the scope of the assessment that will be undertaken, both of which are discussed below.

Definition of Spatial Study Area

The overall study area (or AoI) for the ESIA represents the potential Area of Influence (AoI) 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 study area for the Project ESIA includes the footprint of Project disturbance as demarcated in red in the figure below. This includes the wind farm Project site with a total area of 90km².

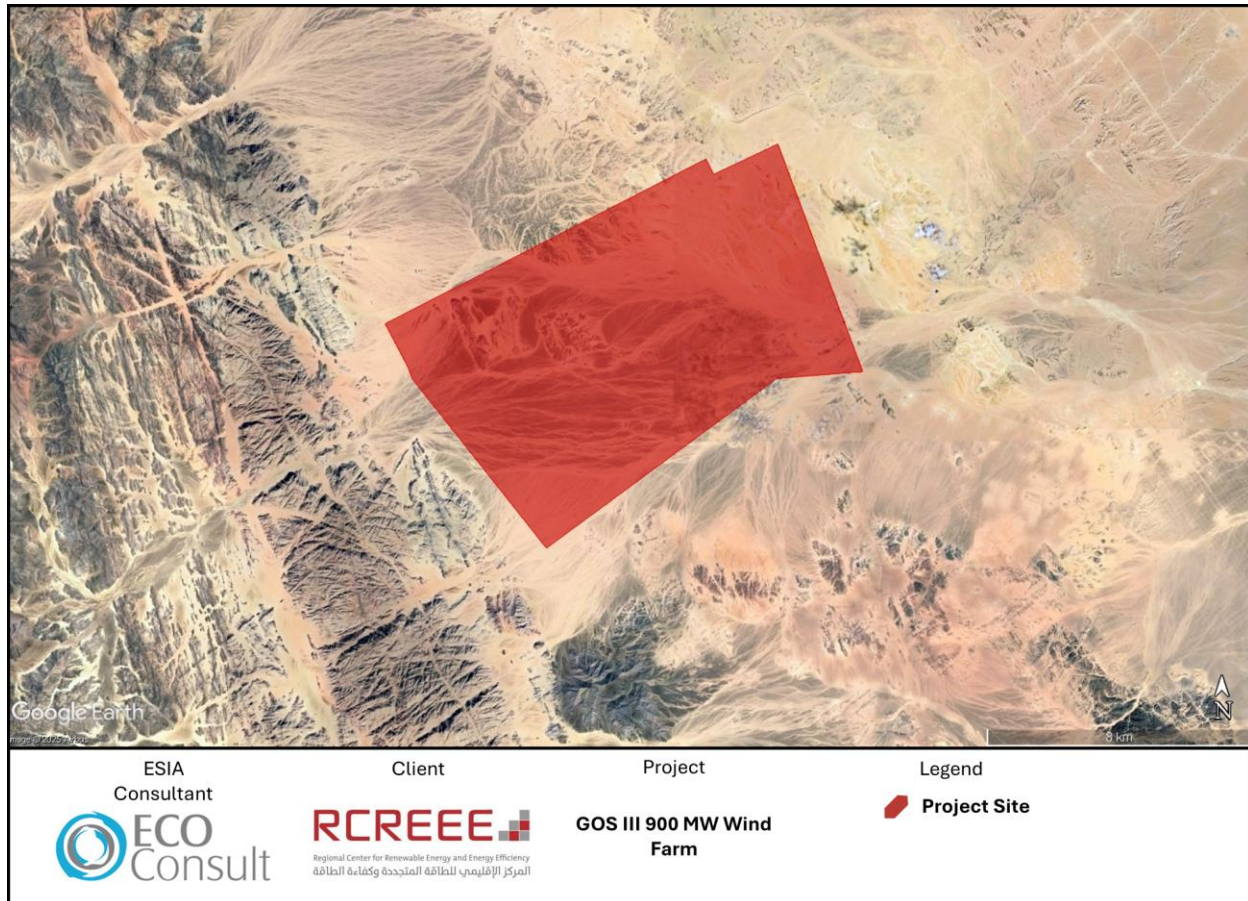


Figure 15: Study Area

However, for certain E&S parameters (such as noise, landscape and visual, socioeconomics, etc.), the study area 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 study area is clearly identified within the relevant section it relates to throughout this ESIA.

In identifying this thematic study area, 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

3.3.2 Temporal Scope of the Assessment

The Project will 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 will 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.

3.3.3 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 study area. 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 “Section 7” to include the following: landscape and visual; land use; geology/hydrology/hydrogeology; biodiversity, avifauna, bats; archaeology and cultural heritage; air quality and noise; infrastructure and utilities; and socioeconomic conditions. Within each section, the methodology which was undertaken throughout 2025. This also included accounting for seasonal factors for biodiversity, avifauna, and bats – refer to “Sections 7.5” to “Section 7.7” for additional details on timing of surveys undertaken.

3.4 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 8.14”. The following section provides a description of the approach, methodology and process adopted for the impact assessment presented within this ESIA.

3.4.1 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.

3.4.2 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.

3.4.3 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 will disappear within a 1-year period, or once construction activities are completed.
- Medium Term: applies to impacts whose effects on the environment will disappear within a 5-year period; and
- Long Term: applies to impacts whose effects on the environment will disappear in a period greater than 5 years.

Reversibility

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

3.4.4 Assessing the Significance of the 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.

Table 6: Determination of Significance

Sensitivity of Receiving Parameter/Receptor \ Magnitude of Impact	Low	Medium	High
	Low	Medium	High
Low	Not significant	Minor	Minor
Medium	Minor	Moderate	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:** Based on the above methodology such impacts result in high magnitude and affect receptors that are highly sensitive. Those are impacts that are considered to have potentially significant and adverse risks and will be a key factor in the overall decision-making process of the Project. In addition, they will also require detailed considerations for mitigation and monitoring measures.
- **Moderate significance:** Based on the above methodology such impacts either (i) result in medium magnitude and affect receptors that are of medium or high sensitivity; or (ii) result in high magnitude and affect receptors that are of medium sensitivity. Those are impacts that are considered to have potentially limited adverse risks and are unlikely to have a significant effect on the overall decision-making process. In addition, mitigation and monitoring measures require some consideration.
- **Minor significance:** Based on the above methodology such impacts either: (i) result in low magnitude and affects receptors that are of medium or high sensitivity; or (ii) result in medium magnitude and affects receptors that are of low sensitivity; or (iii) result in high magnitude and affects receptors that are of low sensitivity. Those are impacts that are considered to have minimal risks and unlikely to be of importance for the overall decision-making process. In addition, mitigation and monitoring measures are readily available to address such risks; and
- **Not significant:** Based on the above methodology such impacts result in low magnitude and affect receptors that are of low sensitivity. Such impacts are beneath the level of perception and do not require any mitigation or monitoring measures.

3.4.5 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 will firstly consider 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, identify 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; and

- **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.

3.4.6 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 into 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 8.15”.

3.4.7 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. Assessment of cumulative impacts is presented in “Section 11”.

3.5 Development of Framework Environmental and Social Management Plan (ESMP)

Based on the results of the impact assessment, development of management measures, and development of monitoring plan, a framework ESMP was compiled into a single table that details all of the above. The framework ESMP will be a key document and will list the E&S requirements and detail the procedures necessary for managing the significant E&S issues connected to proposed Project activities. The framework ESMP will 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 framework ESMP can be used as a stand-alone document during the different phases of the Project by Developer, EPC Contractor, Ministry of Ecology, Environmental Protection, and Climate Change, and other responsible parties.

The framework ESMP aims to provide high level mitigations and requirements for managing the E&S risks anticipated from the Project.

Throughout the Project's construction and operation phase an Environmental and Social Management System (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 framework ESMP presented throughout this document. The development and implementation of an ESMS is considered a key requirement under international E&S standards and requirements. The ESIA also identifies the overall framework, structure and key requirements for the ESMS for the key entities involved in the Project.

Note: as discussed previously under "Section 2.3", during the construction phase there will be temporary facilities which their location will not be known throughout the ESIA phase. This includes site offices, laydown areas, batching plant, and borrow pits. The ESMP will identify key requirements for such facilities in particular.

4. STAKEHOLDER CONSULTATION AND ENGAGEMENT

This section 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 section also discusses the future stakeholder consultation and engagement plans which are to take place at a later stage of the ESIA process as well as the Project development.

4.1 Objectives

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 Project development in June 2025.

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interest in a project and/or the ability to influence its outcome, either positively or negatively.

Stakeholders 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 organizations and groups with special interests, (iii) the academic community, or other businesses.

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 section are to:

- 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.

4.2 Stakeholder Identification and Analysis

The purpose of stakeholder identification is to identify and prioritize Project stakeholders for consultation. Stakeholder identification is an ongoing process, and thus key stakeholders will 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 categorized into the following main categories:

1. People and groups who will be 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 below. The list can be updated and modified in the course of the Project development and as a result of cooperation of the parties.

Table 7: Identified Groups of Stakeholders

Stakeholder Group	Description	Relevance
Stakeholders who may be directly or indirectly affected by the Project		
Local communities which as identified include:	▪ Ras Gharib city ▪ Wadi Dara village	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 this ESIA document. ▪ <u>Community Leaders</u>: They are socially active members and known figureheads for local community members, who may or may not hold government positions. ▪ <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.)
Stakeholders who may Participate in Implementation of the Project		
Investor / lender	Entities that will provide financing for the Project development.	They have interest in ensuring that the Project is developed and implemented in accordance with their E&S requirements and standards and will monitor the compliance of the Project with such requirements.
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		
National Governmental Ministries		
The Egyptian Environmental Affairs Agency (EEAA)	Entity authorized to regulate environmental management issues.	For this Project it will be responsible for reviewing and approving the ESIA study, issuing the environmental permit for the Project, as well as monitoring the implementation of the ESMP and compliance with other conditions of approval as applicable.
Egyptian Electricity Transmission Company (EETC)	Entity that has signed the PPA with the Developer to be the off taker of electricity.	For this Project, they will also be responsible for designing, building and operating the associated interconnection facilities. This will include the Project's connection to the national grid which includes an Overhead Transmission Line (OHTL) or similar.

Stakeholder Group	Description	Relevance
New & Renewable Energy Authority (NREA)	Entity that acts as the national focal point for expanding efforts to develop and introduce renewable energy technologies to Egypt.	For this Project, NREA was the entity responsible for allocation of the land for the development of the Project. Also, they are entrusted to plan and implement renewable energy programs in coordination with national and international institutions.
Ministry of Labour	Official governmental entity responsible for setting labour policies and legislations as well as ensuing protection of labour rights and working conditions.	They have a vested interest in ensuring that labour rights a proper working conditions are maintained for the Project in accordance with Egyptian laws and regulations.
Ministry of Tourism and Antiquities	Entity that is responsible for the preservation and protection of the heritage and ancient history of Egypt, under which operates all inspector offices in the governorates.	For this Project, they are the entity that ensure development activities do not negatively impact cultural heritage sites. In areas near archaeological or historically significant locations, the Ministry is responsible for assessing potential risks, granting necessary approvals, and overseeing measures to preserve and protect antiquities during project implementation.
Ministry of Civil Aviation	Official governmental entity responsible for civil aviation management in Egypt.	They are responsible for issuing permits for projects with specific height requirements and warning signs for future connection of overhead transmission line (s)(OHTLs).
Ministry of Interior	Entity that is responsible for national and local security, as well as approving emergency response and firefighting plans for establishments/projects.	The entity ensures security and public safety throughout the project's lifecycle. This includes protecting the project site, safeguarding equipment, and maintaining order during construction and operation.
General Petroleum Company	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.	They are one of the subsidiary companies affiliated with the Ministry of Petroleum. They could have right of concession for petroleum exploration in some parts of the Project area and adjacent areas.
Armed Forces Operations Authority	Official governmental entity that is responsible for military aviation management in Egypt.	The entity is responsible for issuing permits for projects with specific height requirements (such as wind turbines).
National Telecom Regulatory Authority (NTRA)	Entity that is responsible for the overall regulation and administration of the telecommunication sector in Egypt including interface with telecommunication companies and their infrastructure elements.	The entity is required to provide and approval ensuring that the project does not impact infrastructure elements such as broadcasting towers.
Telecommunication Operators	Could own and operate telecommunication infrastructure within the area. This includes mainly Orange, Etisalat and Vodafone.	Approval is required for the project given that it could impact on such infrastructure elements.

Stakeholder Group	Description	Relevance
Radio and Television Unit	Responsible for overall regulation and administration of the radio and television sector in Egypt including infrastructure elements	Approval is required for the project given that it could impact on such infrastructure elements.
Local Government Ministries and District Authorities		
Red Sea Governorate	The Governorate's main role is supporting the Project in all aspects as required to include providing required permissions.	The key departments of the Governorate that are related to the Project include the following: ▪ <u>Environmental Administration</u> is responsible for monitoring compliance to environmental requirements along with EEAA; ▪ <u>Labor Office</u> 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; ▪ <u>Roads Directorate</u>: responsible for services and development of external roads in the governorate and issuing permits for any construction work on the external roads; ▪ <u>Public Health Directorate</u>: provide the health services and facilities to the local districts and ensure overall local community health and safety.
Ras Gharib Local City Council	The City Council's main role is supporting the Project in all aspects as required to include providing required permissions.	The Council is responsible for administrative oversight as well as supervision and follow-up for monitoring compliance with environmental requirements along with EEAA and Red Sea Governorate.
Wadi Dara Cooperative Association	Wadi Dara Cooperative Association was established in 1994/1995 through an official governmental decision, through which the government allocated land areas in Wadi Dara to the Association for agricultural reclamation.	The Association is the responsible entity that manages the overall agricultural development process within Wadi Dara, including dividing and allocating lands within these areas and selling them to private sector investors. The Association works closely with the Red Sea Governorate.
Directorate of Social Solidarity Ras Gharib	Official governmental entity that acts as the overall management, organization and registration of local community association, foundations and NGOs.	The entity 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 (RSWWC) – Ras Gharib Sanitation Authority – Ras Gharib	Official entity responsible for water and wastewater management within the Governorate.	The entity that will be responsible for providing the Project's requirements of water as well as disposal of wastewater.
Hazardous Waste Management Unit	Entity responsible for hazardous waste management within the Governorate	The entity that will be responsible for the disposal of hazardous waste.

Stakeholder Group	Description	Relevance										
– Red Sea Governorate												
Solid Waste Management – Red Sea Governorate	Entity responsible for solid waste management within the Governorate	The entity that will be responsible for the disposal of solid waste.										
NGOs												
Nature Conservation Egypt (NCE)	NCE is the Birdlife International partner in Egypt and is a member of the International Union for the Conservation of Nature (IUCN). Nature Conservation Egypt (NCE) is an Egyptian NGO working towards conserving Egypt’s natural heritage and the promotion of its sustainable use, for the benefit of present and future generations.	Egypt’s leading experts in the field of nature and biodiversity conservation, NCE is specialized scientific research, advocacy, education and outreach to support species, their habitats, and local communities. NCE works in partnership with local experts and governmental bodies, as well as international organizations and partnerships to ensure efficient collaboration for conservation within and across borders.										
Regional Center for Renewable Energy and Energy Efficiency (RCREEE)	RCREEE is an intergovernmental organization serving 17 Arab countries, acting as the regional hub for advancing renewable energy and energy efficiency. RCREEE supports policy development, capacity building, and technical assistance to promote sustainable energy across the Arab region.	RCREEE is 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. In addition, during the operation phase, RCREEE will be responsible in particular for the implementation of the Active Turbine Management Plan (ATMP).										
<table><tr><th>NGOs/ CBOs</th><th>Scope</th></tr><tr><td>Resala Association</td><td>Social and family services</td></tr><tr><td>El Fardos NGO for Patients’ Care and Service</td><td>Social and family services</td></tr><tr><td>Ibad Al-Rahman Women’s Association</td><td>Social and family services</td></tr><tr><td>Youth Educated Females on Public Service</td><td>Community Development</td></tr></table>			NGOs/ CBOs	Scope	Resala Association	Social and family services	El Fardos NGO for Patients’ Care and Service	Social and family services	Ibad Al-Rahman Women’s Association	Social and family services	Youth Educated Females on Public Service	Community Development
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Youth Educated Females on Public Service	Community Development											
Other												
Media (Newspaper, Television, Internet)	Ensuring that Project activities do not impact any of their infrastructure and utility elements within the area.											
Academic and Research Institutions												
Educational Directorate Ras Gharib	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.											

4.2.1 Vulnerable Groups

A key stakeholder group to which particular attention must be considered during identification are vulnerable groups. Those are groups that due to their socio-economic characteristics may experience impacts more severely and/or disproportionately compared to the rest of the of the community members.

Vulnerable groups are project specific and depend on a range of issues which must be understood such as project location, socio-economic and demographic context, as well as the nature of the development and type of impacts anticipated. Vulnerable groups may be severely affected by the Project by virtue of their physical disability, social or economic standing, and limited education, lack of employment or access to land.

The key vulnerable groups within the context of the Project and their relevance are summarized in the table below.

Table 8: List of Vulnerable Groups and Their Relevance

Group	Relevance
Women groups to include single mothers and widows	Could be considered vulnerable as cultural norms could limit their participation in the decision-making process in general that is related to the Project. Even though such cultural norms are considered applicable within local communities, however Bedouin women are considered much more vulnerable than mainstream women in Upper Egypt.
Disabled groups	Could be considered vulnerable groups mainly due to physical disability which could limit their access to information on the Project as well as participation in the decision-making process in general that is related to the Project.
Elderly Groups	Could be considered vulnerable by limitations of access to participate in the Project related community decision-making process.

4.2.2 Indigenous Peoples

A common consideration across the Project site is a consideration of potential impacts on Indigenous Peoples (IPs). It is noted however, that the Indigenous World 2025 Report¹⁷ states that Egypt is not classified as a country with indigenous people. This conclusion is consistent with the E&S Team's prior experience undertaking E&S assessments for IFI-funded projects in Egypt, including within the Gulf of Suez, where Indigenous Peoples standards were not triggered. This reflects the absence of groups within the national context that meet the criteria for Indigenous Peoples as defined by relevant IFI safeguard frameworks. Therefore, the Project does not trigger standards related to Indigenous Peoples.

4.3 Stakeholder Consultation and Engagement to Date

4.3.1 Targeted Consultations

Targeted consultations were undertaken with various stakeholder groups as highlighted below. During such targeted consultations, a handout was provided in advance in local language (mainly in Arabic language) which entailed information on Project, its location, components, overall ESIA process, key impacts anticipated during the various Project phases, contact details, and other.

- National governmental entities;
- Regional governmental entities;

¹⁷ [The Indigenous World 2025](#)

- Non-Governmental Organizations (NGOs); and
- Gas Exploration Entities.
- Academic and Research Institutions

The detailed minutes of meeting of such consultations along with name/position of person met for each entity is provided in Annex I.

Table 9: Identified Groups of Stakeholders

Entity	Date	Key Outcomes
National Governmental Entities in Egypt & Regional Governmental Entities in Red Sea Governorate		
Ras Gharib City Council	24 June 2025	▪ The Project is located within the administrative boundaries of Ras Gharib City Council (Red Sea Governorate), which includes Zaafarana Village to the north and Wadi Dara Village to the south. It is the second largest city in the Red Sea Governorate, covering an area of approximately 14,344 km². ▪ The land designated for the Project is State-owned land located several kilometers away from Ras Gharib city and falls fully under national jurisdiction for wind energy development as designated by the Egyptian Republic Presidency. Ras Gharib is considered the premier hub for windfarm development in Egypt due to: exceptionally strong and steady winds, ideal geography and proximity to grid, alignment with national energy goals, strong investment and Build-Own-Operate (BOO) model, and effective environmental shut down-on-demand environmental safeguards. ▪ The Project area does not conflict with local land use plans. However, the Ras Gharib City Council expressed the need to obtain a permit from the Armed Forces confirming the absence of oil exploration plans. Further engagement with other high-level authorities may be necessary for sensitive areas. ▪ Local infrastructure services (roads and traffic, cleanliness, water, sanitation and solid waste) are internally coordinated through the Ras Gharib city council. ▪ The Ras Gharib City Council coordinates with NREA to manage and dispose of hazardous waste in the Alexandria Dumpsite (Nahdet Masr Company in El Hamman City) with close coordination with local companies for transportation arrangements. ▪ No project-induced immigration is anticipated as result of the Project construction activities, as construction workers will include local residents. In cases where laborers are coming from outside the local community, it is proposed/suggested to establish worker camps in the Project area rather than accommodating them in the city to avoid higher demand on local residential units and consequently the rise of rental fees if applicable. ▪ The city council plays a central role in facilitating all procedures for windfarm investors, including coordination during construction and operation. It also serves as a direct liaison between project developers and the community. - Weekly public meetings are held every Wednesday at the city council premises, where residents can raise grievances or receive feedback. Requests can be submitted from Thursday to Monday for review. - Residents can also communicate through the Red Sea Governorate's official website¹⁸ or the Government Unified Complaint System¹⁹. - All kind of announcements for public events and local news are published on the city council website. Specific information on public consultation events or local projects news can also be disseminated through the public relation office, or by hanging a banner at the city council. Public consultation sessions are typically held at the Four

¹⁸ <http://www.redsea.gov.eg/t/ras%20gharib/rasgharib.aspx>; <http://www.redsea.gov.eg/t/Contactus.aspx>;

<http://www.redsea.gov.eg/t/Complaints.aspx>

¹⁹ <https://www.shakwa.eg>

		Seasons Hall in Ras Gharib. Key stakeholders to involve include parliament members, Bedouin family heads, NGOs, CBOs, and relevant line ministries and directorates. ▪ Local employment opportunities can be advertised through the Ras Gharib City Council website and coordinated with the labour office. The Red Sea governorate and NREA support local hiring. Use of local contractors is encouraged to boost the Ras Gharib's economy. ▪ No community concerns or grievances are currently anticipated due to the Ras Gharib community's long-standing familiarity with wind energy development. ▪ The Project must obtain relevant permits and approvals, including environmental approvals, , grid connection agreements, land use permits, building permits and site visit permits. The Developer should also consider potential impacts on proximity to residential areas, potential impact on local wildlife and birdlife, potential noise and visual impacts on the local community, and workers on-site safety. ▪ Throughout the Project cycle, the Ras Gharib city council coordinates directly and closely with the Civil Defense, Domestic Intelligence, Police, Fire-fighting Service, and Armed Forces in case of any emergency. It also coordinates with various medical service providers inside and outside Ras Gharib, e.g., Ras Gharib General Hospital, Hurghada General Hospital, Menya General Hospital, and Electricity Hospital in Cairo for medical emergencies. ▪ The Ras Gharib city council highlighted a need to guide developers (in general) toward allocating a certain budget to Corporate Social Responsibility (CSR), in cooperation with the city council, focusing on: - Encouragement to establish on-site camps for workers to avoid pressure on local housing; - Improving local health and education services; - Upgrading roads and completing sanitation networks (especially in El Sakala); - Installing water recycling facilities for tree planting; and - Establishing Bedouin settlements in remote areas like Arab Ayes and Wadi Araba.
Wadi Dara Local Unit	25 June 2025	▪ Wadi Dara village is accessed via one main paved road and a network of unpaved farm alleys. ▪ The unit mentioned that there are no infrastructure or social services that exist in the village beyond limited electricity (3 hours/day) and groundwater wells. ▪ The unit does not anticipate any disruption or impacts on local infrastructure from the construction or operation of the wind farm. ▪ Wadi Dara falls under the jurisdiction of Ras Gharib City Council and is represented by the Board of Directors of the Dara Agricultural Cooperative. ▪ The closest Bedouin settlement is Arab Ayes. No contact or land/resource overlap exists between this community and Wadi Dara. ▪ Community engagement should be coordinated by the Wadi Dara Agricultural Cooperative and local investors. There are no active tribal, women, or youth groups in the area. ▪ Wadi Dara was established in 1995 as an agricultural production development initiative. 5000 feddans ($\approx 21 \text{ km}^2$) were allocated to the Cooperative – 50 feddans ($\approx 0.21 \text{ km}^2$) per investor (80 total) and 5 feddans ($\approx 0.021 \text{ km}^2$) per cooperative member (200 total). It was designated as a Local Unit in 2002. ▪ Residents are permanent agricultural laborers hired by investors. Families may visit during summer but do not reside year-round due to lack of basic services. ▪ Key community concerns include investor contributions to local infrastructure upgrades, particularly: - Extended access to electricity - Provision of potable water

Egyptian Environmental Affairs Agency (EEAA) Office in Cairo	16 October 2025	- Establishment of a basic healthcare unit - EEAA confirmed that relevant environmental and social data may be accessed through the New and Renewable Energy Authority (NREA) and the central EEAA offices. - Survey methodologies were presented, and the entity advised incorporating recommendations received from the General Petroleum Authority, including potential site identification and the inclusion of a waste management plan within the ESIA. - Planned biodiversity fieldwork was discussed, including bird and bat surveys and habitat assessments. EEAA advised that additional feedback would be provided by NCE and Biodiversity Department during a separate session on 23 October 2025. It was also advised to follow national wind farm siting guidelines. - It was advised to consult the NCE for guidance on threatened species and potential sensitive habitats. - EEAA confirmed the absence of recent biodiversity data within the Project area or 10 km buffer but welcomed efforts to collect data within this range. Reference materials from previous studies will be gathered and shared where possible. - The need to define buffer zones, exclusion areas, or setbacks will be determined in consultations with biodiversity specialists, guided by an ongoing national strategic study under EEAA supervision. Additional biodiversity features potentially impacted by the Project will be identified through field surveys and reference to the regional critical habitat assessment. - Permitting requirements include use of an EEAA-accredited consultant, submission via NREA, and 30 working days for official review and issuance of environmental permit. - Bird monitoring during construction and operation phases will be required as per the signed protocol. EEAA is responsible for reviewing and approving all monitoring methodologies and protocols. - EEAA will issue an environmental opinion (approval, rejection, or request for revision) within 30 days after reviewing the submitted ESIA. - Any further requirements or issues of concern will be determined upon submission and review of the final documentation.
EEAA Red Sea Branch, Regional Director	15 October 2025	- Project description and ESIA survey methodology were presented, and EEAA confirmed that the proposed survey methodology is sufficient. - EEAA confirmed no available secondary data or environmental studies for the Project area. - EEAA stated that issues related to protected species fall under the Protected Areas Department and are not within its own jurisdiction. - Monitoring expectations, additional issues of concern, and any required revisions will be confirmed after review of the environmental report.
EEAA Red Sea Branch, Director of Inspection and Legal Monitoring	15 October 2025	- Project description and ESIA survey methodology were presented, and EEAA confirmed that the proposed survey methodology is sufficient. - EEAA clarified that issues related to threatened species and protected zones fall under the authority of the Protected Areas Department. - Permitting must be processed via NREA and the Ministry of Environment in Cairo, with EEAA reviewing submitted environmental studies. - The Project received conditional non-objection. - It was confirmed that the additional requirements include the review of the ESIA and the relevant environmental reports.

EEAA Red Sea Branch, Red Sea Protectorates	15 October 2025	- The Red Sea Protectorates team acknowledged the Project and noted that biodiversity-related publications relevant to the area are available through EEAA's Environmental Impact Assessment Department. - No biodiversity studies or species of concern were identified within or near the Project area. - It was recommended to establish safe bird corridors between adjacent wind projects. - All environmental permits are to be obtained from EEAA headquarters in Cairo. - No objection letter was available at the time of consultation. - Additional recommendations included ensuring the review and publication of relevant environmental studies and reports.
New & Renewable Energy Authority (NREA)	14 October 2025	- NREA confirmed that the Project land is free from conflicting surface or subsurface activities and stated that official land allocation and handover documents had been provided to the Developer. They also committed to sharing formal land use plans for both the Project site and surrounding areas up to 30km. - NREA emphasized adherence to internationally approved technical standards and confirmed that turbine layout plans must be submitted for review and approval prior to implementation. - It was confirmed that NREA is coordinating with relevant government authorities including the Armed Forces Operations Authority, Red Sea Governorate, and the National Authority for Regulating State Land Use. Further coordination will continue with other entities. - NREA emphasized the need for the timely submission of all turbine specifications and layout plans for technical review, the mandatory inclusion of waste management plans in the study for both the construction and operation phases, and highlighted that any delays in environmental approval could negatively affect the achievement of the 2030 renewable energy target (42%).
Ministry of Labour, Ras Gharib	12 October 2025	- Project description and ESIA methodology were presented, including its components, location, and anticipated construction and operation activities. The ESIA methodology was outlined, with emphasis on labour-related risks such as occupational health and safety, labour abuses (e.g., discrimination, child labour, passport retention), and working/living conditions (e.g., leaves, compensation, sanitation, drinking water, accommodation). - A request was made to prioritize hiring locally rather than bringing in labour from outside Ras Gharib. - Recommendations included establishing an on-site employment center and conducting awareness conferences about the Project.
Radio and Television Unit – Ras Gharib & Red Sea Governorate	12 October 2025	- Project description and potential turbine-related signal interference (e.g. reflection, attenuation) was presented. - No major broadcasting towers or transmission infrastructure identified near the Project site. - A broadcasting tower is located far from the Project, approximately 45 km from Ras Gharib. - Coordination advised with Ras Gharib Radio and Television Unit during use of cranes, erection of turbines, or other activities involving tall structures. - Additional requirements include the establishment of a training center for the local community of Ras Gharib to enhance employment opportunities.

Red Sea Water and Wastewater Company (RSWWC) – Ras Gharib	14 October 2025	- The Project scope and ESIA methodology were discussed, with specific focus on potential impacts to local water supply and wastewater systems. - It was confirmed that Ras Gharib is supplied via the Kureimat Line along the highway, which experiences service disruptions affecting local demand. - No water supply facilities or pipelines were identified within the Project footprint. Direct connection to the main line or treatment plant is considered difficult. Instead, it is recommended to use water tankers during the construction period. - For wastewater, the nearest treatment facility is located on Umm Al-Yeser Road. Coordination must be undertaken with Ras Gharib management, and regular drainage of septic tanks is required. - RSWWC is capable of meeting the Project's water supply needs and treating the wastewater generated by the Project without affecting existing demands. - Additional recommendations included proposing the Developer to construct a dual water supply line to alleviate pressure from increased population and labour demands.
Sanitation Authority – Ras Gharib	16 October 2025	- The Project overview and ESIA approach were discussed, focusing on construction-phase wastewater generation and management. - No sanitation facilities are located on or near the Project site. - The Sanitation Authority can accommodate the Project's needs, but only through septic tanks and drained regularly via septic trucks. - Coordination with the Sanitation Department of Ras Gharib is required throughout construction phase. - No additional concerns or requirements were raised.
Hazardous Waste Management Unit – Red Sea Governorate	15 October 2025	- The Project and ESIA scope were presented, including expected hazardous waste streams during construction (e.g., oils, lubricants, contaminated containers). - There are no hazardous waste treatment or disposal facilities within the Red Sea Governorate. - Hazardous waste must be collected, transported, and disposed of by a licensed company approved by the Waste Management Regulatory Authority (WMRA). Tracking forms are required. - Coordination should be made with the Secretary General of the Governorate regarding permitting and oversight. - No additional concerns or requirements were raised.
Solid Waste Management – Red Sea Governorate	15 October 2025	- The Project and ESIA scope were presented, including anticipated solid waste streams such as packaging, construction debris and municipal waste from workers. - The nearest landfill is located in Ras Gharib next to Umm Al-Yeser, with a current capacity of 200,000 m³. It is operated in accordance with national standards. - It was confirmed that the landfill is capable of handling the waste volumes expected from the Project. - Coordination should be made with the Secretary General of the Governorate regarding permitting and oversight. - It is recommended to contract licensed companies for waste transport and disposal. - Recycling and reuse of solid waste is encouraged. A committee may be formed by the Solid Waste Department to oversee recycling and related actions.

Ras Gharib National Council for Women (NCW)	24 June 2025	▪ To ensure continuous access to Project information and updates for women groups, the following platforms and entities were recommended: - Ras Gharib City Council - “Fanar Gharib” Facebook page - NGOs’ WhatsApp groups - Employment vacancy links on company websites ▪ Women and youth can be informed about consultation sessions through NGOs and CBOs operating in Ras Gharib. ▪ Job and procurement opportunities targeting women and youth should be advertised through active NGOs. Many youth in Ras Gharib require technical training as most are graduates of non-technical fields such as commerce, law, science and education. ▪ It was noted that windfarm projects have positively contributed to the community, unlike oil companies that have historically lacked engagement. As an example, one windfarm project has previously upgraded the facilities of a local NGO. ▪ Priority needs for Ras Gharib include: - Creating job opportunities for young men and women; - Delivering technical training programs to prepare youth for Project-related employment; and - Supporting youth development through sports and talent-nurturing activities.
NGOs		
Ressala Charity Organization	24 June 2025	▪ Local active NGOs and CBOs maintain close connections with women in Ras Gharib, especially single breadwinners. Information on Project updates and disclosures can be disseminated through the City Council and active local NGOs. ▪ There is no single entity responsible for coordination, as NGOs operate under the Social Solidarity Department at Ras Gharib City Council but manage their own priorities and activities. ▪ To ensure women’s participation in scoping and disclosure sessions, coordination should take place with the heads and directors of active local NGOs and CBOs in Ras Gharib and Zaafarana including: (i) Ibad El Rahman NGO; (ii) El Fardos NGO; and (iii) Ressala Charity Organization. ▪ Employment and procurement opportunities can be announced via local Facebook groups Ressala Gharib²⁰ and Fanar Gharib²¹, as well as through the directors of active NGOs and CBOs (Ibad El Rahman NGO, El Fardos NGO, and Ressala Charity Organization). ▪ Bedouin family heads in Ras Gharib can also help communicate job opportunities to female members during their clan meetings, as there are no active parliament members in the area. ▪ Ras Gharib faces a lack of basic infrastructure and social services. Windfarm projects have provided valuable contributions in the past (e.g., support during orphans’ day, Ramadan food supplies, and hospital equipment). ▪ Community priorities remain focused on: - Expanding educational services - Improving healthcare services - Organizing medical convoys

²⁰ [Ressala Gharib Facebook page](#)

²¹ [Fanar Gharib Facebook page](#)

El Fardos NGO for Patients' Care and Service	24 June 2025	▪ To ensure continuous access to Project information for women in the local community, it was recommended to: - Assign a dedicated community liaison officer to coordinate between windfarm projects and Ras Gharib civil organizations (one officer may cover multiple projects, requiring coordination between project managers). - Post updates through the “Fanar Gharib” Facebook page and Ras Gharib Radio channel. ▪ Entities suggested for coordination include: - Active and established NGOs and CBOs - Bedouin family heads - Religious leaders in Ras Gharib (e.g., Al-Azhar, endowment, and Mary Gergis Church) ▪ To ensure women’s participation in scoping and disclosure sessions, the following was proposed: - Mobilize participants through local NGOs and CBOs - Coordinate with the National Council for Women (NCW), Ras Gharib Branch ▪ Women can contribute to windfarm projects during construction by offering services to workers’ camps such as food catering and tailoring of clothing and beddings, and during operation in roles such as HR officers, E&S officers, or engineers. Employment opportunities can be advertised through: - The Labor Office in Ras Gharib - The City Council’s official website - The “Fanar Gharib” Facebook page ▪ Additional issues raised include lack of municipal services (transport, housing, subsidized bread), high unemployment, and vulnerability of female-headed households. Proposed interventions include: - Subsidize electricity and gas bills for Ras Gharib residents by at least 10% as a benefit-sharing mechanism - Enforce a minimum 10% quota for local hiring, prioritizing qualified residents with higher education - Establish community cultural projects for Ras Gharib families - Provide group loans for women to launch small enterprises - Contribute seasonal food assistance during Ramadan and religious feasts ▪ Offer scholarships for academically distinguished students from poor families
Hammadin Bedouins from Maaza Tribe	24 June 2025	▪ No Bedouin families currently use or have historically used the Project area for grazing, seasonal migration, water access, agriculture, or other livelihood activities. The area has been affected by prolonged drought, with no rainfall for nearly nine years, making it unsuitable for grazing. ▪ Bedouins typically migrate in search of water for grazing, staying in tents or huts during winter and relocating to the mountains in summer. However, the Project area has not been part of this movement due to lack of water and vegetation. ▪ There are no Bedouin structures (e.g., tents, shelters, wells) currently in use in the general Project area and vicinity. Only natural water wells and crushed rock wind barriers were previously present but are now abandoned due to drought. ▪ There are no cultural, spiritual, or historical sites of significance to Bedouin traditions (e.g., graveyards or shrines) located within or near the Project area. ▪ Preferred communication channels with Bedouin communities include: - Tribal leaders from the Hammadin Tribe (4–5 Sheikhs in Ras Gharib) - Bedouin liaison officers working at windfarm project sites

		- Officers from the Social Solidarity Department at the City Council responsible for providing Bedouin support in Ras Gharib ▪ Consultations and meetings with Bedouin communities can be organized at any time and location, provided at least one week's advance notice is given. ▪ The Bedouin tribe expressed that their main interest lies in securing employment opportunities and receiving tangible services from the Project. They noted previous negative experiences with windfarm developers who consulted them but failed to deliver any benefits. ▪ Key contributions recommended include: - Engaging local subcontractors to provide equipment, vehicles, and support services - Prioritizing local hiring, especially for security and guard services, rather than outsourcing from outside Ras Gharib - Establishing a one-class school in remote Bedouin settlements - Organizing mobile medical convoys to remote areas - Providing an ambulance for remote Bedouin communities
Hammadin Bedouins	12 October 2025	▪ Bedouin representatives confirmed that the Project site and its vicinity are not used for grazing, seasonal migration, water access, or other livelihood activities. ▪ No seasonal structures, water wells, or spiritual/cultural heritage sites were identified within or near the Project footprint. ▪ Communication with Bedouin communities should occur through the tribal sheikh via phone with advance notice. ▪ No additional concerns were raised, but employment opportunities for local tribal youth were encouraged.
Ibad Al-Rahman Women's Association	13 October 2025	▪ The association acknowledged the temporary nature of construction-phase job opportunities and limited operational roles due to the Project type. ▪ Access to information should be facilitated via social media, local NGOs, and the local administrative unit. ▪ Invitations for scoping and disclosure sessions, as well as employment/procurement opportunities, should be channeled through local NGOs and announced via the same platforms. ▪ No additional concerns were raised, and the association recommended offering training courses for women in Ras Gharib.
Gas Exploration Entities		
General Petroleum Company	17 November 2025	▪ Existing infrastructure near the Project site includes water wells, pumps, and low-voltage electricity towers affiliated with Gulf of Suez Petroleum Company (GUPCO) ▪ Correspondence had already taken place between the Developer and GPC's Planning Sector regarding ongoing and planned petroleum activities near the Project area. ▪ Setback distances from petroleum infrastructure were specified as 500 meters in urban areas and a minimum of 1 kilometre in road and desert areas. ▪ Coordination between the Project and petroleum operators was discussed, particularly regarding emergency preparedness and incident response. ▪ It was clarified that coordination is required with both GPC and GUPCO (coastal gas installations) for any construction works in proximity to their facilities. ▪ The Project must coordinate with GPC's Safety, Environment, and Survey

		Departments to ensure compliance with environmental, health, and safety requirements. ▪ Permits are issued through the Ministry, with follow-up and oversight conducted by the relevant sector. Intervention is carried out in case of any identified impacts. ▪ All necessary approvals have been secured, and updated site maps were shared with the Ministry and relevant entities. ▪ Additional comments and requests included: - Installation of road signage (including emergency contact points, lighting, and rest areas) to assist GPC field teams during site visits. - Provision of real employment opportunities for the local community in technical and specialized roles – not limited to unskilled labour or security. - Road improvements between the Project sites and Ras Gharib.
Academic and Research Institutions		
Educational Directorate – Ras Gharib	13 October 2025	▪ The Directorate acknowledged that employment and procurement opportunities will primarily arise during the construction phase and will be limited during operations. ▪ Project updates, disclosures, and data should be shared via targeted social media outreach (e.g., Fanar Gharib). ▪ Participation in scoping and disclosure sessions, and access to employment opportunities, should be coordinated through the Labor Office and announced via social media. ▪ No issues of concern were raised; recommendations included support for school maintenance, youth employment, and offering specialized training for local residents.

4.3.2 Focus Group Discussions (FGD)

Public Scoping Session

A public scoping session was held in Ras Gharib city, Red Sea Governorate at the Four Seasons Hall (venue) on the 23rd of October 2025. The objectives of the public scoping session included the following:

- Introduce the Project to stakeholders (location, components, activities, etc.);
- Present the methodology and study outlines of the Project;
- Identify key anticipated impacts; and
- Allow interested stakeholders to comment on the scope of work undertaken, key issues identified and any other issues of concern they might have.

Announcement and Advertisement of the Session

The public scoping session was announced around 2-weeks in advance in one of the official daily newspapers as shown in the figure below (the advertisement was published in El-Akhbar newspaper on the 10th of October, 2025). The invitation was an open session for any interested stakeholder to attend.

In addition to the public announcement, invitations were sent to key stakeholders. The invitee list included EEAA Headquarter and regional branch, New and Renewable Energy Authority (NREA), Red Sea Governorate, other governmental entities, Ras Gharib City Council, the National Council for Women, local community representatives, NGOs and Developers of Wind Energy Projects in the Gulf of Suez and Gebel

El Zeit. In coordination with the E&S Team, all invitees were notified of the date and location of the public consultation session. Invitations were extended through the following channels:

- Invitations and executive summary sent by the E&S team to stakeholders in the governorate, NGOs and local community representatives by hand mail, fax, email and WhatsApp;
- Invitations sent by RCREEE via e-mails to governmental agencies.
- Telephone calls by the E&S team;



The image shows a newspaper announcement in Arabic. At the top, there are logos for ECO Consult, Safe Soar, RCREEE (Regional Center for Renewable Energy and Energy Efficiency), ORASCOM, ENGIE, TOYOTA TSUSHO GROUP, and Eurus Energy. The main text, written in bold Arabic, reads: 'يتشرف تحالف المستثمرين المكون من شركات (أوراسكوم وإنجي وأوليوس) والمركز الإقليمي للطاقة المتجددة وكفاءة الطاقة بالتعاون مع الشركات الاستشارية إكوكونسلت وسيفسور بدعوة سيادتكم لحضور جلسة التشاور الأولية الخاصة بتقديم المشروع وعرض منهجية إعداد دراسة تقييم الأثر البيئي والاجتماعي لمشروع محطة شقير لطاقة الرياح (GOS III) بقدرة ٩٠٠ ميغاوات خليج السويس - مدينة رأس غارب - محافظة البحر الأحمر'. Below this, it states: 'يتم عقد جلسة التشاور يوم الخميس الموافق ٢٣ أكتوبر ٢٠٢٥ بقاعة الفورسيوز بجوار نادي الفتح بمدينة رأس غارب بمحافظة البحر الأحمر في تمام الساعة الحادية عشرة صباحاً'. It also includes contact information: 'وليزيد من الاستفسارات يرجى الاتصال بالشركة الاستشارية تليفون: ٠١٠٢٤٢٥٠١٥١ / ٠١٠٦٤٦٦٦٣٩٥ / ٠١٠٠٦٢٨١٤٥٠ البريد الإلكتروني: SAFESOAR@HOTMAIL.COM'. At the bottom, there is a table with three columns: 'ESIA Consultant' (ECO Consult), 'Client' (RCREEE), and 'Project' (GOS III 900 MW Wind Farm).

Figure 16: Newspaper Announcement in El-Akhbar Published on 10/10/25

Participating Parties

The total number of participants was 83, in addition to the Developer's representative. The session was moderated by representatives of the E&S Team.

The attendees comprised representatives from various government agencies within Red Sea Governorate to include EEAA branch in Red Sea, NGOs, governmental agencies in Ras Gharib, academics, wind energy

projects developers and local community representatives. A summary of the participating entities is provided in the table below. Additionally, a non-technical executive summary of the ESIA was prepared and distributed to all attendees

Attendance	No.
EEAA - Red Sea	2
Safe Soar	6
ENGIE	4
Ministry of Environment	1
Egyptian Electricity Transmission Company EETC	2
Regional Center for Renewable Energy and Energy Efficiency RCREEE	2
New and Renewable Energy Authority NREA	1
Infinity Power Holding	1
Ras Gharib City Council	9
Members of the local community in Ras Gharib	16
Heads of Bedouin families in Ras Gharib area	3
NGOs	12
General Petroleum Company and other oil and Gas companies	2
Directorate of Social Solidarity Red Sea	5
National Council for Women Red Sea	1
Total	67

The public scoping session commenced with opening remarks delivered by the key participating entities, including the representative from the Developer, the Ras Gharib City Council Chairman, and representatives from EEAA, NREA, and EETC, in addition to RCREEE and the E&S Team.

The speakers emphasized that the purpose of the session was to present the ESIA study methodology prepared for the Project, and to provide a constructive platform for community members and stakeholders to express their concerns and recommendations. They highlighted the importance of consultation sessions as an opportunity for community dialogue on the Project details, particularly energy projects and their potential impacts on the environment.

The E&S Team and RCREEE then delivered a detailed presentation on the ESIA scoping outlines, the methodology adopted for the study, and an overview of the Project, including its location, key components, and development phases. The presentation also addressed the anticipated E&S impacts of the Projects, with particular focus on biodiversity considerations in the Gulf of Suez and Gebel El Zeit regions.

Following the above presentations, an open discussion was held, during which attendees were given the opportunity to comment and raise concerns. The table below provides a summary of the key issues raised and the corresponding responses.



Figure 17: Selected Photos from the Public Session

The table below summarized the key issues raised during the session along with the corresponding responses.

Table 10: Key Outcomes and Responses of the Public Disclosure Session

E&S Attribute	Comment	Response
Job Opportunities	Multiple attendees from Ras Ghareb, including representatives from local authorities, Social Solidarity Department community organizations, civil society groups, and residents, emphasized the importance of ensuring that employment opportunities generated by the Project directly benefit the local community. Key points raised included: - Ensuring that all job opportunities generated by the Project prioritizes residents of Ras Ghareb. - Implementing targeted training programs to improve employability for young men and women. - Organizing a dedicated “Youth	It was clarified that the Project is currently in the scoping stage; however, all concerns and recommendations raised regarding job opportunities are fully documented and will be incorporated into the ESIA. The Developer will prepare a comprehensive Recruitment Plan that identifies labour needs (skilled and unskilled) and prioritizes hiring from Ras Gharib. Recruitment will be coordinated through official channels, including the City Council and Labor Office and other social media pages. It was additionally noted that a dedicated quota will be maintained for employing youth from Ras Ghareb, with all job announcements disseminated through the City Council, Labour Office, and official social media platforms to ensure broad and fair access to opportunities. Regarding the Project’s social contribution, it was confirmed that the majority of the workforce will be sourced from Ras Gharib,

	Day” to identify local talents, provide career guidance, and link youth with future employment opportunities connected to the Project.	while specialized technical positions will be filled from other governorates only when the required skills are not available locally. The Developer is currently preparing studies and plans that identify areas for community engagement and social responsibility throughout the different stages of the Project’s lifecycle. These will be shared with the City Council and relevant stakeholders. All comments raised will be taken into account during implementation and operation, and a Community Service Department within the Project will continue engaging with residents, consistent with Red Sea Wind Energy project.
General Environmental Impacts and its effect on residents	Multiple participants, including local residents and representatives from community institutions, raised additional recommendations related to developer coordination and environmental management within the Project area. Key points raised included: ▪ Establishing an Investors Association for the Gulf of Suez to improve coordination among all renewable energy projects operating in the region. ▪ Installing bird-radar systems in advance due to the height of turbine towers and the importance of monitoring migratory bird pathways. ▪ Residents requested clarification on the potential environmental impacts of the Project on Ras Gharib.	It was clarified that environmental approvals are granted only after comprehensive studies confirm that the Project will not result in harmful impacts on the environment or surrounding communities. A strategic area-wide assessment is conducted prior to issuing any approval to ensure full compliance with national environmental requirements. The findings of these studies, including all identified environmental impacts and corresponding mitigation measures, will be presented and discussed in the next consultation meeting to ensure transparency and continued engagement with local stakeholders.

NGOs and CBOs within the Local Communities

As part of the targeted interviews that were conducted on the 24th and 25th of June (refer to “Section 4.3.1”), two (2) focus group discussions were held in Ras Gharib city with the following entities:

- Ibad El Rahman NGO; and
- Youth Educated Females on Public Service

At the beginning of each session, a presentation on the Project was first provided along with a handout on the following key topics. These sessions were attended by all of the groups above.

- Description of the Project location along with maps;
- Description of key Project components along with figures and illustrations;
- Description of the key activities anticipated in each key phase of the Project (planning,

construction and operation);

- Description of ESIA study and its key components and requirements;
- Explanation of key anticipated E&S impact under each phase of the Project; and
- Explanation of the methodology and scope of work that will be undertaken for the ESIA.

Upon completion of the above informative session, each group was separated for general discussions as well as discussion on any comments or key issues of concern on the overall Project and/or the ESIA process in particular. Key discussions were undertaken in relation to the following key aspects:

- Economic activities and livelihood strategies
- Land use activities
- Community quality of life
- Perceptions towards the Project
- Community structure (ethnic and tribal groups, religion, ethnic minorities, etc.)
- Cultural and Heritage sites

The presentation and handouts were provided in the Arabic language, as well as the delivery of the presentation.

Annex I present the handout and presentation that was provided during each of these FGDs as well as the forms used throughout the FGD.

The table below presents an overall summary of the outcomes of these FGD for each community.

Table 11: Key Outcomes of FGDs

Ras Gharib Community	Date	Key Outcomes
Vulnerable Female Heads of Household – Ibad El Rahman NGO	25 June 2025	▪ Participants confirmed they have never received information about wind farm projects in Ras Gharib. To ensure continuous access to Project updates and documentation, they recommended that local NGOs: - Conduct awareness raising sessions in schools, universities, and among mothers to explain the benefits of renewable energy; and - Disseminate Project information through awareness sessions and distribute non-technical summary leaflets. ▪ To support women's participation in scoping and disclosure sessions, the following approaches were proposed: - NGOs should communicate the session date and time to their beneficiaries directly - Advertisements should be posted at the Social Solidarity Department in the City Council ▪ Participants raised several challenges in accessing employment or procurement opportunities, including: - Scarcity of job opportunities for women in Ras Gharib, especially for those with limited resources. - Lack of financial capacity to start small businesses, even for those who have received training. - Absence of group lending mechanisms to support women entrepreneurs.

		▪ To ensure opportunities reach women, job vacancies should be announced through: - Local active NGOs - The Social Solidarity Department at the City Council ▪ Additional community concerns and proposed priorities included: - Rising cost of living (particularly food and rent) - Limited employment opportunities for Ras Gharib youth ▪ Specific recommendations included: - Prioritize hiring sons of vulnerable women who receive government or NGO assistance. - Support the medical sector with equipment, medication, and services, especially for households with chronic illness.
Youth Educated Females on Public Service	24 June 2025	▪ Participants demonstrated fair awareness of wind farm projects in Ras Gharib, with at least one member employed as a social officer with a contractor. To ensure youth have continuous access to Project information, the following dissemination channels were recommended: - Social media platforms - LinkedIn - Facebook - City Council website - Dedicated project website links - Company outreach via local NGOs ▪ To encourage youth participation in scoping and disclosure sessions, participants referred to the same information channels listed above. ▪ To enhance youth participation in employment and procurement opportunities, participants emphasized the need for companies (investors and contractors) to provide subsidized access to capacity-building programs. Priority areas include: - English language courses - Computer skills - Soft skills and personality development - Job-oriented training through internships or trainee programs within the companies ▪ No major concerns were raised, but participants noted that companies often underestimate the presence and potential of well-educated young women in Ras Gharib. As a result, women are frequently excluded from employment or offered unequal salaries compared to other regions. ▪ Additional community development needs highlighted include: - Establishment of recreational spaces - Sports and professional athletic training programs - Education services tailored for people with special needs



Figure 18: FGD with Ibad El Rahman NGO



Figure 19: FGD with Youth Educated Females on Public Service

Public Disclosure Session

A disclosure session was held in Ras Gharib city, Red Sea Governorate at the Four Seasons Hall (venue) on the 12 of January 2026. The objectives of the disclosure session included the following:

- Introduce the Project to stakeholders;
- Present the results, outcomes and conclusions of the ESIA study
- Allow stakeholders to raise any comments or issues of concern in relation to ESIA study to include but not limited to the baseline results, impacts, mitigation, monitoring measures, etc.

- Discuss any questions, inquiries, or issues of concern raised by stakeholders

Announcement and Advertisement of the Session

The disclosure session was announced around 2 weeks in advance in one of the official daily newspapers as shown in the figure below (the advertisement was published in El-Akhbar newspaper on the 23rd of December, 2025 of December 2025). The invitation was an open session for any interested stakeholder to attend.

In addition to the public announcement, invitations were sent to key stakeholders. The invitee list included EEAA Headquarter and regional branch, New and Renewable Energy Authority (NREA), Red Sea Governorate, other governmental entities, Ras Gharib City Council, the National Council for Women, local community representatives, NGOs and Developers of Wind Energy Projects in the Gulf of Suez and Gebel El Zeit. In coordination with the E&S Team, all invitees were notified of the date and location of the public consultation session. Invitations were extended through the following channels:

- Invitations and executive summary sent by the E&S team to stakeholders in the governorate, NGOs and local community representatives by hand mail, fax, email and WhatsApp.
- Invitations sent by the RCREEE.
- Telephone calls by the E&S Team.
- An advertisement in an official daily newspaper as presented in the figure below.



Figure 20: Newspaper Announcement in El-Akhbar Published on 29/12/2025

Participating Parties

The total number of participants was 73, in addition to the Developer's representative. The session was moderated by representatives of the E&S Team.

The attendees comprised representatives from various government agencies within Red Sea Governorate to include EEAA branch in Red Sea, NGOs, governmental agencies in Ras Gharib, academics, wind energy projects developers and local community representatives. A summary of the participating entities is provided in the table below. Additionally, a non-technical executive summary of the ESIA was prepared and distributed to all attendees (refer to Annex X).

Attendance	No.
Egyptian Environmental Affairs Agency EEAA	1
EEAA - Red Sea	3
RSWE COMPANY (ENGIE - ORASCOM)	4
SafeSoar	7
Egyptian Electricity Transmission Company (EETC)	2
Regional Center for Renewable Energy and Energy Efficiency (RCREEE)	2
New and Renewable Energy Authority (NREA)	1
Ras Gharib City Council	6
Members of the local community in Ras Gharib	9
Heads of Bedouin families in Ras Gharib area	2
Clergy	1
Youths from city of Ras Gharib	4
NGOs- national council for women	18
Wind energy projects	4
General Petroleum Company and other oil and Gas companies	1
Directorate of Social Solidarity Red Sea	3
National Council for Women in Ras Gharib	5
Total	73

The public disclosure session commenced with opening remarks delivered by the key participating entities, including the representative from the Developer, the Ras Gharib City Council Representative, and representatives from EEAA, NREA, and EETC, in addition to RCREEE and the E&S Team.

The speakers emphasized that the purpose of the session was to present the results of the ESIA study that was prepared for the Project, and to provide a constructive platform for community members and stakeholders to express their concerns and recommendations. They highlighted the importance of consultation sessions as an opportunity for community dialogue on the Project details, particularly energy projects and their potential impacts on the environment.

The E&S Team and RCREEE then delivered a detailed presentation on the ESIA scoping outlines, the methodology adopted for the study, and an overview of the Project, including its location, key components, and development phases. The presentation also addressed the anticipated E&S impacts of the Projects, with particular focus on biodiversity considerations in the Gulf of Suez and Gebel El Zeit regions.

Following the above presentations, an open discussion was held, during which attendees were given the opportunity to comment and raise concerns. The table below provides a summary of the key issues raised and the corresponding responses.



Figure 21: Photographs from the disclosure session

The table below summarizes the key issues raised during the session along with the corresponding responses.

Table 12: Key Outcomes and Responses of the Public Disclosure Session

E&S Attribute	Comment	Response
Community engagement activities	Participants noted that they inquired about the investors involved, the association of investors, and whether any representatives from Ras Gharib residents are included.	EETC Representative noted that as discussed during the previous consultation session, discussions had already taken place with the Developer. She explained that a Developers' group was established and held its first meeting, during which discussions were documented to ensure transparency and accountability. The discussions addressed several aspects, including the development of water networks and infrastructure in Ras Gharib. She noted that implementation activities have commenced through coordination between local associations and

		wind project developers, with expected participation from civil society organizations. Developers are also expected to support CSR initiatives in line with community needs.
	Participants noted that they emphasized the importance of announcing consultation invitations sufficiently in advance and through multiple communication channels to ensure broad participation.	The E&S Team stated that invitations were published in newspapers two weeks in advance and distributed through the city council and the National Council for Women one week prior. They also noted recommendations to publish invitations on official social media pages to enhance participation.
	Participants raised questions regarding potential archaeological discoveries during excavation works from Zaafarana to Gabel AlZeit.	The E&S Team informed that coordination is ongoing with the Ministry of Antiquities, monitoring is implemented during excavation, and workers receive chance-find training with immediate reporting protocols. They also noted that site visits have previously been organized in coordination with authorities and will continue across wind projects under controlled arrangements.
	Participants inquired about the preparation of a civil visit to the projects.	RCREEE responded to the inquiry by clarifying that site visits were previously organized in coordination with relevant authorities. RCREEE collaborated with the Energy Authority, the Egyptian Electricity Transmission Company, and the Environmental Affairs Agency to arrange visits during the spring and autumn seasons. These visits were coordinated with the city council to regulate public access to project construction sites. It was explained that such visits are not limited to a single project but are intended to cover multiple wind energy projects.
	Calls were made to promote social participation through initiatives supporting local women, including women with special needs, and small businesses.	The Developer stated that the preparation of the environmental and social study includes conducting public consultations to gather community opinions and identify local needs in Ras Gharib. The Developer emphasized that stakeholder engagement is a key objective to ensure community participation, support coordination among project developers, align with national development goals, and address community requirements. The Developer's CLO also clarified the importance of strengthening social participation in Ras Gharib through collaboration between companies and local stakeholders. The CLO highlighted ongoing developer and company efforts to identify and address community needs.

		Lastly, EETC's representatives stated that civil society organizations and social media platforms play a key role in facilitating communication between developers and the community in Ras Gharib. They explained that coordination committees may be established to support communication between social media representatives and developers. It was emphasized that the Developer's contributions to community initiatives constitute part of their regulatory and funding obligations and reflect their social responsibilities in addition to Project implementation.
Youth involvement	Participants requested clarification regarding the expected operational duration of the Project and its anticipated production timeline. Participants also emphasized the importance of providing employment opportunities for local youth, requesting that at least 80% of employment opportunities following construction be allocated to residents of Ras Gharib.	The Developer responded that Project operation will commence following the completion of environmental approvals, financial close, and completion of required pre-construction procedures. Construction is expected to begin in the second quarter of 2028, with an estimated construction period of approximately 26 months. It was clarified that the construction phase will require a higher workforce, including laborers, engineers, and technicians. The Developer noted that during the 650 MW project implemented (RSWE 1), approximately 350 individuals from Ras Gharib were employed. The Developer further explained that workforce requirements during the operational phase are expected to decrease; however, efforts will be made to employ approximately 40% of workers from Ras Gharib and to provide training and capacity building to enhance local employment opportunities. RCREEE also added that the Project includes training programs for youth from Ras Gharib to support monitoring of migratory birds during the construction of renewable energy projects. It was highlighted that this initiative represents an additional employment and capacity-building opportunity for local youth.
	Participants called for prioritizing employment opportunities for qualified residents of Ras Gharib who hold bachelor's degrees in energy and wind technology disciplines.	The Developer stated that renewable energy projects generate indirect employment opportunities across multiple specializations and are not limited to engineering roles. EEAA also recommended clearly defining community needs and priorities for non-governmental organizations in Ras Gharib. It was further emphasized that supporting small businesses should be considered, along with appointing a community representative to ensure that developer-funded support

		initiatives are appropriately allocated and implemented in line with community priorities.
Written Comments and Recommendations	▪ Consider adherence to international standards during the construction and operational phases of the Project, with continuous monitoring and follow-up. ▪ Implement effective mitigation measures to minimize environmental impacts and preserve the surrounding environment. ▪ Strengthen cooperation with the local community to improve living standards based on priority community needs and environmental quality. ▪ Establish clear procedures and selection criteria for subcontractors to enhance safety performance, reduce accident and fatality risks, and support opportunities for local subcontractors and service providers. ▪ Promote youth participation and representation in consultation and stakeholder engagement activities. ▪ Enhance coordination with other existing projects and support community CSR programs to address local development needs. ▪ Organize site visits to Project locations for government representatives and community leaders, including visits to sites under construction or operational wind energy projects. ▪ Address concerns related to water resource demand in Ras Gharib, including support for water transmission lines and internal distribution networks to maintain service quality. ▪ Promote awareness and implementation of occupational health and safety practices and environmental protection measures to support sustainable development. ▪ Ensure protection of biodiversity through appropriate mitigation measures, including preservation of vegetation cover due to its role in soil stabilization and combating desertification. ▪ Explore opportunities for establishing supporting industries or future projects to increase employment opportunities for local residents. ▪ Consider allocating land within Project areas for potential community development initiatives, such as integrated livestock or agricultural activities. ▪ Enhance collaboration with charitable organizations to support vulnerable families and improve health, education, and environmental services within the city. ▪ Support local employment opportunities while considering housing challenges associated with population increases due to Project activities. ▪ Develop and maintain a database of local youth to support workforce planning and vocational training opportunities. ▪ Consider establishing a local training center to enhance capacity building and workforce readiness. ▪ Participants expressed appreciation for the Project, the consultation process, and its anticipated national, economic, and local community benefits.	

4.4 Future Stakeholder Engagement and Consultation

Future stakeholder engagement and consultations will mainly include the following, each of which is discussed in further detail.

4.4.1 Disclosure of Documentation

The below documents will be disclosed on the Developer's website 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 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)
- Health, Safety, Social and Environmental (HSSE) Management System (MS) Manual

The above will be disclosed in two (2) main languages to include English and Arabic language.

All disclosed documentation will be available at the following locations:

- Ras Gharib District Office
- Red Sea Governorate office

4.4.2 Implementation of the Stakeholder Engagement Plan (SEP)

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 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.

5. REGULATORY AND POLICY FRAMEWORK

This section presents the environmental clearance process in Egypt, the key E&S legislations that are applicable for the Project, and the relevant international E&S standards and requirements.

5.1 Environmental Clearance Process in Egypt

The Egyptian Environmental Affairs Agency (EEAA) is the primary environmental regulator in Egypt. Operating under the Ministry of Environment, the EEAA is responsible for developing and enforcing national environmental and conservation policy, issuing environmental approvals, overseeing environmental compliance, and ensuring integration of environmental management across all development sectors. EEAA also oversees the implementation of environmental standards and the review of Environmental and Social Impact Assessment (ESIA) studies required for development projects.

The ESIA requirements and procedures are set forth in Law No. 4 of 1994 for the Protection of the Environment and its Executive Regulations, as amended by Law No. 9 of 2009 and Prime Ministerial Decree No. 338 of 1995. These laws outline the scope and responsibility of project developers and Competent Administrative Authorities (CAAs) in assessing and mitigating the potential impacts of development projects.

For electricity generation projects, including utility-scale wind farms, the New and Renewable Energy Authority (NREA) serves as the Competent Administrative Authority. NREA is mandated to receive ESIA submissions, assess site suitability, and forward the documentation to the EEAA for environmental clearance. For wind farm projects, the relevant ESIA is submitted to the Central Environmental Impact Assessment Department within EEAA headquarters in Cairo.

As per the EEAA's EIA Guidelines of 2009, utility-scale wind energy projects are classified as Category C—projects with potentially significant environmental and social impacts—which require a full ESIA to be conducted. The full ESIA must be completed and approved prior to obtaining an environmental permit for construction.

The key components of a full ESIA for Category C wind projects include the following:

- **Public Consultation:** Two rounds of consultation are required—first during the scoping phase and again after the draft ESIA is prepared. The public consultation must include disclosure of an Arabic-language technical summary and documentation of meetings with stakeholders, local authorities, and affected communities.
- **Description of the Existing Environment:** Including climatic conditions, geology and soils, water resources, biodiversity (flora and fauna), air quality, noise, land use, socio-economic context, and cultural heritage.
- **Project Description:** Including layout and location of wind turbines, associated infrastructure (e.g., substation, internal roads, transmission lines), and construction methods.
- **Impact Assessment:** Identification and analysis of potential environmental and social impacts, including avifauna interactions, noise, shadow flicker, land use changes, and community health and safety.
- **Assessment of Alternatives:** Including site alternatives, technology options, and “no project” scenario.
- **Emergency Preparedness and Response:** Assessment of potential risks and outline of emergency

response measures.

- Environmental and Social Management Plan (ESMP): Description of mitigation measures, institutional responsibilities, monitoring requirements, and compliance mechanisms.
- Forecast of Environmental Conditions: Estimation of environmental and social conditions following project implementation.

The ESIA is reviewed by the EEAA within a 30-day period. Based on the review, the EEAA may either approve the ESIA and issue the environmental clearance or request additional studies, surveys, or mitigation measures. The environmental approval granted will be valid for the construction phase of the project. Prior to the operation phase, the project developer must provide evidence of compliance with ESIA conditions and may be required to submit an operational phase environmental plan.

5.2 Egypt E&S Regulatory Context

This section lists those legislations that are directly related to E&S 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 to each of the environmental and social parameter being studied and assessed within the ESIA.

Table 13: National Legislation and Guidelines Governing the E&S Compliance for the Project

Legislation
Landscape and Visual
Environmental Law No. 4 of 1994 (amendments in Environmental Law No. 9 of 2009)
Land Use
Expropriation of Real Estates for Public Interest Law - Law 10/1990
Civil Code 131/1948
Building Law No. 119 of year 2008
Law 557/1954
Unified Building Law – Article 39
Geology, Hydrology, Hydrogeology
Environment Law 4/1994
Biodiversity
Environment Law 4 of 1994
Natural Protectorates is Law 102/1983
Archaeology and Cultural Heritage
Archaeology Law 117/1983
Air Quality and Noise
Environment Law 4/1994 amended by Environment Law 9/2009 and Executive Regulations (ER)710/2012
ERs (amended by Decree 1095/2011 amended by Decree 710/2012) which include maximum limits of ambient air pollutants and noise emissions
Modified ERs (710/2012) of Environment Law 4/1994
Environment Law 4/1994 and its modified ERs
Infrastructure and Utilities
Traffic Law 66/1973, amended by Law 121/2008
Electricity Law No. 87 of year 2015

Petroleum pipelines Law 4/1988
Telecommunication Regulation Law 10/2003
Management of Solid Waste, Hazardous Waste and Wastewater
Environment Law 4/1994 amended by Environment Law 9/2009 and ER 1095/2011 amended by Decree 710/2012)
Ministerial Decree 44/2000 The Executive Regulations of Law No. 93/1962 on the Drainage of Liquid Wastes, Decree of Law 93/1962
Solid Waste Management Law - Law 202/2020
Socioeconomics
Law 94/2003 on Establishing the National Council for Human Rights
EEAA EIA guidelines
Occupational Health and Safety
Environment Law 4/1994 amended by Environment Law 9/2009 and ER 1095/2011 amended by Decree 710/2012)
Labor Law No. 14 of 2025
Labour Law No. 12 of 2003 and its amendments by Labor law No. 14 of 2025 ²²
Law 12/2003 on Labor and Workforce Safety and Book V on Occupational Safety and Health (OSH) and assurance of the adequacy of the working environment
Labor Law - Law 137/1981
Decree 458/2007 - defining maximum limits for criteria and requirements necessary for drinking water and domestic use.
Law 73/2021: Occupational Safety and Health Law
Labor and Working Conditions
Labor Law No. 14 of 2025
Labour Law No. 12 of 2003 and its amendments by Labor law No. 14 of 2025 ²³
Law No. 148 of 2019, which came into force on January 1, 2020

5.3 International Agreements

Egypt has signed and ratified a number of international conventions committing the country to the conservation of E&S resources and protection of workers' health & safety and labor rights. The following table lists the key conventions:

²² It is important to clarify that while Labor Law No. 12 of 2003 remains in force, the Egyptian Parliament approved Labor Law No. 14 of 2025, which was published in the Official Gazette on May 3, 2025. Under its issuance provisions, it will enter into effect 90 days later, on August 1, 2025, and will be followed by the launch of specialized labour courts on October 1, 2025.

²³ It is important to clarify that while Labor Law No. 12 of 2003 remains in force, the Egyptian Parliament approved Labor Law No. 14 of 2025, which was published in the Official Gazette on May 3, 2025. Under its issuance provisions, it will enter into effect 90 days later, on August 1, 2025, and will be followed by the launch of specialized labour courts on October 1, 2025.

Table 14: Relevant International Conventions and Agreements

Name of Multilateral E&S Agreement	Year
Biodiversity and Natural Resources	
International Plant Protection Convention	1951
Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Near East	1965
Convention on Wetlands of International Importance Especially as Water Fowl Habitat (RAMSAR)	1971
Convention Concerning the Protection of the World Cultural and Natural Heritage	1972
Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	1973
Convention on the Conservation of Migratory Species of Wild Animals	1979
Protocol to Amend the Convention on Wetlands of International Importance Especially as Water Fowl Habitat	1982
Convention on Biological Diversity (CBD)	1992
Agreement for the Establishment of the Near East Plant Protection Organization	1993
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa	1994
Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean	1995
African Convention on the Conservation of Nature and Natural Resources (revised)	2003
International Tropical Timber Agreement	2006
Hazardous Materials and Chemicals	
Convention Concerning Prevention and Control of Occupational Hazards Caused by Carcinogenic Substances and Agents	1974
Convention on the Prohibition of the Development, Production and Stock-Piling of Bacteriological (Biological) and Toxin Weapons, and on their Destruction	1972
Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal	1976
Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques	1976
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1989
Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	1991
Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1995
Stockholm Convention on Persistent Organic Pollutants (POPs)	2002
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
Vienna Convention for the Protection of the Ozone Layer	1985
Montreal Protocol on Substances that Deplete the Ozone Layer	1987
(London) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	1990
United Nations Framework Convention on Climate Change	1992
(Copenhagen) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	1992
Name of Multilateral Environmental Agreement	
Kyoto Protocol	1997
Paris Agreement under the United Nations Framework Convention on Climate Change	2015
Health and Worker Safety	
International Labor Organization Core Labor Standards	1936
Convention Concerning the Protection of Workers Against Ionizing Radiation	1960
Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration	1977
Occupational Safety and Health Convention	1979
Human Rights	
UN Convention on the Elimination of All forms of Discrimination against Women	1981

UN International Covenant on Economic, Social and Cultural Rights	1982
UN Convention on the Rights of a Child	1990
UN Convention on the Rights of Persons with Disabilities	2008
UN International Covenant on Civil and Political Rights	1982

5.4 Requirements for Project Financing

The Project will be seeking financing from International Financing Institutions (IFIs). Therefore, the Developer wishes to design and manage the project in accordance with international E&S standards and requirements. For the ESIA, it will be based on the requirements of the following entities, each of which is discussed in further details below:

- 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;
- European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2024) and associated Performance Requirements (PR);
- African Development Bank (AfDB). Integrated Safeguards System Policy Statement and Operational Standards (2023);
- Equator Principles Association – Equator Principles (EP4), issued in July 2020;
- Japan Bank for International Cooperation (JBIC) Guidelines for Confirmation of Environmental and Social Considerations (2022); and
- Nippon Export and Investment Insurance (NEXI) Guidelines on Environmental and Social Considerations in Trade Insurance (2017).
- The Agence Française de Développement (AFD), Environmental and Social Framework 2018.

5.4.1 International Finance Corporation (IFC)

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.

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.

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 15: IFC Performance Standard Requirements

IFC PS	Key Points	Applicability
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		for ESIA
PS 1: 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.	Applicable and considered for this ESIA
PS 2: Labor and Working Conditions	The requirements set out in the PS have been in part guided by a number of international conventions negotiated through the International Labor Organization (ILO) and the United Nations (UN). Specific objectives of this Performance Standard are: ▪ To establish, maintain and improve the worker-management relationship; ▪ To promote the fair treatment, non-discrimination and equal opportunity of workers and compliance with national labor and employment laws; ▪ To promote the workforce by addressing child labor and forced labor; and ▪ To promote safe and healthy working conditions, and to protect and promote the health of workers.	Applicable and considered for this ESIA
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.	Applicable and considered for this ESIA
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.	Applicable and considered for this ESIA
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.	Not applicable, Refer to "Section 7.2.2 "
PS 6: Biodiversity Conservation and Sustainable Management Of Living	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	Applicable and considered for this ESIA

Natural Resources	To promote the sustainable management and use of natural resources through the adoption of practices that integrate conservation needs and development priorities.	
PS 7: Indigenous Peoples	Indigenous peoples may be particularly vulnerable to the adverse impacts associated with project development, including risk of impoverishment and loss of identity, culture, and natural resource-based livelihoods. PS7 seeks to ensure that business activities minimize negative impacts, foster respect for human rights, dignity and culture of indigenous populations, and promote development benefits in culturally appropriate ways. 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.	Not applicable, Refer to “Section 7.11”
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.	Applicable and considered for this ESIA

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

- IFC General EHS Guidelines (2007): identifies detailed EHS management and technical recommendations which are applicable for all development projects; and
- EHS Guidelines for Wind Energy (IFC, 2015): Provide guidance’s and information to users on EHS issues related to onshore and offshore wind energy facilities. The Guideline provides a summary of EHS impacts associated with wind energy facilities along with recommendations for their management as well as performance indicators and monitoring programs for environmental, occupational health and safety and community health and safety. Where relevant, the requirements of this guideline are reiterated clearly in subsequent sections that discuss the environmental attributes they relate to where national legislations are not available.

EHS Guidelines for Electric Power Transmission and Distribution (IFC, 2007): Provide guidance’s and information to users on EHS issues related to transmission and distribution lines. The Guideline provides a summary of EHS impacts associated with transmission and distribution lines along with recommendations for their management as well as performance indicators and monitoring programs for environmental, occupational health and safety and community health and safety. Where relevant, the requirements of this guideline are reiterated clearly in subsequent sections that discuss the environmental attributes they relate to where national legislations are not available.

5.4.2 European Bank for Reconstruction and Development

EBRD’s 2024 Environmental and Social Policy seeks to ensure, through its E&S 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.

Under EBRD’s Environmental and Social Policy Annex B identifies large scale wind power projects are classified as “Category A” and which therefore have significant risks and require an ESIA.

To translate this objective into successful practical outcomes, EBRD has adopted a comprehensive set of E&S Requirements (ESR) covering key areas of environmental and social impacts and issues. EBRD expects clients to assess and manage the environmental and social issues associated with their projects so that projects meet their E&S Requirements. The E&S Requirements applicable are summarized in the table below.

Table 16: Overview of Key Points of EBRD Performance Requirements of Relevance to the Project

EBRD PR	Key Points Relevant to the Project	Applicability
ESR 1: Assessment and Management of E&S Risks and Impacts	This requirement outlines the process of appraising, managing and monitoring environmental and social issues associated with a project to include E&S management systems, E&S assessments, ESMP, organizational capacity, monitoring and reporting, etc.	Applicable and considered for this ESIA
ESR 2: Labor and Working Conditions	This requirement assures that human resources policies, procedures and standards will meet the following minimum requirements during the life of the Project with regards to labor and working conditions. This includes issues related to management of worker relationships to include HR policies and procedures, conditions of work, migrant workers, workers' organization, forced labor, child labor, non-discrimination and equal opportunity, grievance mechanism, contracted and supply chain workers, etc.	Applicable and considered for this ESIA
ESR 3: Resource Efficiency and Pollution Prevention and Control	This requirement ensures that resources are utilized efficiently and impacts associated with polluting activities are controlled. This includes issues related to resource efficiency and circular economy, water, waste, pollution prevention and control, greenhouse gas emissions, safe use and management of hazardous substances and materials, pest management, and noise and vibration.	Applicable and considered for this ESIA
ESR 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 minimize the risks and adverse impacts to community health, safety and security as well as occupational health and safety.	Applicable and considered for this ESIA
ESR 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. The requirement includes issues related to avoidance or minimization of displacement, forced eviction, negotiated settlements, socioeconomic surveys, inventory assessments and cut-off dates, valuations, eligibility and compensations, temporary land use restrictions, stakeholder engagement, grievance mechanism and other.	Not applicable

EBRD PR	Key Points Relevant to the Project	Applicability
ESR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	EBRD recognizes the need for the protection and conservation of biodiversity in the context of projects in which it invests. In pursuing these aims, this includes requirements related to assessment of risks and impacts, protection and conservation of biodiversity/Priority Biodiversity Features (PBF)/Critical Habitats (CH), legally protected areas, invasive alien species, sustainable management of natural resource, and supply chains.	Applicable and considered for this ESIA
ESR 7: Indigenous Peoples	Indigenous peoples may be particularly vulnerable to the adverse impacts associated with project development, including risk of impoverishment and loss of identity, culture, and natural resource-based livelihoods. The requirement seeks to ensure that business activities minimize negative impacts, foster respect for human rights, dignity and culture of indigenous populations, and promote development benefits in culturally appropriate ways.	Not applicable
ESR 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 to include archeological sites, built heritage, cultural landscape with natural features, movable cultural heritage, etc.	Applicable and considered for this ESIA
ESR 9: Financial Intermediaries	This Requirement applies exclusively to projects where the EBRD provides funding through financial intermediaries (FIs) such as commercial banks, private equity funds, or microfinance institutions. In this case, the EBRD is providing direct financing to the project developer for the implementation of the Project. Since no financial intermediary is involved in the structure or disbursement of funds, the provisions of PR 9 are not applicable to this project.	Not applicable
ESR 10: 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 requirement entailed identifying people or communities that are or could be affected by the Project, as well as other interested parties; 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 maintain a constructive relationship with stake holders on an ongoing basis through meaningful engagement during project implementation.	Applicable and considered for this ESIA

5.4.3 Agence Française de Développement (AFD) / Proparco

AFD/Proparco aims to promote sustainable and equitable development in all operations funded, by ensuring that such operations contribute to sustainable development objectives, including poverty reduction, protection of biodiversity, preservation of habitats and natural resources, and climate change mitigation. All operations financed by AFD/Proparco are required to comply with the national regulations of the country where the Project is implemented, including for environmental and social issues. However, where national regulations are incomplete or under development, AFD/Proparco uses as reference a

number of international standards, good practices and directives produced by international standard-setting organizations. These reference frameworks include:

- World Bank Safeguard Policies for public sector financing;
- United Nations Principles for Responsible Investment (UNPRI);
- International Finance Corporation (IFC) Performance Standards;
- United Nations Universal Declaration of Human Rights;
- International Labor Organization (ILO) fundamental conventions on labor law;
- United Nations Convention on the Elimination of All Forms of Discrimination against Women; and
- OECD Guidelines for Multinational Enterprises.

For the purpose of this Project, the key points of relevance to the ESIA are summarized in the table below.

Table 17: Overview of Key Points of AFD / Proparco Requirements of Relevance to the Project

AFD / Proparco Requirement	Key Points Relevant to the Project
National Regulatory Compliance	All operations financed by AFD/Proparco are required to comply with the national regulations of the country where the operation is implemented, including E&S requirements.
International Reference Standards	Where national regulations are incomplete or under development, AFD/Proparco uses as reference a number of international rules, good practices and directives. These mainly include the World Bank Safeguard Policies for public sector financing, the United Nations Principles for Responsible Investment (UNPRI), and the IFC Performance Standards.
International Conventions and Principles	AFD/Proparco also refers to major international conventions ratified by the countries where it operates, mainly the United Nations Universal Declaration on Human Rights, the ILO fundamental conventions on labor law, the United Nations Convention on the Elimination of All Forms of Discrimination against Women, and the OECD Guidelines for Multinational Enterprises.
E&S Risk Management Approach	In terms of E&S risk management, AFD Group/Proparco does not have specific standalone E&S standards and applies World Bank Group standards including the World Bank E&S Framework and IFC Performance Standards and the related Guidance and Interpretation Notes.
Alignment with Equator Principles	The AFD/Proparco E&S risk management approach is noted as being in line with the Equator Principles.
Exclusion List	AFD/Proparco applies an Exclusion List ²⁴ as part of its due diligence requirements. This includes, among others, any activity involving or requiring the destruction of Critical Habitat, and any forest project under which no sustainable development and managing plan is carried out. This is of relevance to the Project in relation to biodiversity considerations and the need to confirm whether any Critical Habitat is present.

²⁴ [Exclusion List – AFD Group](#)

5.4.4 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:

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: Labour conditions, health and safety	Labour 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 protection of the workforce, addressing, for example, child labour.
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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)

5.4.5 Equator Principles 4 (EP4)

The Equator Principles Financing Institutions (EPFIs) have consequently adopted a set of E&S guidelines to ensure that large scale development projects properly determine, assess and manage the associated potential impacts on the natural environment and the affected communities.

The latest principles (EP 4) were issued in July 2020. The EP are summarized below.

Table 18: Summary of Equator Principles

No.	Principle	Discussions	Applicability for ESIA
1	Review & Categorization	Identifies categorization for projects as either Category A, B or C. This is determined by an E&S review and due diligence undertaken by the financial institution (and/or their advisor). Based on review of the project it is likely to be categorized as “B” which are “projects with potential limited adverse E&S risk and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures.”	Not relevant for this ESIA study
2	Environmental & Social Assessment	This requires that for Category A and B projects that an Environmental and Social Impact Assessment (ESIA) is undertaken. The Principle provides guidance and illustrative list of issues that the ESIA study should address. This is discussed in further details in the table that follows. In addition, the Principle requires an assessment of potential adverse human rights impacts and climate change risks .	Applicable and considered for this ESIA
3	Applicable Environmental	Principle requires that assessment process comply with relevant host country laws. In addition, for projects located in Non-Designated Countries	Applicable and

No.	Principle	Discussions	Applicability for ESIA
	and Social Standards	(such as the Egypt) compliance with IFC Performance Standards on Environmental and Social Sustainability (Performance Standards) is required.	considered for this ESIA
4	E&S Management System and EP Action Plan	For all category A and category B projects, the financing institution will require that the client develop and/or maintain an Environmental and Social Management System (MS). In addition, an Environmental and Social Management Plan (ESMP) must be prepared by the Client.	Applicable and considered for this ESIA
5	Stakeholder Engagement	Category A and B projects require effective and continuous stakeholder engagement with affected communities, workers and other stakeholders as relevant.	Applicable and considered for this ESIA
6	Grievance Mechanism	Category A and B projects require an effective grievance mechanism for affected communities and workers as appropriate to receive and facilitate resolution of concerns and grievances.	Applicable and considered for this ESIA
7	Independent Review	An independent E&S review will be undertaken for Category A and B projects will on the EIA, ESMP, ESMS, SEP and other as applicable and an Equator Principle Action Plan (EPAP) will be prepared.	Not relevant for the ESIA study
8	Covenants	The Principle requires that the Client covenant and comply with ESMP and EPAP requirements and provide periodic reports to document compliance with ESMP and EPAP and local E&S regulations.	Not relevant for the ESIA study
9	Independent Monitoring and Reporting	After financial close, for category A and B projects, financing institution will require independent monitoring and reporting to assure project compliance with Equator Principles	Not relevant for the ESIA study
10	Reporting and Transparency	Identifies E&S reporting requirements for the client for category A and B projects.	Not relevant for the ESIA study

As discussed in the table above and specifically under Principle 2, the Principle provides guidance and illustrative list of issues that the ESIA study should address. Such issues are identified below. The ESIA ensure that all issued identified below are addressed.

- Assessment of baseline E&S conditions (applicable and considered for ESIA);
- Consideration of feasible E&S preferred alternatives (applicable and considered for ESIA);
- Requirements under host country laws and regulations (applicable and considered for ESIA);
- Protection and conservation of biodiversity and identification of legally protected areas (applicable and considered for ESIA);
- Sustainable management and use of renewable energy sources (applicable and considered for ESIA);
- Use and management of dangerous substances (applicable and considered for ESIA);
- Major hazards assessment and management (applicable and considered for ESIA);
- Efficient production (applicable and considered for ESIA);
- Pollution prevention and waste minimization, pollution control and waste management (applicable and considered for ESIA);
- Greenhouse gas emissions level and emissions intensity (applicable and considered for ESIA);

- Water usage, water intensity water source (applicable and considered for ESIA);
- Land cover and land use practices (applicable and considered for ESIA);
- Consideration of physical climate risks and adaptation opportunities and viability of project operations under changing weather patterns/climatic conditions (applicable and considered for ESIA);
- Cumulative impacts of existing projects, the proposed project and anticipated future projects (applicable and considered for ESIA);
- Consideration of actual or potential adverse human rights impacts (applicable and considered for ESIA);
- Labor issues and occupational health and safety (applicable and considered for ESIA);
- Consultation and participation of affected parties in the design, review and implementation of the project (applicable and considered for ESIA);
- Socio-economic impacts (applicable and considered for ESIA);
- Impacts on affected communities and disadvantaged or vulnerable groups (applicable and considered for ESIA);
- Gender and gender disproportionate gender impacts (applicable and considered for ESIA);
- Land acquisition and involuntary resettlement (not applicable, Refer to “Section **Error! Reference source not found.**”);
- Impacts on indigenous peoples (not triggered and therefore not applicable, Refer to “Section **Error! Reference source not found.**”);
- Protection of cultural property and heritage (applicable and considered for ESIA);
- Protection of community health, safety and security (applicable and considered for ESIA); and
- Fire prevention and life safety (applicable and considered for ESIA).

5.4.6 Nippon Export and Investment Insurance (NEXI)

NEXI have adopted a set of guidelines on E&S Considerations in Trade Insurance to ensure that large scale development projects properly determine, assess and manage the associated potential impacts on the natural environment and the affected communities.

The latest guidelines were issued in April 2017. The guidelines are summarized below.

Table 19: Summary of NEXI E&S Considerations

No.	Principle	Discussions	Applicability for ESIA
1	Screening & Categorization	NEXI conducts an environmental and social screening to categorize projects into Category A, B, or C , based on the nature, scale, location, and potential environmental and social impacts. Category A includes projects with potentially significant, complex, or unprecedented impacts, projects in sensitive sectors, or projects located in or near sensitive areas. Although the Project is not anticipated to result in significant adverse environmental	Not relevant for this ESIA study

No.	Principle	Discussions	Applicability for ESIA
		or social impacts, the NEXI Guidelines define Category A projects as projects that are likely to have significant adverse impacts on the environment. Projects with complicated or unprecedented impacts that are difficult to assess are also classified as Category A. In addition, the Guidelines further explain that projects falling within sensitive sectors are, by default, categorized as Category A. While wind power projects are not explicitly listed as a sensitive sector, other power generation types are identified under sensitive sectors, including thermal power, nuclear power, hydropower, dams, and reservoirs. Furthermore, the Guidelines identify sensitive areas, and state that projects located in or in the vicinity of such areas are, in principle, categorized as Category A. Sensitive areas include national parks and nationally designated protected areas, such as coastal areas, wetlands, areas designated for ethnic minorities or indigenous peoples, and areas of cultural heritage importance.	
2	Environmental & Social Assessment	For Category A and, where applicable, Category B projects, NEXI requires an appropriate level of environmental and social review, typically through the preparation of an Environmental and Social Impact Assessment (ESIA) or equivalent documentation. The review assesses potential impacts and proposed mitigation measures.	Applicable and considered for this ESIA
3	Applicable Environmental and Social Standards	Principle requires that assessment process comply with relevant host country laws. In addition, NEXI assesses alignment with international standards, including the World Bank Safeguard Policies, IFC Performance Standards (where applicable), and relevant World Bank Group EHS Guidelines; for Category A projects, a full ESIA and environmental permits are required.	Applicable and considered for this ESIA
4	Incorporation into Decision-Making	The outcomes of screening and environmental and social review are integrated into NEXI's decision on issuance of commitment; where significant adverse impacts are identified, NEXI may require additional environmental and social conditions, encourage enhanced mitigation measures, defer or condition approval, or, in exceptional cases, decline or cancel commitment or insurance coverage if adequate environmental and social considerations cannot be confirmed.	Applicable and considered for this ESIA
5	Assurance of Environmental and Social Considerations (Post-Commitment)	After commitment issuance, NEXI may request information to confirm appropriate implementation of environmental and social measures; for Category A and B projects, NEXI typically reviews monitoring results for a defined period and may require corrective actions where needed, and reserves the right to cancel commitments or terminate insurance coverage in cases of false reporting, non-disclosure of critical information, or violation of Environmental Special Clauses.	Not relevant for the ESIA study
6	Information Disclosure and Transparency	NEXI discloses information on project screening, categorization, and environmental review outcomes for Category A and B projects through its website, including ESIA availability and monitoring results, in a timely manner prior to and after commitment issuance, while respecting host-country laws and safeguarding the commercial confidentiality of applicants.	Not relevant for the ESIA study
7	Ensuring Compliance with the Guidelines	NEXI endeavors to ensure appropriate implementation of the policies and procedures stated in these Guidelines and compliance with the Guidelines. In order to ensure its compliance with the Guidelines, NEXI	Not relevant for the ESIA study

No.	Principle	Discussions	Applicability for ESIA
		accepts objections regarding its non-compliance with the Guidelines and takes the necessary action.	

As discussed in the table above, and in accordance with the NEXI Guidelines on Environmental and Social Considerations in Trade Insurance, the environmental and social review requirements provide guidance and an illustrative list of issues that the ESIA study should address. Such issues are identified below. The ESIA ensures that all issues identified below are addressed.

- Assessment and examination of baseline environmental and social conditions from the earliest possible planning stage (applicable and considered for ESIA);
- Examination of alternative project proposals and mitigation measures to prevent or minimize adverse environmental and social impacts, with priority given to impact avoidance (applicable and considered for ESIA);
- Compliance with applicable host country environmental and social laws, regulations, standards, and relevant plans (applicable and considered for ESIA);
- Protection and conservation of ecosystems, habitats, and biota, including the identification and consideration of legally designated protected and sensitive areas (applicable and considered for ESIA);
- Environmental impacts associated with energy use and resource efficiency, including greenhouse gas emissions and related global environmental impacts (applicable and considered for ESIA);
- Use, handling, storage, and management of hazardous and dangerous substances (applicable and considered for ESIA);
- Assessment and management of major hazards, accidents, and emergency situations that may affect human health, safety, or the environment (applicable and considered for ESIA);
- Efficient use of resources and materials throughout the project life cycle, in coordination with technical, economic, and environmental considerations (applicable and considered for ESIA);
- Pollution prevention, waste minimization, pollution control measures, and waste management practices (applicable and considered for ESIA);
- Assessment of greenhouse gas emissions and other air-related impacts that may contribute to trans-boundary or global environmental problems (applicable and considered for ESIA);
- Water use, water sources, water consumption, and potential impacts on water resources (applicable and considered for ESIA);
- Land cover, land use practices, and potential changes resulting from project development (applicable and considered for ESIA);
- Consideration of physical climate-related risks and the viability of project operations under changing weather patterns and climatic conditions (applicable and considered for ESIA);
- Assessment of direct, indirect, secondary, and cumulative impacts of existing projects, the proposed project, and reasonably foreseeable future developments (applicable and considered for ESIA);
- Consideration of social concerns and respect for human rights, including potential adverse impacts on

affected communities (applicable and considered for ESIA);

- Labor and working conditions, including occupational health and safety (applicable and considered for ESIA);
- Consultation and participation of stakeholders, including local residents and affected parties, through appropriate information disclosure and engagement processes (applicable and considered for ESIA);
- Socio-economic impacts on local communities and the surrounding area (applicable and considered for ESIA);
- Impacts on vulnerable or disadvantaged groups, including women, children, the elderly, the poor, and ethnic minorities (applicable and considered for ESIA);
- Gender considerations and potential disproportionate gender-related impacts (applicable and considered for ESIA);
- Land acquisition and involuntary resettlement (not applicable; refer to **Section 7.2**);
- Impacts on indigenous peoples (not triggered and therefore not applicable; refer to **Section 7.11**);
- Protection of cultural property, cultural heritage, and landscape values (applicable and considered for ESIA);
- Community health, safety, and security impacts arising from project activities (applicable and considered for ESIA); and
- Fire prevention, emergency preparedness, and life safety measures (applicable and considered for ESIA).

5.4.7 Japan Bank for International Cooperation (JBIC)

JBIC has adopted the Guidelines for Confirmation of Environmental and Social Considerations to ensure that projects supported through its lending, equity participation, and guarantees appropriately identify, assess, and manage potential environmental and social impacts, including impacts on the natural environment, local communities, and human rights.

The Guidelines aim to promote environmentally and socially sound development while ensuring transparency, predictability, and accountability in JBIC's decision-making processes.

The latest version of the Guidelines was issued in May 2022, and the key requirements are summarized below.

Table 20: Summary of E&S Considerations

No.	Principle	Discussions	Applicability for ESIA
1	Screening & Categorization	JBIC conducts an environmental and social screening to classify projects into Category A, B, C, or FI, taking into account the sector, scale, nature, degree of uncertainty of potential impacts, and the environmental and social context of the project site and surrounding areas. Category A projects are defined as those likely to have significant adverse environmental impacts, including projects with complicated or unprecedented impacts that are difficult to assess, projects in sensitive sectors, or projects located in or near sensitive areas. While wind power is not explicitly listed	Not relevant for this ESIA study

		as a sensitive sector, other power generation types are identified, including thermal power, nuclear power, hydropower, dams, and reservoirs.	
2	Environmental and Social Review / ESIA	For Category A projects, JBIC requires a comprehensive Environmental and Social Impact Assessment (ESIA) and confirmation that environmental permits have been obtained in accordance with host country requirements. The environmental review examines potential positive and negative impacts and evaluates measures to prevent, minimize, mitigate, or compensate for adverse impacts, including human rights considerations where relevant.	Applicable and considered for this ESIA
3	Applicable Environmental and Social Standards	JBIC confirms compliance with host country environmental and social laws, regulations, standards, and plans. In addition, JBIC ascertains whether projects meet World Bank Environmental and Social Standards (ESS) or IFC Performance Standards, with IFC Performance Standards applying mandatorily in cases of project finance, structured finance similar to project finance, co-financing with institutions applying IFC PS, or other projects deemed appropriate. Where relevant, World Bank Group EHS Guidelines are used as benchmarks in line with the OECD Common Approaches.	Applicable and considered for this ESIA
4	Integration into Decision-Making	The outcomes of screening and environmental reviews are integrated into JBIC's funding decision-making process. Where JBIC determines that appropriate environmental and social considerations are not ensured, it encourages project proponents to take corrective actions; if such considerations remain inadequate, JBIC may decide not to extend funding.	Applicable and considered for this ESIA
5	Monitoring and Follow-Up	For Category A and B projects, JBIC confirms, through the borrower, the results of environmental and social monitoring conducted by the project proponents over a defined period. JBIC may request additional information, conduct investigations, or require corrective actions if deficiencies are identified, including suspension of disbursement where necessary.	Not relevant for the ESIA study
6	Information Disclosure and Transparency	JBIC discloses information on project screening results, categorization, and the status of ESIA documentation for Category A and B projects prior to funding decisions, and discloses environmental review and monitoring results after funding agreements are signed, subject to host-country laws and confidentiality considerations.	Not relevant for the ESIA study
7	Ensuring Compliance with the Guidelines	JBIC endeavors to ensure appropriate implementation of and compliance with the Guidelines and accepts objections regarding non-compliance. Where necessary, JBIC takes corrective actions in accordance with its procedures and funding agreements.	Not relevant for the ESIA study

As discussed in the table above, and in accordance with the Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations, the environmental and social review requirements provide guidance and an illustrative list of issues that the ESIA study should address. Such issues are identified below. The ESIA ensures that all issues identified below are addressed.

- Assessment and examination of baseline environmental and social conditions from the earliest possible planning stage (applicable and considered for ESIA);
- Examination of alternative project proposals and mitigation measures to prevent or minimize adverse

environmental and social impacts, with priority given to impact avoidance (applicable and considered for ESIA);

- Compliance with applicable host country environmental and social laws, regulations, standards, and relevant plans (applicable and considered for ESIA);
- Protection and conservation of ecosystems, habitats, and biota, including the identification and consideration of legally designated protected and sensitive areas (applicable and considered for ESIA);
- Environmental impacts associated with energy use and resource efficiency, including greenhouse gas emissions and related global environmental impacts (applicable and considered for ESIA);
- Use, handling, storage, and management of hazardous and dangerous substances (applicable and considered for ESIA);
- Assessment and management of major hazards, accidents, and emergency situations that may affect human health, safety, or the environment (applicable and considered for ESIA);
- Efficient use of resources and materials throughout the project life cycle, in coordination with technical, economic, and environmental considerations (applicable and considered for ESIA);
- Pollution prevention, waste minimization, pollution control measures, and waste management practices (applicable and considered for ESIA);
- Assessment of greenhouse gas emissions and other air-related impacts that may contribute to trans-boundary or global environmental problems (applicable and considered for ESIA);
- Water use, water sources, water consumption, and potential impacts on water resources (applicable and considered for ESIA);
- Land cover, land use practices, and potential changes resulting from project development (applicable and considered for ESIA);
- Consideration of physical climate-related risks and the viability of project operations under changing weather patterns and climatic conditions (applicable and considered for ESIA);
- Assessment of direct, indirect, secondary, and cumulative impacts of existing projects, the proposed project, and reasonably foreseeable future developments (applicable and considered for ESIA);
- Consideration of social concerns and respect for human rights, including potential adverse impacts on affected communities (applicable and considered for ESIA);
- Labor and working conditions, including occupational health and safety (applicable and considered for ESIA);
- Consultation and participation of stakeholders, including local residents and affected parties, through appropriate information disclosure and engagement processes (applicable and considered for ESIA);
- Socio-economic impacts on local communities and the surrounding area (applicable and considered for ESIA);
- Impacts on vulnerable or disadvantaged groups, including women, children, the elderly, the poor, and ethnic minorities (applicable and considered for ESIA);
- Gender considerations and potential disproportionate gender-related impacts (applicable and

considered for ESIA);

- Land acquisition and involuntary resettlement (not applicable; refer to **Section 7.2**);
- Impacts on indigenous peoples (not triggered and therefore not applicable; refer to **Section 7.11**);
- Protection of cultural property, cultural heritage, and landscape values (applicable and considered for ESIA);
- Community health, safety, and security impacts arising from project activities (applicable and considered for ESIA); and

5.4.8 Fire prevention, emergency preparedness, and life safety measures (applicable and considered for ESIA). Other

There are additional international E&S standards and requirements that were considered throughout the ESIA study. Those are identified in the table below along with their applicability.

Table 21: Other International E&S Requirements and Standards

Requirement	Applicability for ESIA
IFC Good Practice Note – Addressing Grievances from Project-Affected Communities & IFC Good Practice Manual – Doing Better Business Through Effective Public Consultation and Disclosure	Those identify additional requirements that should be considered and taken into account as part of the planned stakeholder engagement activities as well as the SEP that is provided as a standalone document.
IFC Good Practice Note: A Good Practice Handbook for Companies Doing Business in Emerging Markets	The note identifies key concepts and principles of stakeholder engagement and how to integrate stakeholder engagement with the project cycle. This has been considered for the SEP that is provided as a standalone document.
EBRD and IFC Guidance Note on Worker's accommodation	Identify key issues of concern that should be addressed as well as best practice requirements to be taken into account in relation to worker accommodation
IFC Good Practice Note on Non- Discrimination and Equal Opportunity IFC Good Practice Note – Managing Retrenchment IFC Handbook for Labor and Working Conditions - Measure & Improve Your Labor Standards Performance Good Practice Note: Managing Risks Associated with Modern Slavery International Labor Organization (ILO) Conventions. This will include all ILO conventions signed and ratified by the Government of Egypt and at a minimum all ILO conventions covering core labour standards and all ILO conventions covering the basic terms and conditions of employment	Those are related to workforce management as applicable within the ESIA and associated management plans.
Good Practice Note (GPN) IFC's Use of Security Forces: Assessing and Managing Risks and Impacts	The handbook provides practical, project-level guidance for companies to better understand and implement the requirements outlined in PS 4. Sections focus on risk assessment, managing private security, managing the relationship with public security, preparing a security management plan, and assessing allegations or incidents related to security personnel.

UN Voluntary Principles on Security and Human Rights	Promotes implementation of a set of principles on providing security for their operations in a manner that respects human rights
Addressing Gender-Based Violence and Harassment (GBVH): Emerging Good Practice for the Private Sector	The note prevents the physical, sexual, emotional and financial harm GBVH causes to individuals, as well as the financial, reputational and legal risks it poses to businesses and investors
UNESCO Guidance and Toolkit for Impact Assessments in a World Heritage Context (2022)	Outstanding Universal Values (OUVs) (receptors of biological significance) identified in UNESCO nomination text and associated documents. Baseline surveys to identify the presence of OUVs and subsequent assessment of likely ecological impact of the project (construction and operation) on OUVs. Assessment should include a 'futures' assessment should the baseline ecological value of the WHS (and surrounding area) improve with wider conservation efforts.

6. ANALYSIS OF ALTERNATIVES

This section presents the alternatives that were considered for the Project development to date. This includes site alternatives as well as design alternatives, both of which are discussed in further details below.

6.1 Site Alternatives

The GoE has allocated land to the NREA for the development of renewable energy projects through usufruct rights pursuant to Prime Ministerial Decree No. (37/4/15/14) of 2015, as subsequently regulated and amended by Cabinet Decree No. 54 of 2023 and Prime Minister's Decree No. 55 of 2024.. 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 7,600 km² in the GoS, east and west of the Nile, Benban, and Kom Ombo regions, of which about 5,700 km² (75% share) were designated for wind projects and 1,900 km² (25%) for solar energy projects (25% share). These projects are being developed through usufruct rights, which grant the government the right to use the land while retaining ownership.²⁵

As discussed earlier under "Section 1.1", the Developer signed a MoU with the Government of Egypt. The Project is located inside an area of land allocated to NREA by virtue of the Presidential Decree No. 628 of 2024 for the development of renewable energy development projects, as shown in the figure below.

In general, the key factors considered by the GoE and NREA for selection of such areas included the following:

- Areas to be under governmental ownership and therefore does not require any land acquisition measure;
- Areas to be mostly free from competing uses such as agricultural or housing developments to avoid resettlement and livelihood restoration requirements;
- Areas to be located with the highest wind and solar power potential;
- The geomorphology of the areas to be favorable for renewable energy development and requiring limited construction and landscape modification measures; and
- The access to the areas should 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 900MW wind farm Project. Therefore, taking the above into account, there are no site alternatives that were considered by the Developer in this case.

It is important to note that the Developer had no authority, influence or decision in the site selection process as land allocation was handled by the Ministry of Electricity for the Project. In addition, the entire Gulf of Suez area is now planned for new and additional wind farm and/or green hydrogen developments further restricting availability of any alternative lands within the area. The above information has been included within the section as well.

²⁵ Renewable Energy Incentives (IRENA, 2018)

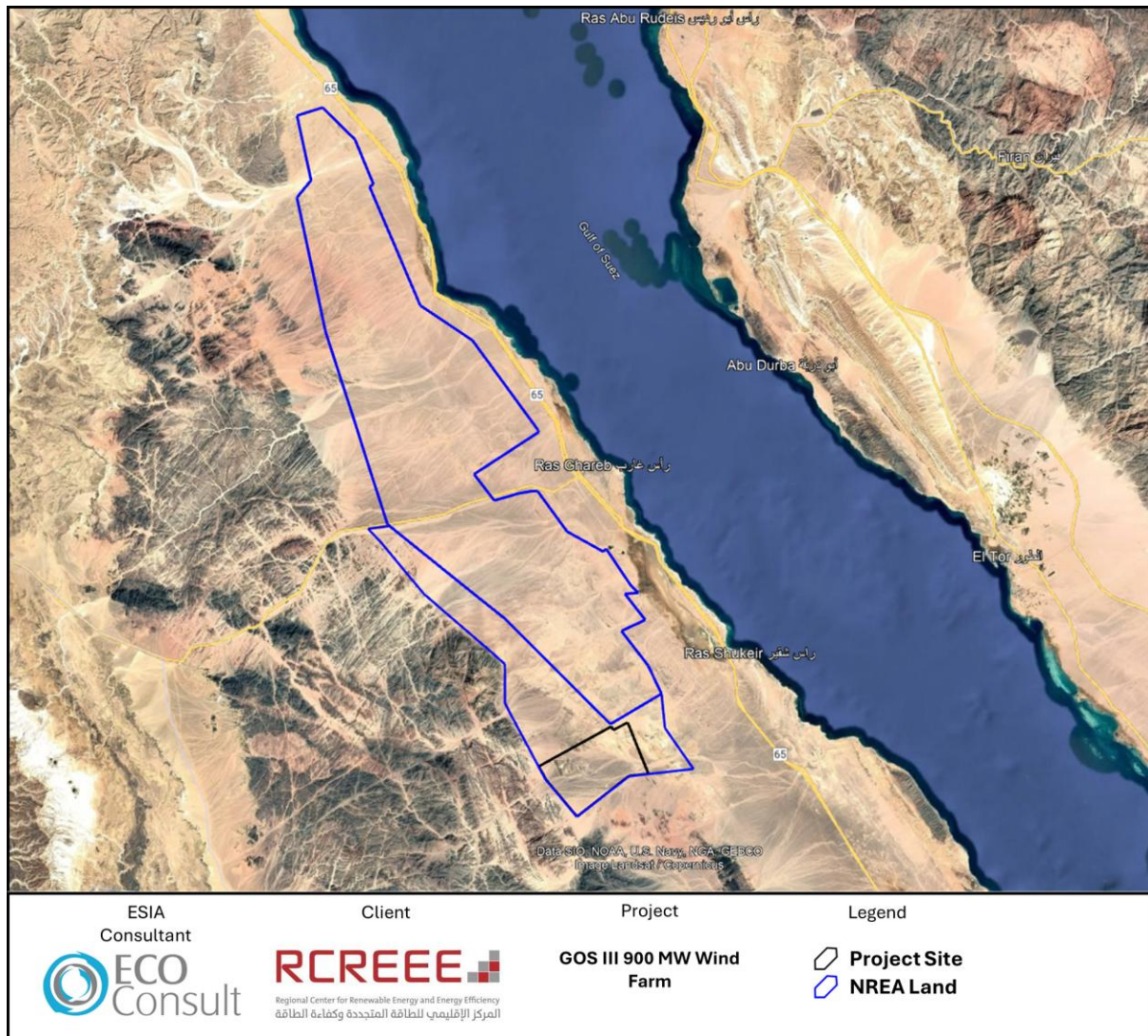


Figure 22: Land Plots Provided by Government

6.1.1 Biodiversity

Initial analysis was undertaken by the “E&S Team” and based on desktop research it was indicated that the Project site does not intersect or overlap with any Key Biodiversity Areas (KBAs), Important Birds Area (IBA) and Protected Areas. The closest KBAs and IBAs to the Project site is Gebel El Zeit KBA IBA that is located around 2.4km east of the Project, and Hurghada Archipelago KBA IBA that is located around 50km south of the Project site. The closest Protected Area is Red Sea Islands that is located around 38km southeast of the Project site. In addition, there are there are four (4) Proposed Protected Areas near the Project that are El-Galala El-Qebalya, Shaieb El-Banat, Malahet Ras Shukeir and Wadi Qena – all of which are located 78km northwest, 45km south-east, 8km north-east and 43km west of the Project site, respectively.

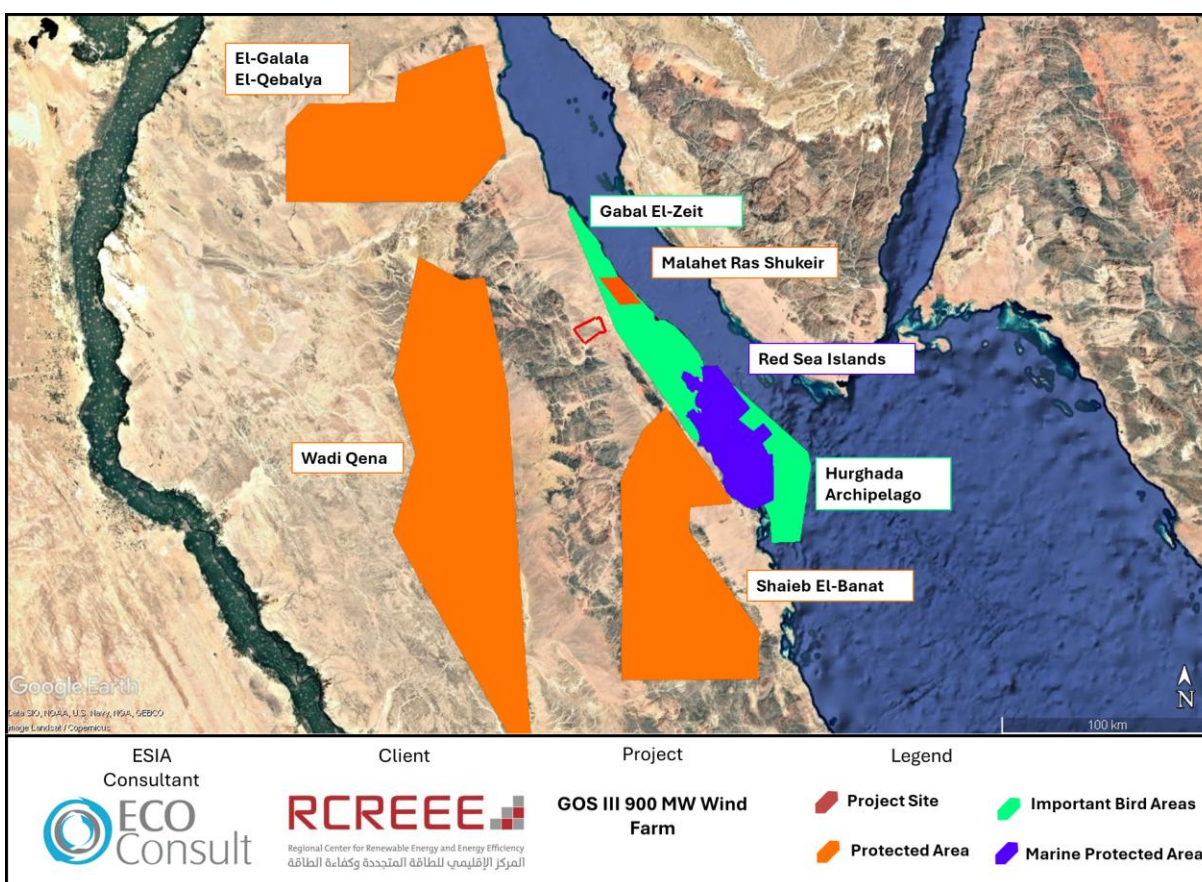


Figure 23: KBAs, IBAs and Protected Areas around the Project Site

Consultations were sought with Nature Conservation Egypt (NCE)²⁶ in August 2025 to review the proposed biodiversity baseline methodology and to gather input on key issues, including proximity to Important Bird Areas (IBAs), Key Biodiversity Areas (KBAs), and other sensitive habitats. A follow-up consultation attempt was undertaken in September and October 2025 to re-engage NCE and obtain technical feedback on the proposed approach and survey coverage. Despite the outreach and multiple follow-ups, no feedback was received from NCE, and therefore no input could be integrated from their side into the assessment.

6.1.2 Land Use

Consultations were undertaken on the 14th of October with NREA in order to identify land tenure of the Project site and therefore avoid to the extent possible any acquisition process as well as physical and/or economical displacement impacts. Additional details on the outcomes of consultation are provided in “Section 4.3.1”.

The entity confirmed that the Project site lies within lands under the jurisdiction of the NREA, designating NREA as the competent administrative entity and land-owning authority responsible for land allocation, facilitating project development, and reviewing associated environmental studies. In parallel, a desktop assessment, satellite imagery review, and site visit were undertaken to verify the presence of any existing and ongoing land use activities within the Project area to ensure that such uses are duly considered in the

²⁶ NCE is the Birdlife International partner in Egypt and is a member of the International Union for the Conservation of Nature (IUCN).

assessment. None were recorded. Accordingly, no restrictions or conflicts related to land use were identified at this stage of the assessment.

6.1.1 Community Settlements

Data was obtained on all potential community settlements within the area to ensure that the Project site is located away from such areas to the extent possible. The closest settlements are Wadi Dara town located 750m southeast of the Project and Ras Gharib town located 32km northeast of the Project site.

However, it is important to note that Wadi Dara Village does not have a permanent community with majority of residents being farm workers and guards employed at the various poultry, livestock and agricultural farms within the settlement (mainly at a rotational basis, where workers are employed for a limited period, typically up to 30 days, after which they leave for a similar period of up to 30 days before returning again, and this cycle continues accordingly).

Therefore, based on this, no restrictions on community settlements were considered for the Project boundary.

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 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 provided an ambitious plan to increase the contribution of renewable energy to 42% of the electricity generated by the year 2035, through hydro, wind, and solar and its efforts are ongoing.

Egypt enjoys favorable 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 favorable 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 realized, and several other hydroelectric plants are being developed.

Taking the above into account, with regards to the Project site in specific it is best utilized 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.

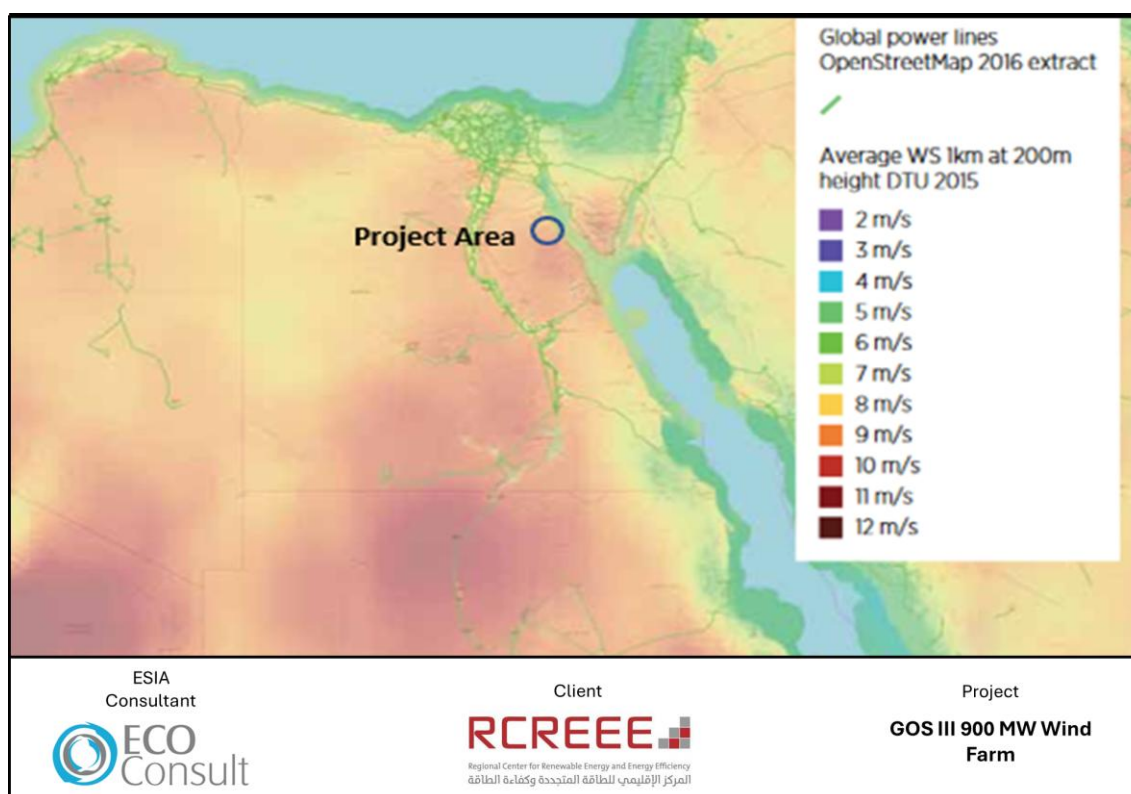


Figure 24: Egypt's Wind Atlas (Source: IRENA, 2018)

6.3 Design Alternatives

As noted in “Section 2.3.2” earlier, the Developer has prepared an initial layout for the Project that is being updated on a continuous basis at this point.

The Developer is committed to ensuring that all identified E&S constraints identified throughout the ESIA process are considered fully throughout the Project design, specifications and layout. Currently, no constraints have been identified to date. However, as part of the ESIA it is expected that E&S constraints will be identified which will need to be considered as part of the detailed design. This could include, for example, archaeological sites, nests for key bird species, burrows for critical species (e.g. Egyptian spiny-tailed lizard), as well as other.

During the ESIA process, site-specific E&S constraints in relation to the Project site will be identified based on the methodology and scope of work identified within “Section 7”.

6.4 No-Project Alternative

The ‘no Project’ alternative assumes that the 900MW 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 – vast barren desert grounds with very limited vegetation with no particular land use.

Should the Project not move forward, then the Project-related negative E&S 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 “Section 10”. Nevertheless, should the Project not move forward; the significant

and crucial positive economic and E&S benefits would not be realized. Such benefits include the following:

- This development allows for more sustainable development and shows the commitment of the Government of Egypt 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 project development. In the case of this Project, it is important to weigh the significant positive economic and E&S impacts incurred from the Project development, against the negative E&S impacts anticipated at the site-specific level – in which generally the ESIA concludes that they can be mitigated, managed and controlled to acceptable levels. The comparison in this Section 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 surroundings in relation to landscape and visual.

7.1.1 Methodology for Assessment

A. Secondary Data Review

Prior to the undertaking of any site-related surveys, a full and detailed review of up-to-date high-quality satellite images for the Project area was undertaken. The objective was to aim to understand site topography and landscape character, and more importantly identify any potential visual receptors within the entire Project footprint and boundary so that it can be inspected during the site survey.

The definition of key critical visual receptor was based on the “Guidelines for Landscape and Visual Impact Assessment (GLVIA)” (Landscape Institute, 2013) as defined below.

Critical Receptors definition per GLVIA
Residents at home.
People engaged in outdoor recreation, whose attention/interest is likely to be focused on the landscape or particular views, including from public rights of way.
Communities where views contribute to landscape setting enjoyed by residents.
Visitors to heritage assets or other attractions, where views of the surroundings are an important contributor to the experience.
Travelers on scenic routes

B. Site Survey

A detailed site survey for the Project area was undertaken in July 2025 to characterize the general topography and landscape of the Project area as well as any potential visual receptors onsite.

7.1.2 Results and Outcomes

A. Landscape and Topography

Based on the site visit, the Project area is located within a varied geomorphological landscape and lies entirely within a large alluvial fan system, as shown in the figure below and depicted in purple, red, and green. Within this fan, two key features are present: elevated hills in the northern central part of the site rising about 45 m above the surrounding ground, and a higher terrain area in the northeast rising roughly 100 m above the ground surface elevation. These features are composed of older rock units and influence the overall fan shape by redirecting surface water flow.

Typical views of the Project site are limited to the open landscape with elevated mountains along the western border of the Project site, with topography of a desert-like habitat as noted within the figure below.

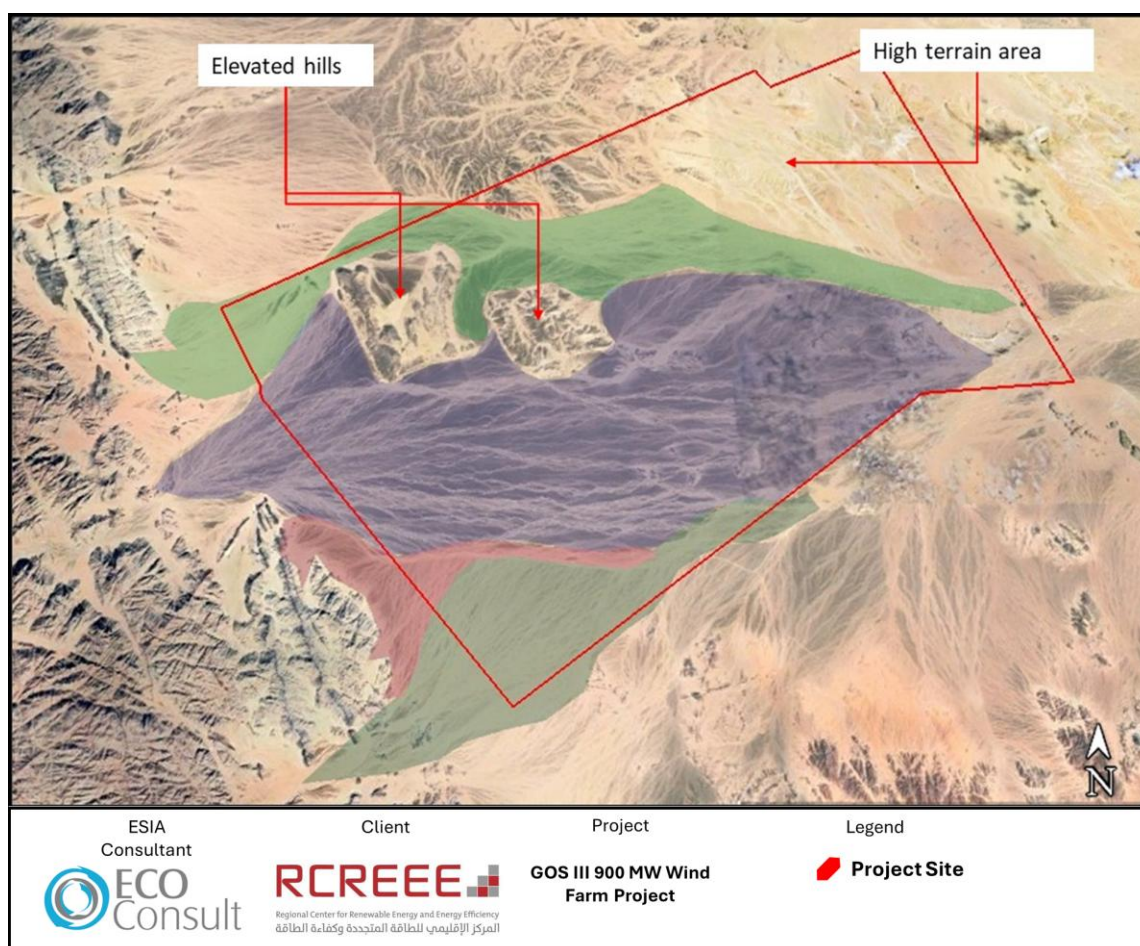


Figure 25: General Site Topography

The figure below presents the general landscape of the Project site.

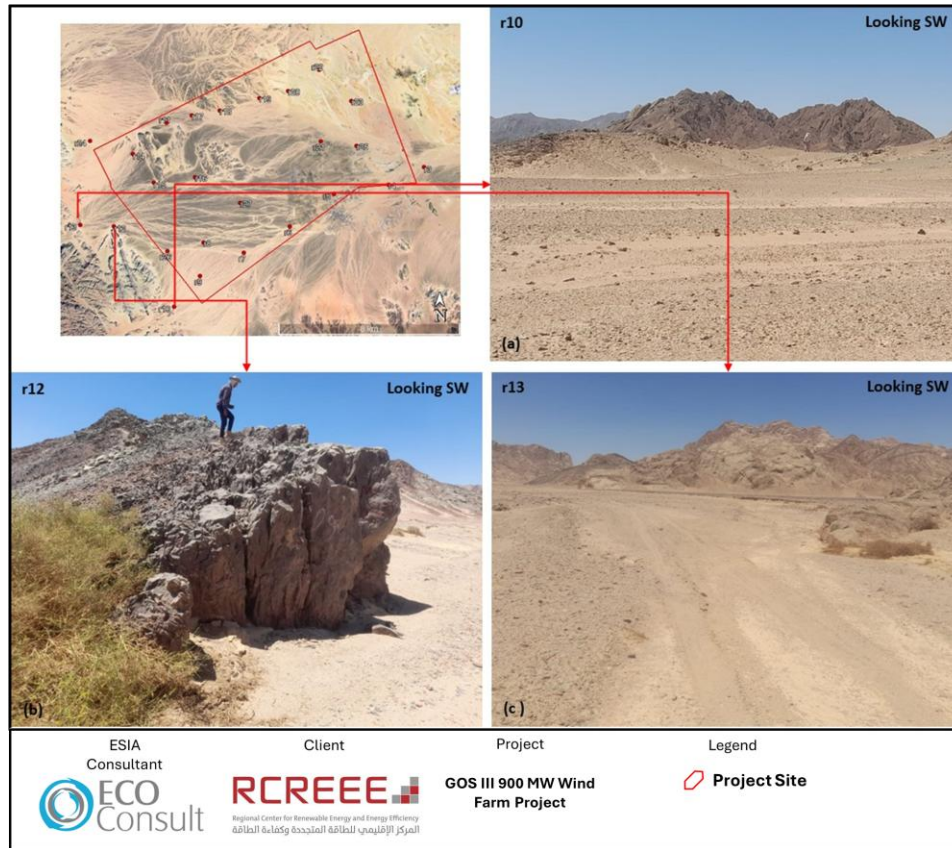


Figure 26: General Site Landscape

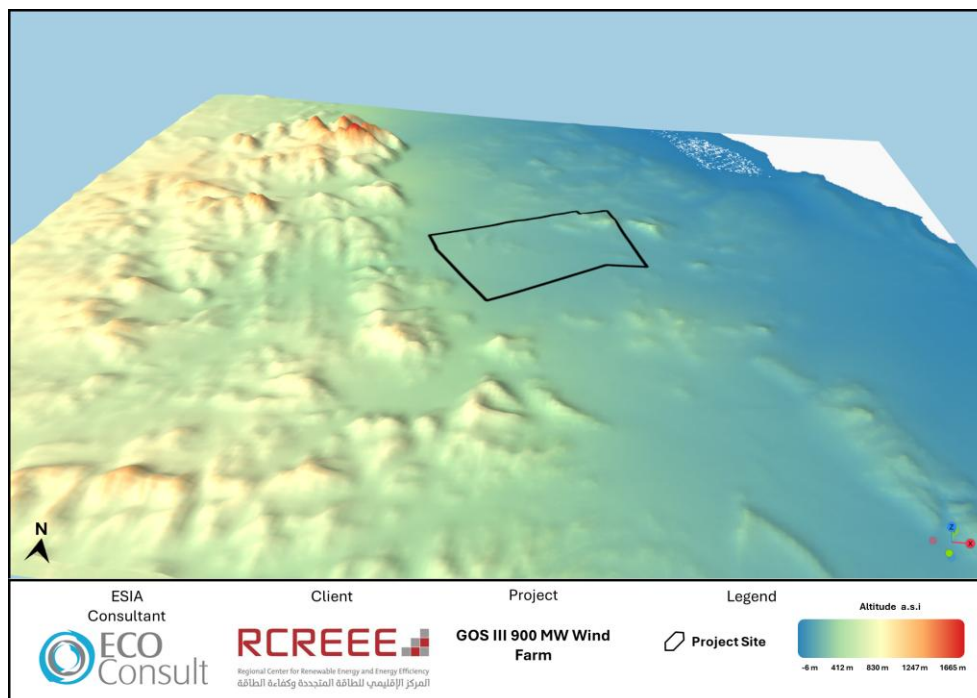


Figure 27: 3D DEM Modelling of the Project Site

B. Visual Receptors

Typical views within a 2km buffer of the Project site include an existing windfarm and a substation east of the Project site as well as agricultural areas in Wadi Dara southeast of the Project as shown in the figure below, refer to “Section 2.7.” Other than the aforementioned, the Project site is mainly limited to a landscape and topography can be described as a desert-like habitat that is barren. Such views are noted within the figure above earlier.

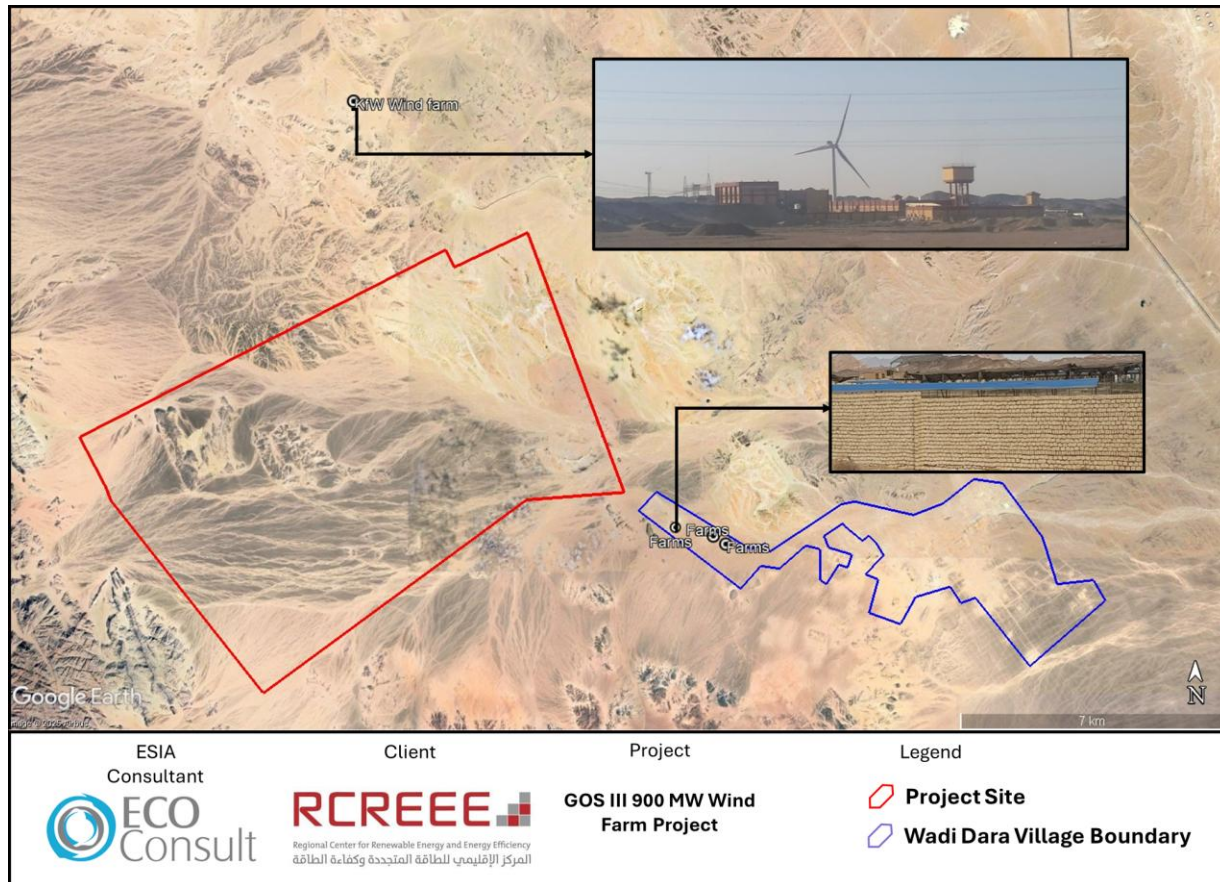


Figure 28: Typical Views from the Project

Based on the site visit and desktop review undertaken, one key visual receptor was identified within and around the Project site which is Wadi Dara Village, located approximately 750m southeast of the Project, as shown in the figure above.

However, Wadi Dara Village does not have a large permanent community with majority of population being workers and guards employed at the various poultry, livestock and agricultural farms within the settlement (mainly at a rotational basis, where workers are employed for a limited period, typically up to 30 days, after which they leave for a similar period of up to 30 days before returning again, and this cycle continues accordingly).

Based on this, aesthetical value for such a receptor loses some importance. The other nearest potential visual receptor is Ras Gharib City, located about 32km to the northeast.

In addition, based on the desktop review undertaken for a 50km radius, no other visual receptors were noted as shown in the figure and table below – all are not defined as key critical visual receptors based on

General Petroleum Company

SUCO Petroleum Company

Ras Charib Port

Power Line

Oxidation Ponds

Ras Shukr Air Port

Tower

Oil Tanks

KIW Wind farm

Culverts

FARMs

FARMs Tower

AMAL Petroleum Co

Gebel El Zeit

Gebel El Zeit Airport

SUCO Petroleum Company

El Zeit Bay

50 km

Google Earth

Client: ESIA Consultant

Project: GOS III 900 MW Wind Farm Project

Legend:

- Project Site
- 50km Buffer
- Visual Receptors identified within 50km

ECOC CONSULT

RCREEE

Regional Center for Renewable Energy and Energy Efficiency

المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

Table 22: Visual Receptors within 50km of the Project Site

Page | 93

Gharib gas collection station	Industry, infrastructure	28.347579°N, 33.098277°E	≈184,000	Collects gas and piped to a treatment system to remove moisture and other contaminants
Ras Gharib port	Industry, infrastructure	28.331644°N, 33.111392°E	≈15,000	It serves as a pivotal maritime facility, particularly for oil and gas.
SUCO petroleum company	Industry	28.325291°N, 33.109204°E	≈ 45,000	Producers of crude oil and gas in Egypt
		27.801517°N, 33.568003°E	≈230,000	
AMAL Petroleum Co	Industry	28.029749°N, 33.403058°E	≈80,000	
AMAPETCO oil and gas C	Industry	28.020962°N, 33.421375°E	≈100,000	
PetroGulf Petroleum Co.	Industry	27.814157°N, 33.563792°E	≈150,000	
Ras Shukeir airport	Infrastructure	28.189001°N, 33.210691°E	≈450,000	Is Small airports serving the city of Ras Gharib
Gebel El Zeit airport	Infrastructure	27.827433°N, 33.533652°E	≈900,000	
Gas plant	Industry	28.052956°N, 33.336625°E	≈140,000	Process natural gas to make it suitable for use in various applications
Ras Shukeir gas plant	Industry	28.049569°N, 33.341940°	≈300,000	
Pyramids for Poultry	Poultry Farms	27.957525°N, 33.242339°E	≈50,000	Grandparent farms, hatcheries and a feed mill
Farms	Agricultural farms	27.962490°N, 33.185435°E	≈200,000	Palm
		27.966122°N, 33.187222°E	≈70,000	
		27.976700°N, 33.215792°E	≈200,000	
WWTP	Infrastructure	28.135661°N, 33.247981°E	35,000	2nd., treatment plant
Gas station	Industry	28.131661°N, 33.245547°E	10,000	Compression station
Oil tanks	Industry	28.129333°N, 33.246517°E	8,000	General petroleum Company tanks
Tower	Infrastructure	28.121103°N, 33.249242°E	10,000	Communication tower
Oil tanks	Industry	28.125508°N, 33.272486°E	500,000	GUPCO tanks
Wind fam	Industry	28.087489°N, 33.245672°E	110 x 106	Gebel Zeit wind farm
Desalination plant	Infrastructure	28.080108°N, 33.256719° E	27,000	Reverse osmoses desalination
Power line	Infrastructure	28.053372°N, 33.210750°E	-	High voltage power line
Culverts	Infrastructure	28.054706°N, 33.241292°E	-	Set of culverts to save the road against surface runoff
Farms	Agricultural	27.993934°N, 33.234090°E	-	Livestock, poultry, Palms
Power line	Infrastructure	28.227908°N, 33.003617°E	-	High voltage power line

Power line	Infrastructure	28.256325°N, 33.069342°E	-	High voltage power line
Power line	Infrastructure	28.227908°N, 33.003617°E	-	High voltage power line
Oxidation ponds	Infrastructure	28.267128°N, 33.091442° E	400,000	Wastewater treatment
Farms	Agricultural	27.986550°N, 33.223511°E	60,000	Livestock, poultry, Palms
Farms	Agricultural	27.986550°N, 33.223511°E	60,000	Livestock, poultry, Palms
Farms	Agricultural	27.988714°N, 33.147483°E	60,000	Livestock, poultry, Palms
Tower	Infrastructure	28.020576°N, 33.306734°E	-	Communication tower
Power line	Infrastructure	27.999139°N, 33.311794°E	-	High voltage power line
Tower	Infrastructure	27.987197°N, 33.343181° E	-	Communication tower

7.2 Land Use

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

7.2.1 Methodology for Assessment

Assessment of baseline conditions was based on a site visit by the 'E&S Team' to the Project site and surrounding areas in July 2025. The site visit aimed to understand in detail any land use activities undertaken onsite. In addition, consultations were undertaken with key stakeholders to better understand and characterize the land use activities onsite as discussed further throughout this section.

7.2.2 Land Ownership

The Government of Egypt has allocated to NREA by virtue of the Presidential Decree No. 628 of 2024 for the development of wind power projects. The Developer had no authority, influence or decision in the site selection process as the site was handed over by the Government to the Developer for development of the Project. In addition, the entire Gulf of Suez area is now planned for new and additional wind farm and/or green hydrogen developments. In general, key factors considered for selection of such areas required that areas had to be under governmental ownership in order not to require any land acquisition measures.

During consultations with NREA and Ras Gharib City Council, the Project site is located within a designated renewable energy development zone by NREA and is therefore under governmental ownership. NREA has a dedicated department responsible for land allocation for energy investments, which coordinates with several government entities, including the Ministry of Antiquities, Urban Planning, and the military authorities, among others.

NREA also confirmed that the land allocated for the proposed Project is not designated for any other development purposes, such as housing, industrial activities, or agricultural reclamation. The Project site lies within an NREA designated renewable energy development zone next to an existing windfarm, therefore there are no land acquisition measures considered for the Project development.

7.2.3 Results and Outcomes

Based on the site survey undertaken, no key land uses were identified to include: (i) physical structures (e.g. houses, tents, structures, etc.) and/or (ii) economic activities (e.g. grazing, agriculture, etc.). The Project site is located in a non-residential zone and does not overlap with any current residential, agricultural, or environmentally sensitive land uses. The nearest land use is mainly poultry and livestock farms within Wadi Dara village, which is located around 750m away from the Project site. In particular, the following was noted:

- No physical structures were noted onsite (such as human settlements or structures). In addition, no man-made features appearing above ground were noted such as roads, electricity lines, pipelines, transmission lines, etc.
- No evidence of any economic activities to include in particular agriculture activities or grazing activities which are common practices undertaken by local communities. In particular, no ploughing marks were noted within the Project area (which would be indicative of agricultural activities) nor any livestock fecal remains (which could be indicative of grazing activities).
- No nomadic or Bedouin activity was noted within the Project site or evidence of such activities.
- Consultations undertaken with multiple Bedouin tribes indicated that the Project area has historically not been used by Bedouins for grazing, seasonal migration, water access, agriculture or other livelihood activities because the Project area and the general surroundings has been affected by prolonged drought for nearly nine (9) years.

Finally, a historical satellite image review was also undertaken which also did not reveal any particular land uses within the Project site as shown in the figure below.

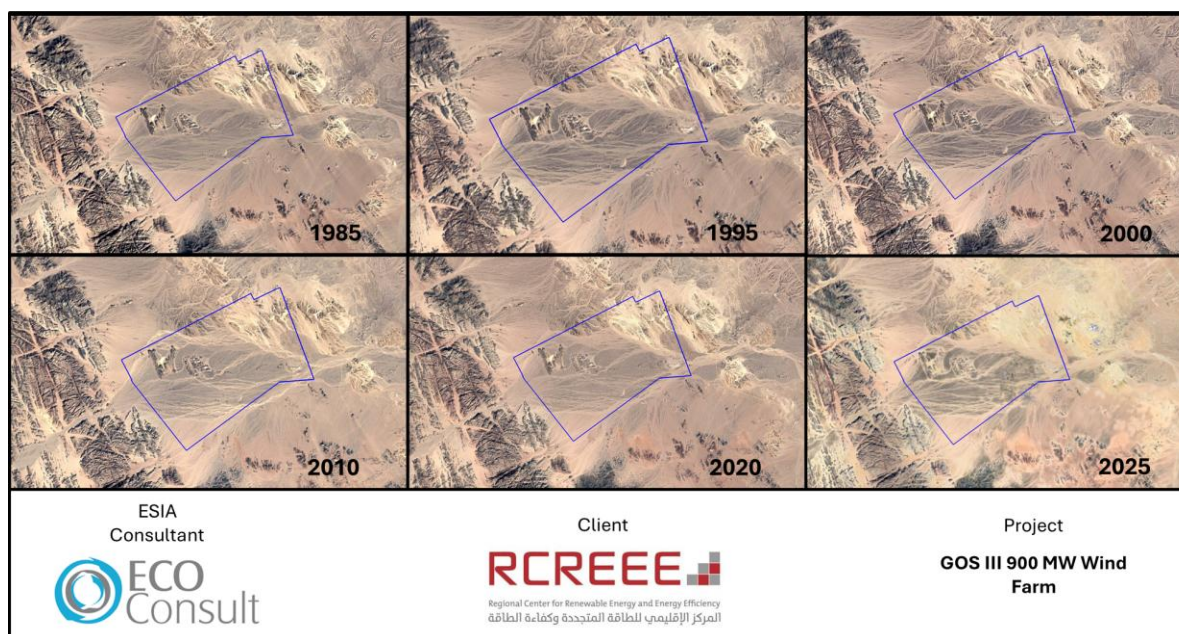


Figure 30: Historical Satellite Image Review

7.3 Geology, Hydrology and Hydrogeology

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

7.3.1 Assessment of Baseline Conditions

Baseline assessment was based on secondary data as available from desktop review as well as a standalone assessment undertaken by the Developer (through technical consultant) to include a geotechnical and hydrology assessment. In addition, a site assessment was undertaken to confirm and verify the outcomes of the literature review and document conditions on the ground.

The above entailed collecting information on the following:

- Geological conditions within the Project site include formations, soil types, and geomorphology along with illustrative maps.
- Hydrology conditions of the Project site to include catchment within which the Project is located along with maps as appropriate. This includes drainage patterns, runoff volumes and surface water resources; and
- Hydrogeology conditions of the Project site along with maps as appropriate. This includes groundwater resources, groundwater quality, etc.

7.3.2 Geology

The geological formations within the Project site and surrounding areas are presented in the figures below, which include various lithologic units ranging in age from Late Paleozoic to Quaternary. As shown in Figure 33 below, the Project site is a part of Gharib Plain. The plain extends NW-SE parallel to the Gulf of Suez and is bounded from the west by the higher mountainous range, a part of Red Sea mountainous series, which is composed of igneous and metamorphic rocks, and from the east by the western coast of the Gulf of Suez.

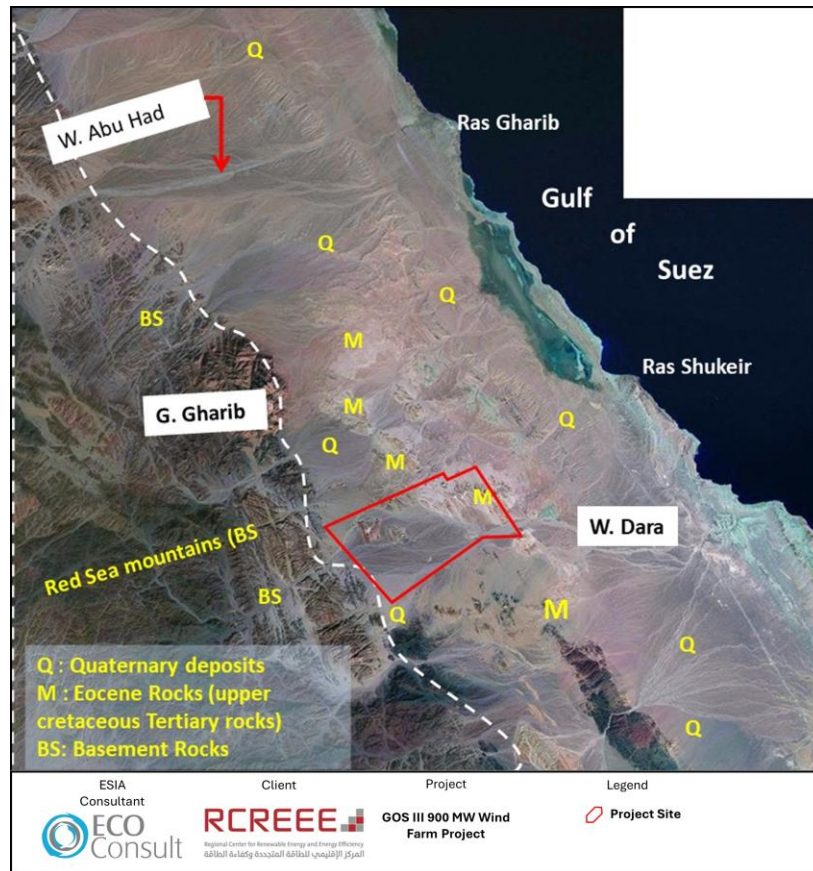


Figure 31: Land Sat Image Showing the Location of the Project Site

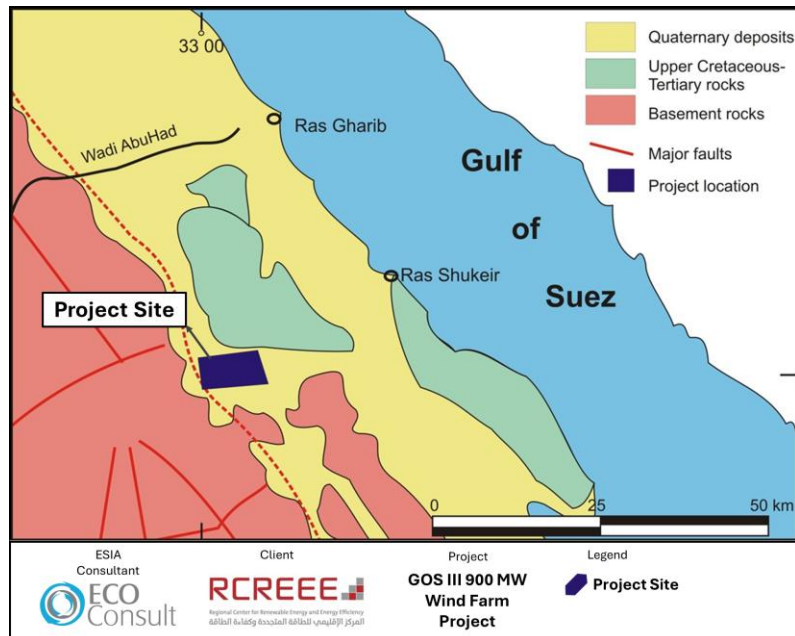


Figure 32: Regional Geologic Map of the Area

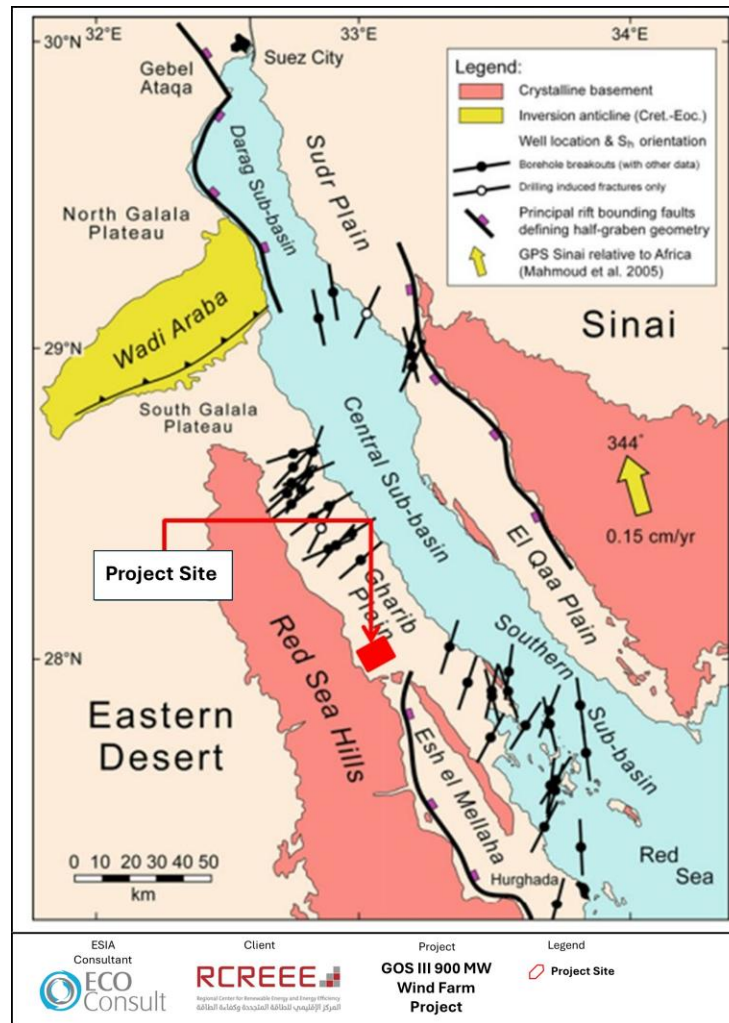


Figure 33: Structure Domains of the Gulf of Suez (Bosworth and Durocher 2017)

Precambrian Basement Rocks

The foundational units forming the western highlands adjacent to the Project site consist of Precambrian igneous and metamorphic rocks belonging to the Red Sea Mountain range. These basement rocks form the Gebel Gharib watershed system, draining toward the Project area via major wadis such as Wadi Dara.

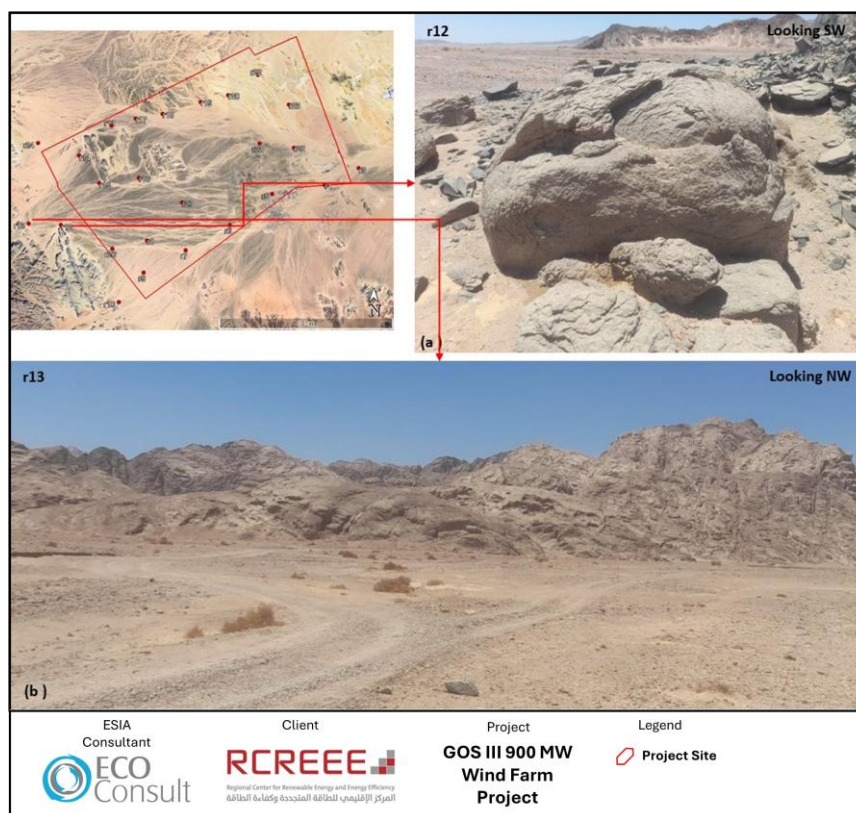


Figure 34: Basement Rocks; (a) The Highly Weathered Boulder Of Older Granite (Light Colour), (b) The Low Relief Exposures of Older Granite

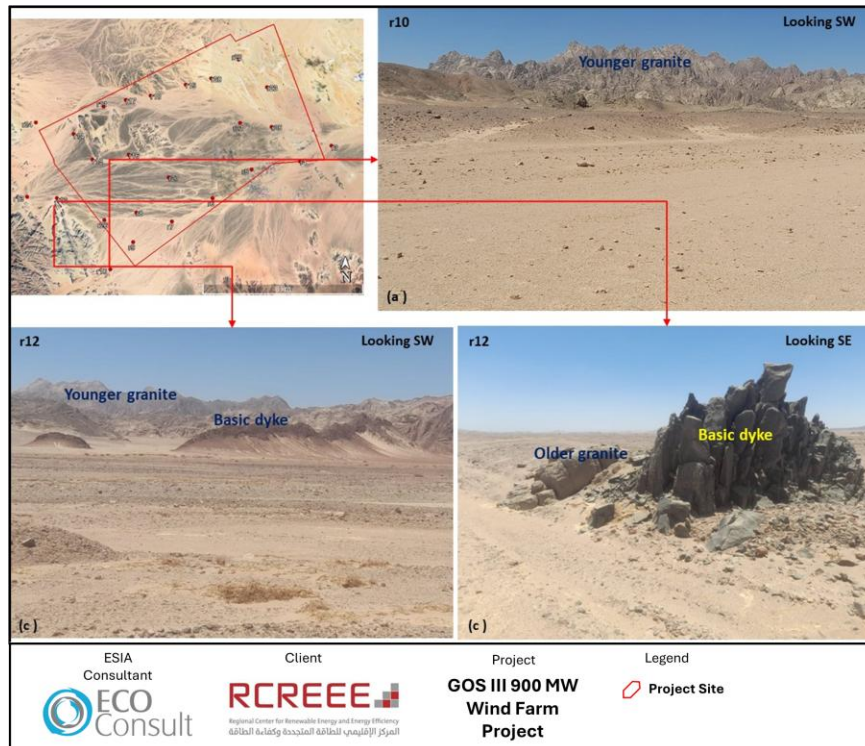


Figure 35:(a) Sharp Peaks of Younger Granite, (b) Basic Dyke Intruded Older and Younger Granites, (c) The Intrusion of Basic Dyke in Older Granite

Older Granite (Gray Granite)

The older granite forms low relief bodies have gray and whitish gray colors, medium to coarse grained equigranular and sometimes contain xenoliths in different sizes. 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 distributed in the surface deposits covering the whole surface area of the Project site.

Younger Granite or Red Granite

The younger granite forms highly elevated conspicuous peaks with sharp contacts with the adjacent rock units. 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 the whole area of the Project.

Dyke swarms

Younger basic and acidic dykes intrude the basement rocks in multiple orientations. These dykes occur as narrow, sub-vertical bodies exhibiting variable compositions and represent the youngest intrusive phase within the basement terrane.

Upper Cretaceous Deposits

The Upper Cretaceous – Tertiary deposits are exposed in the north of the middle and in the eastern parts of the Project site. As these deposits mainly of Upper Cretaceous sandstone intercalated with carbonates capped by thin bed of Miocene evaporites, the weathered product is light in color as shown in the image at the northeastern part of the Project site.

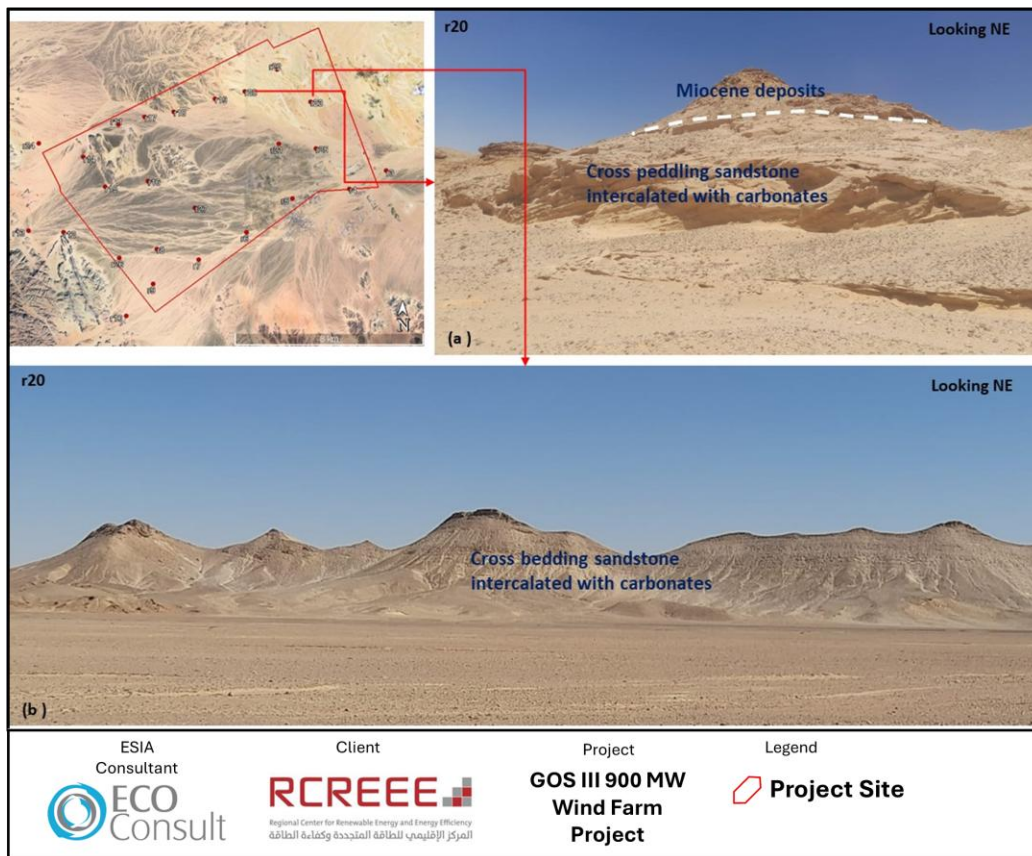


Figure 36: Upper Cretaceous Sandstone Cross Bedding Sandstone

Miocene Deposits

The exposed Miocene sediments in the eastern part of the site are mainly of Evaporite in the form of thin bed on overlying the elevated hills. In some places the Miocene evaporites exist as dark brown and highly weathered layers overlying the Cretaceous sandstone and carbonates

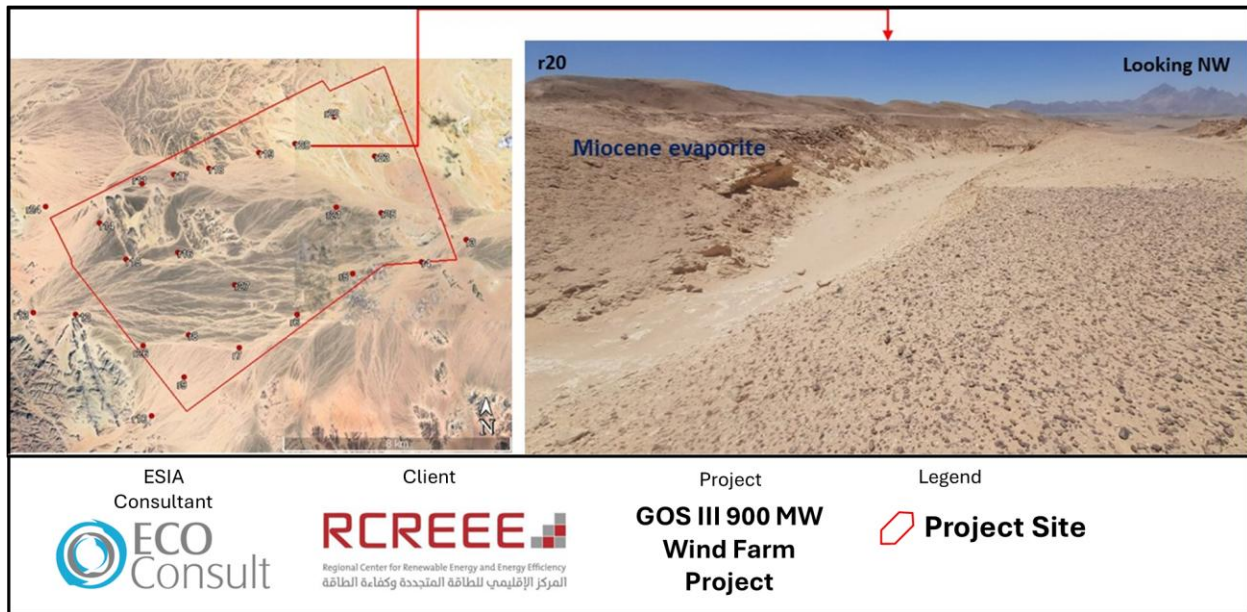


Figure 37: Field photograph of the Miocene Evaporite

Quaternary Deposits

Quaternary deposits cover most of the project site in the form of alluvial deposits either in the alluvial fan areas or on the top of exposed hills and elevated terrain of Cretaceous -Miocene deposits.

- These deposits are composed of gravel, sand, clay, aeolian sand sheets and sand accumulations. They are mainly clastic sediments of different textures ranging from silt to gravel size.
- The composition of the Quaternary deposits is mainly the weathering products of the surrounding exposed rocks.
- In the western part of the Project site where the occurrence of the igneous rocks of the Red Sea Mountain range, which consists mainly of granitic rocks rich in feldspars reddish in color, the soil cover in the area predominantly dark especially the alluvial fan deposits, as it consists of fragments of younger granite and feldspars, the weathered products of granites, as shown in Figure 38.
- In the eastern part of the Project site where the erosion of the exposed sandstone, carbonate and evaporite enrich the Quaternary deposits by their weathered products. The high percentages of fine sand and clay are more obvious than in the middle and west parts of the Project site as shown in the figures below.
- Weathered evaporates with fine sand and clay as shown in Figure 39 (a). Fine sand and clay are rich in the Quaternary deposits in the middle of the eastern part of the Project site. On the surface of the elevated terrain in the northeastern part of the site, Quaternary deposits rich in limestone fragments, pieces of corals impeded in fine sand and clay as shown in Figure 39 (c).

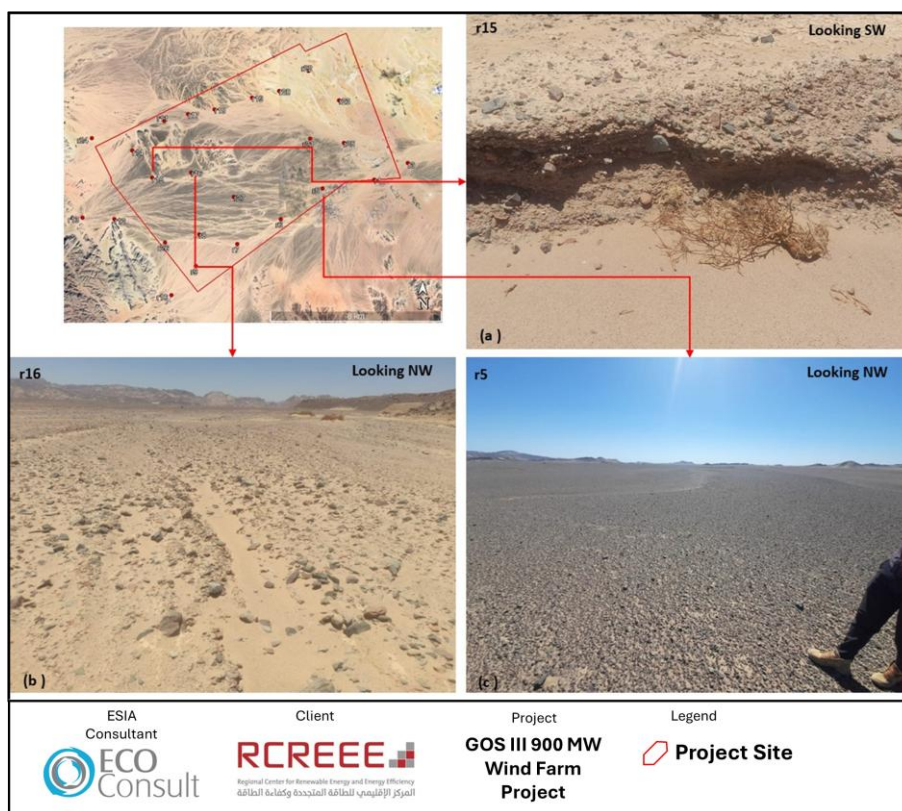


Figure 38: Sample Images of Quaternary Deposits Covering most of the Project Site

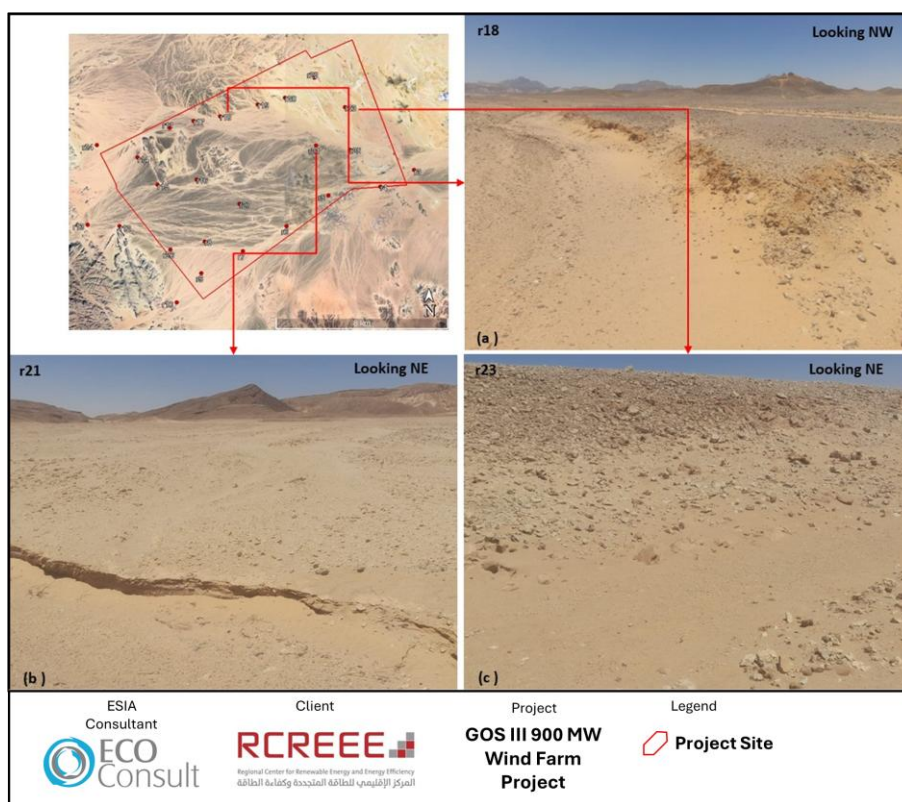


Figure 39: The Quaternary Deposits Cover the Ground Surface of the Eastern Part of the Site

Subsurface Geology

The Project site is located within the structurally active Gulf of Suez rift system, which is characterized by repeated subsidence and the accumulation of thick sedimentary successions. The regional basin architecture comprises three major half-graben systems, separated by structurally complex accommodation zones (Bosworth, 1985; Rosendahl, 1987) or transfer zones (Morley et al., 1990; Patton et al., 1994).

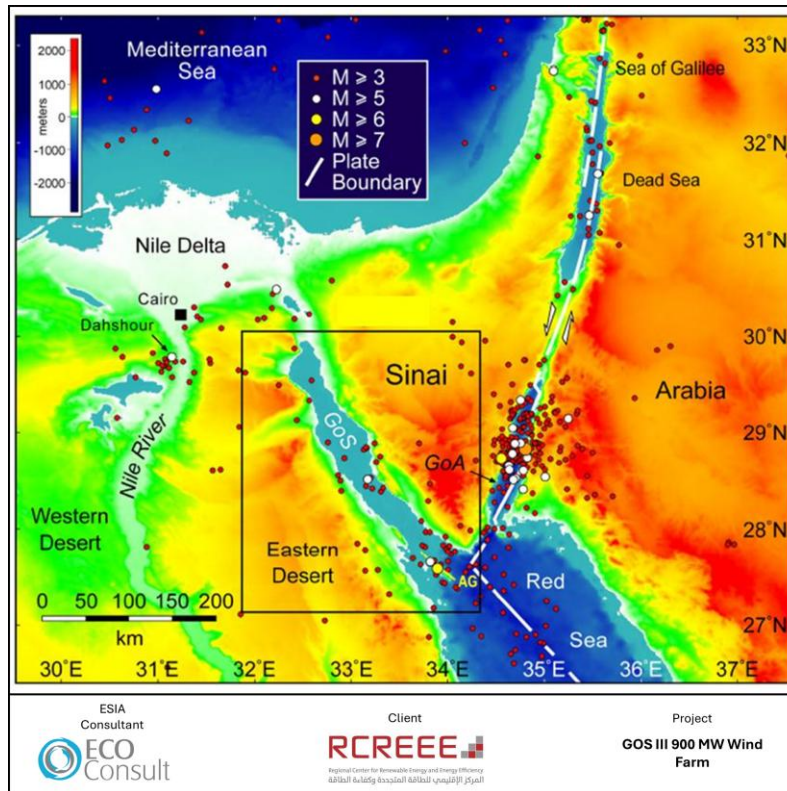


Figure 40: Plate tectonic setting of the Gulf of Suez (Bosworth & Durocher, 2017)

The Gharib Plain, where the Project is located, lies within the Central Sub-basin of the Gulf of Suez, which is characterized by south-westward-dipping strata and NE–SW oriented extensional stresses.

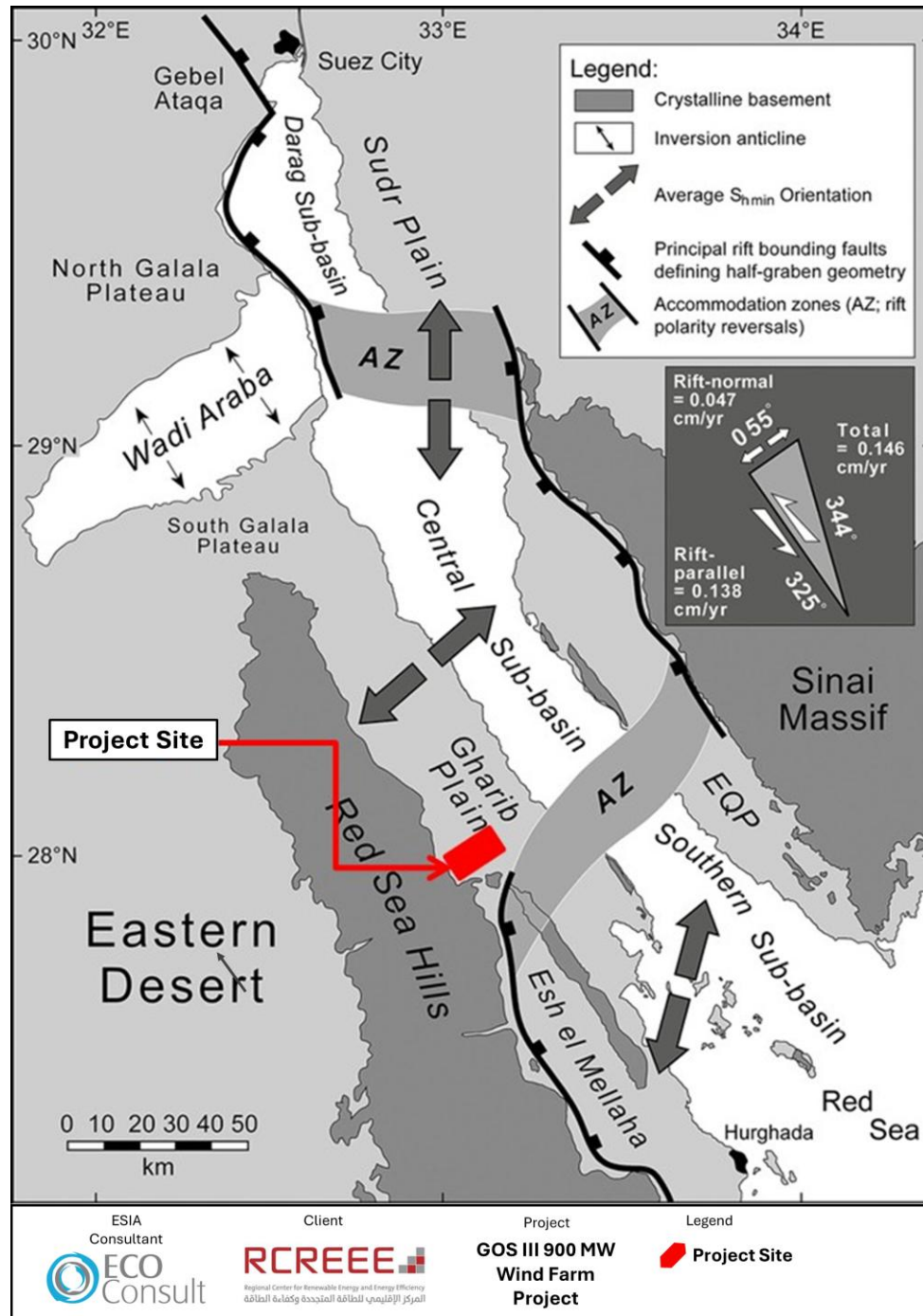


Figure 41: Minimum Horizontal Stress Orientations (S_{hmin}) in the Gulf of Suez Sub-basins

Surface expressions of faulting include young fault-line scarps developed within partially lithified Pliocene–Pleistocene sands and gravels. These scarps are generally straight, display predominantly dip-slip displacement, and are down-thrown toward the northeast.

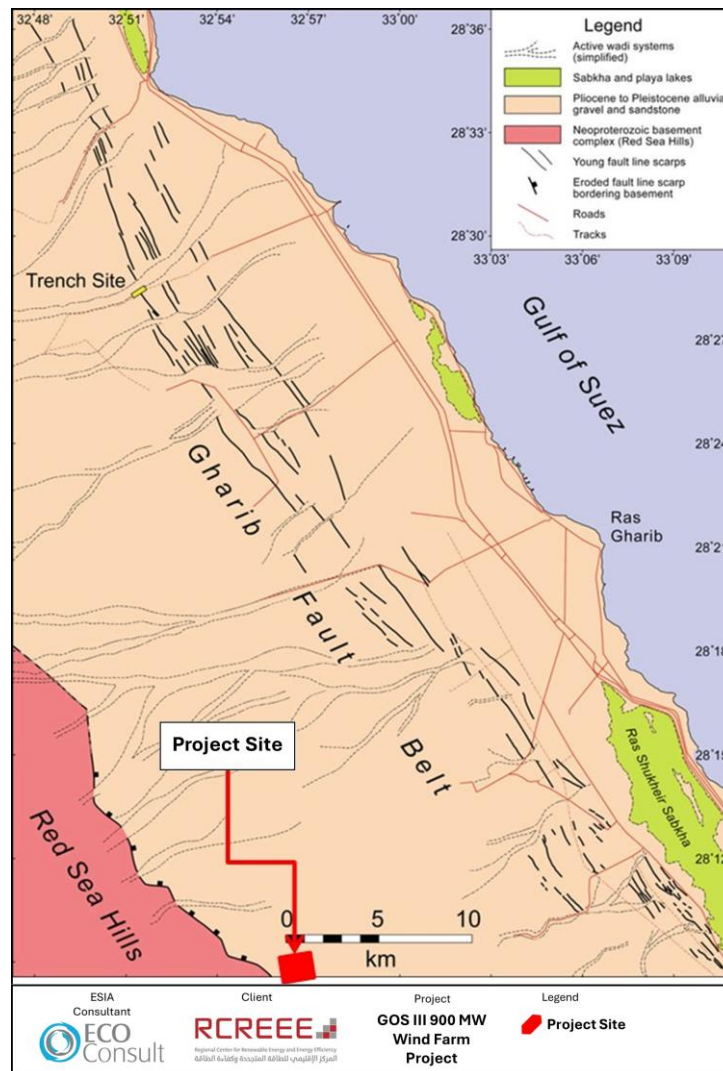


Figure 42: Young Fault-line Scarps in Pliocene–Pleistocene Alluvium within the Gharib Plain

7.3.3 Hydrology

A topographic and drainage analysis has been prepared for the Project site and surrounding areas using topographic maps, Landsat imagery, and DEMs generated from SRTM data and GIS software. As noted in the figure below. The Project site is located within a gently sloping plain that descends uniformly toward the Gulf of Suez. The ground surface across the area is dominated by wide, low-relief alluvial fans and shallow drainage lines that extend across much of the site, while isolated sandstone hills occur in the central sector and higher Cretaceous–Tertiary terrain is exposed along the eastern margin. The regional slope is consistently gentle, with observed gradients ranging between approximately 0.003 and 0.005 toward the southeast to northeast, and slightly steeper local slopes of about 0.02 in the eastern elevated zone.

The Project site lies within the watershed area of Wadi Dara, which is one of the dry wadis in the area running east–west along the project site, with the southern mainstream of Wadi Dara crossing the project site while the northern one runs outside the site from the north. The drainage network intersecting the area consists of shallow and wide drainage lines, and the tracks of the surface water flow are very shallow and wide, reflecting the simple topography and the gentle and consistent slope toward the Gulf of Suez.

The Red Sea region experiences seasonal flash floods characterized by high velocity, short duration, and sharp discharge peaks; however, within the Project site the slope is very gentle, the drainage lines are wide and shallow, and the surface flow is very weak to sort the surface deposits even in the upstream part. The thickness of the recently developed terraces does not exceed a few centimeters, indicating that the surface water flow in the alluvial fans is very slow and thin. The southern mainstream of Wadi Dara crosses the site, while wide and shallow tributaries are recognized across the western, middle, and eastern parts of the site, all following the regional slope toward the east. According to regional studies, the expected degree of flash flood hazard in the site is medium.

Taking the above into consideration, the physiographic characteristics of the Project site can be differentiated into two main relief units as follows:

- **High Relief Unit:** This unit is represented by the elevated basement exposures and the high-altitude terrain of Cretaceous–Tertiary rocks located along the western and eastern margins of the Project site. In the west, small and large tributaries drain the basement rocks forming many alluvial fans covering most of the site area, with the apex of these fans positioned just to the west of the site. In the east, the terrain rises to about 100 m above ground, where low-order drainage lines are very wide and shallow. The elevated hills exposed in the northern middle part of the site rise approximately 45 m above the surrounding surface, and the slopes in this sector may reach values of about 0.02. Deep and narrow tributaries drain the high terrain to the northeast, redirecting surface flow around the elevated blocks.
- **Low Relief Unit:** This unit encompasses the central and southeastern parts of the Project site, where the ground surface exhibits a simple, nearly flat to very gently sloping pattern with gradients of approximately 0.005 to 0.003. These areas are covered by Quaternary deposits in the form of alluvial fans and terraces, with the thickness of recently developed terraces not exceeding a few centimeters. The drainage tracks in this unit are very shallow and wide, and the surface flow is very weak, resulting in broad, diffuse runoff pathways with minimal incision. Wide and shallow drainage lines cross the western, middle, and southeastern sectors of the site, all conforming to the gentle regional slope toward the Gulf of Suez.

Based on the topographic maps, DEM models, and site investigations, the Project area is characterized by simple topography with a gentle and consistent slope toward the Gulf of Suez. The surface of the site consists of alluvial fans and terraces that are wide, shallow, and weakly developed, and the tracks of the surface water flow are very shallow and wide. Small and large tributaries drain the basement rocks forming many alluvial fans covering most of the site area, and elevated hills of Cretaceous–Miocene and Cretaceous–Tertiary rocks are exposed in parts of the site. The drainage lines crossing the Project area do not show strong incision; instead, the surface is covered with gravel and rock fragments embedded in fine-grained sand and silt, and the thickness of these terraces does not exceed a few centimeters. The Project site and its surroundings lack permanent fresh surface water bodies or streams.

Field observations during the site visit further indicated that the area is characterized by a complete absence of deeply incised drainage lines or strong surface flow paths. The Quaternary deposits that blanket the site consist of alluvial fan and terrace sediments with variable grain size, ranging from boulders and gravel embedded in fine sand and clay in the upstream western parts to coarse sands and gravels in the central sector and sandy loam toward the eastern sandstone and evaporite hills. These deposits exhibit high permeability and porosity, granting them a high infiltration capacity that enables the absorption of significant volumes of surface flow during rainfall events. The shallow and wide nature of the drainage lines, combined with the thin terrace deposits, reflects weak surface flow and low erosive power even during storm events.

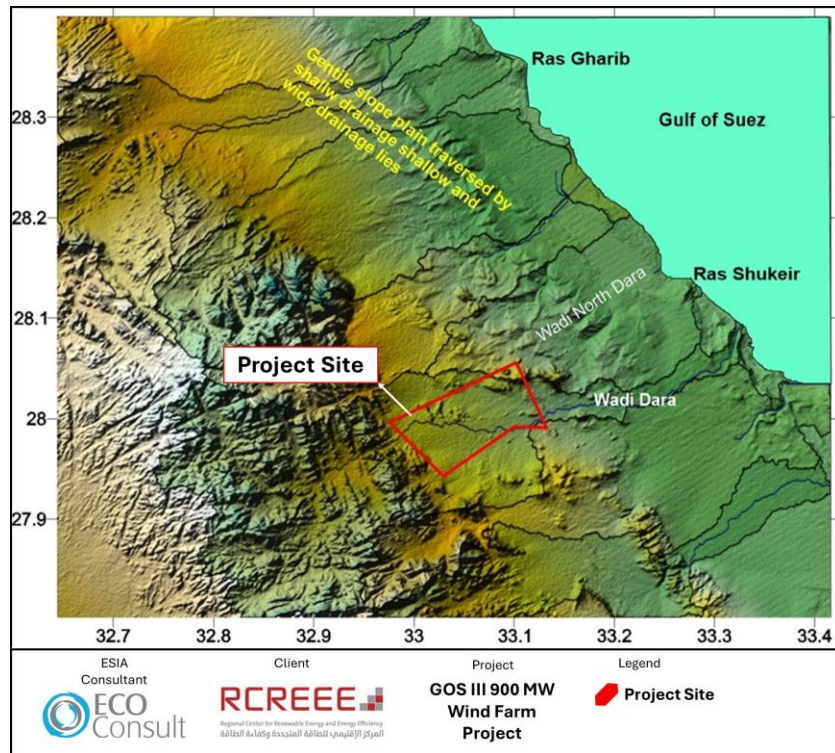


Figure 43:DEM Showing the Physiography and Drainage Basins around the Project Area

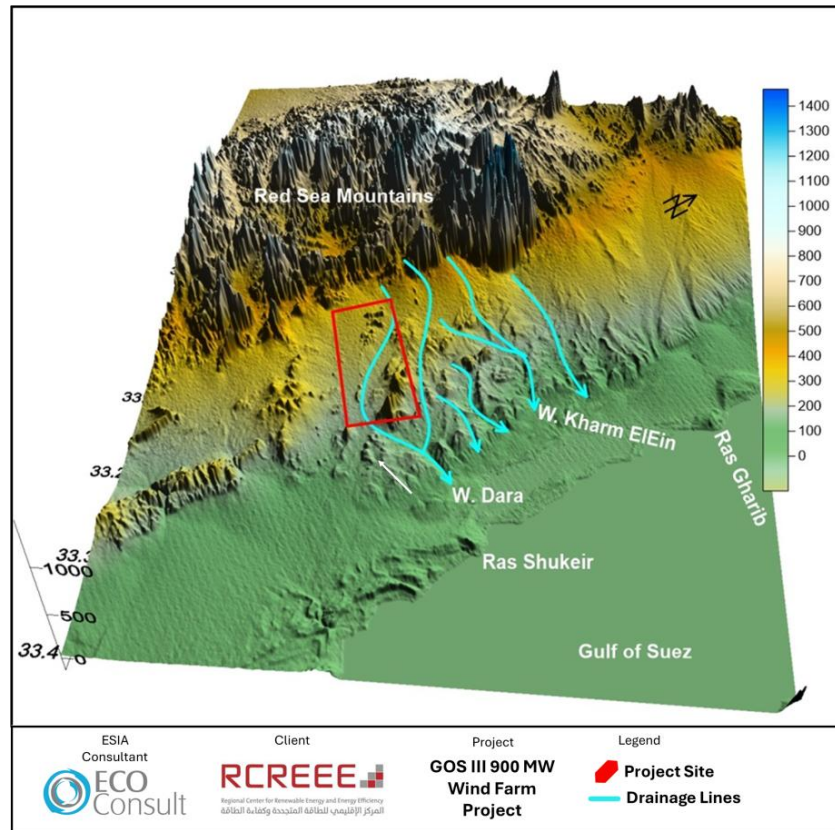


Figure 44:3D DEM of the Project Area Constructed from SRTM Data

7.3.4 Hydrogeology

The Project area is located within the middle western part of the Gulf of Suez, an area that has been studied extensively in the fields of geology, hydrology, hydrogeology, and geophysics. Groundwater in this region may occur within the weathered zones of hard rocks, Paleozoic to Lower Cretaceous sandstones, paleo-karstified carbonates of the Upper Cretaceous–Eocene sequence, and alluvial deposits, with its distribution largely controlled by the presence and configuration of underlying clays. In the Gulf of Suez, groundwater is used mainly for tourist and industrial purposes, and groundwater represents between 10–40% of the utilized water supplies, with daily discharge rates ranging from 260 to 3000 m³/day at Wadi Araba and El Sukhna–Zafrana.

According to the hydrogeological map of Egypt, a low to moderate productive underground reservoir is expected beneath the Project site, while in Wadi Dara to the southeast, groundwater has been used only for land reclamation due to its high TDS values. The Pre-Cenomanian sandstone aquifer, a portion of the regional Nubian Sandstone Aquifer System, consists of sandstone and shale intercalations overlying the basement rocks, with a thickness ranging from 100 to 300 m and decreasing westward. Available regional hydrogeological data from drilled wells located outside the Project site (e.g., within the broader Wadi Dara area) indicate that groundwater depths vary between approximately 9 m and 120 m below ground level. These wells are not located within the Project site, and no groundwater wells have been identified within the Project boundary. The recorded groundwater in these regional wells is characterized as brackish, indicating elevated salinity levels and limited suitability for potable use. Available groundwater data from wells in Wadi Dara indicate the absence of a shallow aquifer with a continuous source of freshwater recharge, as rainfall is scarce and insufficient to replenish the wadi-fill sediments throughout the year. Although the wadi deposits are unconfined and possess high porosity and permeability, regional eastward dipping and the absence of subsurface barriers prevent groundwater accumulation even during heavy rainfall. No information is available regarding the hydrogeological conditions directly beneath the Project site due to the absence of groundwater wells or previous aquifer studies.

Groundwater in the Gulf of Suez is primarily exploited for tourism- and industry-related developments. Groundwater withdrawal accounts for approximately 10 – 40% of total water use across the Gulf province, with daily abstraction rates ranging from 260 m³/day in Wadi Araba to nearly 3000 m³/day in the El Sukhna – Zaffarana area. Continuous extraction from these aquifers places increasing stress on both groundwater quantity and quality, underscoring the need for sustainable management in line with regional development pressures.

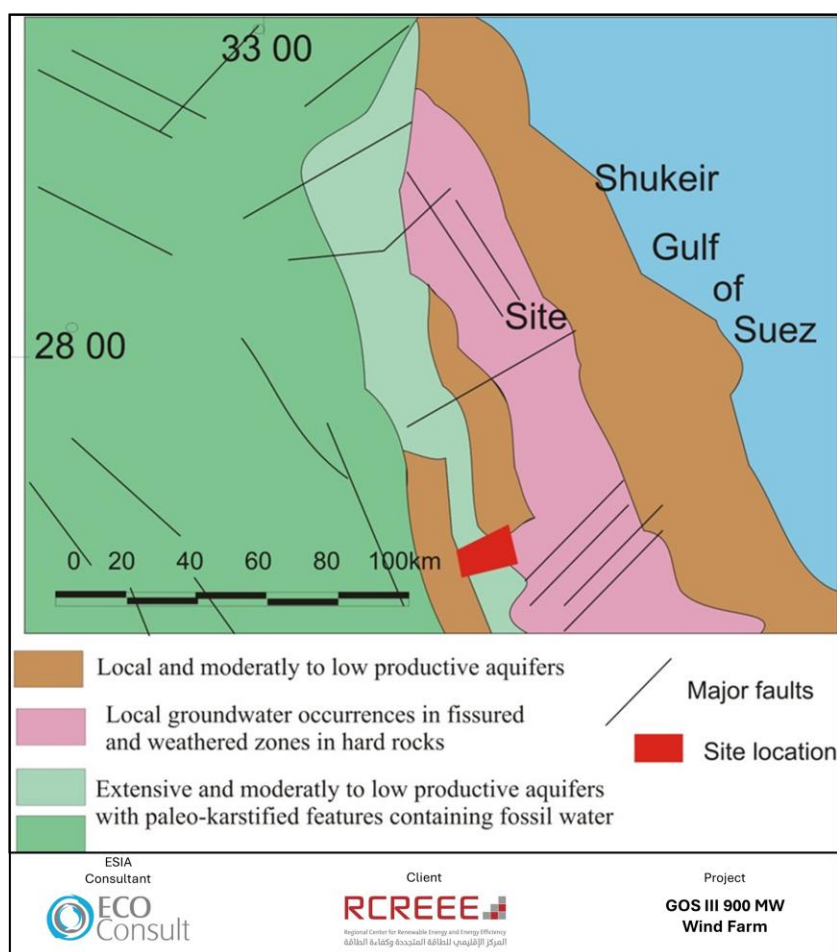


Figure 45: Hydrogeological Map of the Area around the Project Site

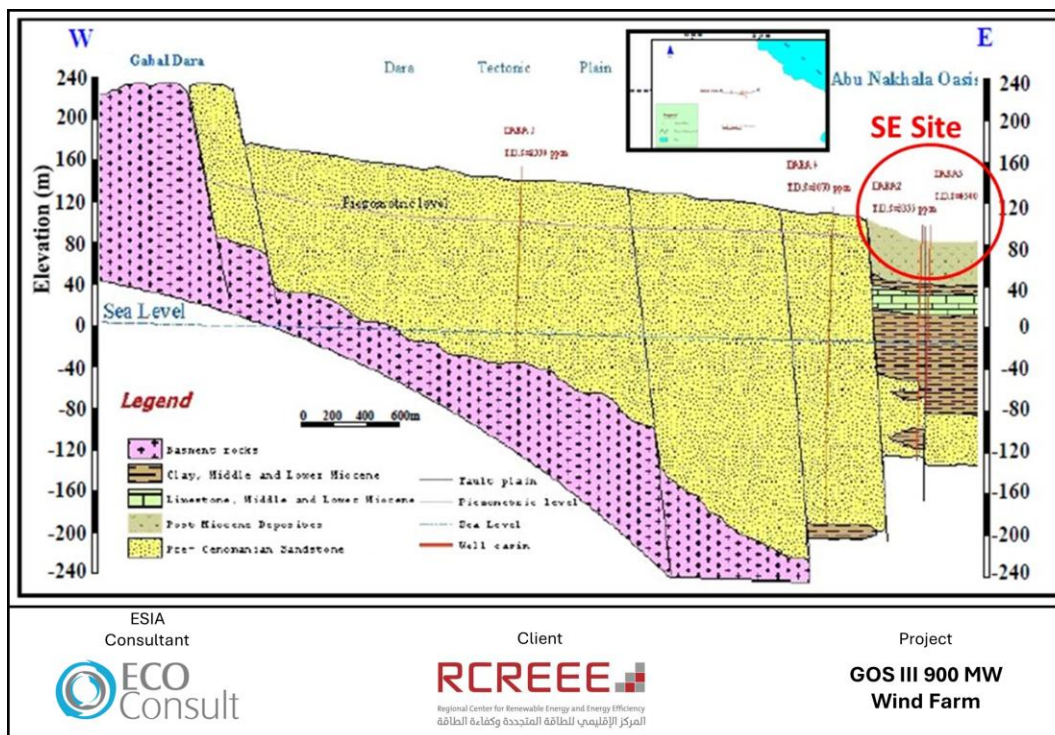


Figure 46: Hydrogeological Cross-Section along Wadi Dara Based on Drilled Wells (Nasr, 1990)

Three groups of pumped and observation wells were drilled by the Desert Research Institute within the Dara area southeast of the Project site, and additional wells drilled by RIGW (2005) are the main source of groundwater information in the study area. These wells provide data on groundwater levels, salinity, and aquifer characteristics, including depths to water that vary between 9 m and 120 m. As shown in Table 23, the TDS values recorded in these wells range from 2550 mg/L to 8200 mg/L.

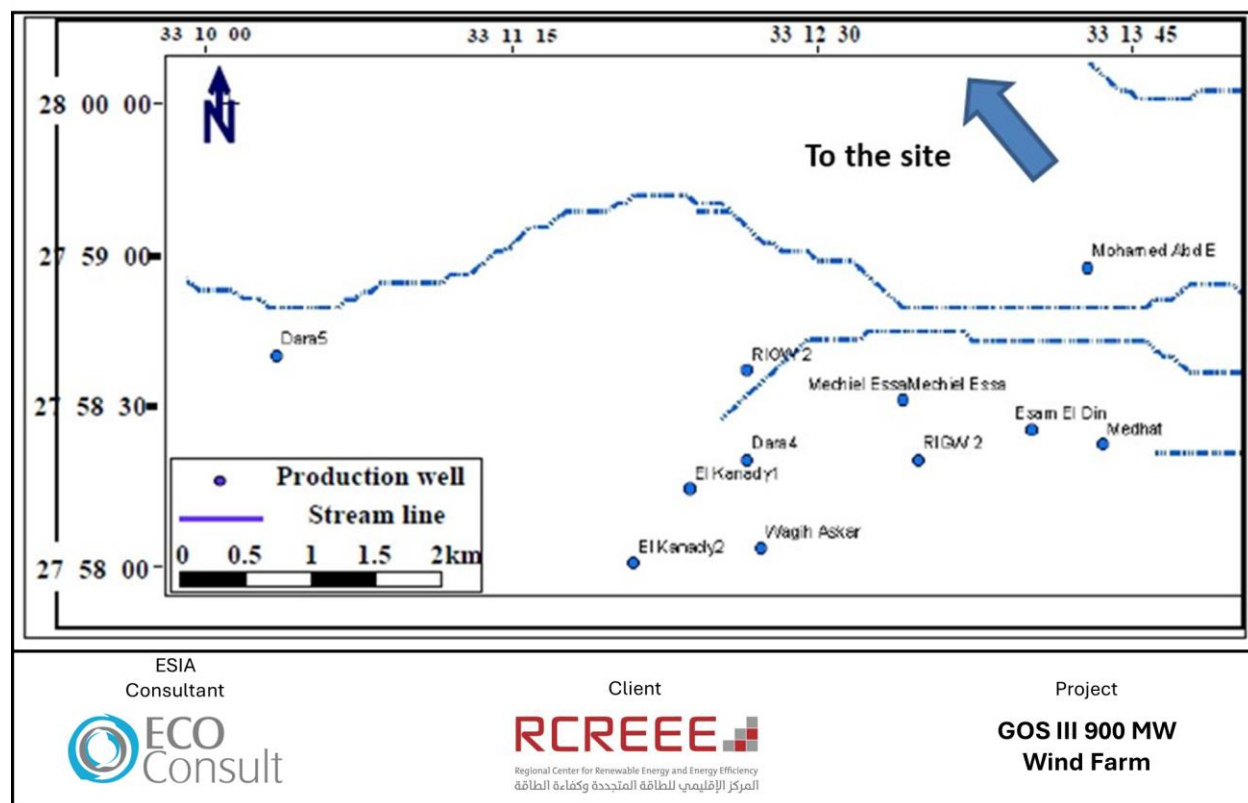


Figure 47: Location map of the drilled wells at Wadi Dara

Table 23: The Available Data in Wadi Dara Area (Bediar 2015)

No	Lat. N	Long. E	Gl m amsl	DW m	TDS gm/l	WL m
1	27°58'56.9"	33°12'12.2"	121.9	11.34	3400	110.5
2	27°58'31.8"	33°12'12"	128	16	3650	112
3	27°58'27.1"	33°12'11.57"	135	26.6	2720	108.3
4	27°58'10.1"	33°12'43.7"	151	39.2	2675	111.8
5	27°58'33.8"	33°12'54.2"	109	Flowing	6750	105
6	27°58'59.7"	33°12'10.5"	154	44.4	2550	109.5
7	27°58'18.6"	33°12'36.7"	120	93	3250	27
8	27°58'40.7"	33°12'21.8"	97.2	94.9	7630	2.32
9	27°58'49.4"	33°12'49.4"	150.6	9	3400	141.6
10	27°58'47.8"	33°12'50.2"	121.9	7.78	8200	114
11	27°58'13"	33°12'13"	134.5	24	2800	110.5

Based on these findings, freshwater groundwater resources are not considered significant within the Project site, except for localized areas in the southern part of Wadi Dara where limited rainfall infiltration may temporarily recharge shallow sediments during storm events. This assessment is supported by the following observations:

- There is no existence of shallow groundwater aquifer with a continuous source of freshwater

recharge. This is due to the scares of rainwater to recharge the shallow wadi fill sediment aquifer throughout the year.

- 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 barriers resulted in no accumulation of groundwater even in case of heavy rain fall with high infiltration volume expected.
- No available information about the hydrogeological condition of the project site. This is due to the lack of studies related to groundwater aquifers and complete absence of groundwater well drilled to exploit the water reservoir.

7.4 Climate and Meteorology

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

7.4.1 Assessment of Baseline Conditions

(i) Methodology of Assessment

The methodology was based on secondary data available through online resources on key climate and meteorological conditions. This includes temperature, wind speeds, humidity, rainfall, sand/snowstorms and other as applicable. The assessment provided below is for Ras Gharib, which is considered representative of the Project site and the local communities.

(ii) Results

Temperature

The figure below presents the annual temperature variations in Ras Gharib based on historical information throughout the past 30 years. The average daily maximum temperature presents the peak temperature on an average day each month, while the average daily minimum temperature presents the average minimum temperature.

As shown in the figure below, the hottest months are typically June – August, with averages reaching a maximum of 34°C. The coldest months are typically December – February with averages reaching a minimum of 10°C.

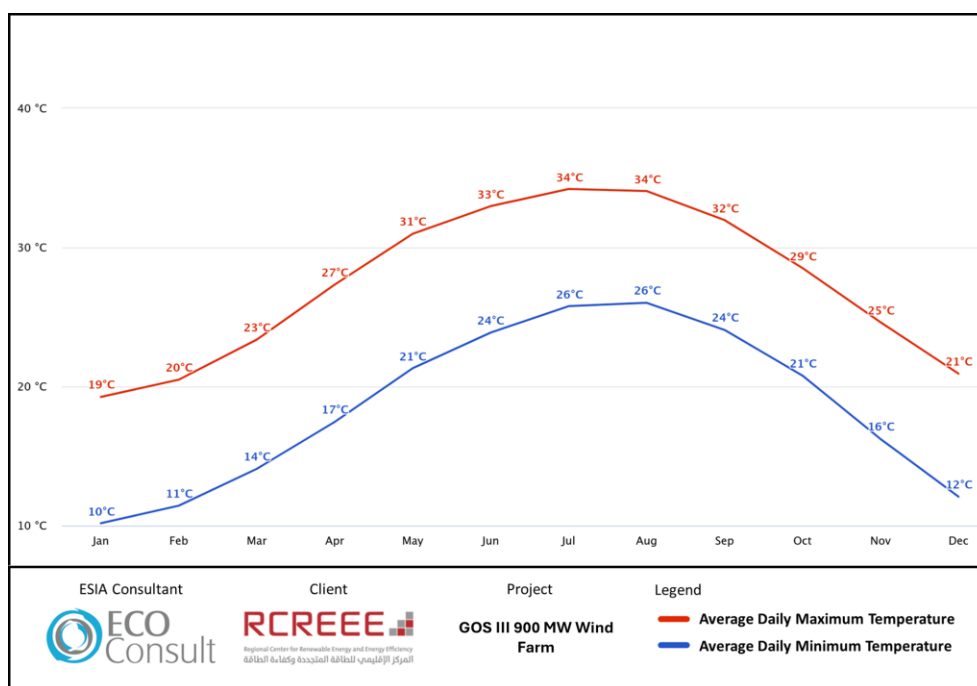


Figure 48: Average Monthly Maximum and Minimum Temperatures for the Past 30 Years

Wind Speed and Direction

The figure below presents the windspeed patterns across Ras Gharib. As noted below, there is a distinct seasonal variation, with higher wind speeds prevalent during the warmer months. June is the month with the highest wind speeds, ranging from a minimum of 18 km/h to a maximum of 30 km/h, with an average speed of 24 km/h. The lowest wind speeds occur during January, ranging from a minimum of 10 km/h to a maximum of 22 km/h, with an average wind speed of 16 km/h.

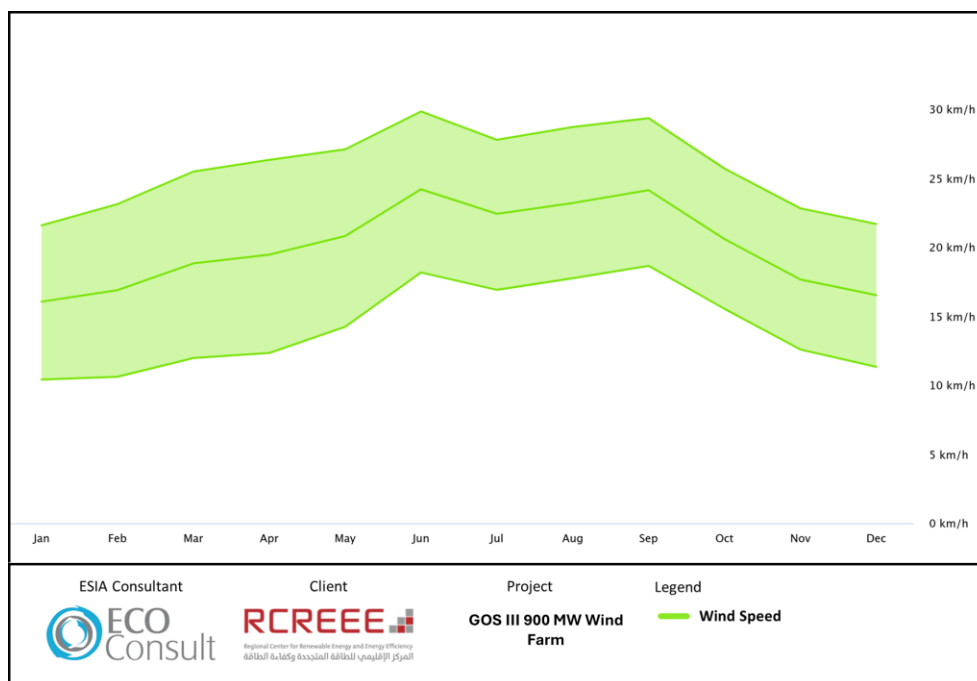


Figure 49: Average Monthly Wind Speeds for the Past 30 Years

The figure below categorizes the months based on the frequency of different wind speeds, whereas noted the months March until September witnessed the highest speeds exceeding 40 km/h. Generally, wind speeds in Ras Gharib predominantly fall within the range of 20 km/h to 30 km/h.

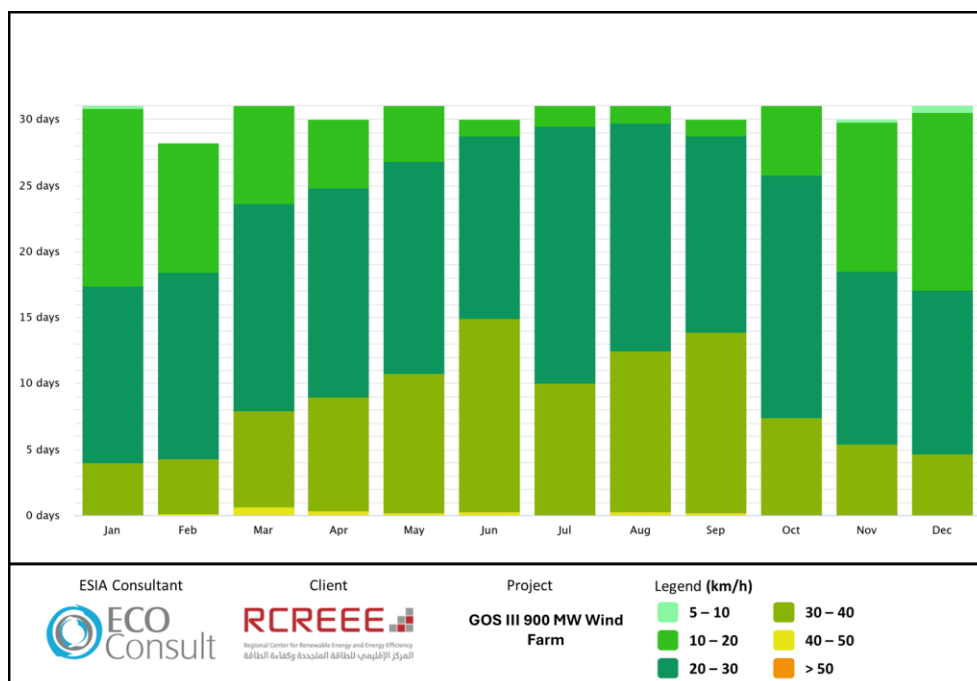


Figure 50: Wind Speed Patterns in Ras Gharib Over the Past 30 Years

The figure below presents a wind rose with distinctive patterns in wind direction. The prevailing wind direction is predominantly from the northwest (NW) to the north-northwest (NNW). Conversely, the sector with the least occurrence of wind direction spans from the northeast (NE) to the southwest (SW).

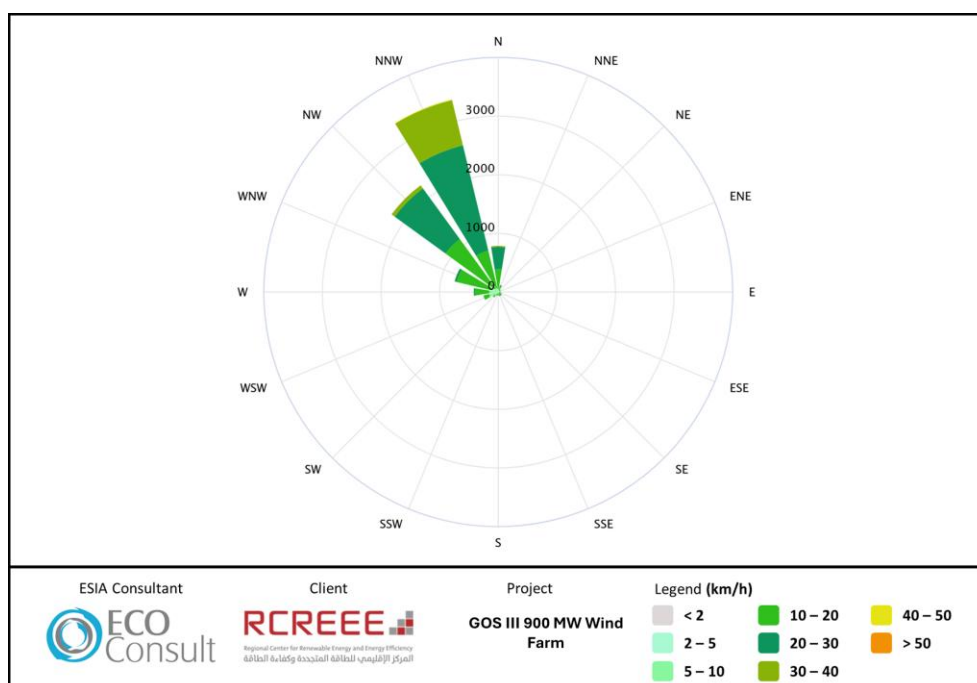


Figure 51: Wind Rose of Ras Gharib

Rainfall

The figure below presents the amount of rainfall and number of rainy days across the year in Ras Gharib. As noted, January has the highest number of rainy days (at around 1.1 days). June, July and August have zero rainy days.

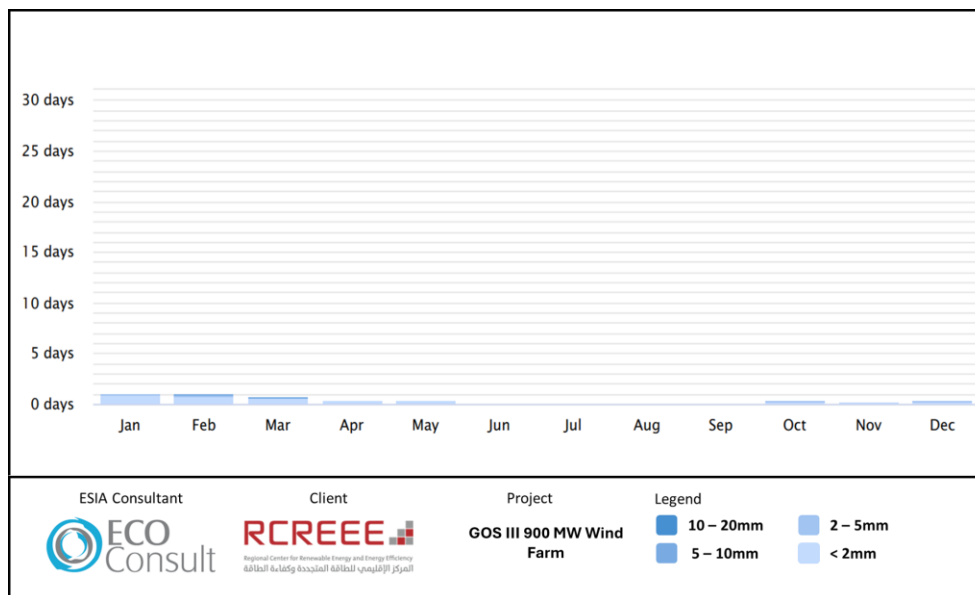


Figure 52: Average Monthly Rainfall Distribution in Ras Gharib for the Past 30 Years

Humidity

In Ras Gharib, there is a seasonal fluctuation in average humidity levels. October registers the highest average relative humidity at 62.0%, highlighting a relatively more humid condition during autumn. The lowest average humidity levels in Ras Gharib are during the months of late spring and early summer, ranging between 44.2% and 43.8% in May and June. The data suggests a gradual rise in humidity from August onward, reaching its peak in October, after which it starts to decline. This pattern reflects the distinct humidity variations between the drier summer months and the more humid autumn and winter seasons.

Table 24: Average Humidity Levels

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Humidity (%)	57.7	54.4	50.5	47.1	44.2	43.8	45.7	47.5	52.5	62.0	59.1	60.2

Heat/ Cold Waves

The frequency of heat waves in Egypt varies across its territories, with the desert areas experiencing the highest risk due to maximum air temperature norms nearing 40°C. In these regions, the occurrence of heat waves poses a significant threat to human health. The number of days with high air temperatures serves as an index for assessing the likelihood of dangerous heat waves. In accordance with the criteria established by economic entities and design institutes, any instance where the air temperature exceeds or equals 40°C, irrespective of its duration, is considered a hazardous phenomenon in Egypt.

Specifically, within the Project site, the frequency of air temperatures equal to or exceeding 40°C is considered rare, as shown in the figure below. The temperature generally falls between 30-35°C.

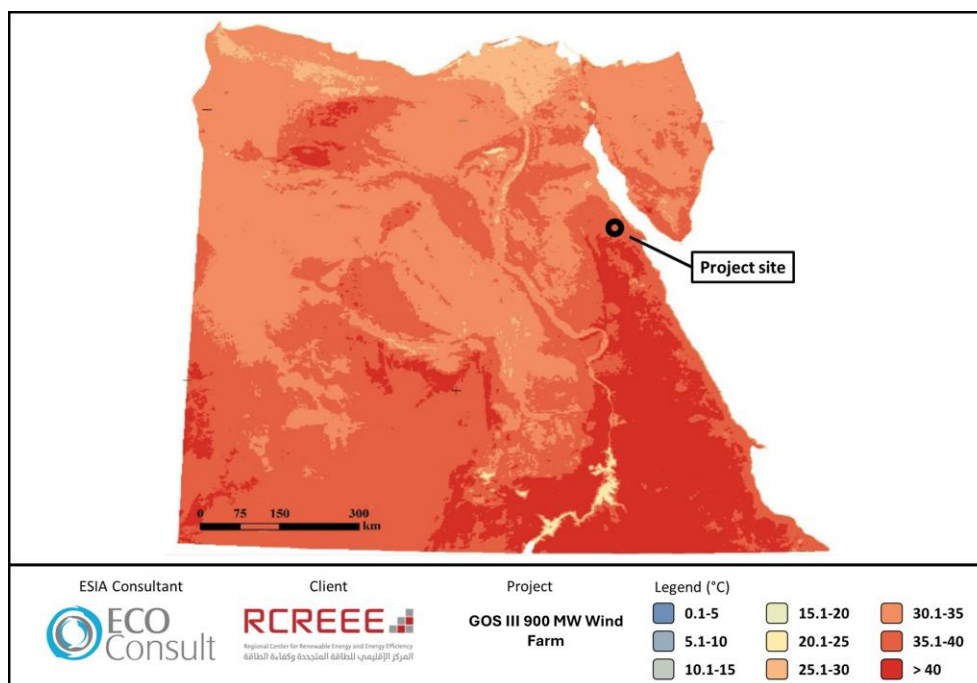


Figure 53: Temperature within Egypt

The figure below illustrates that the months characterized by temperatures surpassing 40°C are primarily from May through July. This suggests anticipation of increased heatwave occurrences during these months, with particular emphasis on the month of June. The data indicates a heightened likelihood of extreme heat events, emphasizing the need for attention and preparedness during this period to mitigate potential adverse effects. Contrarily, there are no days where temperature falls below 0°C.

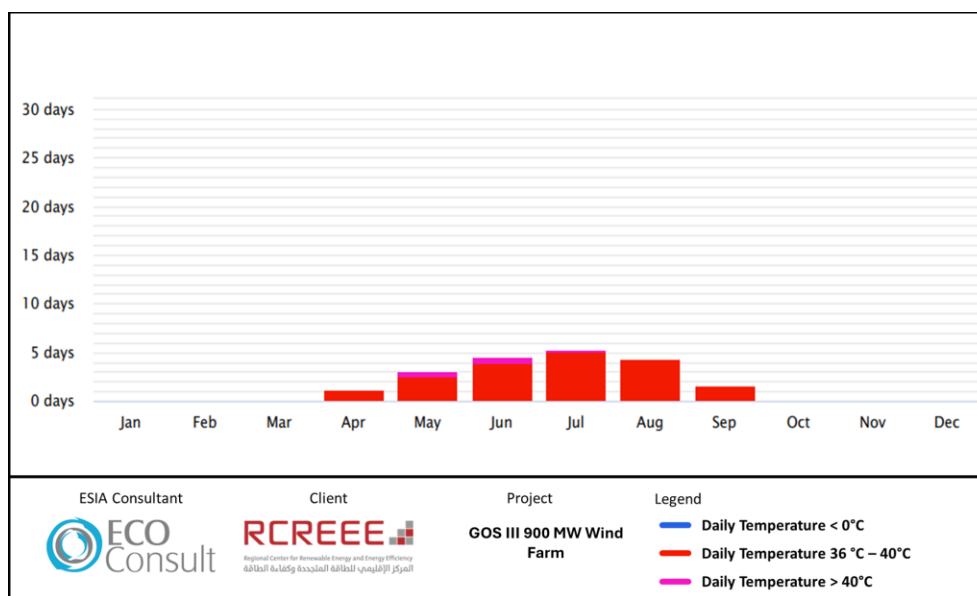


Figure 54: Number of Days in Egypt with Temperatures <0°C and >40°C

7.5 Biodiversity – Excluding Birds and Bats

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 Planet²⁷, IUCN²⁸, Birdlife Datazone IBA²⁹ and Key Biodiversity Areas³⁰. The results of the search are as follows:

- Protected Areas
 - Gebel El Zeit KBA IBA
 - El Qa Plain KBA IBA
 - Red Sea Islands
- Potential Protected Areas
 - Wadi Qena
 - Malahet Ras Shukeir
 - Shaieb El-Banat

²⁷ <https://www.protectedplanet.net>

²⁸ <https://www.iucnredlist.org>

²⁹ <https://datazone.birdlife.org>

³⁰ <https://www.keybiodiversityareas.org>

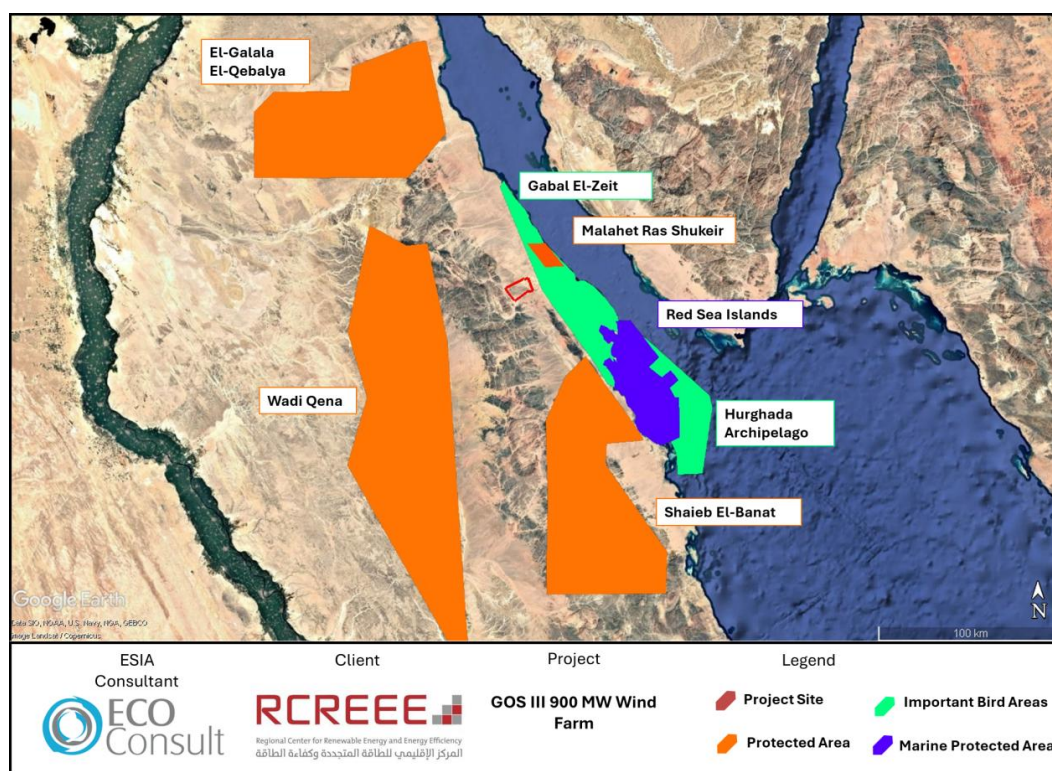


Figure 55: KBAs, IBAs and Protected Areas around the Project Site

Gebel EL Zeit IBA and KBA

Gebel El Zeit is designated as both an IBA and a KBA (with concurrent boundaries) and the project area for GOS III lies 2.4 km to the West the protected site. The site consists of a narrow, 100 km 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 Gemsa. 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 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 Gemsa and the saltmarsh at Sabkhet Ras Shukheir.

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

Table 25: 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	Non-breeding	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 in the KBA citation 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 26: 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	NT		Y
Birds	<i>Falco naumanni</i>	Lesser Kestrel	LC		Y
Birds	<i>Larus leucophthalmus</i>	White-eyed Gull	VU		Y

El Qa Plain IBA and KBA

El Qa Plain lies approximately 46 km east from the Project site 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 27: 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 of note 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 28: Bird Species that Trigger KBA Designation

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	NT		Y
Birds	<i>Falco naumanni</i>	Lesser Kestrel	LC		Y

Hurgada Archipelago KBA IBA

IBA Designation

An archipelago of 22 uninhabited islands which lies 50 km south of GOS III, plus a handful of very small islets, scattered from the Straits of Gubal (at the mouth of the Gulf of Suez) to Hurghada. Most are small or medium-sized and fairly flat coralline islands, such as Tawila and Ashrafi, but some are quite large and hilly. Shadwan is the largest of the Egyptian Red Sea islands, being c.56 km² in area and reaching some 300 m at its highest point. The area of the IBA includes adjacent marine waters.

The Hurghada Archipelago holds the largest known breeding population of White-eyed Gull (*Larus leucophthalmus*) in the world. A total of 6,500 adults was counted attending the sprawling Hurghada city rubbish-dump in May 1996. It is almost certain that all these birds breed on the Hurghada archipelago and, probably, represent only part of the local breeding population. The fact that all birds counted were adults in breeding plumage indicates that the total population of the area, if immatures and juveniles are accounted for, should be much larger than the previous estimate of 1,500–2,000 pairs. The current estimate made here for the Hurghada archipelago is of at least 3,000 breeding pairs, or a total population of some 10,000 birds. In addition, the Hurghada archipelago supports a considerable diversity of other breeding seabirds and waterbirds. At least 15 species are known to breed or to have bred: *Sula leucogaster*, *Phaethon aethereus*, *Butorides striatus*, *Egretta gularis*, *Platalea leucorodia*, *Pandion haliaetus*, *Falco concolor*, *Charadrius alexandrinus*, *Larus hemprichii*, *Sterna caspia*, *Sterna bergii*, *Sterna bengalensis*, *Sterna anaethetus* and *Sterna repressa*.

Table 29: IUCN Red List Categories

Species	Current IUCN Red List Category	Season	Year(s)	Population estimate at site	IBA criteria met
White-eyed Gull <i>Larus leucophthalmus</i>	LC	Breeding	-	3,000 breeding pairs	A1, A4i
Caspian Tern <i>Hydroprogne caspia</i>	LC	Breeding	-	200 breeding pairs	A4i
White-cheeked Tern <i>Sterna repressa</i>	LC	Breeding	-	1,500 breeding pairs	A4i
Lesser Crested Tern <i>Thalasseus bengalensis</i>	LC	Breeding	-	500 breeding pairs	A4i
Sooty Falcon <i>Falco concolor</i>	VU	Breeding	-	44 breeding pairs	A4ii

KBA Designation

This site qualifies as a Key Biodiversity Area of international significance that meets the thresholds for at least one criterion described in the Global Standard for the Identification of KBAs. The islands south of 27°15' N are protected as part of the Elba National Park, declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. Islands further north are not protected, but are proposed for protection. Species triggering the KBA designation are shown the Table 30 below.

Table 30 KBA Triggering Species

Taxonomic Group	Scientific name	Common name	IUCN Red List Category	KBA Criteria	Legacy Criteria
Birds	<i>Falco concolor</i>	Sooty Falcon	VU	A1b, D1a	Y
Birds	<i>Larus leucophthalmus</i>	White-eyed Gull	VU	B1, D1a	Y
Birds	<i>Sterna bengalensis</i>	Lesser Crested Tern	LC		Y
Birds	<i>Sterna caspia</i>	Caspian Tern	LC		Y

Taxonomic Group	Scientific name	Common name	IUCN Red List Category	KBA Criteria	Legacy Criteria
Birds	<i>Sterna repressa</i>	White-cheeked Tern	LC		Y

Red Sea Islands

The Red Sea Islands has been a Marine Protected Area and Developing Resources Protection Area since 2006. It lies 38 km south-east of GOS III and is designated on a national level. Its reported area is 1800.00 km². The reason for designation is not clear from available literature. 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.

Proposed Protected Areas

Shaieb El-Banat

Shaieb El-Banat has been a proposed Terrestrial and Inland Waters Protected Area since 1999. It lies 45 km south-east of GOS III and is designated on a national level. Its reported area is 4,855.85 km². The reason for designation is not clear from available literature. 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 a proposed Terrestrial and Inland Waters Protected Area since 1999. It lies 8 km north-east of GOS III and is designated on a national level. Its reported area is 107.19 km². The reason for designation is not clear from available literature. 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.

Wadi Qena

Wadi Qena has been a proposed Terrestrial and Inland Waters Protected Area since 1999. It is 43 km west of GOS III and is designated on a national level. Its reported area is 8006.56 km². The reason for designation is not clear from available literature. 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 Habitats and Flora

A. Methods: Habitats and Flora

A standard Sampling method is applied uniformly across the entire study region, using a random influence balanced strategy. The sampling design allocates 30 sampling points across the study region, maintaining a minimum distance of at least 1.0 km between samples to achieve comprehensive site coverage and prevent double sampling in the vicinity of each site, thereby ensuring sample independence.

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 the figure below. 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.

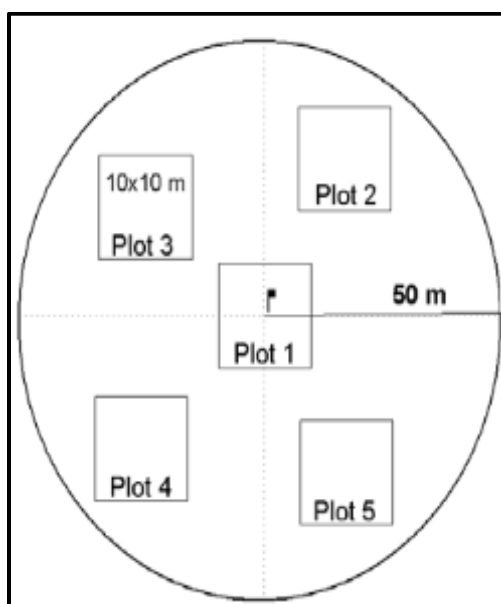


Figure 56: Floral Quadrat Survey Sampling Methodology

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

A trial TWINSpan analysis was then undertaken to identify and map the floral community of the site which aims to provide diagnostic species of each identified community to give better assessment of the flora and biodiversity of the site. The analysis was conducted on a plant abundance matrix containing 30 sampling sites and 19 plant species as shown in fig 56.

TWINSpan Analysis Protocol

TWINSpan (Two-Way Indicator Species Analysis) is a divisive hierarchical clustering method specifically designed for ecological community data analysis. Originally developed by (Hill, 1979), TWINSpan has become one of the most widely used classification techniques in vegetation science and community ecology. The method simultaneously classifies both sites and species, creating a two-way ordered table that reveals the underlying structure of ecological communities.

The primary objectives of this analysis were to:

- Identify distinct plant community groups within the dataset
- Determine diagnostic species for each identified group
- Visualize community relationships through ordination
- Provide ecological interpretation of the results

The TWINSpan analysis was implemented using a hierarchical clustering approach with Ward's linkage method and Euclidean distance to capture abundance patterns. The analysis was configured to identify four distinct groups based on the dendrogram structure and ecological interpretability.

NMDS Ordination

Non-metric Multidimensional Scaling (NMDS) was performed to provide an independent validation of the clustering results and to visualize the relationships between sampling sites in reduced dimensional space using a two-dimensional solution.

Mapping Communities

To transfer the results of the TWINSpan analysis to a spatial representation of the results an approach previously described by *alqamy* 2004 that uses Thiessen polygons to identify an area of influence of each sampling site relatively to the distance of the neighboring sites and its position in relation to the extent of the study region. Thiessen polygons were created by Thiessen polygons tool in ArcPro 3.2.

B. Results: Habitat and Flora

During the 2025 surveys a total of 20 plant species were recorded across Project Aol as shown in the table below. The majority of these species were in the herb and shrub communities with *Vachellia tortilis* representing the tree community in low numbers.

Table 31: Results of April-May 2025 Survey

Species Scientific Name	Total Abundance	IUCN Status
<i>Aerva javanica</i> (Burm.f.) Juss. ex Schult.	2	-
<i>Anastatica hierochuntica</i> L.	18	-
<i>Caroxylon imbricatum</i> (Forssk.) Moq.	2	-
<i>Citrullus colocynthis</i> (L.) Schrad.	2	-
<i>Cleome droserifolia</i> (Forssk.) Delile	1	-
<i>Cometes abyssinica</i> R.Br. ex Wall.	1	-
<i>Convolvulus hystrix</i> Vahl	1	-
<i>Cornulaca monacantha</i> Delile	3	-
<i>Heliotropium strigosum</i> Boiss.	2	-
<i>Launaea spinosa</i> (Forssk.) Sch.Bip. ex Kuntze	1	-
<i>Leptadenia pyrotechnica</i> (Forssk.) Decne.	1	-
<i>Morettia philaeana</i> (Delile) DC.	11	-
<i>Ochradenus baccatus</i> Delile.	21	LC
<i>Stipagrostis ciliata</i> (Desf.) De Winter	2	LC
<i>Tetraena coccinea</i> (L.) Beier & Thulin	24	-
<i>Trichodesma africanum</i> (L.) Sm.	2	-
<i>Vachellia tortilis</i> subsp. <i>raddiana</i> (Savi) Kyal. & Boatwr.	1	LC
<i>Zilla spinosa</i> (L.) Prantl in Engl. & Prantl.	36	-
<i>Zygophyllum arabicum</i> (L.) Christenh. & Byng	45	-
<i>Zygophyllum molle</i> (Delile) Christenh. & Byng	9	-

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

The collective Shannon-Wiener Biodiversity Index for the Aol was 1.876, while the same calculated for each sampling site ranged from 0.00 to 1.494. The species count for the Aol was 20 species, which ranged

from 0 species to 13 species between sampling sites with the species richness across the Aol being 4.9. This shows the site is moderate to high in both flora diversity and floral richness.

The floral diversity and species richness across the Aol was highest in the western northern and western-southern corners of the site.

The habitats present on the site are largely natural habitat, but with varying levels of disturbance. The habitats do not meet any of the criteria for Annex I or Priority Habitats and are assessed as being of Low to Medium Sensitivity.

7.5.3 Reptiles and Amphibians

A. 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 general survey methods were undertaken for reptiles and these included:

- **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 remain open for seven consecutive nights at each sampling location. Data recorded within the pitfall trapping was recorded to calculate local occupancy of each species.

In addition to the above general survey methods, specific surveys for Egyptian Spiny-tailed Lizard (*Uromastix aegyptia*) were undertaken. This species, also known as the Dhabb Lizard, is recognized as an IUCN Vulnerable species and additional surveys were designed to not just be representative but to cover all individuals and burrows in the AOl.

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

B. Results: Reptiles and Amphibians

The results of the reptile surveys completed are shown in the table below and are summarised below.

In general, the composition of the herpetofauna within the Project Aol is characterized as low densities of common and widespread species, with the exception of Egyptian Spiny-tailed Lizard which is discussed below. At least five species of reptile were recorded throughout the survey effort.

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

Table 32: Results of the Reptile Surveys

Common Name	Scientific Name	Red List Status	Number
Spiny-tailed Lizard	<i>Uromastix aegyptia</i>	Vulnerable VU	63
Sahara Sand Viper	<i>Cerastes vipera</i>	Least concern LC	7
Bosc's Fringe-toed	<i>Acanthodactylus boskianus</i>	Least concern LC	1

Pygmy Gecko	<i>Tropicolotes nattereri</i>	Least concern LC	2
Red Spotted Lizard	<i>Mesalina rubropunctata</i>	Least concern LC	1
Lizard sp.	-	-	7

Spiny-tailed Lizard (Dhabb Lizard) *Uromastyx aegyptia*

Surveyors recorded 63 observations of live individuals and both active and inactive burrows of Egyptian Spiny-tailed Lizard. Observations were at a density of 0.772 per km². The spatial distribution of these observations in the project site shows a noticeable concentration of the species on the central area and southern part of the study site and towards the higher grounds, as shown in the figure below.

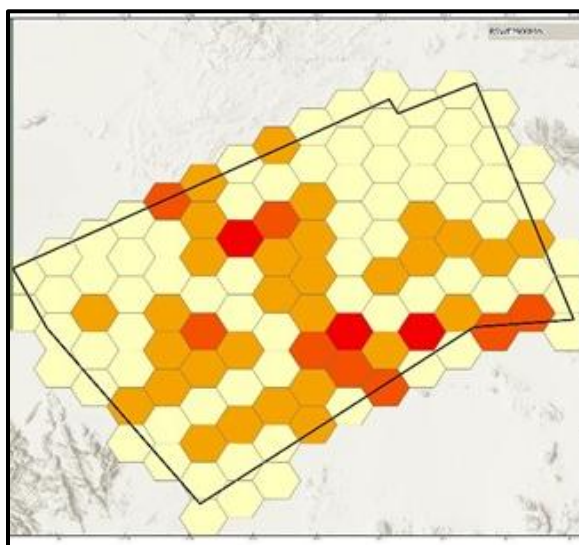


Figure 57: spatial distribution of presence marks of spiny-tailed lizard (*Uromastyx aegyptia*) on the site

The Egyptian Spiny-tailed Lizard has a patchy distribution from Egypt (east of the Nile), eastwards into Israel, Jordan, southern Syria, Iraq and Iran and southwards into the Arabian Peninsula. It occurs in open, flat, gravelly, stony and rocky areas, and it is infrequently seen in sandy areas. Animals forage on low vegetation close to their burrows, where they live in loose colonies.

There is no published information about the global population, but the species is generally uncommon and declining throughout its range in Egypt. The species is threatened by habitat loss due to over-grazing, quarries and agricultural expansion, and pet and medicinal trade (some of them being illegal). The species is protected by Egyptian legislation (Wilms et al. 2012), implying that it cannot be killed or captured in any protected area.

During the ecological field assessments that were carried out at the project site a number of Egyptian Spiny-tailed Lizards and burrows were identified. Despite its broad distribution, the Egyptian Spiny-tailed Lizard is assessed globally as IUCN Vulnerable, declining throughout its range, and poorly-known, and thus considered a Priority Biodiversity Feature.

7.5.4 Mammals (excluding bats)

A. Methods: Mammals

The terrestrial mammal survey included a full walkover/drive of the Project Aol. Any signs of mammals including scat, footprints, direct observations, burrows, or other signs were recorded. 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 large and small mammal species.

Large Mammals

Three survey methods were used for specifically surveying large mammals:

- Camera Trapping – camera traps were deployed in six (6) sites for 30 days each (from 26 April to 24 May), resulting in a total of 180 camera days to account for species of medium to 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 odor). 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 and Active Search – observers walked 500m transect lines from 30 different locations within the AoI in each direction (N, S, E and W). Observed species were recorded and where possible, photographed. The midpoint of each transect is shown in in the figure below.

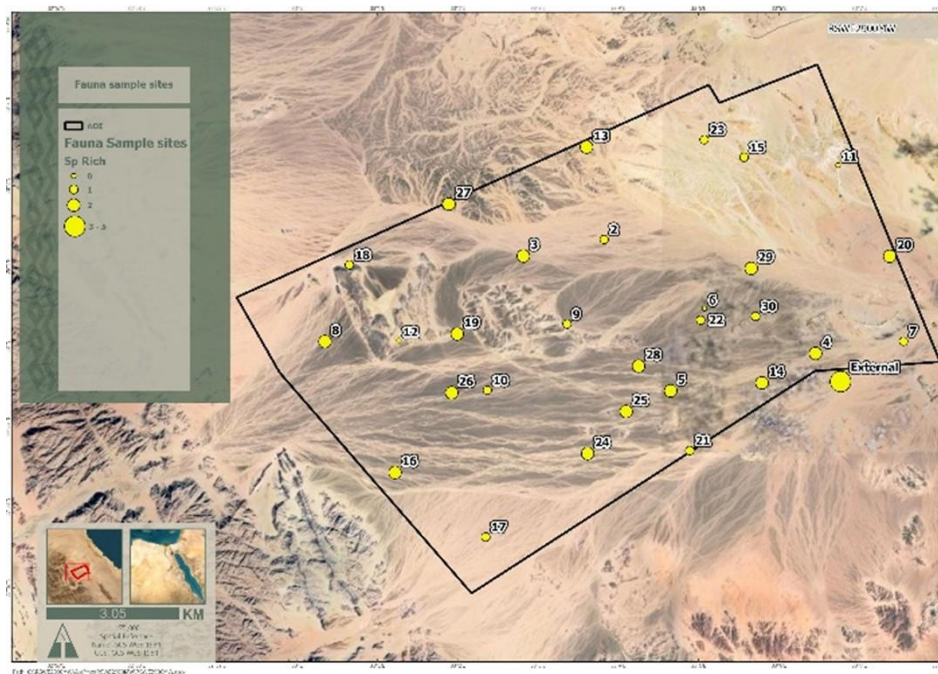


Figure 58: Distribution of line transects over the study

Small Mammals

In order to survey small terrestrial mammals, live trapping methods were used. Baited Sherman traps of differing sizes were installed randomly at 16 locations across the Project AoI to cover all relevant habitat types, with a higher density of traps allocated to areas where small mammal activity has been previously recorded. Each of the traps elapsed 7 days in the field in continuous sampling mode. This counts to a total sampling effort of 112 trap-days. 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. Individuals were then released into the site they were trapped.

B. Results: Mammals

Large Mammals

Only two (2) large mammal species were recorded across the three survey methods as shown in the table below. Only Red Fox (*Vulpes vulpes*) is a wild animal and is an IUCN Least Concern Species.

Line Transects

Only two mammal species were recorded during the line transect surveys, as can be seen in table below.

Table 33: Results of the Mammal Surveys

Common Name	Scientific Name	Red List Status	Number
Domestic Dog	<i>Canis familiaris</i>	Not assessed	1
Red Fox	<i>Vulpes vulpes</i>	Least Concern LC	8

Camera Trapping

Two species were recorded using this method: Red Fox and Jerboa species. Red Fox was recorded a total of five times, while Jerboa species was recorded four times.

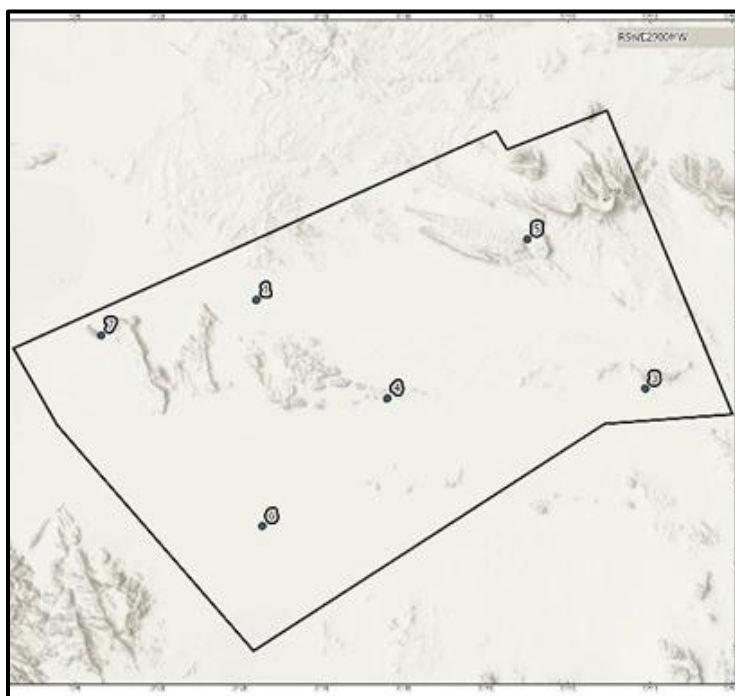


Figure 59: Observed gazelle and Ibex records on the site and coordinates

Track Stations Survey

Six track stations were set up and one wild mammal was recorded: Red Fox which was detected on all sites except station 4.

Small Mammals

Of the sixteen sampling sites, three returned positive records. Traps captured two wild species, the Cairo Spiny Mouse (*Acomys cahirinus*) and Lesser Egyptian Gerbil (*Gerbillus gerbillus*); both of which are listed as IUCN Least Concern.

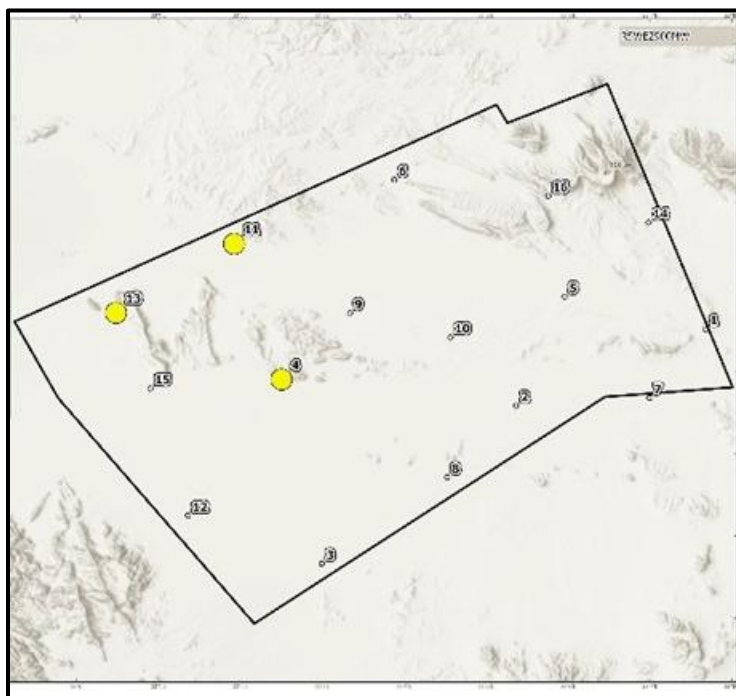


Figure 60: Live trapping locations

7.5.5 Invertebrates

A. Methods: Invertebrates

Invertebrate methodologies were pitfall trapping, with 16 sites within the AoI. Surveyors identified the species using key books, relevant scientific articles as well as consultation with external experts as appropriate.

B. 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.

Table 34: Results of the Invertebrate Surveys

Common Name	Scientific Name	Red List Status	Number
Darkling Beetle	<i>Cerenopus concolor</i>	Not assessed	72
Darkling Beetle	<i>Trachyderma hispidum</i>	Not assessed	18
Big Black Ant	<i>Cataglyphis niger</i>	Not assessed	90
Camel Spider	-	-	1
Deathstalker Scorpion	<i>Leiurus quinquestriatus</i>	Not assessed	1
Desert Silver Ant	<i>Cataglyphis bombycina</i>	Not assessed	8
Medium Desert Ant	-	-	34
Praying Mantis	-	-	1

Small Desert Ants	<i>Cataglyphis spp.</i>	Not assessed	22
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7.6 Avifauna

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

7.6.1 Baseline Assessment Methodology

General Introduction

According to the methodology outlined in the “Environmental Impact Assessment (EIA) Guidelines and Monitoring Protocols for Wind Energy Development Projects along the Rift Valley / Res Sea Flyway (RVRSF) with a particular reference to wind energy in support of the conservation of Migratory Soaring Birds (MSBs)” (2013), the “Strategic Environmental and Social Impact Assessment for an Area of 300 km² of potential wind farms at the Gulf of Suez (2013)”, and the methodology applied in the “Strategic and Cumulative Environmental and Social Assessment Active Turbine Management Program for Wind Power Projects in the Gulf of Suez (2019)”, the assessment used specific pre-assigned Observation Points (OPs) [also known as Vantage Points (VPs)] for the spring and autumn 2025 migration periods.

The objective of the survey was to provide an assessment of the presence and activities of the migratory and resident birds within the Project site and provide a detailed analysis indicating species’ duration of activity and the elevations at which they are present. Meeting these objectives will provide an in-depth understanding of the predicted impacts of the Project on bird species.

Six (6) Vantage points (VPs) were designated to cover the Project area. Due to the large-scale nature of the Project site and longer period of monitoring hours undertaken every day the rotational system was as follows: a) The monitoring was divided into a morning and evening shifts (5-6 hours each), b) The selection of the VPs during any monitoring event entailed rotational work to avoid for overlaps among contiguous VPs. For example, the VPs selected on Day 1 included VP1, VP3, VP5, whilst the remaining was monitored on the following day. This approach ensures avoidance of overlap between the monitoring teams, so as to minimize the chances of double-counting as much as possible., and 3) Each VP was covered by two observers (i.e. for a total of 6 observers per day) that are qualified with adequate previous experience in avifaunal assessments for wind farms.

In the figure below, the locations and orientation of the VPs are indicated at the site where they were attended on alternating days. In other words, two VPs located adjacent to one another were not operated in the same day in order to avoid duplication and double-counted sightings. For example, Group A’s VP1 and VP3 and Group B’s VP2 and VP4 would be active on alternating days.

Other measures to avoid double-counting included: (i) continuous communication between team members onsite at VPs to report key flocks passing through the site; (ii) daily revision of daily sheets of observers by Team Leader to check for any potential double counting data, which if identified were removed for the data set accordingly – this included records that have same or similar number of birds, trajectories and timings.

Unlike previous methodologies that undertook eight (8) hours of observations, the Project’s methodology has been updated to ensure monitoring is undertaken to start a minimum of 1-hour after sunrise until 1-hour before sunset.

Note: Although a 1-hour break is provided between each two-observation periods, the approach ensured that this does not affect the quality of recordings by alternating break periods among observes (i.e. one observer takes a break, for example, from 1pm-2pm while the second observer remains on shift and vice-versa). The approach enabled the continuous observation of avian sighting throughout daylight hours.

The start and end of observation periods varied depending on the following conditions:

- The season and, therefore, the duration of daylight hours
- Weather conditions, including visibility
- Observers were equipped with binoculars and cameras.

The field team was instructed to commence the monitoring program at the GOS III plot on February 2025, in accordance with the methodology identified above. The spring monitoring season in Egypt begins 20 February. The monitoring period was spread over the entire migratory period employed in the wider region of the Eastern Desert in Egypt (mid or late February to mid-May) for the spring season and mid-August to early November in the autumn season).

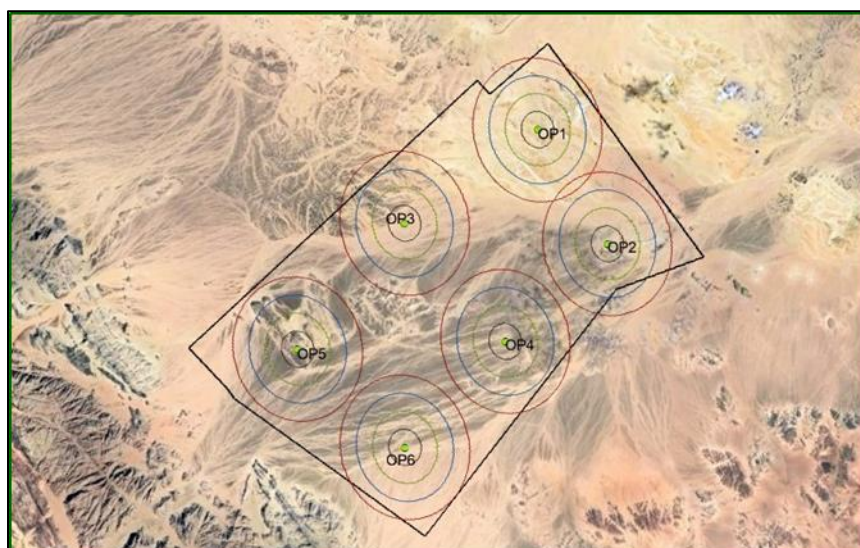


Figure 61: Location of VP for the spring and autumn seasons 2025

Table 35: Coordinates of the VPs (UTM 36R)

OP	X	Y
VP1	509647	3101459
VP2	510660	3097926
VP3	505417	3099975
VP4	507212	3096107
VP5	501645	3097448
VP6	503755	3094062

Data Collection

Data was recorded on spreadsheets (figure below) that were completed on a daily basis. During data collection, observers accounted for days of zero bird counts (days with no records of migrating birds) to better understand birds' response to changes in weather conditions, limiting factors of crossing the Gulf

of Suez, as well as determine favourable and unfavourable weather conditions of migration generally or specifically for a certain species.

Information on bird flight activity was collected from the VPs. The recording of observations followed the methods described by Band et al. (2007) and SNH (2017), which are summarized below, in addition to some site-specific adaptations to the migratory context in Egypt (also indicated below). This has been taken into account given that SNH includes method developed for Scotland, where migration patterns are different when compared to Egypt.

If a target species is detected, it was followed until it ceased flying or was lost from view. For each observation of a target species, the following data were collected:

- The time the target species was detected
- The flight duration of the target species to the nearest 15-second interval
- Estimate of the bird's flight elevation from the point of first detection and thereafter at 15-second intervals. Flight elevation was classified based on turbine specifications and at least divided into two classes: at collision risk and above collision risk.

At the time of the spring 2025 season, neither the Project layout nor the specifications of turbines were available. Therefore, the collision risk height was set at 240m, however, the general turbine tip height planned for the wind developments in the region is 219.17 m. Thus the CRM was done in 240m. This height was also the same for the autumn.

As guidance to observers to define their area of survey before starting the observation, determining the cardinal directions (North, South, East, and West) and pre-defining several landmarks of reference in the field, if feasible, were outlined. Observers constantly scanned with and without binoculars within a circumference of 360 degrees around each VP until a target species is detected.

Weather conditions (wind intensity and direction, visibility, cloud cover and precipitation) were recorded at start of monitoring activities, then at every subsequent hour and at the end time of monitoring activities. Ideally, observations should have been made in a range of wind conditions. This is particularly important in the case of soaring birds when wind direction and strength is likely to affect migration behaviour and flight routes.

BASIC DATA METRICS

- Date (year/month/day)
- Vantage point (or Observation Point)
- Observer name (initials)
- Time at the start of the observation period
- Time at the end of the observation period
- Observation time in hours and minutes format (00: 00)
- Species with their English names. For unidentified birds it will be referred to the nearest identifiable systematic Genus, e. g. two close species *Circus macrorus/pygargus*, or to Genus level, e.g., *Aquila sp.*, if not possible to the closest group e. g. Unidentified Raptor (UR).

- Number – number of birds of the same species (mixed species flocks should have one line and one key number for each species)
- Sex and Age - Sex: M/F; Age: Juvenile (J), Immature (I), Adult (A).
- Flying Height considering the following classes: 1-50, 50-120, 120-180, 180- 240, 240-300, 300-500, and above 500 m.
- Origin – cardinal/inter cardinal direction of the point where the bird was first detected in relation to the observer.
- Direction – cardinal/inter cardinal main direction of the bird(s)'s trajectory
- Relevant behaviour of flying – Soaring, Gliding, Active flying
- Observation numbers
- Observation Distance
- Recorded Inside or Outside the project site
- Any other noteworthy remarks were noted.

Weather Data

- This sheet will only be filled by one of the senior observers assigned by the Team Leader.
- The following weather variables will be recorded hourly.
- Cloud cover (%)
- Visibility (km)- following predefined categories: 1 = 2.5 km, 2 = 5 km 3 = 7.5 km, 4 = 10 km
- Temperature (°C)
- Wind direction (cardinal/inter cardinal points)
- Wind speed (Beaufort)
- Precipitation: Yes/No. Heavy (H)/Moderate (M)/Light (L)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
FID	Date	week	mon	VP	Start	End	montime	hr	min	Totmontin	Rec	Species	No.	Withou	birds/hr	Obs. Time
7	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	7	STE	15	15	1.8947	9:51
8	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	8	SBU	1	1	0.1263	9:51
9	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	9	STE	8	8	1.0105	9:59
10	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	10	BOE	1	1	0.1263	10:11
11	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	11	STE	6	6	0.7579	10:15
12	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	12	STE	5	5	0.6316	10:19
13	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	13	STE	12	12	1.5158	10:25
14	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	14	STE	1	1	0.1263	10:48
15	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	15	STE	10	10	1.2632	13:26
16	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	16	AGS	3	3	0.3789	13:30
17	20-feb-25	8	2	4	8:20	16:15	7:55	7	55	475	17	STE	2	2	0.2526	13:37
18	21-feb-25	8	2	1	10:25	14:00	3:35	3	35	215	1	SHE	1	1	0.2791	10:35
19	21-feb-25	8	2	1	10:25	14:00	3:35	3	35	215	2	SHE	1	1	0.2791	11:30
20	21-feb-25	8	2	1	10:25	14:00	3:35	3	35	215	3	AGS	1	1	0.2791	12:10
21	21-feb-25	8	2	1	10:25	14:00	3:35	3	35	215	4	STE	6	6	1.6744	13:15
22	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	1	STE	7	7	1.1667	9:40
23	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	2	IME	1	1	0.1667	9:40
24	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	3	STE	69	69	11.5000	9:48
25	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	4	STE	2	2	0.3333	11:14
26	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	5	STE	1	1	0.1667	11:17
27	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	6	STE	1	1	0.1667	11:25
28	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	7	STE	2	2	0.3333	11:46
29	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	8	STE	1	1	0.1667	12:18
30	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	9	RSP	3	3	0.5000	13:13
31	21-feb-25	8	2	3	9:10	15:10	6:00	6	0	360	10	STE	1	1	0.1667	13:42
32	21-feb-25	8	2	5	8:25	15:30	7:05	7	5	425	1	STE	2	2	0.2824	12:02
33	21-feb-25	8	2	8	9:10	14:50	5:40	5	40	340	1	SHE	1	1	0.1765	14:02
34	22-feb-25	8	2	2	9:00	15:50	6:50	6	50	410	1	STE	2	2	0.2927	9:05
35	22-feb-25	8	2	2	9:00	15:50	6:50	6	50	410	2	STE	1	1	0.1463	13:38
36	22-feb-25	8	2	4	8:20	16:20	8:00	8	0	480	1	STE	4	4	0.5000	11:20
37	22-feb-25	8	2	4	8:20	16:20	8:00	8	0	480	2	STE	6	6	0.7500	11:28
38	22-feb-25	8	2	4	8:20	16:20	8:00	8	0	480	3	STE	2	2	0.2500	11:35
39	22-feb-25	8	2	4	8:20	16:20	8:00	8	0	480	4	STE	1	1	0.1250	11:43
40	22-feb-25	8	2	4	8:20	16:20	8:00	8	0	480	5	STE	1	1	0.1250	12:46

Figure 62: Data sheet example

The field team was in contact during the reporting period via mobile phones and a “WhatsApp Group”. This would ensure immediate communication to follow up on the migrating flocks and individuals over the Project area, avoiding double counts of same flocks/individuals, while also ensuring full and accurate perception about the record spatial and temporal aspects.

Maintaining consistent and rapid communication was crucial to avoid double counting of observed species.

7.6.2 Monitoring times

As shown in the tables below, monitoring times per VP differed in spring and autumn. The alternating monitoring time per VP resulted in non-comparable bird raw-numbers, as a longer monitoring time might result in more birds recorded. Therefore, a standardized value for such comparisons was calculated as noted throughout this section. This variable, which measures such variations, is the passing rate (*#birds/hour of observation*), see Bibby et al. 1992, Caughley 1977.

Table 36: Level of Effort from Project Site VP during spring 2025

	VP1	VP2	VP3	VP4	VP5	VP6	Total
Feb	32:00	39:58	39:55	32:03	31:56	39:49	215:41
Mar	128:17	119:10	119:49	128:04	127:45	119:55	743:00
Apr	119:53	119:04	118:57	118:55	119:56	119:17	716:02
May	64:00	71:56	71:55	62:31	64:00	63:55	398:17
Total	344:10	350:08	350:36	341:33	343:37	342:56	2073:00

Table 37: Level of Effort from Project Site VP during autumn 2025

	VP1	VP2	VP3	VP4	VP5	VP6	Total
Aug	176:26	176:50	176:21	175:59	175:59	175:59	705:36
Sep	240:21	240:52	239:16	239:25	239:25	239:25	959:54

Oct	247:36	247:31	247:57	247:44	247:44	247:44	990:48
Nov	80:00	80:00	80:00	80:00	80:00	80:00	320:00
Total	744:23	745:13	743:34	743:08	743:08	743:08	2976:18

The relief of the landscape at the project site is quite homogeneous. There is bare ground with almost no vegetation cover, except a few shrubs. This suggests there are few and rare features that would affect the birds' behaviour making them to prefer certain areas within the footprint (e.g. use of slope soaring flight because the presence of mountains or deep cliffs).

A. Bird Numbers

There were between 25 (autumn) and 30 (spring) species recorded in 2025. Following the common rule among projects in the GoS, there were more birds and contacts in spring (157,891 birds and 5,326 records) compared to autumn (78,232 birds and 636 records), as shown in the table below). In addition, observers were not able to identify a variable number of birds – those were classified as raptors, falcons, eagles or unidentified raptor. It is noteworthy that despite the increase of 30% in the monitoring time in autumn, spring doubles the number of birds.

73.55% of the birds belonged to only three (3) species, the White Stork *Ciconia ciconia*, Steppe Buzzard *Buteo buteo vulpinus*, and the White pelican *Pelecanus onocrotalus*. In addition, another two (2) accounted for more than ten thousand individuals each (Honey Buzzard and Black kite). All of these species represent more than 94.71% of the total birds. In autumn occurred the same, 98.35% of the birds recorded belonged to only three (3) species; the White Stork, Eurasian Honey buzzard, and the White pelican. In addition, another two (2) accounted for more than a hundred individuals each (Black kite and Steppe buzzard). All of these species represent the 99.38% of the total birds recorded. This is referred only for the migratory birds, see the later section for the two potential resident (breeding ones), the Golden eagle and the Sooty falcon.

The fraction of unidentified birds e.g. “eagle”, “harrier”, and “raptor” are negligible in terms of importance for future analyses, as we present passing rates instead of raw numbers. The numbers in the Table are not the real ones crossing the Project's footprint. The observers miss birds too far from their sight; or they migrate at times the observers are not at the site, during the night, like the Common crane and the Lesser kestrel. Thus, we must work with median passing rates (birds/hour) and their associate confidence intervals. This median has a range, percentiles 5 and 95% where the real median falls. For understanding purposes, there is a maximum and a minimum passing rate, and the real value falls in between. This range already includes such missing information because of imperfect detection.

Table 38: Species Recorded during Vantage Point Monitoring in the spring and autumn 2025 (number of records and individuals)

SPECIES	IUCN Red List (2021)	National Status	spring		autumn	
			#records	Individuals	#records	Individuals
Black Kite <i>Milvus migrans</i>	LC	Passage migrant	850	12,311	64	627
Bonelli's Eagle <i>Aquila fasciata</i>	LC	Passage migrant	1	1	-	-
Booted Eagle <i>Hieraetus pennatus</i>	LC	Passage migrant	279	387	17	17

SPECIES	IUCN Red List (2021)	National Status	spring		autumn	
			#records	Individuals	#records	Individuals
Black Stork <i>Ciconia nigra</i>	LC	Passage migrant	97	924	3	15
Chrested H Buzzard <i>Pernis ptilorhynchus</i>	LC	Passage migrant	1	1	1	1
Common Crane <i>Grus grus</i>	LC	Passage migrant	1	8	-	-
Demoiselle crane <i>Antropoides virgo</i>	LC	Passage migrant	-	-	1	9
Eleonora's falcon <i>Falco eleonora</i>	LC	Passage migrant	1	1	1	1
Egyptian Vulture <i>Neophron percnopterus</i>	EN	Passage migrant	131	199	14	32
Golden eagle ³¹ <i>Aquila chrysaetos</i>	LC	Resident breeder	-	-	2	3
Glossy Ibis <i>Plegadis falcinellus</i>	LC	Passage migrant	2	19	2	46
Griffon Vulture <i>Gyps fulvus</i>	LC	Wintering Resident/passage migrant	7	7	-	-
European Honey-buzzard <i>Pernis apivorus</i>	LC	Passage migrant	246	11,747	210	5,829
Eurasian hobby <i>Falco subbuteo</i>	LC	Passage migrant	1	1	-	-
Eastern Imperial Eagle <i>Aquila heliaca</i>	VU	Passage migrant	15	15	-	-
Common Kestrel <i>Falco tinnunculus</i>	LC	Passage migrant	20	21	-	-
Long-legged Buzzard <i>Buteo rufinus</i>	LC	Passage migrant	92	133	27	32
Lanner Falcon <i>Falco biarmicus</i>	LC	Passage migrant	5	8	4	6
Lesser Kestrel <i>Falco naumanni</i>	LC	Passage migrant	1	1	-	-
Lesser Spotted Eagle <i>Clanga pomarina</i>	LC	Passage migrant	449	1,542	4	4
Levant Sparrowhawk <i>Accipiter brevipes</i>	LC	Passage migrant	29	3,911	1	5
Marsh Harrier <i>Circus aeruginosus</i>	LC	Passage migrant	47	65	45	63
Montagu's Harrier <i>Circus pygargus</i>	LC	Passage migrant	4	5	8	9
Osprey <i>Pandion haliaetus</i>	LC	Passage migrant	28	29	1	1
Pallid Harrier <i>Circus macrourus</i>	NT	Passage migrant / winter visitor	2	2	10	10
Steppe Buzzard <i>Buteo buteo vulpinus</i>	LC	Passage migrant	1,177	48,011	84	178
Short-toed Snake-eagle <i>Circaetus gallicus</i>	LC	Passage migrant / summer breeder	453	867	5	5

³¹ The numbers for the Golden eagle cannot be interpreted as different birds, but same individual/s passing repeatedly. Same applies for the Sooty falcon.

SPECIES	IUCN Red List (2021)	National Status	spring		autumn	
			#records	Individuals	#records	Individuals
Sooty Falcon <i>Falco concolor</i>	VU	Passage migrant/Resident	-	-	6	7
Greater Spotted Eagle <i>Clanga clanga</i>	VU	Passage migrant	23	24	-	-
Eurasian Sparrowhawk <i>Accipiter nisus</i>	LC	Passage migrant	114	119	-	-
Steppe Eagle <i>Aquila nipalensis</i>	EN	Passage migrant	1,073	9,357	19	22
White Pelican <i>Pelecanus onocrotalus</i>	LC	Passage migrant	45	18,740	78	23,445
White Stork <i>Ciconia ciconia</i>	LC	Passage migrant	131	49,650	28	47,665
Subtotal			5,326	157,891	636	78,232

Unidentified buzzard	N.A.	N.A.	20	510	7	10
Aquila sp.	N.A.	N.A.	63	194	13	16
Raptor sp.	N.A.	N.A.	4	10	2	4
Falcon sp.	N.A.	N.A.	15	19	23	25
Harrier sp.	N.A.	N.A.	3	3	25	35
	N.A.	N.A.	-	-	29	31
Total			105	736		

B. Conservation Status

As a whole, and according to IUCN Red List of Threatened Species (IUCN, 2021), six (6) are globally threatened – these include two (2) Endangered-EN, the Steppe Eagle and the Egyptian Vulture, and three (3) Vulnerable-VU, the Eastern Imperial Eagle, Greater Spotted Eagle, and Sooty Falcon. In addition, one (1) species is Near Threatened-NT, the Pallid Harrier. All the remaining species have been evaluated as Least Concern.

However, there is one species which is resident, the Golden eagle, that despite classifies as Least Concern, constitutes an important biodiversity value. The presence of the species in Egypt is in the southernmost point of its distribution range worldwide. An individual loss has the implication of reducing the distribution map but also to extinct the Golden Eagle in the country.

C. Spatial Passage per VP

Each species has a different passing rate and timing for migration, which varies depending on the month and season. This has been fully studied in the scientific literature, e.g. (Shirihai et al. 2000). For the comparison among VPs, the median passing rate (birds per hour of observation) was utilized. There were no differences when comparing the passing rates per species, neither spring nor autumn (Camiña et al. 2025a and 2025b). The lack of a preference is an expected result because of two main reasons: 1) the uniform landscape of the project site which does not have special characteristics forcing or influencing the birds to behave differently and 2) the, similarly, absence of geographic features which could influence the bird's flight. Reasons for potential differences in 2025 could be related with the congregatory behaviour

of the different species: there are species migrating solitary or small groups, opposite to others like the White stork or the Honey Buzzard. None of the analysis performed showed significant differences in the passing rates among VPs in spring or autumn. In other words, the passage was random and only influenced by the flocking behaviour. The presence of some large flocks for the most congregatory species may influence the appearance that birds tend to pass preferring certain areas, which is not really true. The mean flock sizes for every species each year appear in the table below.

Table 39: Mean flock size per species, number of observations in spring and autumn 2025, and min and max flock sizes recorded. Those highlighted are considered solitary or migrating in small groups.

SPECIES	Spring 2025		Autumn 2025		Minimum and Maximum Flock Sizes	
	Mean Flock Size	# records	Mean Flock Size	# records	Min	Max
Black Kite	7.00	850	9.79	64	1	300
Black Stork	4.00	97	5.00	3	1	55
Common Crane	8.00	1	-	-	8	8
Booted Eagle	1.00	279	1.00	17	1	8
Common Kestrel	1.00	20	-	-	1	2
Eastern Imperial Eagle	1.00	15	-	-	1	1
Egyptian Vulture	1.00	131	2.28	14	1	6
Griffon vulture	1.00	7	-	-	1	1
Eurasian Sparrowhawk	1.00	114	-	-	1	2
E. Honey Buzzard	17.00	246	27.75	210	1	1,000
Great White Pelican	200.00	45	300.57	78	1	6,000
Golden eagle	-	-	1.5	2	1	2
Greater Spotted Eagle	-	-	-	-	-	-
Lanner Falcon	2.00	5	1.5	6	1	2
Lesser Kestrel	1.00	1	-	-	1	1
Lesser Spotted Eagle	16.00	449	-	-	1	40
Levant Sparrowhawk	15.00	29	5.00	5	2	2,000
Long-legged Buzzard	1.00	92	1.18	27	1	4
Montagu's Harrier	1.00	4	1.12	13	1	3
Marsh harrier	1.00	47	1.40	45	1	12
Osprey	1.00	28	1.00	1	1	2
Pallid Harrier	1.00	2	1.00	10	1	1
Short-toed Snake Eagle	1.00	453	1.00	5	1	12
Sooty Falcon	-	-	1.16	6	1	2
Steppe Buzzard	16.00	1,177	2.11	84	1	700
Steppe Eagle	3.00	1,073	1.15	19	1	200

SPECIES	Spring 2025		Autumn 2025		Minimum and Maximum Flock Sizes	
	Mean Flock Size	# records	Mean Flock Size	# records	Min	Max
White Stork	130.00	131	1,702	28	1	15,000

The table above indicates the results of observations for the various species sighted including: the White stork, Great White Pelican, and Levant Sparrowhawk have the largest mean flock sizes (>2,000 individuals per flock) in 2025. Others like the Eurasian Honey and Steppe buzzards have smaller mean flock size. On the contrary, thirteen (13) out of thirty-one (27) species, are considered solitary birds (as highlighted in the table).

The hypothesis before performing the 2025 monitoring sessions and based on the experience of the Consultant in analyzing similar data for other wind farm projects in the region for multiple migratory seasons, was for those species that tend to pass in greater numbers through specific VPs one year, they are not likely to repeat their routes in the same way the following season – demonstrating variability at the scale of the project site.

D. High Risk Flight Paths

The wind conditions on a site are dependent from the wind speed and direction, and the temperature. The Table summarizes the wind directions and the number of days where such condition occurred. As seen, most of the days (65.91%) wind blew from the NW. There were four days at the end of the monitoring with sand storms, which made the counts unfeasible. Here we only present the data for the spring, as it is the season with more birds and records for all the species. The autumn data are too scarce for comparisons and limited to a handful of species, mainly the White stork.

For the project, the wind direction was influential in indicating the number of birds at risk – indicated as (“yes”) or (“no”). Western, southwestern and southern wind directions indicated that species were less likely or had not traversed the project footprint.

Table 40: Distribution of bird numbers according to wind direction in spring 2025

Wind direction	days	%	Number of contacts	Number of birds	Passing rates
E	3	3.41%	104	4048	4.780
N	2	2.27%	147	7088	6.097
NE	3	3.41%	103	10873	13.209
NNE	3	3.41%	361	8318	2.864
NNW	6	6.82%	374	11172	3.771
NW	58	65.91%	2958	62220	2.612
S	1	1.14%	136	2948	2.723
SE	9	10.23%	1019	40655	4.976
SSE	1	1.14%	47	3148	8.135
SSW	1	1.14%	177	8125	5.685
W	1	1.14%	5	32	0.667

Table 41 Distribution of bird numbers according to wind direction in spring 2025 sorted per species

	Wind (days)	Steppe Eagle	Honey buzzard	White stork	Steppe buzzard	White Pelican
E	3	299	3	3000	677	0

N	2	172	0	2500	3554	490
NE	3	79	0	8080	2151	400
NNE	3	423	9	113	6399	247
NNW	6	1604	3177	126	4582	900
NW	58	5459	5453	20146	13670	4264
S	1	36	772	372	348	150
SE	9	1085	2333	9511	13884	10529
SSE	1	3	0	1910	610	500
SSW	1	197	0	3892	2118	990
W	1	0	0	0	18	0

As seen in the table above, the days with the most frequent wind direction is the NW (65.91%) followed by a minimal number of SE (10.23%) and NNW (6.82% of days). Both the number of birds and the records per wind direction are strongly associated (Chi square non parametric tests $p < 0.001$), suggesting the birds migrate according to the existing wind directions. Birds seem not to rely on site wind directions to cross, they cross at any time regardless such directions.

On a second attempt, the passing rates (birds/hr) were compared according to the wind speed. For the purpose of wind energy, real wind data were obtained at 100 and 250 above ground from the Global Wind Atlas (<https://globalwindatlas.info>). Wind speed increases with height, making analyses more confident than using the data collected by the observers at ground level. At height, wind is not blocked i.e. hills, dunes or whatever other orographic accident in the area, making measurements useful at the turbine rotor height.

For the White Stork and the Steppe Buzzard, the stronger the wind, the lower number of birds /passing rates recorded. This is expected as passing rates and bird numbers are close related. The stronger the wind the lower migration flux. This did not happen at least for the other “abundant” species like the pelicans, Steppe Buzzard, Steppe eagle, or the Egyptian vulture and other MSBs. Or the less abundant species, further analysis would be necessary, probably comparing multiple wind farms to have enough samples for that.

E. Temporal Patterns: Monthly and Daily Passes

From the data in the tables, the Consultant was able to represent temporal patterns to understand the migration through the project site we first present the cumulative counts throughout the season, followed by the most abundant species and those with the highest risk based on the CRM model.

The most comprehensive monitoring of bird migration in the Middle East comes from the work by Shirihi et al. (2000) “*Raptor Migration in the Middle East. A summary of 30 years of field research*”. As the title says, it includes more than thirty years of established monitoring. The authors explain that counts at the Gulf of Suez of migratory birds in both autumn and spring were observed and recorded already in the 80’s and 90’s with specific references there such as Biljsma (1982, 1983), Wimpfheimer et al. (1983), Meininger & Atta (1994), or other counts in the Southern Red Sea Area (Sorensen 1982, Grieve 1996). The authors also provide details on and how migration occurs both in spring and winter along the entire Middle East, from Djibouti to Jordan and Lebanon, from Egypt to Yemen, providing also data from latitudes further north like Bosphorus. The assessment below compared the results with the Shirihi et al. (2000) study in order to understand and compare the raptor migratory patterns recorded within the Project site since it is more focused in the Middle East. For the non-raptor species, other scientific sources have been considered.

It must be kept in mind that despite wind energy is a new field; the migratory counts existed many decades before the first turbines started spinning. The VP counts do not differ from those counts being done exclusively to study the migration.

(i) The White Stork

This species has been recorded from early March to May, with peaks in the second half of March in 2025. For the study and comparison of the passage of the White Stork the work by Van den Bossche (2002) was relied on, who uses data from the 90's for his analyses. This study refers to smaller flocks in April and May. The site results show a different pattern as large flocks were recorded consistently: March, April, and May with flocks larger than 1,000 birds but a small number of contacts (records). However, the pattern of migration has greatly changed over the entire Palearctic, with a proportion of the population becoming sedentary due to feeding from dumpsites along the way. The hourly interval is the same as the overall pattern observed before with two migration peaks – one in the mid-morning and another in the early afternoon.

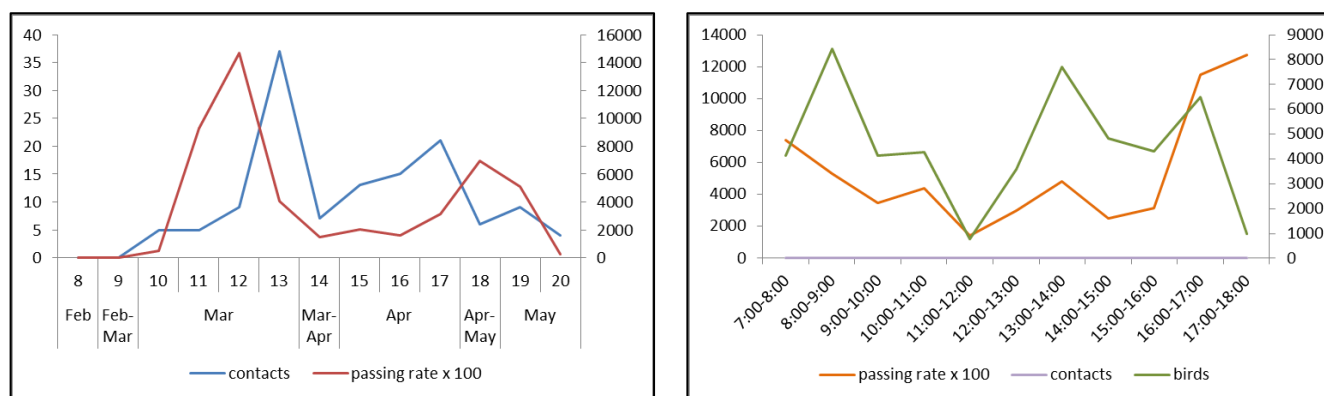


Figure 63: White Stork: passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval.

(ii) The Steppe Buzzard

The next figure below presents the migration pattern for the Steppe Buzzard which extends from mid-March to May. The large pass start in mid-March to April-May, reaching the highest counts in late March. Shirihi et al. (2000) mentions that 90% of the total numbers passes between 22 March and 15 April. Results almost perfectly match this pattern, but in 2025 the passing time frame extends beyond mid-April. All the times the passing rates matches with the records, showing the consistency on group migration.

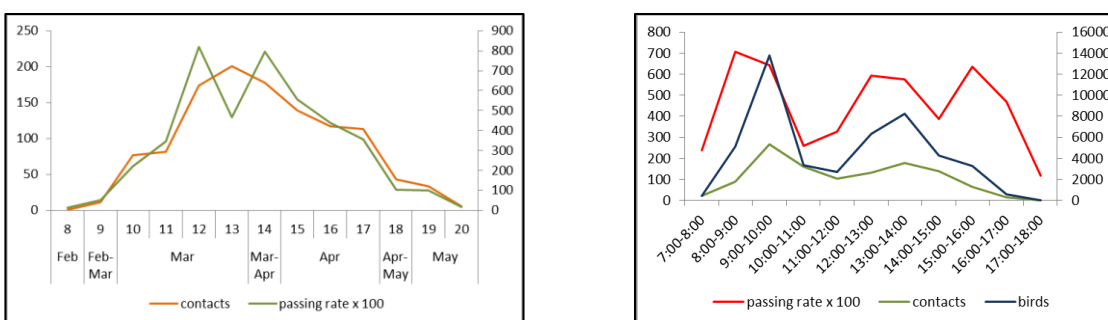


Figure 64: Steppe buzzard, passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval

(iii) **The European Honey Buzzard**

The figure below presents the migration pattern for the European Honey Buzzard. As expected, according to the well-known migratory patterns in the region, the European Honey Buzzard peaks in May, despite an incipient migration in the last week of April, this is formed by scattered contacts. Shirihi et al. (2000) refers to the European Honey Buzzard with a migration period which extends from mid-March to mid-June and recorded the peak between late April and late May – which corresponds well with the data noted for the project site. Information about the migration in June is not available, as all the migratory counts ends by May 20th.

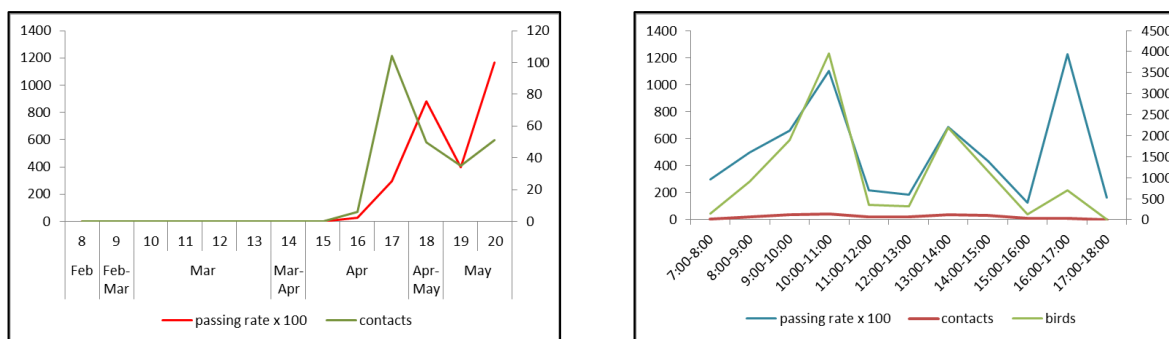


Figure 65: Honey buzzard, passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval.

(iv) **The Black Kite**

The figure below presents the migration pattern for the Black Kite. This species appeared from March to May (a total of 11 weeks) with the highest numbers occurring between mid-March and end of April. This pattern is similar to what is referenced by Shirihi et al. (2000). Some slight differences appear with other projects in the region –a week later in 2021- but this could be due to normal issues in the migration (delays because of unknown reasons, detours, etc.) given the scale of this process.

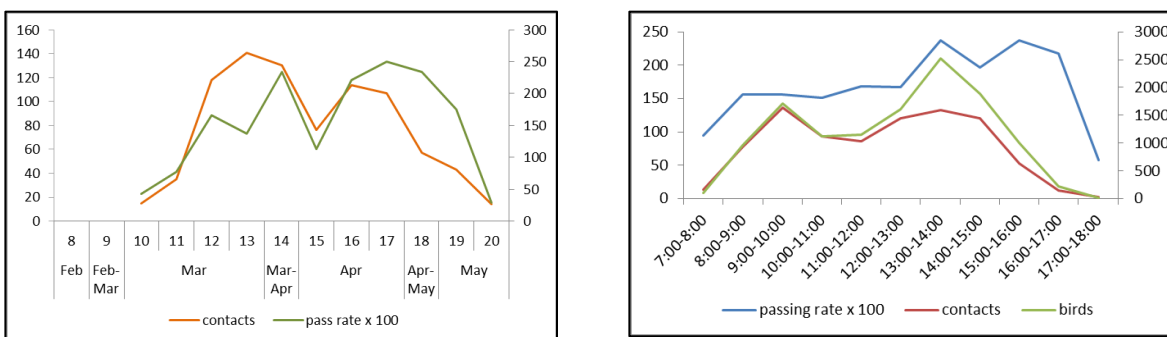


Figure 66: Black kite, passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval.

(v) The Steppe Eagle

The figure below presents the migration pattern for the Steppe Eagle. This species migrates between mid-February and May (a total of 12 weeks), showing its peak in early March in 2025, and a smaller one in early April. In general, the pattern here is similar to Shirihai et al. (2000). The daily passage is also concentrated with most of the birds passing since the morning window at 8:00 am till 15:00 pm. The birds start the migration early in the day, with a higher passing rate which then descends and remains similar for the rest of the day. However, most of the contacts reach it by the mid-day. It is one the Priority species for this and other projects in the GoS, classified as Endangered by the UICN.

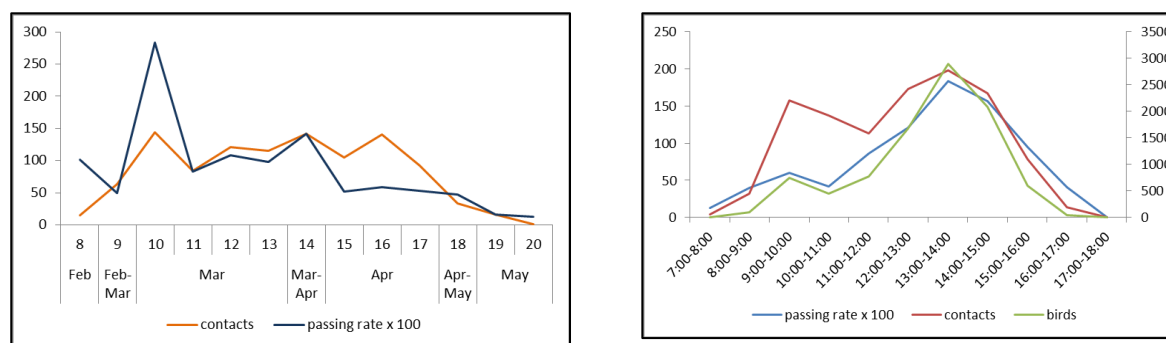


Figure 45: Steppe eagle: passing rates and contacts during the spring 2025 according to months and weeks and daily hour interval.

The hourly passage rate for the Steppe Eagle is similar to that for the Steppe Buzzard, with a nearly similar passing rate throughout the day. Also, the patterns of the number of records keep the same trend of the previous raptor species; the records reach the peak by 9:00-10:00am, then decreasing till the end of the day.

In autumn the patterns change, The Honey Buzzard has a quite concentrated pattern in autumn in terms of weeks, passing early in the season. Both contacts and passing rates are highly synchronized, many birds cross in large groups involving similar numbers of birds. On the contrary, in autumn the Steppe eagle is really scarce, with only nineteen birds (19) for twenty two records in the entire season. The most abundant is the White stork once again, whilst black kites are neither abundant nor scarce.

As shown in the below, the Eurasian Honey buzzard, and White storks cross the area early in the season in August and September. The White pelican did just the contrary, with a peak in early October, and the Black kite has a more widespread distribution, but the passing rate is much lower. These figures are reinforced by that one representing the number of records (observations) as well. The species with more recordings is the Honey buzzard (Y-axis at the bottom graph), which are three-fold those registered for the other three species.

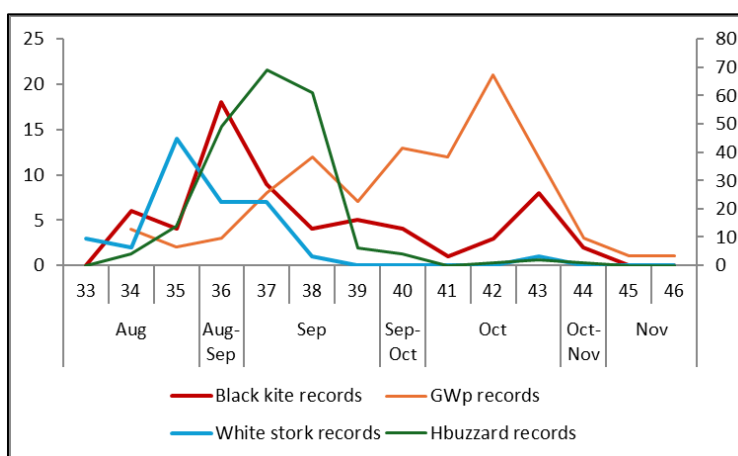
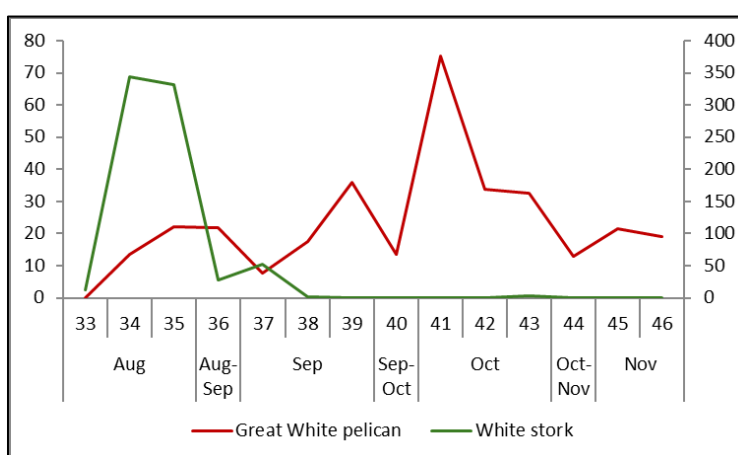
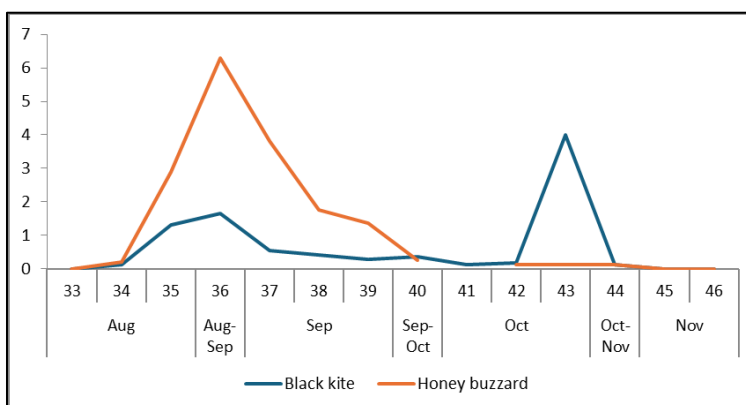


Figure 67 Passing rates of the Black kite and Eurasian Honey Buzzard (top), Great White pelican and with stork (middle), and distribution of records for all the species (bottom) across the project area per months and weeks.

7.6.3 Breeding Birds

The close proximity to the mountain range favors the appearance of cliff nesting birds of importance. Unless specific targeted studies were being done, concern exists for two raptor species, one resident the entire year, the Golden eagle (*Aquila chrysaetos*) and the Sooty Falcon (*Falcon concolor*).

A. The golden eagle

It is important to highlight the recordings from VP2 and 3, involving one (1) and two (2) birds respectively. In addition, the golden eagle has been cited in Egypt in the GoS in such exact area in August 2024. During the autumn monitoring, there were observations in August and October.

The species is categorized as least concern (LC) according to the IUCN (WESTRIP, J.R.S. et al. 2022. *Aquila chrysaetos*. The IUCN red list of threatened species 2022: e.t22696060a210501592. <https://dx.doi.org/10.2305/iucn.uk.2022-1.rlts.t22696060a210501592.en>). This finding opens the chance that more pairs could exist in the mountains of the red sea in Egypt, which have been probably not properly monitored because of the harsh climate by ornithologists or scientists.



Figure 68 Areas where Golden eagles have been recorded in Egypt during appropriate breeding season. Data from Sullivan et al. (2017)

From an ecological perspective, this observation would extend the breeding range to the south, and to the east in northern Africa, where it would be really very scarce. In the Golden eagle, population growth rates are particularly sensitive to adult mortality rates and only a 4% reduction in adult survival is enough to trigger population decline, which cannot be offset by increased productivity (Tack, J.D., Noon, B.R., Bowen, Z.H., Strybos, L. & Fedy, B.C. (2017). No substitute for survival: Perturbation analyses using a Golden eagle population model reveal limits to managing for take. *J. Raptor Res.* 51, 258–272.

Thus, appropriate mitigation measures should apply, despite the LC category but because of the biodiversity value of being the current southernmost region in the Mediterranean where the species do

breed. Despite globally, the loss of one individual is minimal for the entire world population; it is not at regional level due to its small population.

A detailed breeding survey on this species would be necessary to assess the real population size in this area, unique for the world in the edge of its distribution range. The finding on this wind farm pre-operation monitoring is highly relevant due to the protected species list in Egypt (BirdLife International (2025) available at <https://datazone.birdlife.org/country/factsheet/egypt>

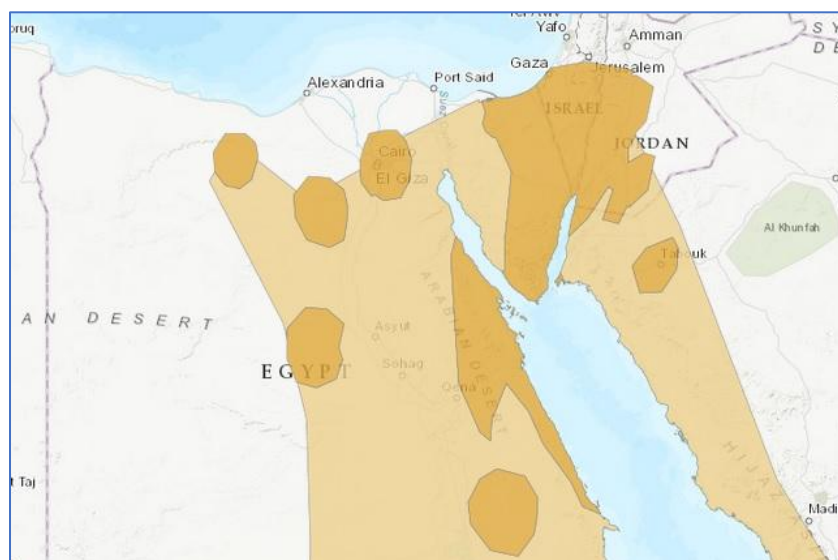
A complete survey before the operational phase comprising the entire breeding cycle of the species would be necessary to properly assess the potential impact of this and other similar projects planned near the mountains and suitable cliffs. This monitoring should be developed with experts on the species, and GPS tagging highly recommended to save time and improve budgets. This monitoring could be shared by other developers in a similar situation.

■ References:

- Sullivan et al. (2017) Using open access observational data for conservation action: A case study for birds. Biological Conservation. <http://dx.doi.org/10.1016/j.biocon.2016.04.031>
- The Cornell Lab of Ornithology. Birds of the World. <https://birdsoftheworld.org/bow/species/goleag/cur/introduction?lang=es>

B. The Sooty Falcon³²

Following Garrido et al. (2021), the sooty falcon breeds colonially in hot, arid deserts and coastal habitats without vegetation, and on coral islands, where its breeding coincides with the autumn migration of the small birds on which it feeds (Clark and Davies, 2018). It nests in a hole or on a cliff ledge. It is classified as Vulnerable (VU) in the IUCN Red List 2021. It is a migratory species; birds arrive in their breeding grounds in April and return to their wintering sites in October (del Hoyo et al., 1994).



³² BirdLife International. 2021. *Falco concolor*. The IUCN Red List of Threatened Species 2021: e.T22696446A180387681. <https://dx.doi.org/10.2305/IUCN.UK.2021-3.RLTS.T22696446A180387681.en>. Accessed on 22 December 2025.

Figure 69: Distribution map of the Sooty falcon in Egypt. Dark color: breeding, light color: passage.

Despite there were no individuals have been recorded in the spring migration, up to seven individuals were recorded between August and October. This is a species, for which observers are not able of proper monitoring from the Vantage Points due to its small size (e.g., observers lost their capabilities for detecting and recording the birds at very short distances, much shorter than the 1.8- 2 km radius. In other words the species is UNDERESTIMATED.

The Sooty falcon has been recorded already colliding with wind farms in the Gulf of Suez, close to the proposed project. A recent paper on the Lesser Kestrel *Falco naumanni* quantified the potential long- term demographic impact of collisions to anthropogenic structures like windfarms in a relatively short-lived bird species. Additional mortalities induced by collisions with turbines may also have a strong impact on their population dynamics.

Due to the habitat characteristics, close to the cliffs and mountain ridge, we consider the potential breeding population has not been properly assessed in this and other surrounding projects with similar characteristics. The current monitoring is limited to the migratory seasons, without non species specific breeding monitoring. This should be done.

Following Garrido et al. 2022: The species is included in the CMS Appendix II. There is a draft International Single Species Action Plan (Gallo-Orsi et al., 2014, unpublished). The main conservation and research actions needed: Awareness of the species should be raised. Research should be conducted to inventory, survey and monitor the population to determine, protect and manage potential breeding sites and key dispersal areas, including migration corridors. Research on the ecology of breeding, non-breeding and migrating birds is needed, involving GPS tagging and on-the-ground investigations, to assess potential threats to the species.

A species-specific study with experts (apart of the normal migration monitoring) on the potential breeding of the species in the project area, and others in the vicinity, see Figure 69, should be completed During the Construction and prior to testing.

■ Additional References:

- Garrido, J.R., Numa, C., Barrios, V., Qninba, A., Riad, A., Haitham, O., Hasnaoui, H., Buirzayqah, S., Onrubia, A., Fellous-Djardini, A., Saheb, M., Rousselon, K., Cherkaoui, S.I., Essetti, I., Noaman, M., Radi, M., Cuzin, F., Irizi, A., Monchaux, G., Hamdi, N., Monti, F., Bergier, P., Ouni, R., Etayeb, K., Chokri, M.A., Azafzaf, H., Gyenge, P., Si Bachir A. and Bakass, B. 2021. The Conservation Status and Distribution of the Breeding Birds of Prey of North Africa. IUCN, Gland, Switzerland.
- Duriez, O. P. Pilard, N. Saulnier, P. Boudarel, and A. Besnard. 2023. Windfarm collisions in medium-sized raptors: even increasing populations can suffer strong demographic impacts. Animal Conservation 26 (2023) 264–275

7.6.4 Conclusions

- Related with the migration period of each of the species, the White Stork, Steppe Buzzard, European Honey Buzzard, Black Kite, and the Steppe Eagle follow the known pattern through the Middle East, as described by Shirihi et al. (2000), despite some delays recorded. An exhaustive recording of the ages of the birds passing was not conducted which may assist to better understand which fractions of the populations are migrating.
- The results are consistent with other projects in the region. A very detailed information of the

monitoring and migration is available in the Bird Monitoring reports (Camiña et al. 2025a and 2025b), where all species are described in detail.

- There are TWO SPECIES, the Golden eagle and Sooty Falcon, which could be breeding in the area of influence of the project. Further assessment should be done before operation across their respective breeding seasons. These studies should involve experts on these species and GPS tagging. These species suggest evidences of being resident and breeding, and conservation efforts must be made in the edge of its world distribution. Thus, mitigation measures must apply to preserve the species in Egypt and confirm their statuses and potential impact of wind farms in the GoS.
- The survey did not identify any key, important or significant habitats for roosting or breed sites for the MSBs within the Project area, except for the two above mentioned species. This is mainly attributed to the desert and barren nature of the area and lack of trees.
- The survey did not identify any specific or preferred routes for birds within the Project site. The entire project area also shows consistency in this respect due to the landscape.
- The survey did not identify any site-specific constraints or area of concern that should be avoided.
- As expected, numbers of birds passing through change between seasons. The CRM cannot be considered to establish thresholds for collision estimations, other than considering higher or lower risk. In any case, the species of major and lower concern are the same as in other project within the Red Sea region wherever the project is, e.g., north or south to Ras Gharib.

7.7 Bats

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

7.7.1 Methodology for Assessment

The baseline assessment of the Project site was based on a literature review and site surveys both of which are discussed in further details below.

Literature Review

This was based on previous studies, data, surveys, and records available in published scientific papers, books, and journals on bats of Egypt and the Gulf of Suez. The conservation status of the bat species listed from the literature review is based on IUCN's Red List of Threatened Species (IUCN, 2021).

Site Surveys

The site survey was performed using of a bat detector; there were deployed two Song Meter SM4 Acoustic Recorder from Wildlife Acoustics Inc. The survey was based on automatic recordings from May through November continuously, according to the schedule in the Table. In general, from December to March in the northern hemisphere bat activity is reduced because of the hibernation. Nevertheless, Minimum temperatures below 15°C in Ras Gharib are uncommon. As happens in other countries or even Southern Spain, this mild weather makes the bats to be active almost all of the time.

The bat detectors were programmed to record from 30 minutes before sunset till 30 minutes after sunrise, including the change between summer and winter time in the last Friday of April and the last Thursday of October.

Table 42: Coordinates of location of the bat detectors

Location	Lat	Long	Met Mast	Rationale
1	27.998883	33.00387	No	Coverage within the study area
2	28.009201	33.09974	Yes	Coverage within the study area

Table 43: Dates of recording in 2025

From	to	#Bat detector	Detector code	# nights	Files
03 rd May	15 th May	11	S4U25442	13	838
03 rd May	15 th May	12	S4U25450	13	750
15 th May	26 th May	11	S4U25442	12	202
26 th May	04 th June	11	S4U25442	10	271
04 th June	13 th June	12	S4U25450	10	1951
13 th June	22 nd June	12	S4U25450	10	100
22 th June	01 st July	11	S4U25442	10	1576
01 st July	11 th July	11	S4U25442	11	983
11 th July	20 th July	12	S4U25450	10	291
20 th July	30 th July	12	S4U25450	11	1008
30 th July	08 th Aug	11	S4U25442	10	296
08 th Aug	18 th Aug	11	S4U25442	11	634
18 th Aug	28 th Aug	12	S4U25450	11	344
28 th Aug	07 th Sept	12	S4U25450	11	1201
07 th Sept	23 rd Sept	11	S4U25442	17	1201
23 rd Sept	06 th Oct	11	S4U25442	14	445
06 th Oct	20 th Oct	12	S4U25450	15	600
20 th Oct	01 st Nov	12	S4U25450	13	516
Total				212	13,207

Two locations and two detectors were used for the bat monitoring from May through November. Weather data were taken from two met-masts installed in the project area. The Bat detector was the Song Meter SM4BAT from Wildlife Acoustics.

Met mast data were processed as follows:

- Meteo data recording at wind farms takes place on a 10 minutes basis at different heights.
- Sunrise and sunset times were filtered from www.dayandnight.com
- Files with recordings were filtered selecting only those for which the wind speed was equal or lower to 8 m/s. Those above such threshold were discarded, as the bat activity even above 6 m/s is quite scarce.
- Extracted files were then analyzed with “Anabat Insight” using Auto ID. Anabat Insights may apply filters during file conversion (e.g., .wav to .zc) or analysis to separate structured bat calls

from unstructured noise. Filters can be used in a number of ways to streamline the analysis.

7.7.2 Results

Literature Review

Little is known about the distribution of the bats of Egypt. Qumsiyeh (1985), Osborn (1988), and Hoath (2003) reported around 20 species. As for the study area, Osborn (1988) reported only two species from the Red Sea Mountains of Egypt; namely *Nyctinomus aegyptiacus* and *Plecotus christiei*. Both species are resident within the area, and no large-scale migration was reported in Egypt. Qumsiyeh (1985) reported four bats from the Red Sea Mountains including *Taphozous nudiventris* from Quseir, *Pipistrellus kuhlii*, *Taphozous perforatus* and *Asellia tridens*. Most recently, Benda & Ševčík (2020) updated the distribution of the Egyptian bats with additional locality records with a total of 20 species.

Table 44: List of Bat Species Recorded in Project Site and Vicinity Based on Literature Review

Family	Species
Pteropodidae	<i>Rousettus aegyptiacus</i> (E. Geoffroy St.-Hilaire, 1810)
Rhinopomatidae	<i>Rhinopoma microphyllum</i> (Brunnich, 1782).
	<i>Rhinopoma cystops</i> Thomas, 1903
Emballonuridae	<i>Taphozous perforatus</i> Geoffroy, 1818
	<i>Taphozous nudiventris</i> Cretzschmar, 1830
Nycteridae	<i>Nycteris thebaica</i> (Geoffroy, 1813)
Rhinolophidae	<i>Rhinolophus clivosus</i> Cretzschmar, 1828
	<i>Rhinolophus hipposideros</i> (Borkhausen, 1797)
	<i>Rhinolophus mehelyi</i> Matschie, 1901
Hipposideridae	<i>Asellia tridens</i> (Geoffroy, 1813)
Vespertilionidae	<i>Pipistrellus kuhlii</i> (Kuhl, 1817)
	<i>Vansonia rueppellii</i> (Fischer, 1829)
	<i>Hypsugo ariel</i> (Thomas, 1904)
	<i>Cnephaeus bottae</i> (Peters, 1869)
	<i>Otonycteris hemprichii</i> Peters, 1859
	<i>Nycticeius schlieffenii</i> Peters, 1859
	<i>Barbastella leucomelas</i> (Cretzschmar, 1826)
	<i>Plecotus christii</i> Gray, 1838
	<i>Tadarida teniotis</i> (Rafinesque, 1814)
Molossidae	<i>Nyctinomus aegyptiacus</i> Geoffroy, 1818

All species are not threatened and listed under Least Concern category according to the IUCN Redlists. However, three species; *Pipistrellus rueppellii*, *Taphozous nudiventris* and *Cnephaeus bottae* are listed as VU in the Egyptian Mammal Red List (Basuony et al., 2010).

- Basuony, M.I., Gilbert, F. & Zalat, S. 2010. Mammals of Egypt: Atlas, Red Data Listing & Conservation. Ministry of State for Environmental Affairs. 274 pp+VIII.
- Benda, P. & Ševčík, M. 2020. Bats (Mammalia: Chiroptera) of the Eastern Mediterranean and Middle East. Part 16. Review of the distribution and taxonomy of bats in Egypt. Acta Soc. Zool. Bohem. 84: 115–279.
- Dietz, C. 2005. Illustrated identification key to the bats of Egypt. Electronic Publication, Version 1.0, released 21.12.2005 Tuebingen (Germany).

- Hoath, R. 2003. A Field Guide to the Mammals of Egypt. The American University in Cairo Press. 320 pp.
- Osborn, D.J. 1988. New bat records from the Red Sea Mountains of Egypt. Mammalia 52 (4): 596-598.
- Qumsiyeh, M.B. 1985. The Bats of Egypt. Special Publication of the Museum, Texas Tech University No. 23. Texas Tech Press, Lubbock, Texas. 102 pp.

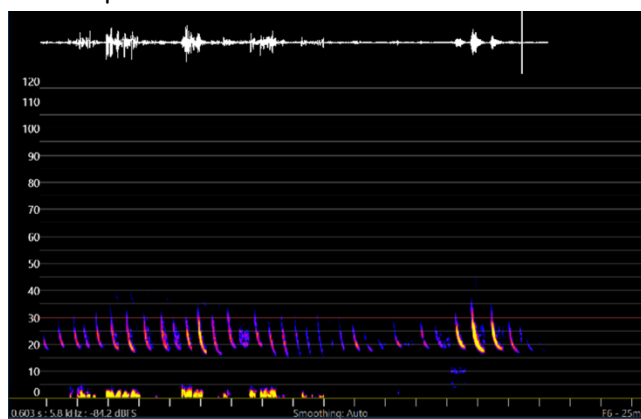
Outcomes of the surveys

Out of the 13,207 files recorded, days per month retrieving wind speeds lower than 8 m/s at some 10 min interval were the following: 25 in May, 26 in June, 29 in July, 25 in August, 28 in September, and another 26 in October. The total number of files available was lower than expected because of several failures in one of the detectors. Totaling 11,676 files were available for analysis.

Bat calls were only recorded at one of the two detectors, being scarce despite using the Auto ID.

File name	Passes	<i>Eptesicus bottae</i>	Total
S4U25450_20250715_002947.wav	36	36	36

The Figure shows the calls of the specie.



Eptesicus bottae

Figure 70: Sonograms of the species detected in the bat recording surveys at the Project

7.8 Archaeology and Cultural Heritage

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

7.8.1 Methodology for Assessment

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

A. 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.

B. Stakeholder Consultation and Engagement

Stakeholder consultation and engagement activities were undertaken with the Ministry of Tourism and Antiquities which is the key entity involved in archaeology and cultural management. Refer to “Section 4.3.1” earlier for addition details.

In addition, as part of the consultations and FGD undertaken with the local communities, and more specifically Bedouin tribes, specific discussions were undertaken in relation to cultural heritage sites within the Project area. Refer to “Section 0”.

C. Site Survey

A field survey was undertaken by an archaeology and cultural heritage expert in June 2025 to verify the presence/absence of any surface archaeological or cultural heritage remains within the Project site. The survey covered the entire Project 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.

7.8.2 Results and Outcomes

A. Literature Review

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 45: 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.	100km to the north
Saint Anthony Monastery (Deir el Qidis Antun)	Saint Anthony's disciples founded the monastery between 361 and 36 (Starkey.2012:205)	120km to the northwest
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).	102km to the northwest
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.	50km to the southeast

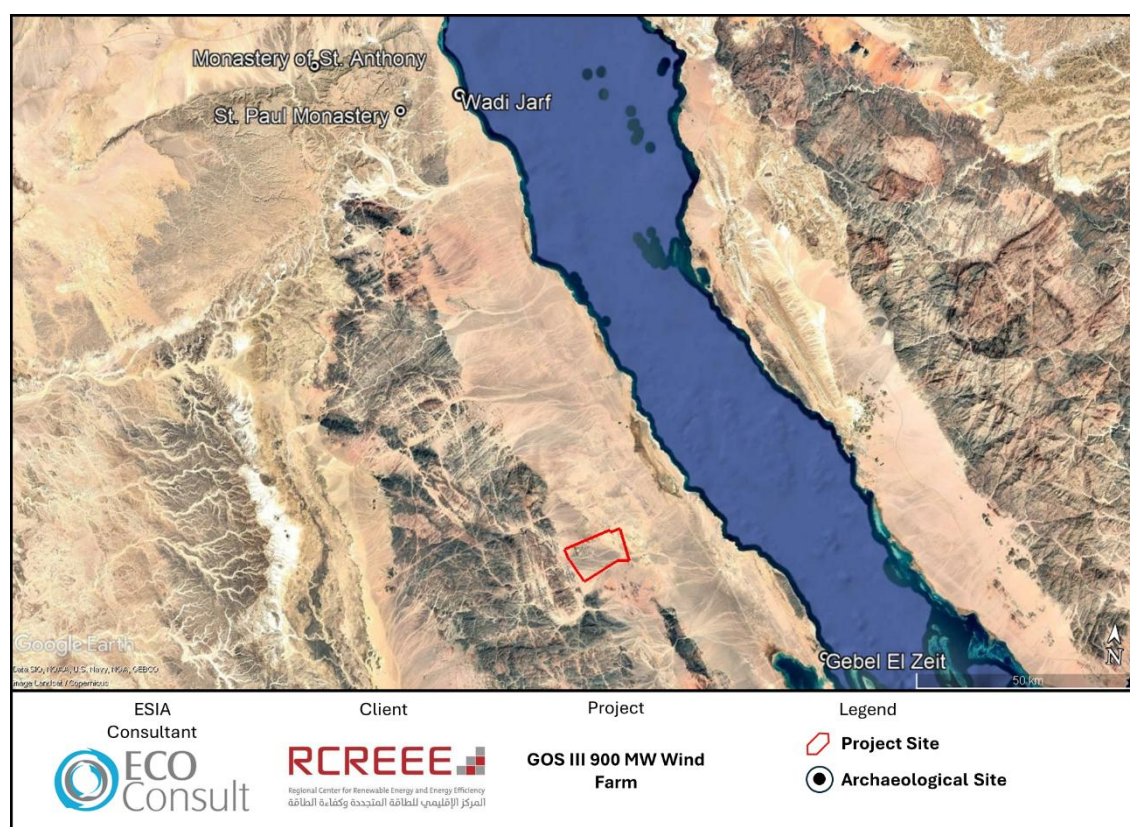


Figure 71: Project Site and Archaeological Sites

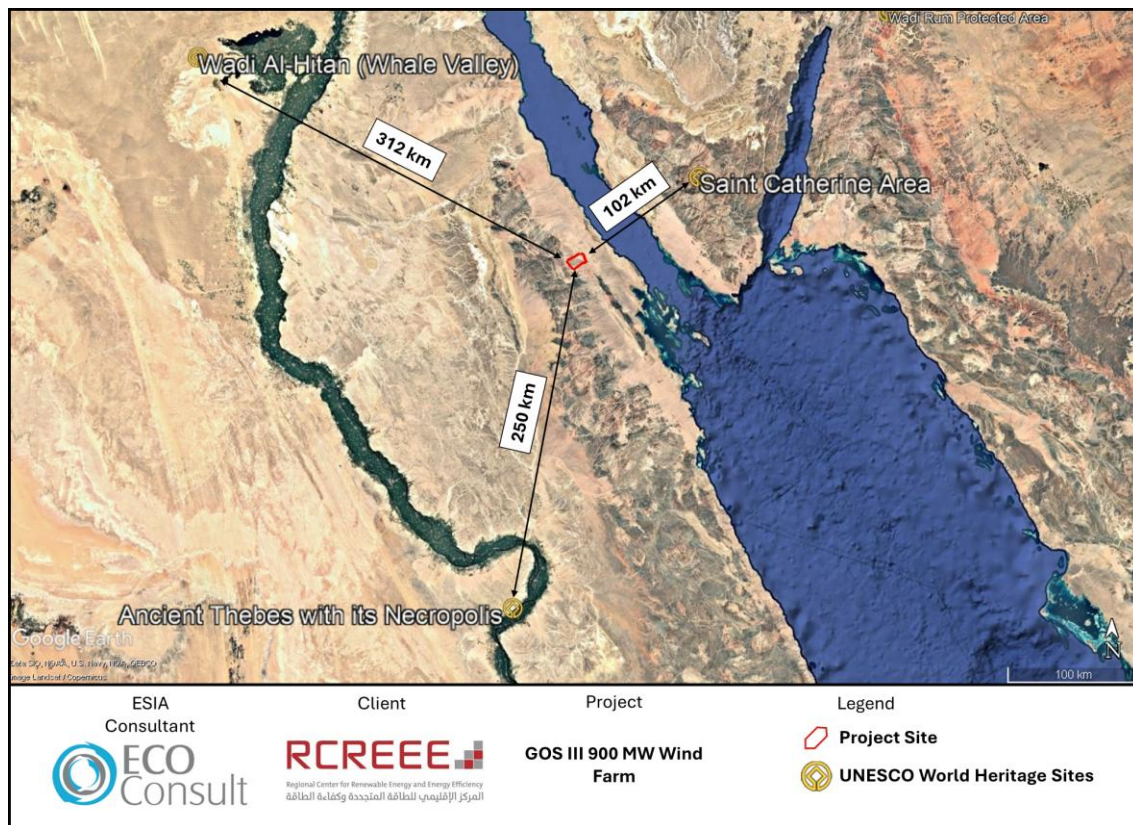


Figure 72: Project Site and UNESCO WHS

B. Stakeholder Consultation and Engagement

Additionally, the discussions with local communities indicated that there are no cultural, spiritual or historical sites of significance to Bedouin tradition such as graveyards or shrines located within or near the Project site.

C. Site Survey

Based on the site survey for the Project site footprint, it was confirmed the absence of any archaeological evidence, indicating that the Project site shows no signs of any historical/cultural significance. The following was concluded from the survey:

- No surface archaeological remains or indications of subsurface archaeological deposits were observed.
- No artifacts (such as pottery shards, lithic tools, organic remains, structures, or architectural features) were found.
- The natural surface consists of gravelly/sandy/rocky soil (as appropriate), with no clear evidence of ancient human activity.
- The area is not listed as an official archaeological site according to the records of the Ministry of Tourism and Antiquities.

7.9 Air Quality and Noise

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

7.9.1 Methodology for Assessment

A. Selection of Parameters

Monitoring was undertaken for the following parameters: (i) gases to include Carbon monoxide (CO), Sulphur Dioxide (SO₂) and Nitrogen Oxides (NO_x), (ii) Suspended Particulate Matter to include Particulate Matter smaller than 10.0 (PM₁₀) and 2.5 microns (PM_{2.5}) in diameter, TSP (total suspended particle) 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 characteristics and attributes. Suspended particulate matter is expected given the desert nature of the site. On the other hand, pollutants (such SO₂, NO₂,) are expected onsite but rather at minimal concentrations as the site is 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, in terms of noise, the Project area is already subject to background noise from the windy nature of the site, casual vehicular movement from the nearby Highway.
- Such parameters are likely to be affected mainly during the Project's construction 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.

Based on a site visit undertaken by the 'E&S Team' and a review of satellite imagery, no significant point sources of anthropogenic air pollutant emissions were observed within the immediate vicinity of the Project site. Previous air quality and noise monitoring programs undertaken in the area³³ further confirms the above as they have indicated that outcomes of the monitoring results were all significantly less than the maximum permissible limits to include both Egyptian limits as well as international limits. The Project site is also expected to have similar air quality and noise characteristics.

B. Selection of Location

To assess the air quality baseline conditions within the Project area, three (3) monitoring points were selected as shown in the figure below. Monitoring was undertaken for 12 hours at each point respectively. The coordinates for the monitoring points and location are presented in the table and figure that follows.

Table 46: Location for Noise and Air Quality Monitoring Points

Station Name	Coordinates	
	Latitude	Longitude
Monitoring Point 1	28° 1'36.80"N	33° 2' 0.30"E
Monitoring Point 2	27° 58'17.90"N	33°2'17.90"E
Monitoring Point 3	27° 59' 48.40"N	33° 6' 28.30"E

³³ [SUEZ Wind Energy BOO Wind Power Plant 1.1. GW – SWE South \(PLOT 2\)](#)

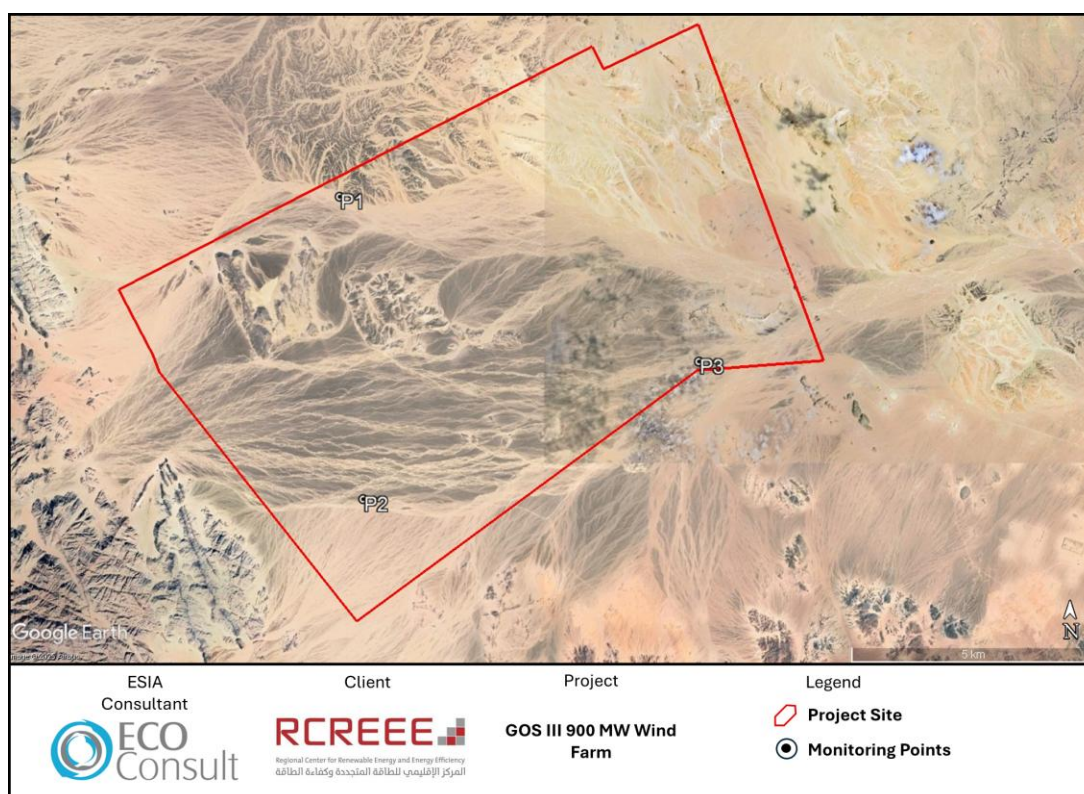


Figure 73: Satellite Map for Measurements Point Location

C. 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 ‘urban’ areas were used for comparison given the nature of the site that does not include any industrial activities and therefore cannot be classified as such.

Table 47: Applicable National Permissible Limits for Air Quality

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. Out of the areas below, it is believed that the following classification best describes the Project site “Residential suburb with low traffic activity and limited activities service”. In such area limits are set at 55 dB(A) and 45 dB(A) for both day and night respectively.

Table 48: Applicable National Permissible Limits for Noise

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

Results were also compared with the IFC General EHS Guidelines for air quality and noise as presented in the table below.

Table 49: IFC EHS General EHS Guideline Noise and Air Quality Limits

Parameter	Limit
Sulfur Dioxide ($\mu\text{g}/\text{m}^3$)	125 (Interim target-1) 24-hour
Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)	200 1-hour
Particulate Matter PM10 ($\mu\text{g}/\text{m}^3$)	150 (Interim target-1)24-hour
Noise one-hour LAeq (dB(A))	Daytime 07:00 - 22:00 = 55; Nighttime 22:00 – 07:00 = 45

7.9.2 Results

Air Quality

The table below presents the analysis results of ambient (24-hour) air quality levels for this point, compared with the limits specified in national and international standards.

Table 50: Air Quality Analysis Result

Air Quality Monitoring Results							
Date	Time	NO ₂	SO ₂	CO	PM2.5	PM-10	TSP
10/11/2025 Monitoring Point 1	8:00AM	16.02	17.71	2	35.7	52.4	68.9
	9:00	12.94	14.85	1.87			
	10:00	10.27	13.99	1.75			
	11:00	10.27	10.85	1.62			
	12:00PM	13.96	12.28	1.75			
	1:00	10.27	11.99	1.87			

Air Quality Monitoring Results							
Date	Time	NO ₂	SO ₂	CO	PM2.5	PM-10	TSP
	2:00	12.32	13.71	1.62			
	3:00	13.35	14.57	1.87			
	4:00	12.73	11.14	2			
	5:00	11.50	7.14	1.62			
	6:00	10.68	11.71	1.75			
	7:00	11.70	13.42	1.87			
	8:00	14.99	15.42	2			
	9:00	15.85	14.85	1.87			
	10:00	11.50	9.99	1.62			
	11:00	9.85	10.57	1.75			
	12:00AM	9.24	14.57	1.87			
	1:00	8.42	8.28	1.62			
	2:00	8.21	14.85	1.87			
	3:00	17.04	17.42	2			
	4:00	13.14	13.71	1.87			
	5:00	14.99	15.71	1.87			
	6:00	17.25	16.85	2			
	7:00	18.89	20.57	2.12			
	Average	12.72	13.59	1.83			
11/11/2025 Monitoring Point 2	8:00AM	15.00	16.28	1.87	38.1	54.3	71.2
	9:00	20.54	17.14	2			
	10:00	17.86	14.57	1.87			
	11:00	14.58	16.57	2			
	12:00PM	24.64	16.00	1.87			
	1:00	18.69	11.14	1.75			
	2:00	9.03	6.85	1.5			
	3:00	13.35	10.00	1.62			
	4:00	10.47	11.71	1.75			
	5:00	19.51	14.57	1.87			
	6:00	27.31	20.57	2.12			
	7:00	20.95	15.14	1.87			
	8:00	20.12	18.28	2			
	9:00	22.18	20.28	2.25			
	10:00	13.76	11.71	2.12			
	11:00	11.70	10.57	1.87			
	12:00AM	8.62	6.00	1.5			
	1:00	14.3	13.14	1.75			
	2:00	11.09	9.14	1.62			
	3:00	17.45	14.57	1.87			
	4:00	20.54	11.42	1.75			
	5:00	8.42	14.28	1.87			
	6:00	12.73	16.00	1.87			
	7:00	15.40	18.28	2			

Air Quality Monitoring Results							
Date	Time	NO ₂	SO ₂	CO	PM2.5	PM-10	TSP
	Average	16.18	13.92	1.85			
12/11/2025 Monitoring Point 3	8:00AM	19.10	14.85	1.87	33.9	51.8	67.5
	9:00	16.63	12.85	1.75			
	10:00	8.01	16.57	2			
	11:00	8.42	7.713	1.62			
	12:00PM	14.78	10.28	1.75			
	1:00	13.55	9.71	1.62			
	2:00	8.42	6.57	1.5			
	3:00	4.72	15.71	2			
	4:00	6.77	12.00	1.75			
	5:00	10.06	9.14	1.62			
	6:00	6.36	7.14	1.5			
	7:00	10.47	9.71	1.62			
	8:00	8.01	6.85	1.5			
	9:00	14.58	7.71	1.62			
	10:00	21.77	10.85	1.75			
	11:00	17.86	10.00	1.62			
	12:00AM	19.10	9.14	1.87			
	1:00	16.63	7.14	1.5			
	2:00	10.06	5.99	1.5			
	3:00	7.59	5.14	1.37			
	4:00	6.77	4.57	1.5			
	5:00	15.40	9.42	1.62			
	6:00	12.94	10.28	1.75			
	7:00	17.86	15.42	2			
	Average	12.33	9.78	1.67			
IFC limits		125	125	-	-	150(24hr)	-
Egyptian limit		150	125	30	100	-	230

As noted in the table above, all measured parameters comply with both Egyptian legislative requirements as set within Annex 5 of the Executive Regulation (D1095/2011) for ambient air quality as well as IFC limits. The figure below provides a graphical interpretation of the results outlined in the table above.

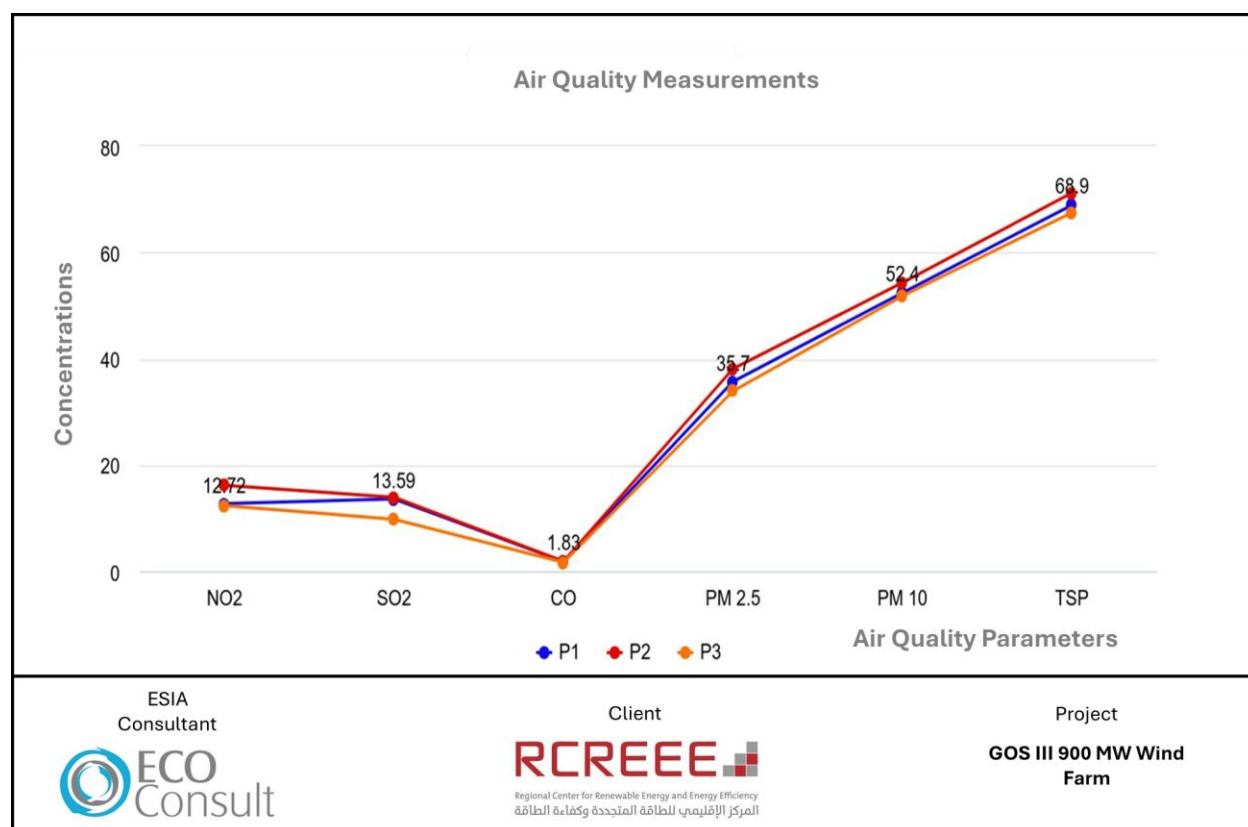


Figure 74: Average Concentrations ($\mu\text{g}/\text{m}^3$) of Key Air Pollutants Measured at Points P1, P2, and P3

Noise

The table below presents the analysis results of ambient (24-hour) noise levels for the measurement point, compared with the maximum permissible limits specified in Egyptian law standards.

Table 51: 24-Hour Ambient Noise Level Measurements and Comparison with National Standards

Noise Monitoring (24-hours) Results			
Time	Monitoring Points		
	1	2	3
	10/11/2025	11/11/2025	12/11/2025
8:00AM	48.9	50.2	52.3
9:00	51.8	52.1	53.5
10:00	53.2	53.6	50.4
11:00	50.8	55.1	52.3
12:00PM	51.9	58.4	50.1
1:00	49.5	56.3	53.4
2:00	50.2	54.9	56.2
3:00	50.3	50.8	55.7
4:00	52.3	51.5	53.1
5:00	48.9	48.6	52.6
6:00	47.1	50.4	54.5
7:00	51.2	49.3	49.8
8:00	48.6	50.1	51.6
9:00	51.2	45.3	52.3

Noise Monitoring (24-hours) Results			
Time	Monitoring Points		
	1	2	3
	10/11/2025	11/11/2025	12/11/2025
10:00	44.2	49.5	48.1
11:00	45.9	51.3	54.2
12:00AM	46.5	51.6	50.3
1:00	50.3	47.5	48.5
2:00	51.9	45.7	51.7
3:00	52.2	48.3	49.3
4:00	47.3	47.9	47.1
5:00	44.9	52.1	51.2
6:00	49.5	46.9	50.5
7:00	50.4	55.2	48.8
Average	49.54	50.94	51.56
Daytime Average	50.42	51.90	52.70
Nighttime Average	48.31	49.60	49.97
National Standards	Daytime Limit: 55dB, Nighttime Limit: 45dB		
IFC Limits	Daytime Limit: 55dB, Nighttime Limit: 45dB		

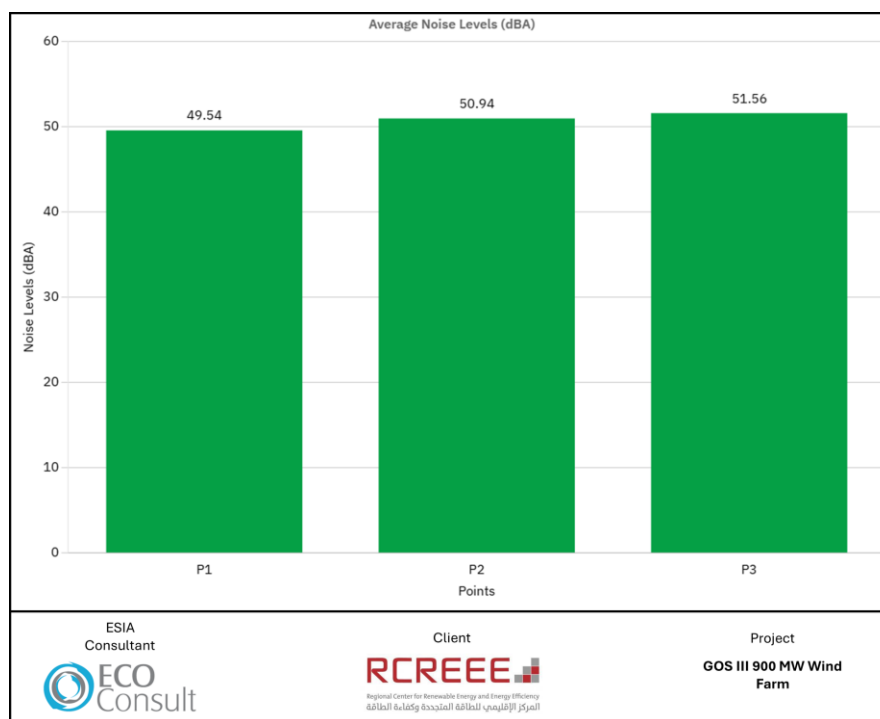


Figure 75: Average Noise Levels Recorded at Each Monitoring Point

The above indicates that the site maintains good air quality and generally low noise levels in line with both national standards and the IFC guidelines. All air quality parameters measured during both daytime and nighttime were within the permissible limits. Concentrations of key pollutants, including NO₂, SO₂, CO, PM_{2.5}, PM₁₀, and total suspended particulates, were significantly below their respective thresholds, demonstrating a low risk of air pollution related impacts.

Noise levels were within the allowable limits during the daytime. While the nighttime results exceeded allowable limits, this is attributed to natural reasons, mainly wind, since no anthropogenic noise sources were identified during the monitoring period.

7.10 Infrastructure And Utilities

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

7.10.1 Assessment of Baseline Conditions

Assessment of baseline conditions was based on a site visit by the 'E&S Team' to the Project site and surrounding area in July 2025. The site visit aimed to identify any key visible infrastructure and utility elements within the Project site or surrounding areas (e.g., electricity infrastructure lines, water infrastructure lines, etc.).

Desktop review as well as consultations were undertaken with key governmental entities to better understand and characterize infrastructure and utility element services required for the Project development as discussed further throughout this section. This includes water supply, waste management services, traffic and transport, etc. The consultation activities were previously discussed in "Section 4" and are discussed again in the sections below as applicable and relevant.

7.10.2 Existing Roads and Networks

The Cairo-Hurghada (Highway 65) runs around 15 km east of the Project site, as shown in the figure below. There is also a road network for the adjacent wind farms.

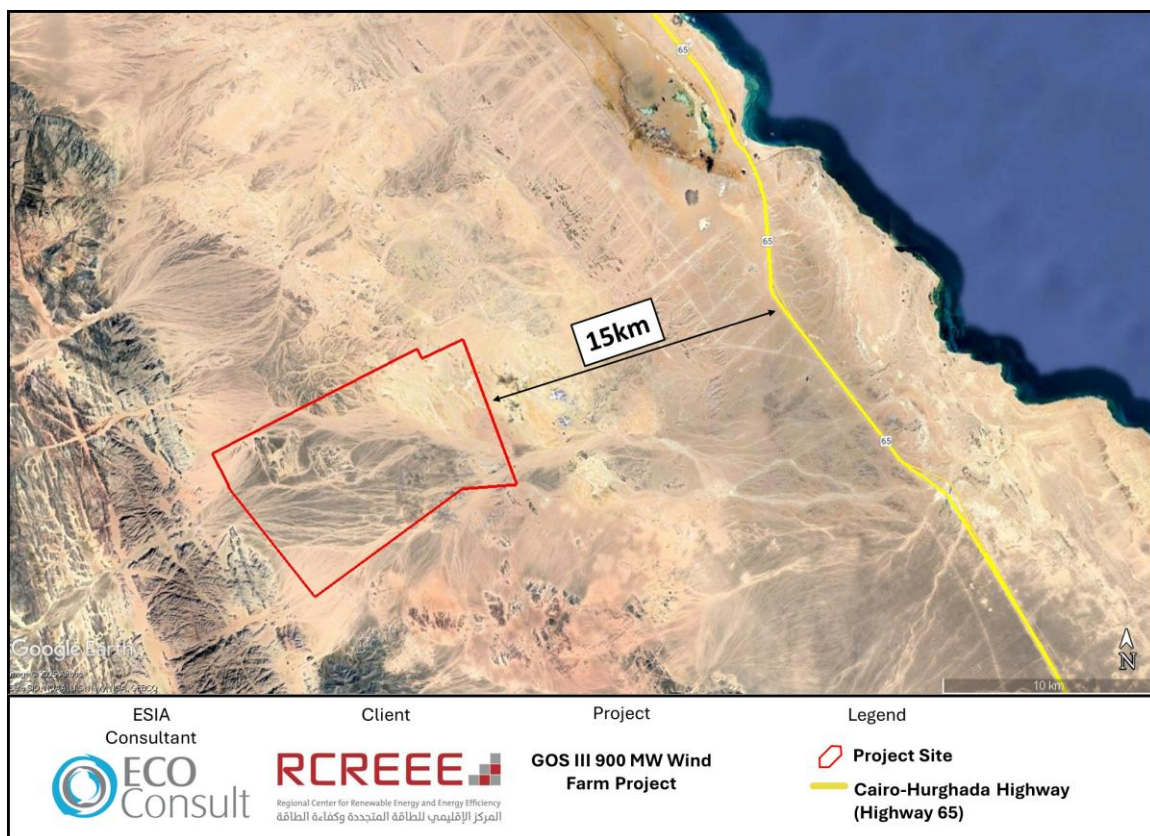


Figure 76: Highway 65 in Relation to the Project Site

7.10.3 Telecommunication, Radio and TV

As part of the site survey undertaken, no infrastructure elements in relation to telecommunications, radio or TV were noted within the Project site (e.g. broadcasting towers). A total of three (3) communication towers were noted near the Project; however, the nearest one is located more than 15km east of the Project site as shown in the figure below.

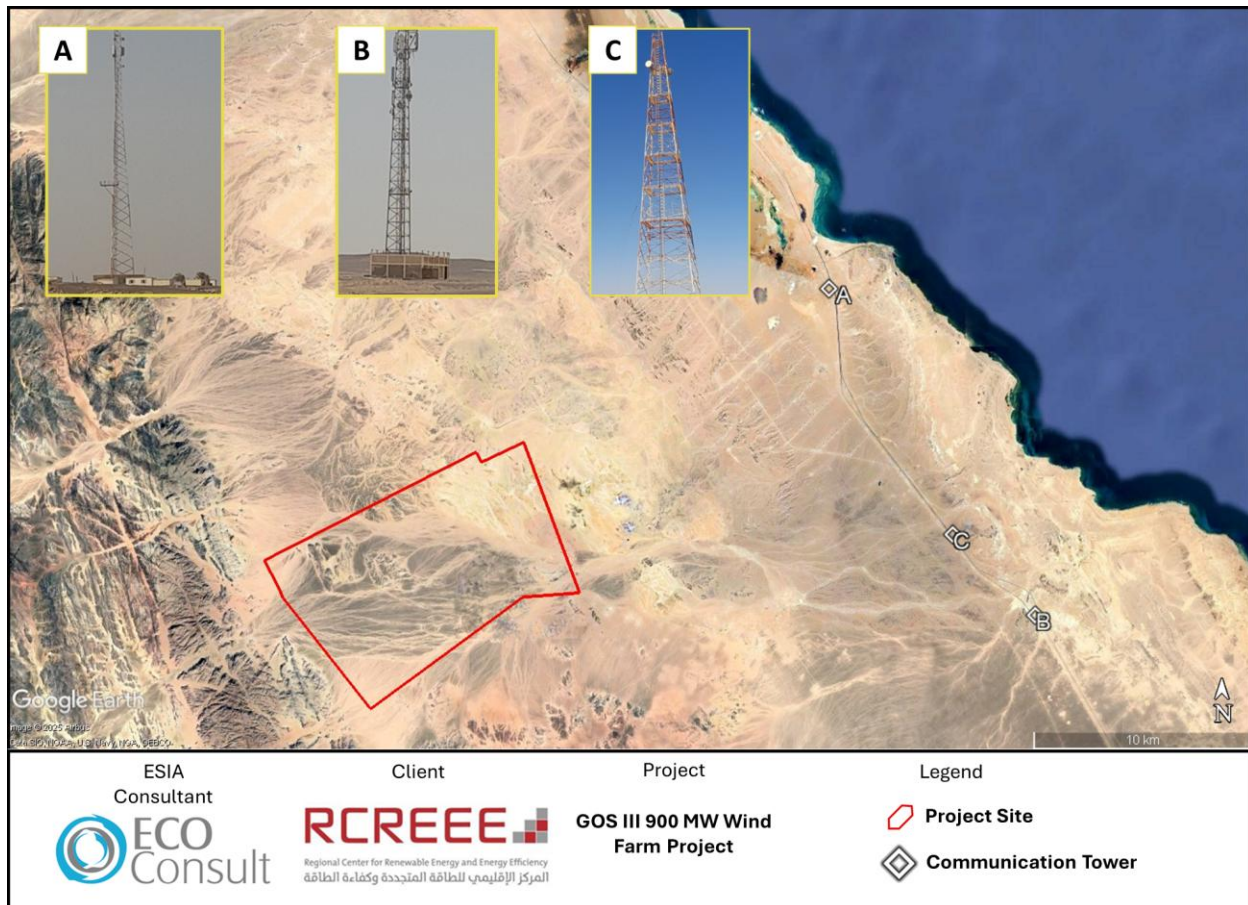


Figure 77: Nearest Communication Towers to the Project Site

7.10.4 Waste Management (Solid Waste, Wastewater and Hazardous Waste)

As discussed earlier in “Section 4” consultations were undertaken to obtain information on municipal and construction waste disposal facilities, Wastewater Treatment Plants (WWTPs), and hazardous waste landfills with the following entities:

- Solid Waste Management Branch of Red Sea Governorate which is the relevant entity that is responsible for handling solid waste in Red Sea Governorate;
- Hazardous Waste Management Unit in Red Sea Governorate, which is the relevant entity that is responsible for handling hazardous waste in Red Sea Governorate; and
- Red Sea Water and Wastewater Company (RSWWC) and the Sanitation Authority in Ras Gharib which are the relevant entities responsible for handling wastewater in Ras Gharib District.

According to consultations undertaken with the Solid Waste Management Branch, the nearest landfill in Ras Gharib is located next to Um-Al-Yeser with a current capacity of 200,000m³, and the entity confirmed that it can handle waste expected from the Project.

Wastewater Treatment Plants

According to consultations with RSWWC and the Sanitation Authority in Ras Gharib, the nearest wastewater treatment plant is the Ras Gharib Treatment Plant located around 16km northeast of the Project site, as shown in the figure below. It was also indicated that wastewater generated by the Project should be managed using septic tanks and drained regularly via septic trucks.

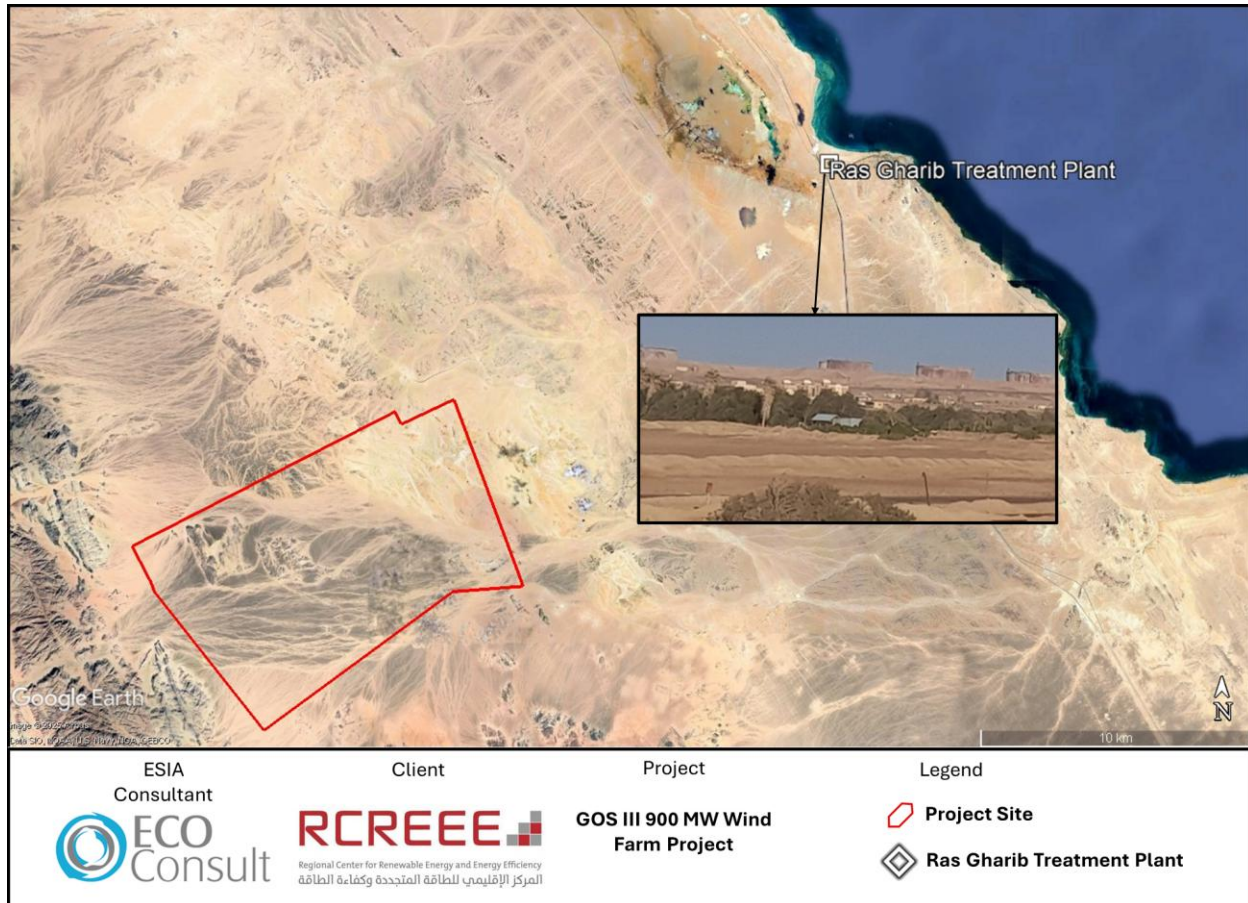


Figure 78: Project Site Relative to the Closest Wastewater Treatment Plant

Hazardous Waste Landfill

According to consultations with Hazardous Waste Management Unit in Red Sea Governorate, there are no hazardous waste treatment or disposal facilities within the Red Sea Governorate. Instead, the hazardous waste must be collected, transported and disposed of by a licensed company approved by the Waste Management Regulatory Authority (WMRA).

7.10.5 Water Resources

Consultations with RSWWC indicated that the main source of water supply in Ras Gharib is by the Kureimat pipeline along the highway, which experiences service disruptions affecting local demand. Due to this, direct connection to the main line is considered difficult and therefore it is recommended to use water tankers during the construction period.

7.10.6 Electricity Networks

Based on desktop review as well as a site visit, the Project area contains existing electrical infrastructure, including substations and several overhead transmission and distribution lines in the vicinity of the Project. As such, the area is already subject to routine electromagnetic field (EMF) exposure associated with standard power infrastructure.

Substations and Overhead Transmission Lines

As previously mentioned in “Section 2.7”, there are multiple windfarms developments surrounding the Project site, and therefore within a 20km buffer there are three (3) existing substations, as shown in the figure below.

In addition, there are multiple 220kV OHTLs surrounding the Project site which are under the responsibility of the Egyptian Electricity Transmission Company (EETC). As such, the area is already subject to routine electromagnetic field (EMF) exposure associated with standard power infrastructure.

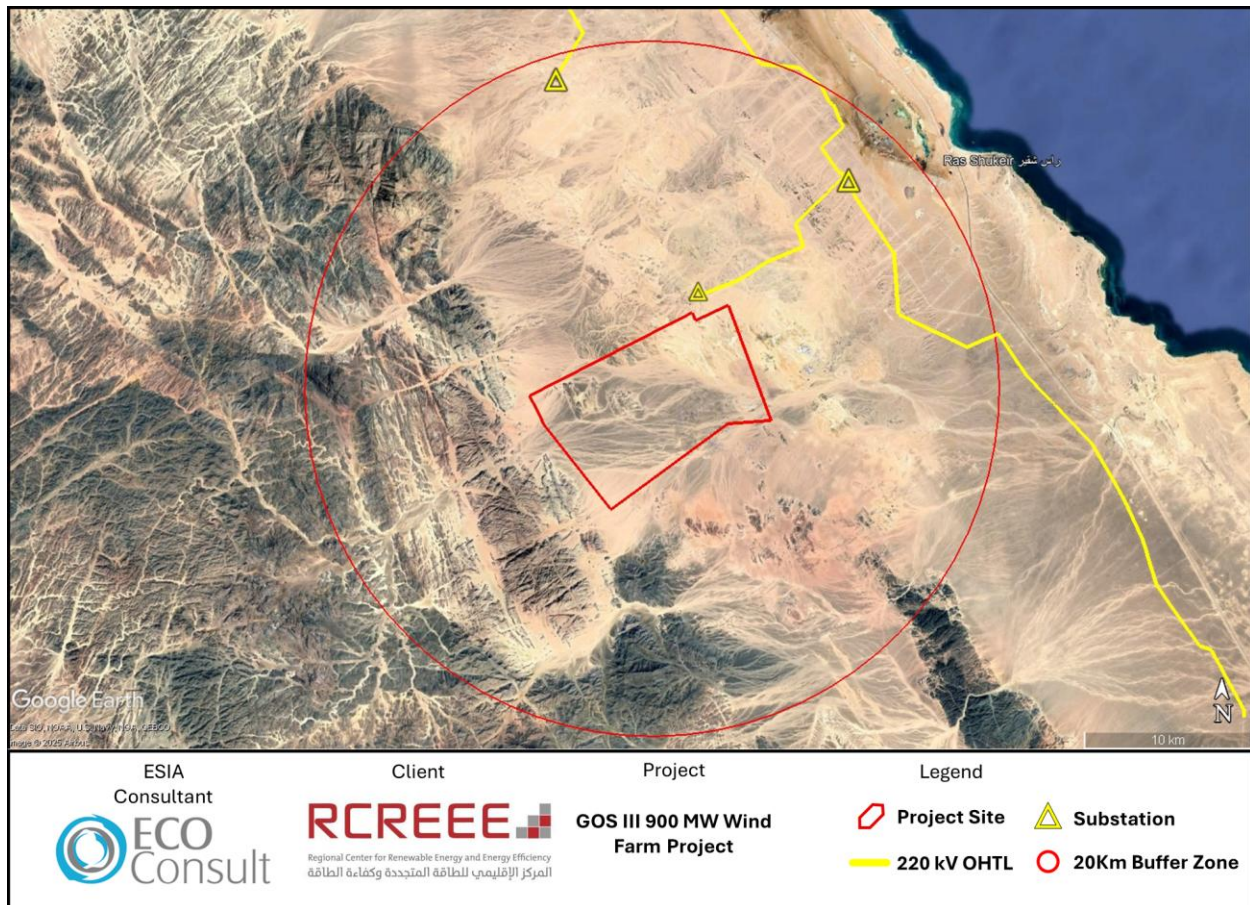


Figure 79: Existing Transmission Lines and Substations in the Project Area



Figure 80: Existing OHTLs



Figure 81: Existing Substations

7.11 Socioeconomics

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

7.11.1 Methodology for Assessment

Assessment of baseline conditions was based on a desktop review of official and published secondary data and statistics from governmental agencies (such as the Central Agency for Public Mobilization and Statistics – CAPMAS) in addition to the data and information mentioned during the meetings with the various stakeholders and local communities). Such secondary data was collected and is presented in relation to key socio-economic indicators to include but not limited to demographic dynamics, population characteristics, employment status, community structure, livelihoods, and other data sets.

In addition, a detailed assessment was done for a total of 14 farms in Wadi Dara Village to assess the type of structure, type of occupancy, number of occupants (if any), and

The Project site is located within the Red Sea Governorate that is bordered by the Red Sea Coast to the east and Bani-Suef, Menia, Asyout, Suhag, Qena, Luxor and Aswan Governorates to the west, Suez Governorate to the North, and North Sudan to the south. 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 seven (7) Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 108km southeast 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 two (2) rural (village) local units (Zaafarana and Wadi Dara). Therefore, the affected communities include in particular Ras Gharib City and Wadi Dara village, both of which are located 32km northeast and 750m southeast of the Project site.

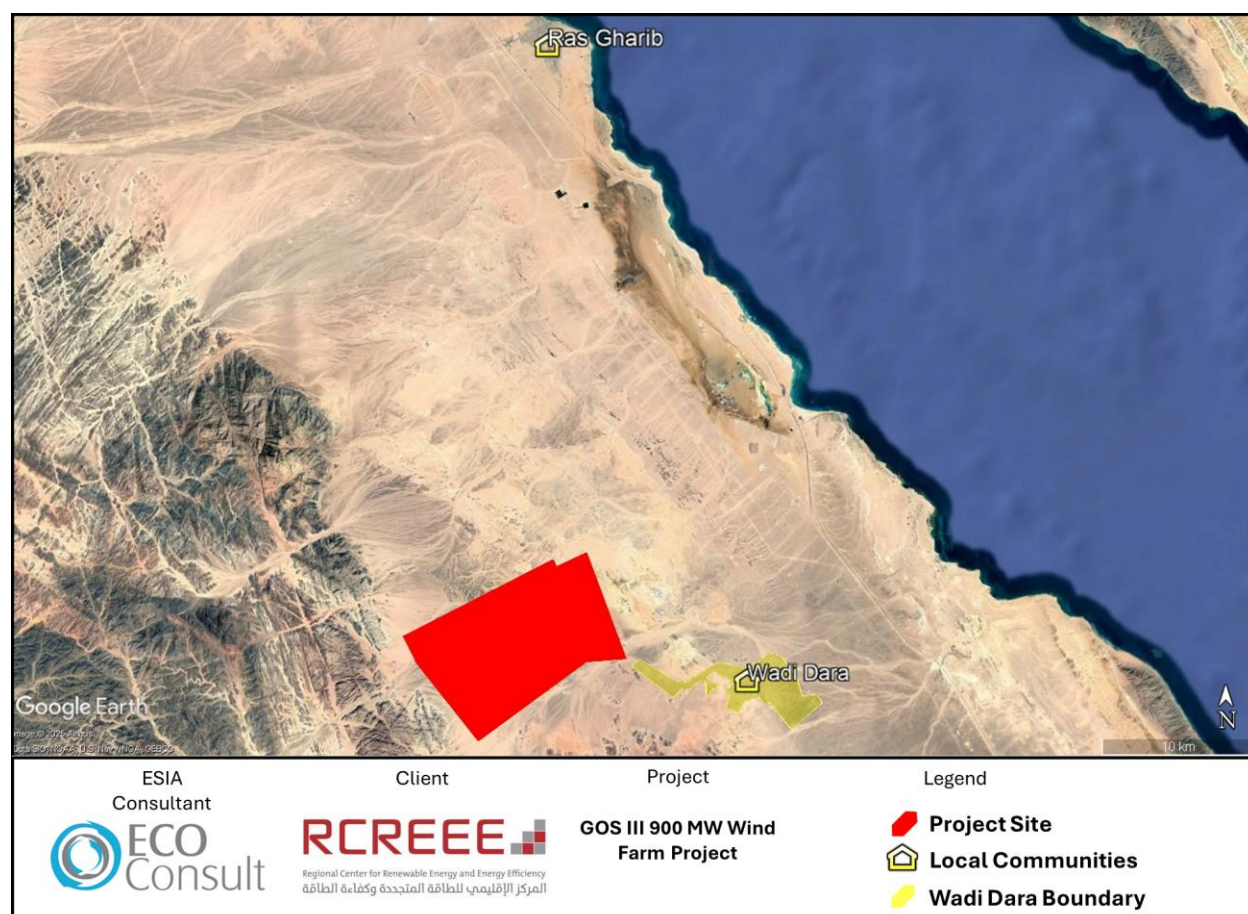


Figure 82: Project Site and Closest Communities

7.11.2 Results and Outcomes

A. Ras Gharib City

Population and Demographic Profiles

Based on information from the Statistical Yearbook 2022, 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.

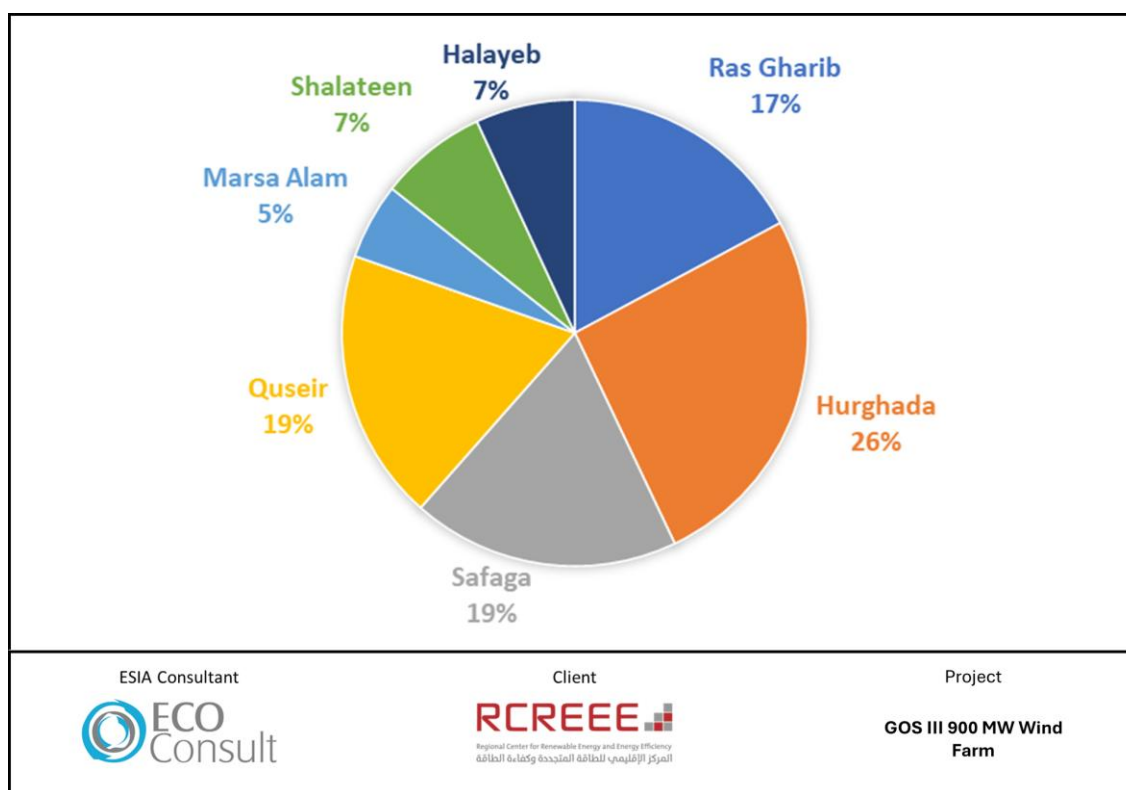


Figure 83: Distribution of Population Density According to Districts in the Red Sea Governorate

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 neighboring 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 21.0/1000 (*Red Sea Governorate Information Centre, Statistical Yearbook of Red Sea Governorate, ٢٠٢٠-٢٠٢١*). 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	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 ³⁴	Females ³⁵	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 following table 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)

34 Out of the total number of males (15 years of age and above) nationwide.

35 Out of the total number of females (15 years of age and above) nationwide.

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 wagedworkers. 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.

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 Gharib 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%
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 middle class. 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 Sea Governorate Information Centre, 2018)

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
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 Gharib 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.

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 k.w.h yearly	730.00
Total electricity consumption	Million k.w.h yearly	621.90
Electricity consumption for lighting	Million k.w.h yearly	424.27
Electricity consumption for industrial utilization	Million k.w.h yearly	197.63
No. of subscribers in the electrical grid	Thousand subscribers	157.05
Per capita share of electricity used for lighting	k.w.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, 2018)

Item	Red Sea Governorate	Ras Gharib
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 non-metallic 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 km ²), 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 seasons. Fish food is four times more abundant in the southern part of the Red Sea coast compared to the northern part.	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. - 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	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.

Item	Red Sea Governorate	Ras Gharib
	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.	- 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.	

B. Wadi Dara Village

As previously mentioned, a survey was conducted for a total of 14 farms within the Wadi Dara Village as shown in the figure below. The results of the questionnaire undertaken during the site visit will be attached as a separate Annex.

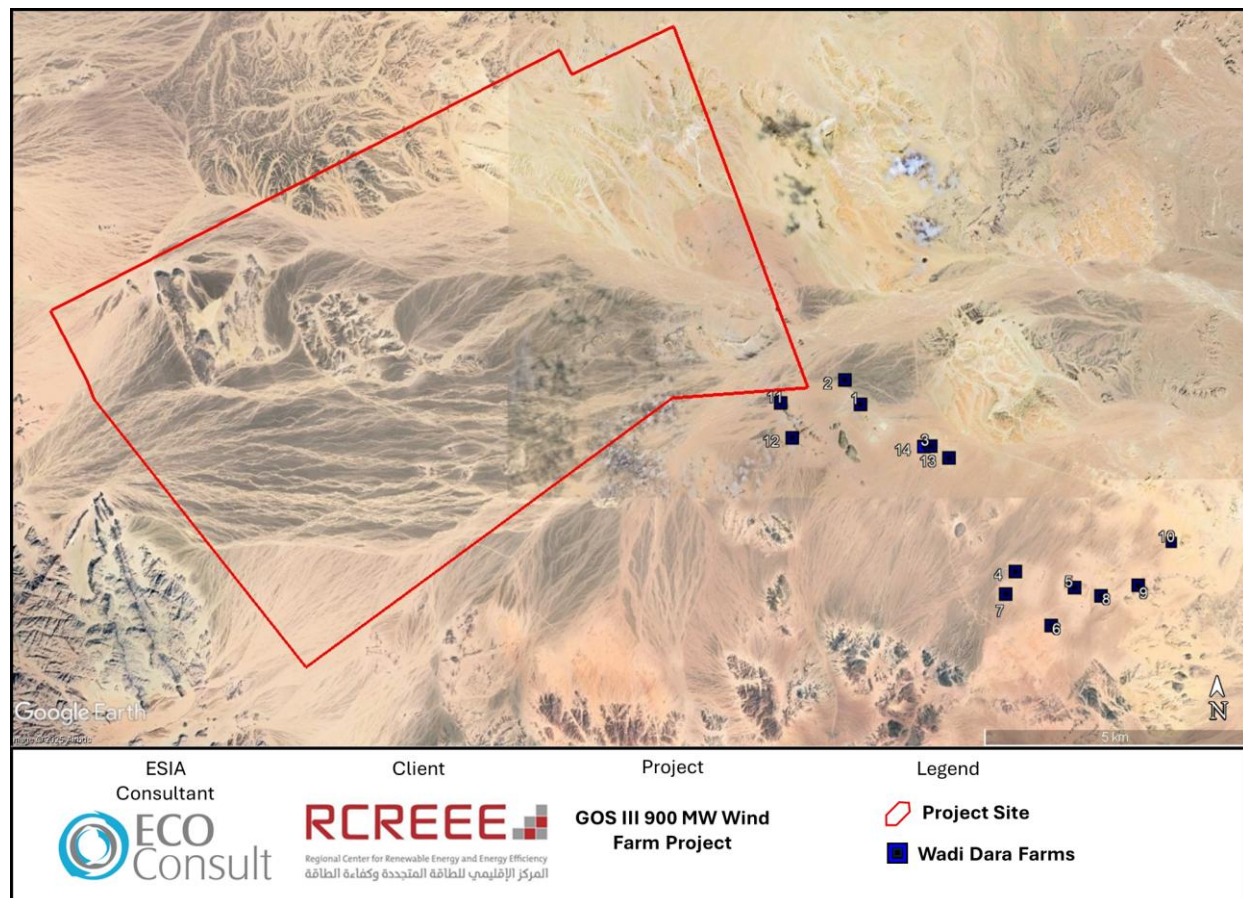


Figure 84: Location of Wadi Dara Farms

Table 64: Coordinates of Wadi Dara Farms

Reference Number	Coordinates	
	Latitude	Longitude
1	27.993177	33.144932
2	27.996715	33.140141
3	27.985851	33.156395
4	27.965673	33.173728
5	27.96975	33.185152
6	27.956525	33.180657
7	27.961881	33.171871
8	27.961570	33.190260
9	27.963370	33.197439
10	27.970648	33.203787
11	27.994384	33.128483
12	27.987960	33.130393
13	27.993177	33.144932

14	27.986974	33.156088
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The following table presents the results of the survey conducted:

Table 65: Wadi Dara Suvey Results

Ref No	Type of Structure	Occupancy / Quantity	Presence of windows facing the Project	Picture
1	Poultry farm Residents/ Accommodation	Workers accommodated at this location operate on a rotational basis, with each worker residing on-site for up to 30 days, followed by a 30-day off-site period before returning for the next rotation.	Yes	
2	Poultry farm under construction	No residents at this point	Yes	
3	Isolated biosafe area for poultry farm Accommodation for workers	Workers are accommodated on a shift-based rotational basis, with 20 workers present per shift and replaced by another group after one month. 20 persons per month per shift.	Yes	
4	Poultry farm	Workers accommodated at this location follow a rotational schedule, whereby each	Yes	N/A

Ref No	Type of Structure	Occupancy / Quantity	Presence of windows facing the Project	Picture
	Residents/ accommodation	worker remains on site for a maximum of 30 days, followed by a 30-day off-site period before returning for the next rotation. 17 workers per shift, with two shifts per day. The farm relies on a generator as the primary source of power.		
5	Agricultural farm (palm tree farm)	No workers were present on site during the visit. It is assumed that workers accommodated at this location follow a rotational schedule, whereby each worker remains on site for a maximum of 30 days, followed by a 30-day off-site period before returning for the next rotation. The farm uses solar power as the primary source of electricity.	Yes	
6	Poultry farm	At the time of the visit, only one community guard was present on site. It is assumed that workers accommodated at this location will follow a rotational schedule, whereby each worker remains on site for a maximum of 30 days, followed by a 30-day off-site period before returning for the next rotation.	Yes	

Ref No	Type of Structure	Occupancy / Quantity	Presence of windows facing the Project	Picture
7	Active poultry farm Residence/ accommodation	Workers are accommodated on site on a part-time basis. A total of 17 workers are present per shift, with two shifts per day. Workers remain on site for periods exceeding 30 days. The farm relies on a generator as the primary source of power.	Yes	
8	Active poultry farm and palm tree farm with on-site accommodation.	The site is occupied by full-time residents. A total of seven permanent workers reside on site throughout the year. Power supply is provided by an on-site generator.	Yes	
9	Livestock farm (Arabian horses) and agricultural farm (palm trees) with on-site accommodation.	The site is occupied by full-time residents. A total of five permanent workers reside on site throughout the year.	Yes	

Ref No	Type of Structure	Occupancy / Quantity	Presence of windows facing the Project	Picture
10	Agricultural farm (palm tree farm) under construction.	No residents or workers were present on site during the site visit.	Yes	
11	Poultry farm under construction. related to Ministry of Defense	Approximately nine daily workers are present on site, in addition to two drivers.	Yes	
12	No structure was present			

Ref No	Type of Structure	Occupancy / Quantity	Presence of windows facing the Project	Picture
13	Egg-hatchery farm related to the Ministry of Defense	Workers are accommodated at this location on a rotational basis. Each worker remains on site for a maximum of 30 days, followed by a 30-day off-site period, before returning for the next rotation.	Yes	
14	Water desalination source for nearby poultry farms	The facility is under the control of the Ministry of Defense. Workers are present on a shift basis, with approximately 10 persons per month assigned for one shift.	Yes	

8. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

This section 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.

8.1 Overview of Strategic Environmental and Economic Impacts

8.1.1 Government 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

The topic of 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 on 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 will contribute to increasing energy security by way of increasing the availability of a national and mostly import-independent energy resource. The estimated electricity generation from the Project is estimated at around 3,977 Gigawatt hours (GWh) per year on average; which will serve the annual electricity needs of around 36,000 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 1,510,000 million metric tons of CO₂ annually.

The above has been calculated based on statistics obtained from the EEHC Annual Report 2023/2024 provided a CO₂ generation factor for electricity production in Egypt, and which was estimated at 380.3 gCO₂/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 negative 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.

The table below provides an overall summary of the impact on landscape and visual during the construction phase. The overall impact is considered to be of minor significance.

As discussed earlier in 'Section 7', Wadi Dara Village (less than 1km from the boundary of the Project site) represents several sensitive visual receptors in the surrounding vicinity. While there are a number of structures as discussed in 'Section 7.11', structures that are the closest to the Project site have workers residing at the farm in a rotational basis, where workers are there for limited periods, typically up to 30 days, after which they leave for a similar period of up to 30 days before returning again, and this cycle continues accordingly. Visual impacts will be observable from the main road leading into and from the Village.

Construction Phase		
Type	Negative	N/A
Duration	Short-term	Limited to construction phase which is 24 months
Magnitude	Medium	Given that construction activities will not be noticeable
Reversibility	Reversible	With completion of construction activities
Sensitivity	Low	Given the number of existing wind power plants and substations surrounding the Project
Likelihood	High	Given nature of activities expected
Frequency	Frequent	Will occur for 24 months during construction period
Timing	N/A	Not applicable
Extent	Low	Impacts will occur within the actual footprint of Project. Under worst-case scenario and for tall construction elements this is expected to be within 5km radius.
Significance	Minor	

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 workday.
 - 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.
- 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 reduced and categorized 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 work should be carried out at all times 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. color, 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 (220m for this Project) that can be seen from several kilometers 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:

- The only potential sensitive receptors would be Wadi Dara village and Ras Gharib city which are located 750m southeast and 32km north-northeast of the Project site, respectively.
- Project area is considered a barren and desert area and in general is located within an industrial area with multiple wind farm developments 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 most likely be visible from vehicles passing across the Hurgada - Cairo Highway as well as the main road leading into Wadi Dara Village which also intersects the Project Site. The turbines can attract visual attention and potentially distract drivers passing along the highway.

In accordance with the above, the table below provides an overall impact assessment for the windfarm on landscape and visual receptors during the operation phase.

Operation Phase		
Type	Negative	N/A
Duration	Long-term	Throughout the operation phase
Magnitude	Medium	Given that visual impacts are noticeable in the adjacent area
Reversibility	Reversible	With decommissioning of WTGs
Sensitivity	Medium	Given that there are no sensitive receptors in the area.
Likelihood	Medium	Given nature of activities expected
Frequency	Frequent	Expected throughout entire operational phase
Timing	Not relevant	Applicable throughout entire operational phase
Extent	High	Turbines can be visible for distances greater than 10 km
Significance	Moderate	

Mitigation Measures

The following identifies the mitigation measures to be applied by the Project Operator during the operation phase and which include:

- Coordinate with the Traffic and Transport Authority, install clear and informative signage in Arabic and English language at Hurgada – Cairo Highway and on the road leaving the highway and into Wadi Dara Village 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 categorized as minor significance.

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.

Based on the results and outcomes of the desktop and site survey presented in “Section 7.2”, there are no anticipated land acquisition impacts and there are no further requirements to be considered for the ESIA study. Therefore, there are no impacts anticipated in terms of land ownership.

In addition, there are no physical or economical activities undertaken at the Project site. Therefore, there are no anticipated impacts on land use in relation to physical and/or economical displacement from the Project footprint.

Based on the above, there are no anticipated impacts on land use and there are no further requirements to be considered for the ESIA study.

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*

It is important to investigate potential risks of local flood hazards from drainage systems, particularly during the rainy season and during flash flood events, as these could affect the Project components. The Project site and its surroundings lack permanent fresh surface water bodies or streams; instead, the area is traversed by shallow, dry drainage lines that channel occasional precipitation from the Red Sea Mountains toward the Gulf of Suez. As outlined in the reference baseline, the Project is located within a plain intersected by wide, shallow drainage lines and underlain by Quaternary alluvial deposits in the form of alluvial fans and terraces, reflecting the simple topography and gentle regional slope of the area.

The Project lies within the drainage basin of Wadi Dara, one of the main wadis in the region. Regional studies have identified several drainage basins in the wider Ras Gharib area that contribute to flash-flood hazards along the Red Sea coast, including Wadi Abu Had, Wadi El Darb, Wadi Malaha, Wadi Garf, and Wadi Dara. Based on regional flood hazard classification, Wadi Dara is characterized by a medium degree

of flash flood hazard without associated vulnerability, as it does not directly affect densely populated areas.

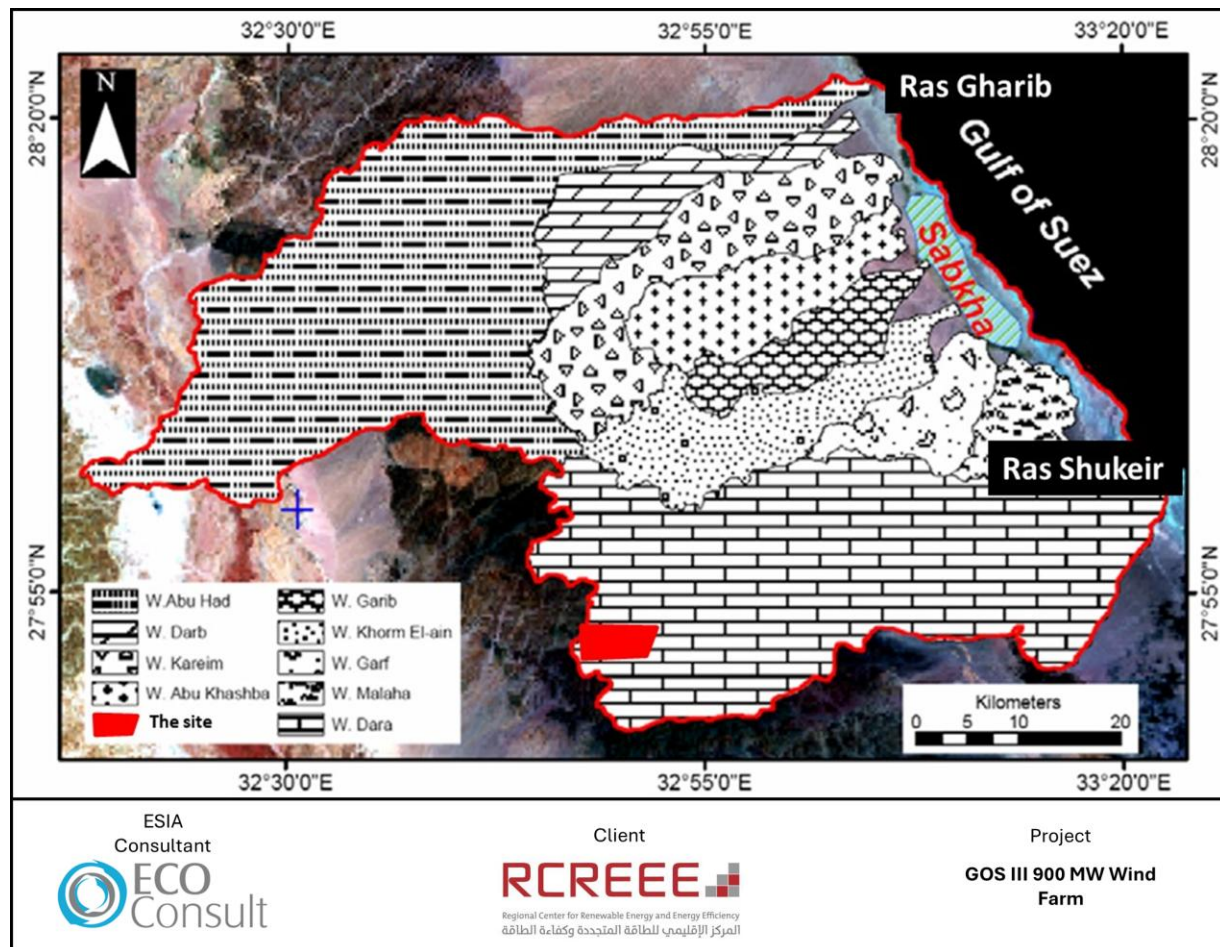


Figure 85: Delineated Drainage Basins in the Wider Study Area Showing the Project's Location Within Wadi Dara (Modified after Youssef and Hegab, 2005)

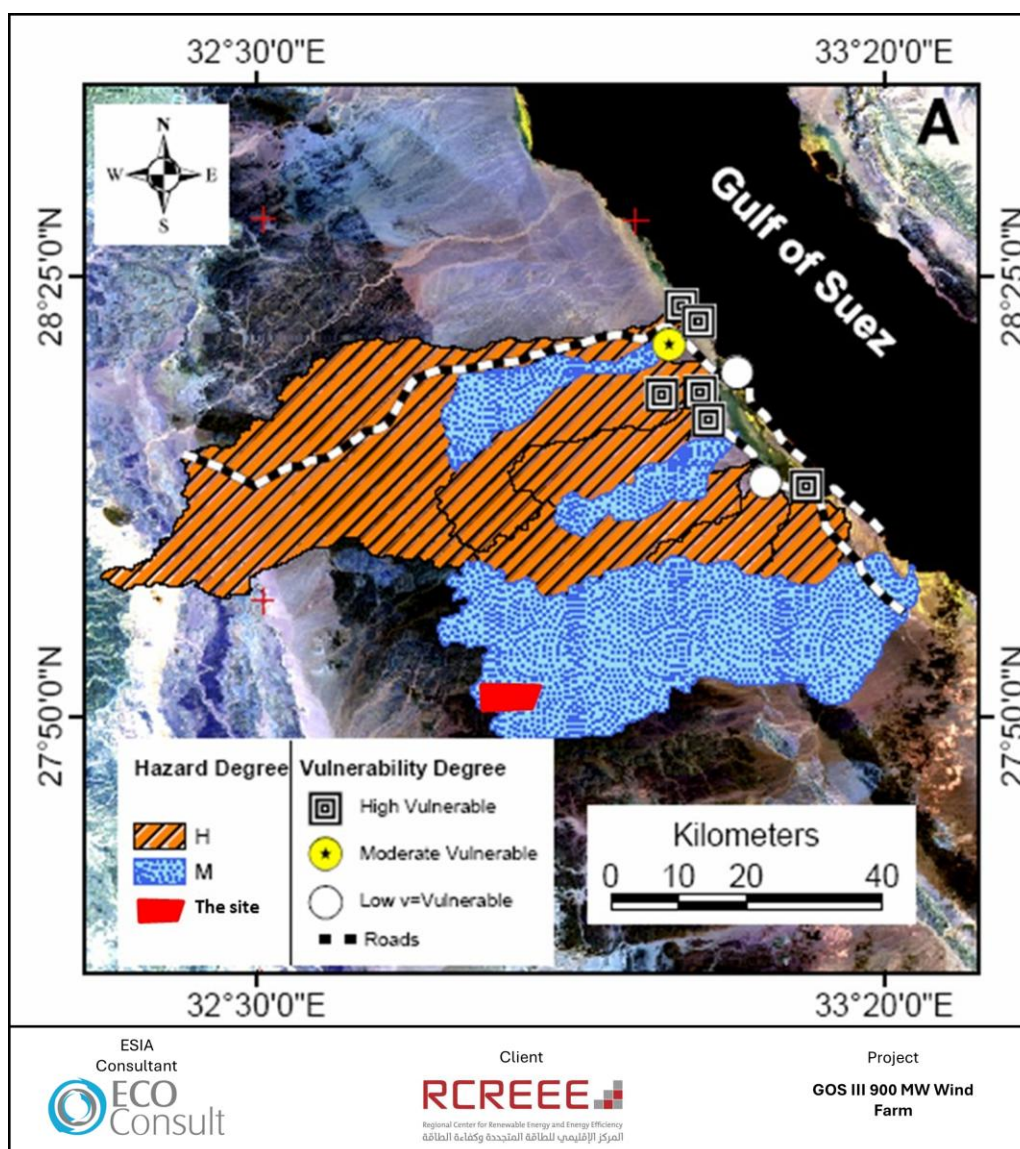


Figure 86: Regional Flash-Flood Hazard and Vulnerability Classification for the Delineated Drainage Basins
(After Youssef and Hegab, 2005)

A literature review and historical record of flash floods along the Red Sea and Gulf of Suez indicate that destructive flash floods have occurred repeatedly between 1972 and 2016 in locations such as Ras Gharib, Safaga, El Quseir, Marsa Alam and other coastal and Upper Egypt towns. These events have caused road damage, dam failures, demolished houses and loss of life. However, during the major storm of October 26–27, 2016, the watershed of Wadi Dara did not receive any heavy rainfall, whereas the city of Ras Gharib was severely damaged by flash flooding.

Table 66: Historical Records of Hazardous Flash Floods in Egypt

Date	Area	Recorded damage & References
October 2019	Cairo, Alexandria, meet Ghamr and new Cairo	12 Deaths, road damages
April 2018	Al ain Alshokhna, Fifth settlement "New Cairo"	Road damage, damaged vehicles, 10 million EGP loss
October 2016	Ras sedr, Sharm Elshekh, Hurghada, and Qena	Road damage, water pipe damage

2015	Assuit, Sohag, Qena, Luxor, and Aswan	Destroyed houses
2015	Alexandria, Al-bhera, and Matrouh Governorates	35 Deaths, 180 destroyed houses, dozens injured thousands of acres drowned
February, October 2015	North and south of Sinai, Red Sea region	Road damages, loading and unloading area of Hurghada International Airport drowned
March, May 2014	Taba, Sohag, Aswan, Kom Ombo	Dam failure at Sohag, road damages
2013	South Sanai & Sohag, and Assuit	Deaths, road damage, 750 million EGP loss
2012	W. Dahab, Catherine area	Dam failure, destroyed houses
January 2010	Aswan, Sinai, and Al Arish	8 Deaths, 1381 damaged houses, roads and infrastructure
2009	Along the Red Sea coast, Aswan, Sinai	12 Deaths, damaged houses and roads and 37 injuries
October 2004	W. Watier, Safaga, El-Qusier	Road damage
May 1997	Hurghada, Marsa Alam	200 Deaths, destroy roads, demolished houses damaged vehicles
November 1996	Dhab, Sohage, Qena, Safaga, El-Qusier, Marsa Alam, W. Aawag	3200 Destroyed houses
September, November 1994	W. El-Gemal, Marsa Alam, W. Sudr	1 Death, roads damage, 27 injuries
March, August 1991	South Sanai	32 Deaths, dam failure
October 1990	Qena Governorate	Demolished 180 houses
January 1988	South Giza	Roads damage and demolished houses
October 1987	Aswan Governorate	Roads damage, demolished houses and farms
1985	Aswan Governorate, W. Elarish, Qena and Sohag	5619 Deaths, demolished houses
February 1982	Aswan, Kom Ombo, Idfu, Assiut, Marsa Alam, El-Qusier	Drowning of 10 villages, 180 houses destroyed, and 1500 citizens displaced.
April 1981	Minia, Assuit, and Sohag	17 Deaths, road problems, and 200 houses destroyed
February, November, and December 1980	W. El-Arish	Destroyed houses, roads, and farms
May, October 1979	Giza	500 Houses destroyed
1975	Qena Governorate	Demolished houses, destroyed roads, and dam failure
February 1975	W. Al Arish	Demolished houses, destroyed roads, and dam failure



Figure 87: Observed Flood Damage in Ras Gharib During the October 2016 Storm Event

Further regional assessments (e.g. Elnazer et al., 2017) indicate that, while some basins such as Wadi Abu Had and Wadi Al Darb pose high risks to urban areas (e.g. Ras Gharib), the Wadi Dara basin is characterised by a medium flash flood hazard level but without associated vulnerability, due to the absence of major settlements along its course. A flood mitigation channel of approximately 38 km has been proposed and partially implemented around Ras Gharib to divert flood waters north of the city and reduce future flood risk.

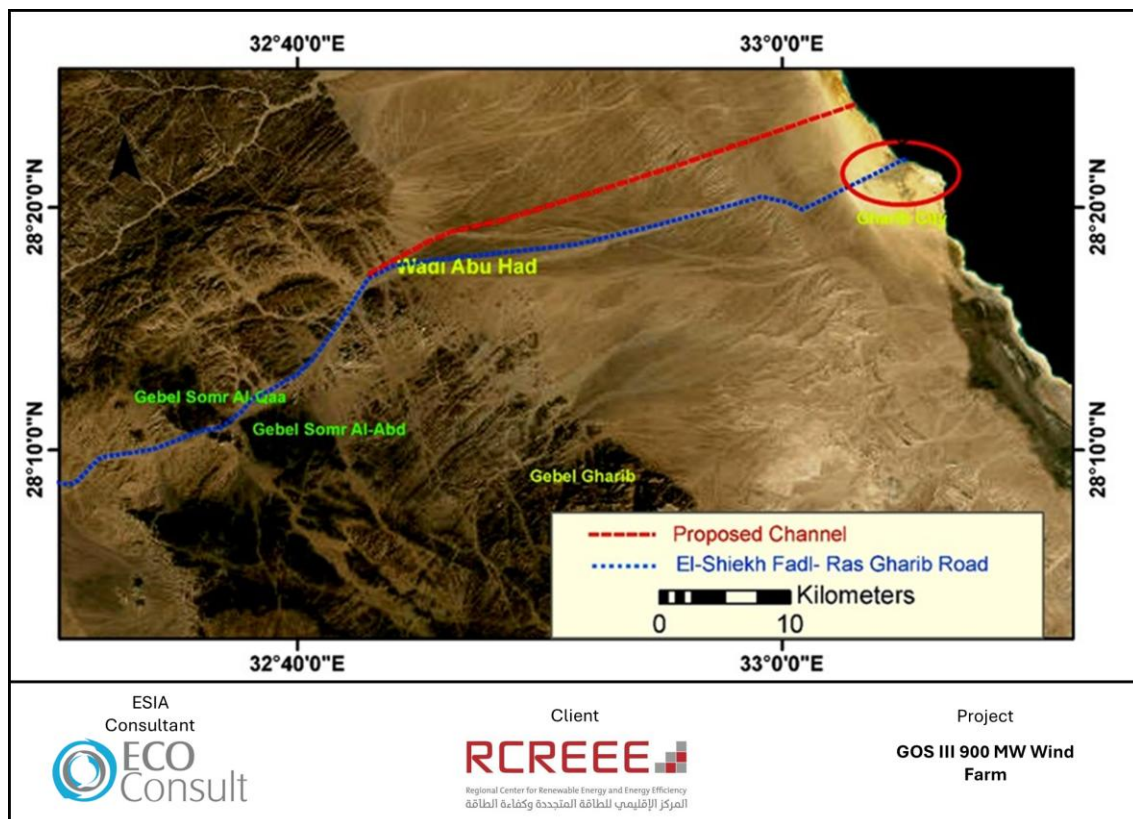


Figure 88: Proposed Flash Flood Channel Location in the Study Area (After Elnazer et al., 2017)

At the Project scale, surface water conditions and the drainage network were analyzed using topographic maps, Landsat images, and digital elevation models (DEMs) generated from SRTM data. These analyses indicate that the Project site is located within a gently sloping plain trending toward the east and northeast and intersected by shallow and wide drainage lines. The regional slope of the area is gentle, and the site surface is characterized by simple relief, where drainage lines are weakly incised and separated by shallow alluvial terraces, reflecting low-intensity surface flow and limited capacity for erosion or transport of large sediment loads.

DEM-based watershed analysis confirms that the Project site lies within the watershed area of Wadi Dara, with one of its main trunk streams crossing the site, while another runs outside the site to the north. Three-dimensional terrain modelling illustrates the course of Wadi Dara and its tributaries in relation to the Project site and highlights the overall gentle topography and eastward-directed surface flow paths.

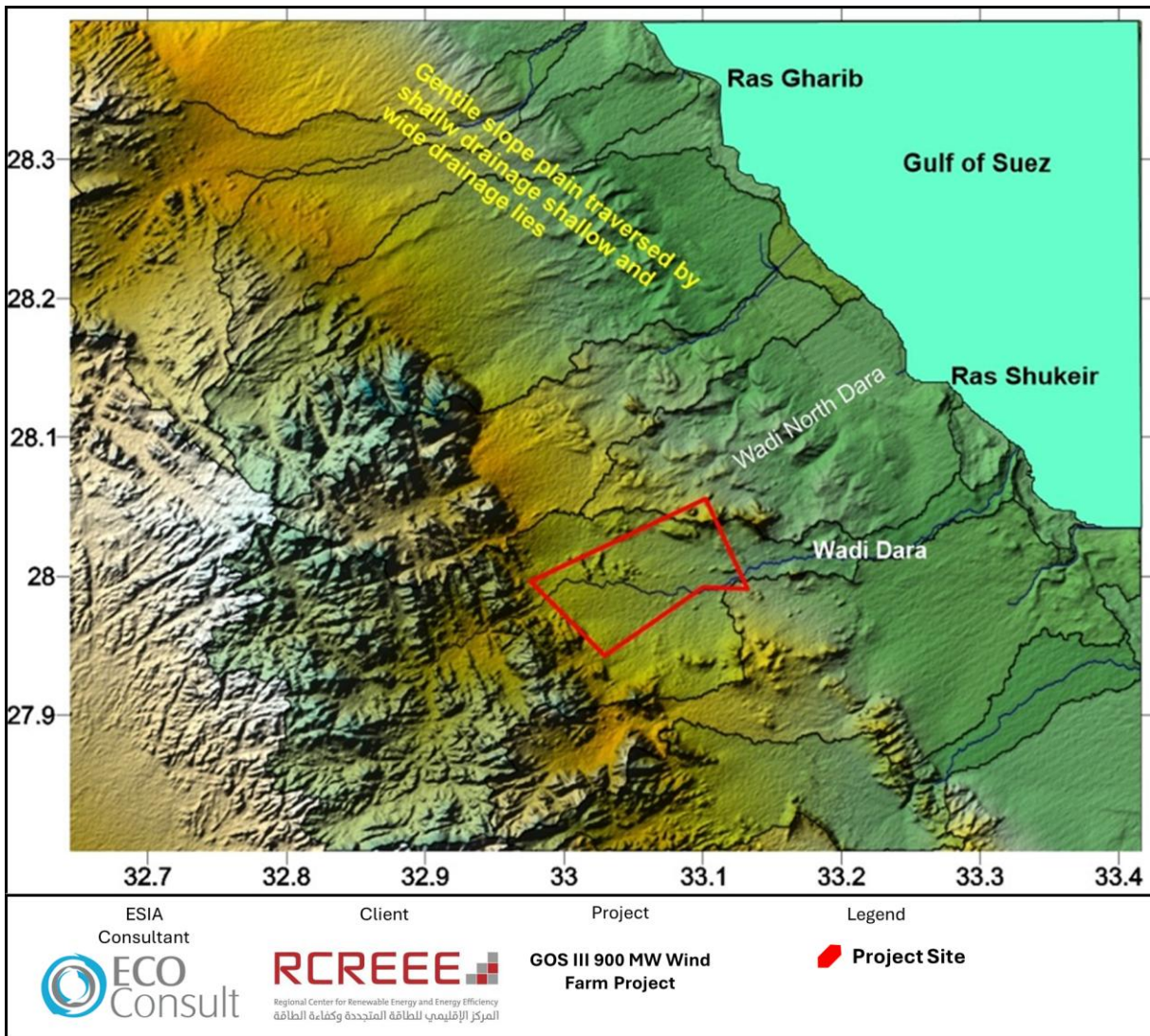


Figure 89: Drainage Basins Intersecting the Project Area Derived From DEM-Based Watershed Analysis

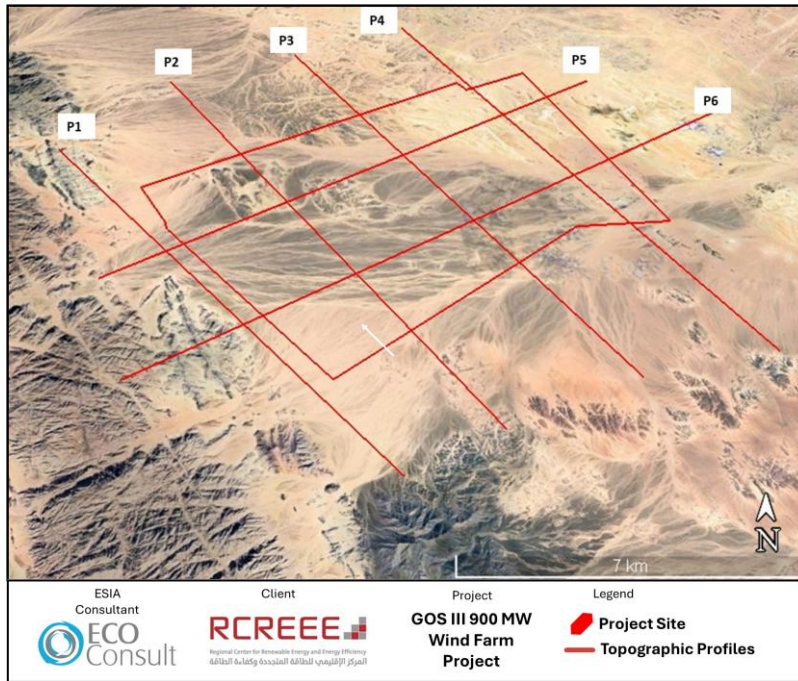


Figure 91: Topographic Profiles Along the Project Site

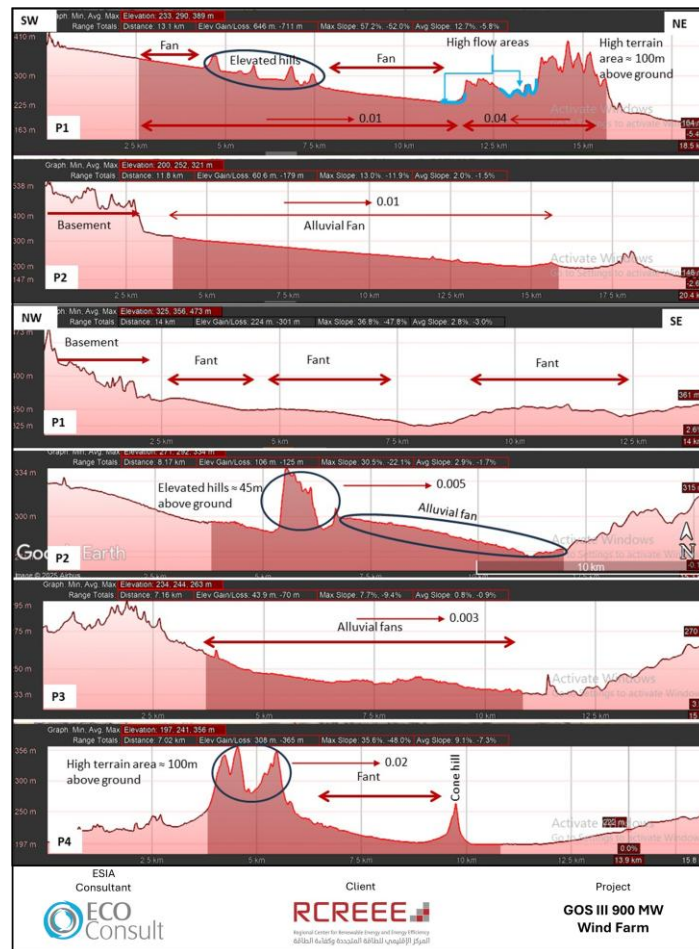


Figure 92: Topographic Profiles Along the Project Site

In addition, field observations further confirm that the Project area is wide and nearly flat, with numerous straight, shallow, and short tributaries. The main trunk streams crossing the site are shallow and wide and are covered with fine sand and coarse gravel, indicating weak surface flow intensity. Small, elevated hills composed of Upper Cretaceous and Miocene sediments, mainly evaporite, are exposed in the eastern part of the site; however, these hills are dissected by shallow tributaries and surrounded by gently sloping alluvial surfaces that remain accessible via existing tracks or roads.

The soil cover across the Project site consists of Quaternary alluvial deposits in the form of alluvial fans and terraces, exhibiting variations in grain size from gravelly sand in the western part of the site near the basement rocks to sandy loam in the eastern part where sandstone and evaporite prevail. The upper layer of these deposits contains coarse gravel and rock fragments to a depth of less than one meter, underlain by finer materials. The soil is characterized by high porosity and permeability, resulting in a high infiltration capacity that allows a significant proportion of rainfall and surface runoff to infiltrate during storm events. The observed surface flow is generally weak and appears insufficient to effectively sort the surface deposits, even in upstream areas close to the basement rock exposures.

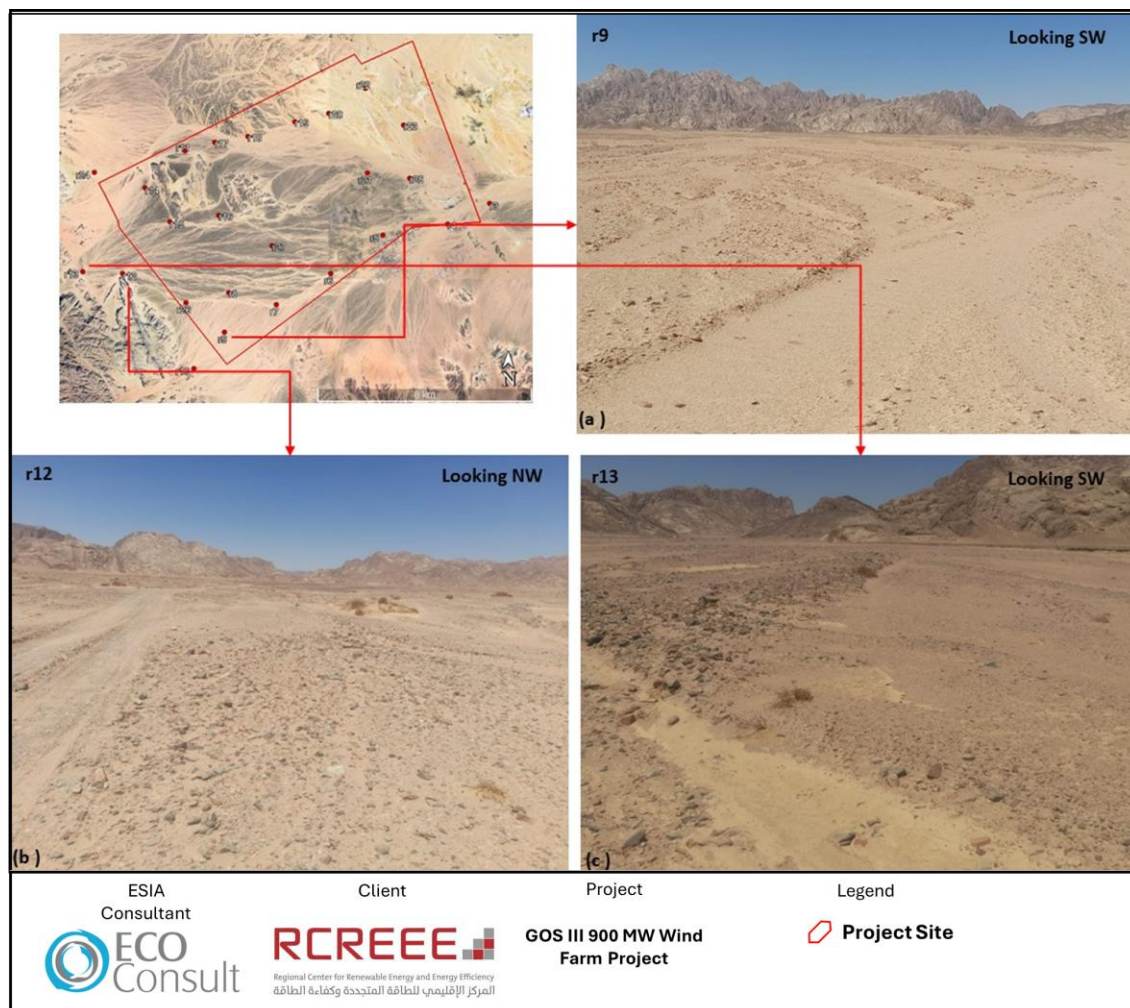


Figure 93: Grain Size Variation of the Surface Deposits in the Western and Central Parts of the Project Site

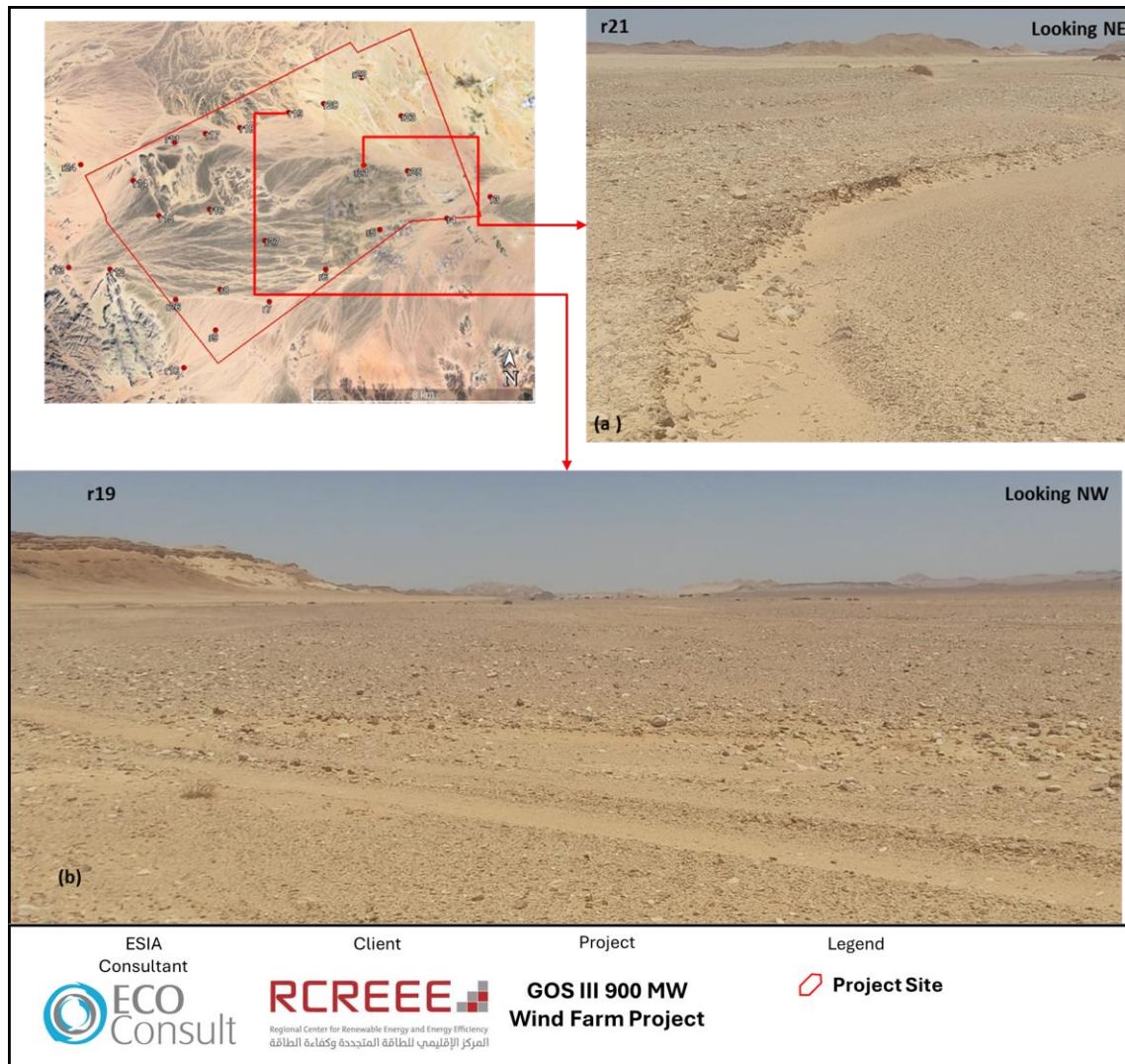


Figure 94: Grain Size Variation of Surface Deposits in the Eastern Side of the Project Site

Furthermore, measurements of terrace thickness and channel morphology indicate that the average thickness of surface flow along the main drainage lines is limited to a few centimeters in the western and middle parts of the Project site and increases only slightly in the eastern part where tributaries merge into mainstream channels. This indicates that surface water flow in the alluvial fans is very slow and thin compared to flow in the more confined channels in the eastern portion, and that the likelihood of floods or severe surface runoff posing a threat to site infrastructure is minimal over most of the Project site area and only slightly higher in the low-elevation sandstone and evaporite zones in the east.

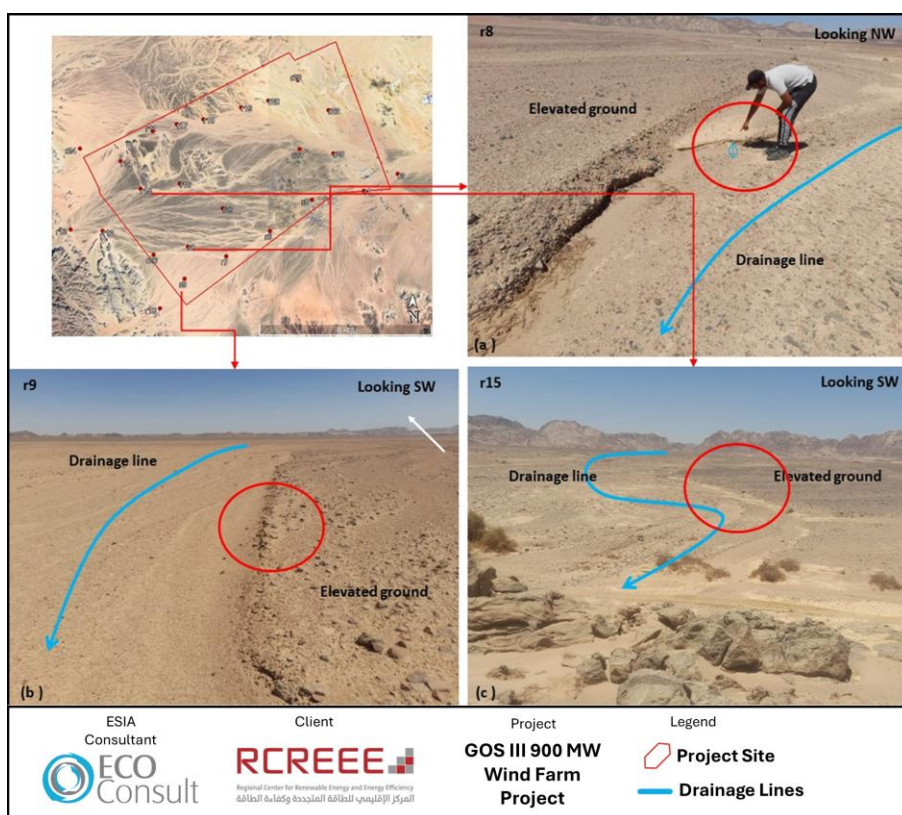


Figure 95: Shallow and Wide Drainage Lines Crossing the Western and Middle Parts of the Site, Characterized by Thin Surface Flow and Low-Elevation Ground Between Drainage Lines

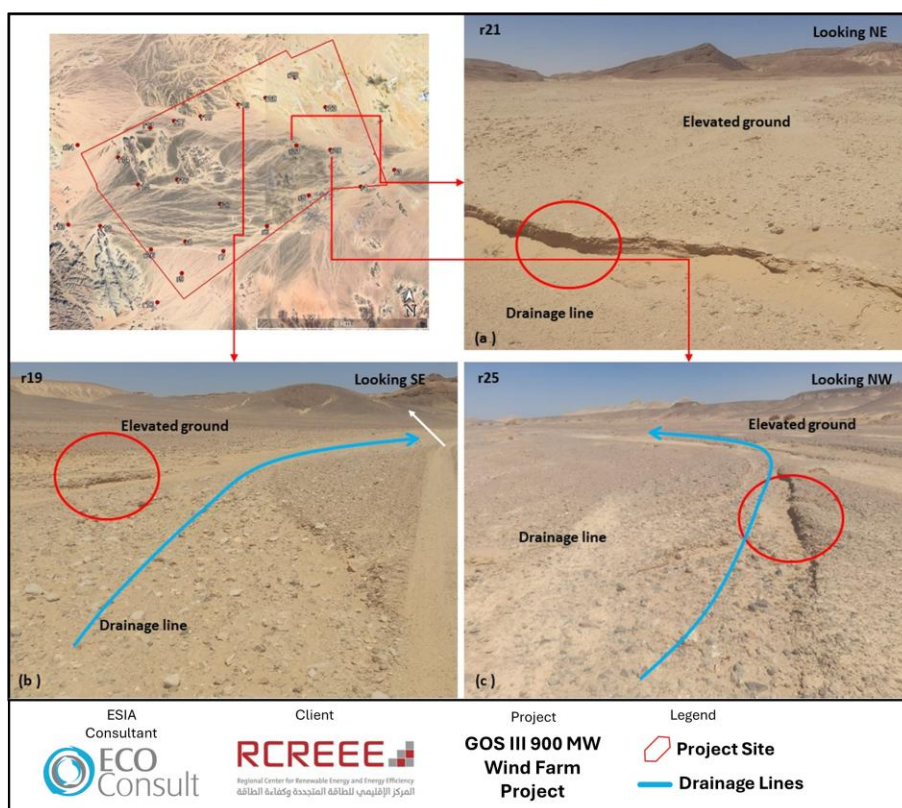


Figure 96: Main Streams of the Drainage Lines Crossing the Eastern Part of the Project Site

In addition, vegetation density within the Project site is closely associated with the drainage lines. Vegetation is sparse and sporadically distributed along the floors of the drainage lines, indicating either low rainfall intensity or a high soil infiltration capacity that limits surface water retention time. Field observations confirm a very low overall vegetation density across the site, with only small and scattered vegetation present along the mainstreams of the drainage lines as shown in the figure below.

Erosion is confined mainly to the sides of drainage lines, with thin sediment layers accumulating on channel floors. Annual sediment deposit is estimated to be only a few millimeters, confirming that erosion processes are currently very weak. No field indications of water accumulation areas, such as depressions capable of storing surface runoff, were observed within the site.

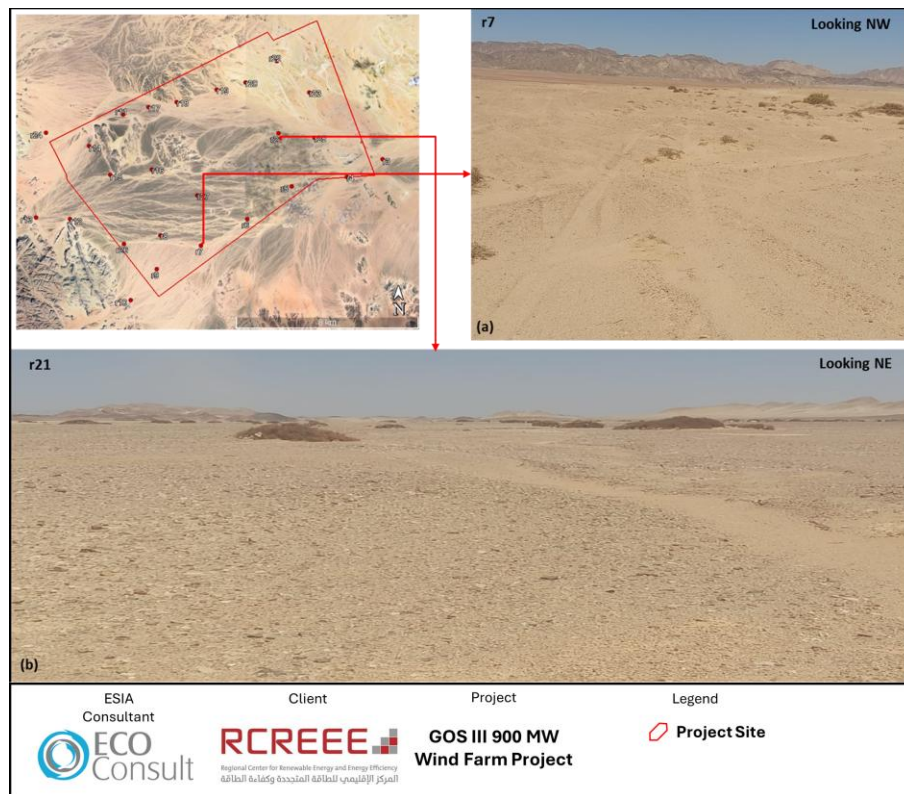


Figure 97: Sporadic and Weak Vegetation Along the Mainstream of the Drainage Lines

Existing Mitigation Measures

Several flood mitigation measures have already been applied in the area around the Project site to protect existing infrastructure located along drainage lines, including culverts installed beneath paved roads where they cross mainstream wadis and concrete or stone fences constructed around the bases of transmission towers. These measures demonstrate that weak to moderate surface runoff in drainage lines can be effectively managed using straightforward engineering solutions.

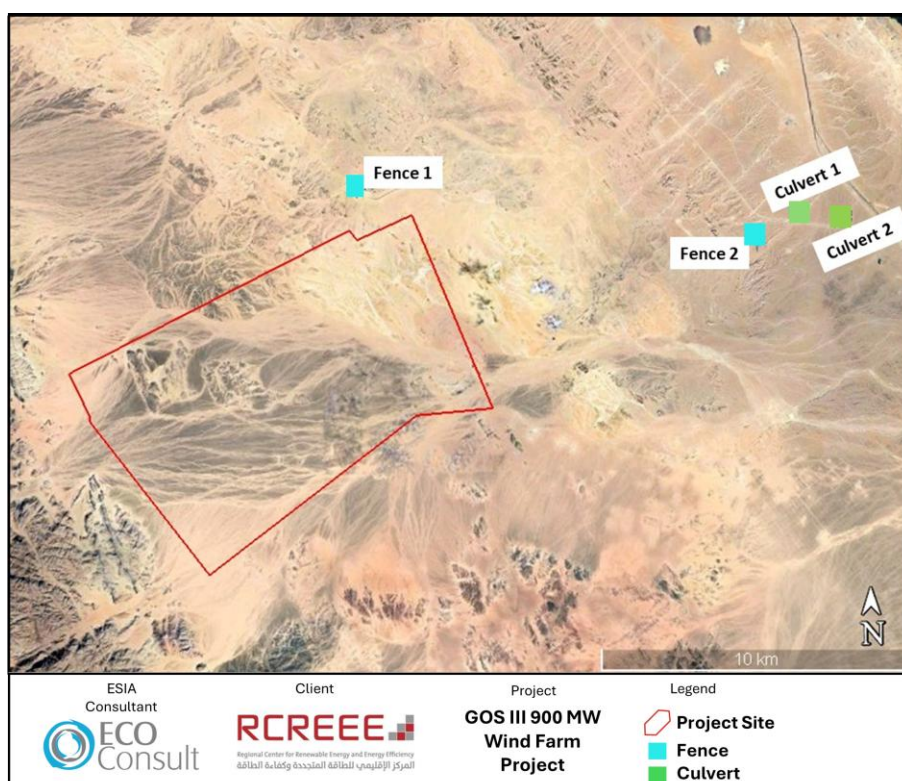


Figure 98: Locations of Flood Mitigation Structures Observed Near Existing Infrastructure Close to the Project Site

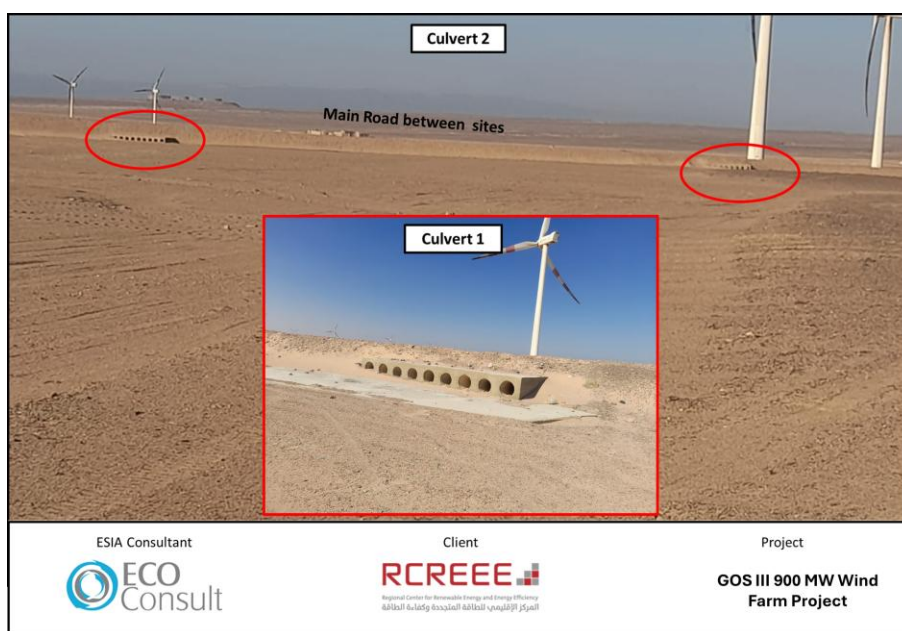


Figure 99: Culverts Installed Under the Main Road to Facilitate Safe Passage of Surface Runoff



Figure 100: Simple Fences Applied to Protect the Base of Towers from Surface Flow Erosion

In conclusion, the flood vulnerability assessment undertaken for the Project site indicates that most of the area is characterized by typical alluvial fan surfaces with simple relief and gentle slopes toward the east and east northeast, where very shallow and wide drainage lines prevail and surface runoff remains limited. Localized variations in surface flow conditions are associated with geomorphological features within the site, particularly the elevated Cretaceous sandstone hills located in the northern part of the site, which locally collect and redirect surface flow, resulting in slightly faster flow velocities and marginally deeper flow paths. In the northeastern part of the site, the presence of higher elevated terrain redirects drainage toward the southeast, and during heavy rainfall events, surface runoff from the alluvial fans combined with direct runoff from the elevated terrain may concentrate within a narrow drainage line along the margin of the elevated terrain. These conditions indicate that potential flood susceptibility is generally low across most of the Project site, with relatively higher surface runoff potential confined to limited drainage lines adjacent to elevated terrain.

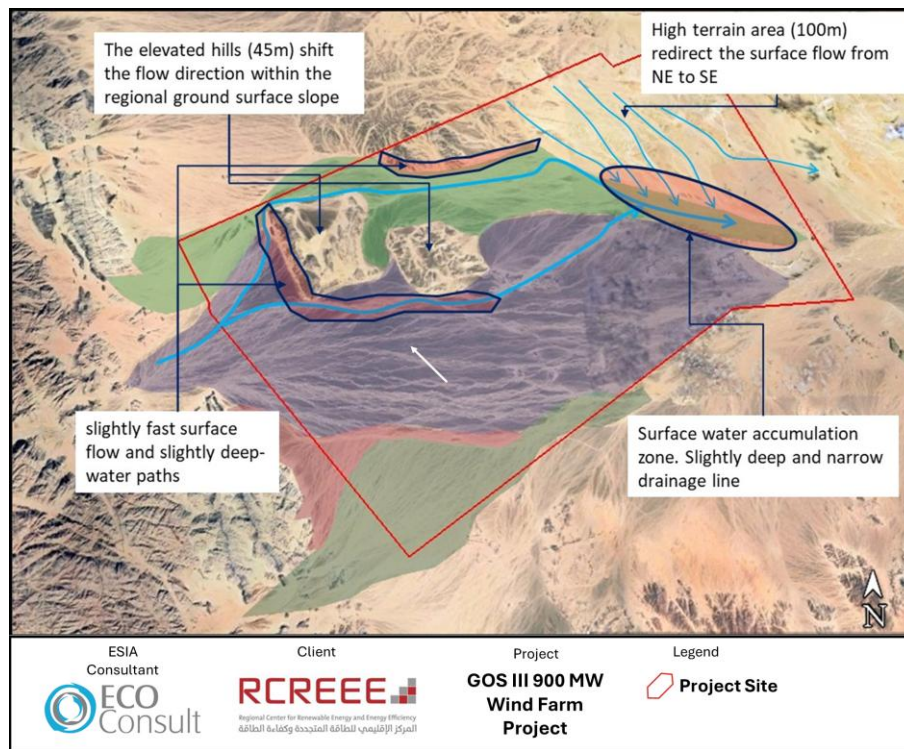


Figure 101: The Role of Elevated Hills and Terrain in the Modification of The Direction of Surface Flow

Based on all of the above, the following map identifies areas that may be subject to runoff during heavy rainfall events. The areas most susceptible to surface runoff are primarily the floors of the mainstream drainage lines that cross the Project site.

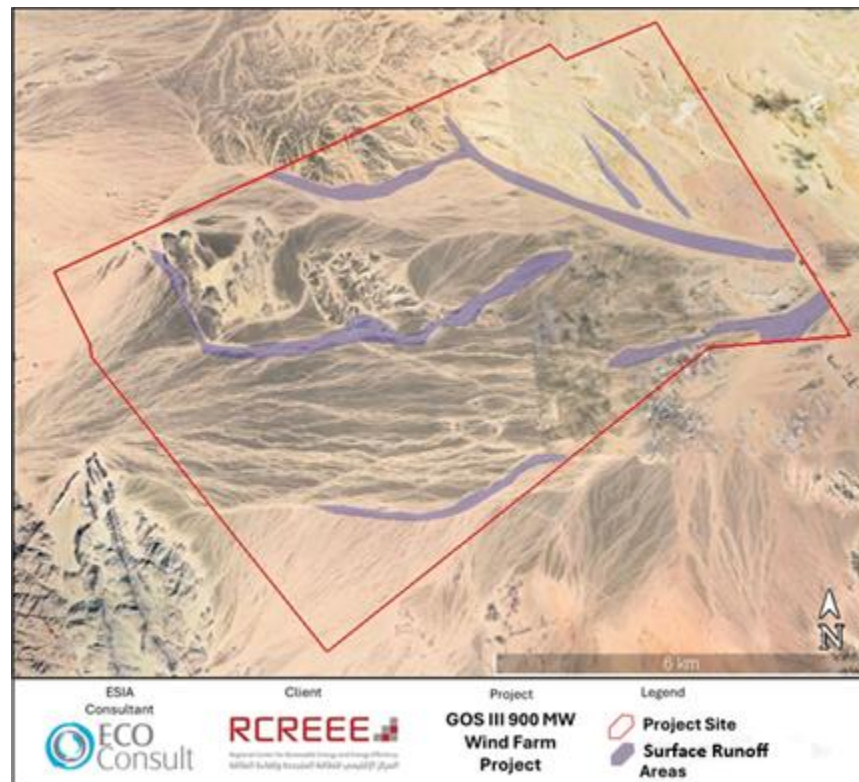


Figure 102: Proposed Locations of Surface Runoff Along Mainstream Drainage Lines Within the Project Site

Mitigation Measures

Based on the extensive studies conducted to assess the potential for flooding and surface runoff at the Project site, including the review of available secondary data and the collection of relevant primary data, the following recommendations are proposed to mitigate potential risks:

- Given the possibility of extreme rainstorms exceeding the maximum calculated estimates in nearby drainage basins by Youssef and Hegab (2005), it is recommended to construct a one-meter-high concrete fence around critical facilities, particularly turbines or any infrastructure located within the mainstreams of drainage lines. These areas are more susceptible to surface runoff, and such fencing would provide an additional level of protection against unexpected flood events.
- To reduce flood-related risks, turbines should preferably be installed on elevated ground away from drainage mainstreams, as these locations are less prone to the accumulation of surface runoff. Where avoidance is not feasible, additional mitigation measures should be applied to enhance resilience, including reinforcing turbine foundations, elevating turbine bases above anticipated flood levels, or constructing reinforced concrete fences around turbine bases. A minimum fence height of 1.5 meters is recommended to ensure adequate protection against potential surface runoff impacts.
- The Project's access roads, whether paved or asphalted, cross wide and shallow drainage lines where surface runoff is generally weak to moderate and does not concentrate along narrow paths. While the overall impact on roads is expected to be limited, it is recommended to install simple cement culverts with a maximum diameter of one meter beneath roads at identified crossing points to allow surface water to pass without obstructing or damaging road infrastructure.
- While the establishment of flood early warning systems falls under the responsibility of local authorities in the Ras Gharib and Ras Shukeir areas, it is essential for the Project team to develop and implement an internal flood management plan. This plan should define clear response procedures for flood emergencies, including rainfall monitoring, evacuation arrangements, protection of critical infrastructure, and contingency actions during severe rainfall events. Proactive preparation will help minimize potential damage, reduce operational downtime, and ensure the safety of personnel and Project infrastructure.

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.

Construction Phase			Operation Phase		
Type	Negative	Such impacts are controlled through implementation of general best practice.	Type	Negative	Such impacts are controlled through implementation of general best practice.
Duration	Short-term		Duration	Long-term	
Magnitude	Medium		Magnitude	Medium	
Reversibility	Reversible		Reversibility	Reversible	
Sensitivity	Low		Sensitivity	Low	
Likelihood	Medium		Likelihood	Medium	
Frequency	Frequent		Frequency	Frequent	
Timing	Not relevant		Timing	Not relevant	
Extent	Medium		Extent	Medium	
Significance	Minor		Significance	Minor	

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance can be reduced to not significant.

(i) 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.

Note: expected waste quantities, the landfill that will be used for the Project and impacts on landfills is discussed separately under "Section 8.11.2".

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 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). However, if inadequate disposal of wastewater occurs and is allowed to drain on land, this might contaminate the soil and possibly infiltrate to groundwater.

Note: expected wastewater quantities, the WWTP that will be used for the Project and impacts on WWTP is discussed separately under “Section 8.4.2”.

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 wastewater 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.

Note: expected hazardous waste quantities, the hazardous waste landfill that will be used for the Project and impacts on the landfill is discussed separately under “Section 8.11.2”.

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 refueling) 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.

8.4.3 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.

Construction Phase		
Nature	Negative	Such impacts are controlled through implementation of general best practice.
Duration	Short-term	
Magnitude	Medium	
Reversibility	Irreversible	
Sensitivity	Low	
Likelihood	Medium	
Frequency	Periodic	
Timing	During rain events	
Extent	Low	
Significance	Minor	

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase:

- Existing natural flows will be maintained where possible as part of the drainage system design and any change to the natural/pre-development surface water conditions within the site to be minimized to the extent possible.
- Scheduling to avoid construction activities during heavy rainfall periods (i.e., during the wet season) to the extent practical. In addition, this will include modifying or suspending activities during extreme rainfall and high winds to the extent practical.
- Salvage and store topsoil and subsoil before areas are excavated, with topsoil stripped and stockpiled separately.
- 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 sites during site preparation and construction to prevent

silt runoff where applicable. This could include but not limited to silt fences, gravel bag berms, fiber rolls, or other similar applications.

- Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible.
- Specifically in terms of road design the following shall be considered:
 - All roads shall be graded and shaped appropriately;
 - Provision of limiting access road gradients to reduce runoff-induced erosion;
 - Provision of effective short-term measures for slope stabilization, sediment control and subsidence control;
 - On steep sections of access road, transverse drains ('grips') will be constructed where appropriate in the surface layer of the road to divert any runoff off the road into swales/roadside drains; and
 - To reduce damage to soil and risks of soil erosion, the length and width of the on-site and off-site roads should be with the route optimized to reduce the need for cut-and-fill material. Run-off and erosion control features should be included in designs.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance can be reduced to not significant.

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 Climate and Meteorology

This section discusses the potential impacts anticipated from the various Project phases to include the planning, construction and operation phases. For each identified impact, a set of mitigation measures and monitoring requirements have been identified to eliminate the impact or reduce it to acceptable levels.

The key risks on climate and meteorology are related to the following:

- Impacts on occupational health and safety from onsite construction and operational works related to extreme climate conditions such as sandstorms, extreme heat, etc. Such risks have been assessed under "Section 8.12" and applicable mitigation and monitoring measures have been identified.
- Impacts on ensuring appropriate worker accommodation considering climatic conditions such as extreme heat, extreme cold, etc. Such risks have been assessed under "Section 8.12" and applicable mitigation and monitoring measures have been identified.
- Impacts on worker health and safety from transportation activities during construction and operation (e.g. worker transportation to/from local community areas, component transportation, etc.) related to extreme climate conditions such as sandstorms, etc. Such risks have been assessed under "Section **Error! Reference source not found.**" and applicable mitigation and monitoring measures have been

identified.

Taking the above into account, there are no further requirements to be considered.

8.6 Biodiversity

This section identifies and assesses the anticipated impacts from Project activities on identified ecological receptors during the construction and operation 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.

All mitigation measures contained in this section will be included in a Project specific Biodiversity Management Plan which will also include details of pre-clearance, pre-construction, and during-construction monitoring.

Sensitive Receptors

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 and mitigation and monitoring for these species will be included in a Biodiversity Management Plan.

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.

Monitoring will need to be completed to ensure no net loss of PBFs during the operational phase.

It is considered that the Project has met the requirements as set out in IFC PS6 Paragraph 17 and the measures detailed below will be included in the management plan documents. These documents will also set out measures designed to achieve No Net Loss for those species defined as PBFs.

Table 67: Summary of Sensitive Receptors and Species

Receptor	Conservation Status IUCN	Justification	PBF (yes or no)	Sensitivity
Habitat	-	Site habitats are common for the wider region in Egypt, and is considered to have no specific importance, vulnerability or potential for consideration as a critical habitat.	No	Low
Flora	-	Flora is moderately diverse, however no IUCN CR, EN, VU species and no endemic or near-endemic species were noted within the Aol.	No	Low
Small Mammals	-	Two species of small mammal were noted during live trapping, all of which were IUCN least concern.	No	Low
Egyptian Spiny-tailed Lizard	VU	63 Spiny-tailed Lizard were recorded during line transects and further inactive burrows/field signs (a total of 92 observations of presence recorded). This is a high population of an IUCN Vulnerable species.	Yes*	High
Other Reptile Species	-	Four additional species of reptile were noted during line transects and pit-fall traps in very low numbers. All species were IUCN Least Concern.	No	Low

Mammal Species	LC	Red Fox was recorded regularly but is an IUCN LC species, along with a single domestic dog.	No	Low
Invertebrate species	LC	All species recorded are IUCN LC	No	Low

* One PBF species have been identified under EBRD Criteria 2 - Vulnerable Species

8.6.1 *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 partially disturbed and degraded 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). Habitats are valued as being of Low Sensitivity as they are not listed as Priority Habitats and are already degraded, e.g. there are tracks and quarries throughout the area. 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. site offices) as well as cabling and communication routes.

Habitat loss has been discussed with respect to habitat and flora itself but not in regard to fauna. The list of terrestrial fauna present on site from surveys is presented below. Most species are IUCN Least Concern, however one species is categorized as IUCN Vulnerable (VU): Egyptian Spiny-tailed Lizard. This species has specific individual mitigation measures in place to ensure no harm comes to the species during works and these are detailed further below.

Loss of habitat supporting terrestrial fauna 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 physical 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, 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 with the enhancement of around 1.58 km² (this is preliminary) using appropriate, native planting in suitable parts of the Project Area. This will ensure no loss of available terrestrial habitats for these widespread species. Planting within these areas will be 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.

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.

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 of minor significance overall.

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 and relevant receptors highlighted to the site staff.
- Prior to construction works, working areas will be clearly demarked (using appropriate 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 1.58 km² as a preliminary footprint 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 into the AoI on vehicles or within any imported soil material. The impacts of non-native and introduced flora could be moderately 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, which are irreversible (if allowed to become established) and moderately 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 removed from close proximity of 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 as far as possible 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 from further afield.
- Adequate wheel-washing facilities to be constructed at the entrance to the site (e.g. at the north-eastern or south-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 have the potential to negatively impact sensitive ecological receptors (e.g. reptiles, mammals) as a result of direct mortality.

Animals that are on site, such as the Egyptian Spiny Tailed Lizard (IUCN VU), are likely to be exposed to impacts during construction as they are a diurnal species meaning they will be mobile while site works are active. The site also offers suitable burrowing habitat, which could be damaged during construction. Unmitigated, impacts on Egyptian Spiny-tailed Lizard could potentially be medium-term and irreversible (e.g. loss of breeding habitat and mortality) and of high significance.

Mitigation Measures

A summary of mitigation measures to avoid and mitigate for direct impacts on sensitive vertebrate receptors is included below. These measures will be included in a Biodiversity Management 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 and relevant receptors highlighted to the site staff.
- Prior to construction works, working areas will be clearly demarked (using appropriate 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.
- Pre-construction surveys for sensitive species (i.e. those qualifying Priority Biodiversity Features) of herpetofauna will take place. The locations of known/active burrows used by Egyptian Spiny-tailed Lizard will be marked throughout the Project Area and appropriate buffers around each burrow established.
- 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;
 - Preferably be within the project wide boundary but certainly 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.

- Not within another existing or proposed development site (or where there is likely to be a proposed site).
- Capture and movement of Egyptian Spiny-tailed Lizards will only be completed as a last resort. All works will aim to be completed at least 100m from active burrows. Locations where burrows are present up to 200m 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 captured and 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 pre-construction 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 Egyptian Spiny-tailed Lizard burrows any remaining burrows within 100m 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 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.
- Where possible animals will be moved to existing, but inactive, burrow sites – as long as the site is still suitable for use, with nearby food and cover plants etc.
- Studies have shown that soft releasing Egyptian 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 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).

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 30 kph will be enforced by the EPC Contractor on all site roads.
- 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 20kph.
- 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 50m from the road to reduce the likelihood of hitting scavengers, including birds of prey.
- A chance find procedure will be developed by the EPC Contractors 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 Egyptian Spiny-tailed Lizard for food, trophy or to be sold. Species such as Red Fox and snakes 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. 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 AoI. 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 Minor 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 where receptors may temporarily abandon the area during the construction period. It is likely that any disturbance impacts, irrespective of duration will be reversible once the disturbance event has passed.

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.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Reduced Air Quality / Dust

The habitat across the AoI is very sandy. It is likely that construction related ground disturbance will 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.
- Emissions from the batching plant will be monitored in line with control plans to minimize air pollution.

Direct Impacts on Sensitive Receptors (Vertebrates) – Noise

Noise as a result of construction can result in direct impacts on 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 minor to moderate significance.

Mitigation Measures

- Vehicles will be properly maintained to minimize noise emissions.

- Use of available technology and management practices within 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 mammal species. 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 minor significance given the small number of mammals present. Mitigation measures will help all nocturnal site use by other animals.

Mitigation Measures

- Limit the amount of lighting, especially within the wider Aol (e.g. at turbine construction sites). Night-time working is not anticipated and will certainly not be a regular occurrence. This will be achieved by ensuring that night-time working is only undertaken with appropriate justification, e.g. emergency works.
- 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 Aol 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 minor to major 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 attract 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 pests live traps will be used, in order 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. 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 pests 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.

8.6.2 Potential Impacts during the Operation Phase

Indirect Impacts on Sensitive Receptors (Vertebrates) – 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 have be very short-term (for the duration of the disturbance impact) and reversible and is likely to only result in impacts of low magnitude. The significance of operational disturbance is therefore considered to be minor, at worst.

Mitigation Measures

- Speed limits of 30 kph will be enforced by the O&M Contractor
- Sensitive species are to be included in the site induction for all operational staff where additional control measures will be discussed including allowing animals to move around the site, not chasing after them in vehicles or approaching them on foot

Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions

Vehicle related collision are 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 30 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 20 kph
- 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 50m from the road to reduce the likelihood of hitting scavengers, including birds of prey.
- A chance find procedure will be developed by the O&M Contractors so that all workers report any road collisions so that any such incident can be investigated in full and included in ongoing mortality monitoring at the site.

Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting

Lighting could potentially result in negative impacts of a range of ecological receptors including those of high sensitivity.

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 minor 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.
- No lighting will be installed along access road

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 the operational 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.

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 pests 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 /

non-native 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 AoI. 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.
- All of the above monitoring requirements will be included within Biodiversity Management Plans which will include Key Performance Indicators (KPIs) against which the results of the monitoring will be assessed.

8.7 Avi Fauna

This section identifies the anticipated impacts on birds (avifauna) from the Project throughout its various phases. For each impact, a set of management measures, including mitigation and monitoring measures, and additional requirements, which have been identified to reduce, or eliminate, the impact to acceptable levels.

8.7.1 *Potential Impacts during the Construction Phase*

Site preparation activities by the EPC Contractor for installation of the WTGs and associated components, like the substation, transmission cables, access roads and internal road network, or buildings, are expected to include land clearing activities, levelling, excavation, grading.

Such activities can impact the avifauna which potentially uses the site for resting – it does not matter if being soaring or non-soaring resident and migratory species. Generally, such construction activities do not result in any major alteration of the site's habitats given that they are limited to a small individual footprint, and the area of disturbance is quite reduced.

The potential impacts are created during the construction phase only, and of a long-term duration. However, such impacts are considered of negative nature and of a low magnitude given that the construction activities' actual area of disturbance is relatively minimal. The environmental receptor is determined to be of a medium sensitivity. Given all of the above, such an impact is considered to be minor significance.

Mitigation Measures by the Developer/EPC Contractors

- Implementation of proper housekeeping measures to reduce impacts including:
 - A complete additional survey comprising the entire breeding cycle of the Golden Eagle species would be necessary to properly assess the potential impact of this, and other similar projects planned near the mountains and suitable cliffs. This monitoring should be developed with experts on the species, and GPS tagging highly recommended to save time and improve budgets. This monitoring could be shared by other developers in a similar situation.
 - A species-specific additional study with experts for the observed Scooty Eagles (apart of the normal migration monitoring) on the potential breeding of the species in the Project area, and others in the vicinity should be done prior to operational phase.
 - Should the additional assessments indicate highly sensitive areas for resident species, then

additional mitigation and monitoring measures will be required. This could include the use of Automatic Detection Cameras (ADC) or additional resources. The most feasible option considering biodiversity and commercial criteria should be determined based on the outcomes of the additional assessment in compliance with the experts' opinion of the two affected species.

- IF CONFIRMED, and depending on the distance of the works to potential breeding sites, works will be restricted to be performed out of the breeding seasons. A buffer of 2 km will apply to any nest (occupied or not by the eagles /colony for the falcons. Restrictions to apply after detailed study for both species, at least for one complete breeding season.
 - If breeding is confirmed within the area of influence, construction works will be limited during the breeding season period applicable within a buffer of 2 km. Blasting will be banned in case of being necessary.
 - Restrict activities exclusively to the allocated construction areas, including movement of workers and vehicles to allocated roads within the site, prohibiting off-roading to minimize disturbances.
 - Ban hunting of birds on site at any time and under any condition to anyone, especially workers.
 - Implement measures, preventing bird attraction to the site. This includes measures such as prohibiting littering, dumping, and ensuring waste streams are disposed appropriately in accordance with the measures identified in earlier.
 - Avoid unnecessary elevated noise levels at all times. In addition, apply adequate noise abatement measures. This could include the use of well-maintained mufflers and suppressants for high noise generating equipment and machinery. Develop a regular maintenance schedule of vehicles, machinery, and equipment for early detection of issues to avoid unnecessary elevated noise level, etc.
- Reduced speed limits inside the footprint to avoid road kills and dust.
 - Report any incidental finding and killing of wildlife. Develop a protocol to report dispose of any dead and injured wildlife or animals recorded onsite.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant.

Monitoring and Reporting Requirement

The following summarizes the monitoring requirements for the projects which must be undertaken and which include:

- EPC Contractors to submit the construction schedule and plan and demonstrate that construction is planned avoiding to areas of concern during breeding season.
- Submission of an animal handling protocol, either dead or alive.

8.7.2 Potential Impacts during the Operation Phase

Wind turbines have the associated collision impact on birds from risks of collision and electrocution for any kind of bird.

For the Golden eagle and Sooty falcon, if the additional assessments indicate highly sensitive areas for resident species, then additional mitigation and monitoring measures will be required. This could include the use of Automatic Detection Cameras (ADC) or additional resources. The most feasible option considering biodiversity and commercial criteria should be determined based on the outcomes of the additional assessment in compliance with the experts' opinion of the two affected species".

For the use of ADS, it is highly recommended for the developer, to plan before construction their potential costs, to be included in the financial model prior to disbursement by the lenders. This, will minimize the impact of the operational phase in the finances.

Related to migration: Egypt is one of the main Flyways for migratory soaring birds (MSBs) crossing from breeding grounds in Europe and Asia to their wintering areas in Africa (Rift Valley-Red Sea Flyway-RVRSF). The high wind energy potential in the Gulf of Suez (GoS) speeded up the development of wind energy facilities. The principal risks to migratory and resident bird species are the fatal collisions with turbines and overhead powerlines and disturbance/barrier effects.

Given the importance of the area for bird migration, and the implementation of related international commitments, the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) initiated the "Active Turbine Management Program" (ATMP) aiming to determine the optimum wind turbines operations periods during the heavy bird migratory seasons (spring and autumn) during pre, under, and post-construction phases of wind farms.

This program aims to ensure the protection and risk mitigation of the environment while increasing the feasibility and the productivity of the wind projects over the project lifetime. Therefore, RCREEE has succeeded in launching the study and providing an innovative coordination and execution strategic framework among public and private stakeholders, including three governmental institutions; the New and Renewable Energy Authority (NREA), the Egyptian Environmental Affairs Agency (EEAA) and the Egyptian Electricity Transmission Company (EETC) by releasing a Bird Migration Protocol (BMP) called the "*Executive Framework for Strategic Cumulative, Environmental & Social Assessment & Program of Ornithological monitoring and Active Turbine Management for Wind Energy Developments in Gulf of Suez*". One of the objectives of the Bird Migration Protocol is to strengthen the protection of birds in their migration path in Egypt from the potential effects of wind-energy projects through a series of practical activities in the GoS area, as well as facilitate cooperation among relevant stakeholders.

Objective

The goal of this section is to provide field documentation of migration patterns of MSBs across the Project Area for wind turbines, and to assess potential associated collision risks. This report will aim to present the following in particular for Project based on the spring and autumn 2025 periods. The objective of the assessment within this section is to:

- Identify species and numbers of birds migrating through the area
- Identify the flying bird numbers at risk height for wind turbines; and
- Evaluate the Collision Risk of the different species according to Collision Risk Modelling (CRM).

Collision Risk Modelling and Flying at Risk

General introduction to CRM

The Collision Risk Model (CRM) is a simplified model developed to predict the potential impact of wind turbines on birds. There exist several CRM models developed / improved around the world, being one of the most used that known as the Band model (SNH 2012). It must be clear that the CRM was not developed to provide a threshold of collisions, but an order of magnitude which would help the authorities –when it was designed- as a way to decide on project permitting purposes. A full and detailed development of the model can be read in Band, Madders, and Whitfield (2001) Developing field and analytical methods to assess avian collision risk at wind farms. In: De Lucas, Janss, and Ferrer (Eds). Birds and wind farms: Risk assessment and mitigations.

It is also important to mention that the model was developed in Scotland, where the major migratory routes like the RVRSF do not exist, and also scientific literature afterward, provided evidences of the lack of consistency between the pre and post construction monitoring at wind facilities; predicted risks rarely matched with the observed ones, once the wind farms became operational. See in this regard Ferrer et al. (2012) Weak relationship between risk assessment studies and recorded mortality in wind farms. *Journal of Applied Ecology* 2012, 49. This study was also developed along another major bottleneck in the Western Palearctic where lower numbers – around 500,000 MSBs- but similar species occur. The analysis below provides further insight about collision risk flights, the data collected.

This project has only completed two migratory season (Spring & Autumn 2025) It is well known that collision risk flights greatly change within seasons for different years (e.g., two consecutive springs). These changes between years within the same season suggest that the data are not comparable between them, and reinforces the idea of the low value to make any concrete or informed predictions. Other variations for the remaining species should not be considered as indicative, because of the low numbers of birds observed (usually < 5 individuals each), and some of the species which were not detected in one year would have passed through the site despite not being recorded by the observers. In other words, the numbers of birds at risk height differ between seasons, and data should not be used to estimate collision for one year as it could differ significantly during the second year.

The model for the two types of turbines selected appears in the table below.

Table 68: Turbine specifications used for the CRM

Model	Goldwind GWH204-10.5MW)
Rated Capacity	Up to 11MW
Rotor Diameter	up to 210 m
Hub-Height	117 m
Maximum speed of the blade tips	Not provided
Blade Chord Length	No provided
Number of WTGs	Up to 90

Data inputs for the CRM analysis were derived from the results of the VP surveys, as well as the above-mentioned turbine specifications and the following assumptions:

Rotation speed (rpm)	7.5	Average value calculated from manufacturer's Specifications for similarly-sized turbine.
Percent of time operational	Monthly values ranging from 64% to 85%	Project specific data not available, representative values taken from SOSS example

Maximum blade width (m)	4.5	Not provided
Pitch (degrees)	47.5	Not provided

In addition to bird densities derived from VP survey data, CRM makes use of physical and observational characteristics of avifauna species. Input values used in the CRM analysis are presented in the table below. Data on physical dimensions of birds were derived from Cornell Lab of Ornithology's Birds of the World (<https://birdsoftheworld.org>), while information specific to the VP survey observations, such as typical flight speeds derived from Alerstam et. Al. (2007), flight styles, and maximum effective radius of observation/identification were generated using input from the databases.

Table 69: Physical and observational characteristics of each bird species included within the CRM analysis.

Scientific name	English Common Name	Length (m)	Wingspan (m)	Flight type	Flight speed
<i>Milvus migrans</i>	Black Kite	0.55	1.37	gliding	11.7
<i>Ciconia nigra</i>	Black Stork	1	1.55	gliding	16
<i>Aquila pennata</i>	Booted eagle	0.51	1.38	gliding	11.3
<i>Grus grus</i>	Common Crane	1.08	1.9	flapping	16.67
<i>Falco tinnunculus</i>	Common Kestrel	0.31	0.68	flapping	13.9
<i>Aquila heliaca</i>	Eastern Imperial Eagle	0.71	1.9	gliding	18.06
<i>Neophron percnopterus</i>	Egyptian Vulture	0.62	1.6	gliding	13.9
<i>Gyps fulvus</i>	Eurasian Griffon	1.01	2.52	gliding	19.4
<i>Falco tinnunculus</i>	Eurasian Kestrel	0.31	0.68	flapping	13.9
<i>Accipiter nisus</i>	Eurasian Sparrowhawk	0.34	0.67	flapping	19.4
<i>Pelecanus onocrotalus</i>	Great White Pelican	1.56	2.93	flapping	15.6
<i>Clanga clanga</i>	Greater Spotted eagle	0.71	1.8	gliding	11.7
<i>Pernis apivorus</i>	Honey Buzzard	0.6	1.5	flapping	18.06
<i>Falco naumanni</i>	Lesser Kestrel	0.31	0.66	flapping	13.9
<i>Clanga pomarina</i>	Lesser spotted eagle	0.67	1.68	gliding	11.7
<i>Accipiter brevipes</i>	Levant Sparrowhawk	0.37	0.74	flapping	11.1
<i>Buteo rufinus</i>	Long-legged Buzzard	0.53	1.3	gliding	16.67
<i>Circus pygargus</i>	Montagu's Harrier	0.49	1.23	gliding	8.4
<i>Pandion haliaetus</i>	Osprey	0.66	1.59	gliding	11.4
<i>Circus macrorus</i>	Pallid Harrier	0.46	1.1	gliding	11.1
<i>Falco vespertinus</i>	Red-footed falcon	0.32	0.75	flapping	12.8
<i>Falco cherrug</i>	Saker Falcon	0.51	1.12	flapping	22.2
<i>Circaetus gallicus</i>	Short-toed Snake-Eagle	0.66	1.77	gliding	11.3
<i>Falcon concolor</i>	Sooty falcon	0.36	0.88	flapping	11.3
<i>Buteo buteo</i>	Steppe Buzzard	0.46	1.23	gliding	16.67
<i>Aquila nipalensis</i>	Steppe Eagle	0.7	1.9	gliding	18.06

<i>Circus aeruginosus</i>	Western Marsh-Harrier	0.48	1.3	gliding	11.1
<i>Ciconia ciconia</i>	White Stork	1.02	1.65	gliding	16

The table below shows the number of birds at a collision height of 240 m, according to the wind turbine plans in the Table above. The turbine tip height (hub plus blade) is 219.17 m and the clearance height is 13.5 m. On the other hand, the bird observational data has been collected into the following height intervals: 1 to 50m, 50-120, 120-180, 180-240, 240-300, 300-500, and above 500 m.

The lack of field references for the observers, but also trials to test their accuracies when estimating flying height, makes us to consider a precautionary principle with the following conditions:

- Any MSB bird flying at the clearance height is considered risk
- The maximum risk of collision height has been set at 240 m, as it is the closer bird recording height compared to the rotor swept maximum height, which is 220.

Published and validated avoidance rates (AR) were not available for several of the species, yet the AR parameter is well-known to be a very important parameter in Band CRM analysis, with outcomes very sensitive to slight variations (Cook et. al, 2012). For each species included within the CRM analysis, a “most realistic” AR parameter value, bounded by a “conservative” low parameter estimate (95%), and a high estimate (99.9%) was developed, reflecting an upper bound, based on a comprehensive review of available literature. Considering these two boundaries, the extent of avoidance rates considered in the literature were incorporated.

The flight duration of the target species was recorded at minute’s intervals, as per data recorded and included in the database.

Table 70 Observational data from the VP surveys used to derive bird density inputs for the spring CRM analysis in spring 2025. For all species shows the percentage and time of flights at risk height.

Species	No risk	Risk 240	Total	% Risk
Black kite	3,818	8,493	12,311	68.99
Black stork	182	742	924	80.30
Booted eagle	65	322	387	83.20
Crested Honey Buzzard	0	1	1	100.00
Egyptian vulture	39	160	199	80.40
Elenora's Falcon	0	1	1	100.00
Eurasian sparrowhawk	29	90	119	75.63
European Honey Buzzard	3,363	8,384	11,747	71.37
Eastern Imperial eagle	3	12	15	80.00
Great White pelican	3,013	15,457	18,470	83.69
Levant Sparrowhawk	2,281	1,630	3,911	41.68
Lesser spotted eagle	439	1,103	1,542	71.53
Long-legged Buzzard	8	125	133	93.98
Marsh harrier	7	58	65	89.23
Montagu's harrier	0	5	5	100.00
Osprey	5	24	29	82.76
Pallid harrier	0	2	2	100.00

Short-toed eagle	189	678	867	78.20
Lanner falcon	0	8	8	100.00
Steppe buzzard	10,669	37,342	48,011	77.78
Steppe eagle	1,954	7,403	9,357	79.12
Common Crane	8	0	8	0.00
White stork	10,839	38,811	49,650	78.17

Table 71 Observational data from the VP surveys used to derive bird density inputs for the spring CRM analysis in autumn 2025. For all species shows the percentage and time of flights at risk height.

Species	No risk	Risk 240	Total	% Risk
Black kite	518	109	627	17.38
Black stork	12	3	15	20.00
Booted eagle	10	7	17	41.18
Crested Honey Buzzard	0	1	1	100.00
Egyptian vulture	1	31	32	96.88
Elenora's Falcon	0	1	1	100.00
Demoiselle crane	9	0	9	0.00
European Honey Buzzard	3,117	2,712	5,829	46.53
Lanner falcon	2	4	6	66.67
Great White pelican	13,353	10,092	23,445	43.05
Levant Sparrowhawk	5	0	5	0.00
Lesser spotted eagle	2	2	4	50.00
Long-legged Buzzard	8	24	32	75.00
Marsh harrier	6	57	63	90.48
Montagu's harrier	0	9	9	100.00
Osprey	0	1	1	100.00
Pallid harrier	0	10	10	100.00
Short-toed eagle	1	4	5	80.00
Eastern Imperial eagle	-	-	-	-
Steppe buzzard	77	101	178	56.74
Steppe eagle	11	11	22	50.00
Common Crane	-	-	-	-
White stork	20,824	26,841	47,665	56.31

Published and validated avoidance rates (AR) were not available for several of the species, yet the AR parameter is well-known to be a very important parameter in Band CRM analysis, with outcomes very sensitive to slight variations (Cook et. al, 2012). For each species included within the CRM analysis, a “most realistic” AR parameter value, bounded by a “conservative” low parameter estimate (95%), and a high estimate (99.9%) was developed, reflecting an upper bound, based on a comprehensive review of available literature. Considering these two boundaries, the extent of avoidance rates considered in the literature were incorporated.

Table 72: Published Avoidance rates (AR) for several bird species

Species	Low	Mid	High
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Golden Eagle ³⁶ <i>Aquila chrysaetos</i>	98.1	99.58	99.9
Imperial Eagle <i>Aquila heliaca</i>	98.1	99.58	99.9
Steppe Eagle ¹ <i>Aquila nipalensis</i>	98.1	99.58	99.9
Honey Buzzard ² <i>Pernis apivorus</i>	95	99	99.5
Saker Falcon ¹ <i>Falco cherrug</i>	99.5	99.8	99.9
Eurasian Griffon ³ <i>Gyps fulvus</i>	98	99	99.5
Egyptian Vulture ⁴ <i>Neophron percnopterus</i>	99	99.58	99.9
Great White Pelican <i>Pelecanus onocrotalus</i>	95	99	99.5
Eurasian Sparrowhawk ¹ <i>Accipiter nisus</i>	99	99.5	99.9
Common Buzzard ¹ <i>Buteo buteo</i>	97.8	99.5	99.9
Long-legged Buzzard ¹ <i>Buteo rufinus</i>	97.8	99.5	99.9
Short-toed Snake-Eagle ⁵ <i>Circaetus gallicus</i>	98.1	99.58	99.9
Eurasian Marsh-Harrier ⁵ <i>Circus aeruginosus</i>	95	99	99.9
Pallid Harrier ⁵ <i>Circus macrourus</i>	95	99	99.9
Lesser Kestrel ¹ <i>Falco naumanni</i>	87.3	96.9	99.9
Eurasian Kestrel ¹ <i>Falco tinnunculus</i>	87.3	96.9	99.9
Common Crane ² <i>Grus grus</i>	95	99	99.5
Black Kite ⁶ <i>Milvus migrans</i>	98	99.2	99.85
Black Stork ² <i>Ciconia nigra</i>	95	99	99.5
Booted Eagle ² <i>Aquila pennata</i>	95	99	99.5
Greater spotted Eagle ² <i>Clanga clanga</i>	95	99	99.5
Lesser spotted eagle <i>Clanga pomarina</i>	95	98	99
Levant Sparrowhawk <i>Accipiter brevipes</i>	95	98	99
Montagu's Harrier <i>Circus aeruginosus</i>	95	98	99
Osprey <i>Pandion haliaetus</i>	98	99.2	99.5
White Stork ² <i>Ciconia ciconia</i>	95	99	99.5

(i) **Spring 2025**

The output of the CRM should be interpreted as a magnitude of the impact rather than a true value of the number of fatalities. The tables below show the estimated fatalities according to three avoidance rates. A rank of high (red), medium (yellow), low (green), and negligible collision risk was established based on the outputs of the CRM after scaling the fatalities to make them comparable among species.

Table 73: Collision Risk estimates for a 240m risk height in spring 2025

Species	Avoidance 99.5%	Avoidance 98%	Avoidance 95%	Risk
Black kite	312	1,248	3,119	Medium
Black stork	23	92	230	Lower
Booted eagle	10	39	97	Lower
Crested Honey Buzzard	0	0	0	Lower

³⁶ Whitfield and Madders (2006a), ²Cook et al.(2012), Vasilakis et al. (2012), ⁴ Whitfield and Madders(2009),
⁵Whitfield and Madders (2009), SNH (2010),

Species	Avoidance 99.5%	Avoidance 98%	Avoidance 95%	Risk
Egyptian vulture	5	18	45	Lower
Elenora's Falcon	0	0	0	Lower
Eurasian sparrowhawk	3	11	27	Lower
European Honey Buzzard	261	1,042	2,605	Medium
Eastern Imperial eagle	0	1	3	Lower
Great White pelican	468	1,873	4,678	Medium
Levant Sparrowhawk	89	356	890	Lower
Lesser spotted eagle	35	140	351	Lower
Long-legged Buzzard	3	13	32	Lower
Marsh harrier	1	6	15	Lower
Montagu's harrier	0	0	1	Lower
Osprey	1	3	7	Lower
Pallid harrier	0	0	0	Lower
Short-toed eagle	20	79	197	Lower
Lanner falcon	0	1	2	Lower
Steppe buzzard	1,218	4,870	12,169	Highest
Steppe eagle	213	852	2,129	Medium
Common Crane	0	0	0	Lower
White stork	1,130	4,509	11,227	Highest

The table above shows the collision risk magnitudes. These values were re-scaled to 0-1 rank for a proper classification of the potential risk. The highest value is for the White stork (maximum risk of collision with red colour in the Table), followed by the steppe buzzard (risk scale 0.46, yellow), a group of three species including the European Honey Buzzard, Great White Pelican, and the Black kite (green). A fourth (lower risk compared to the previous ones) includes the Levant Sparrowhawk, Black stork, Short-toed eagle, and Booted eagle.

(ii) Autumn 2025

Table 74: Collision Risk estimates for a 240m risk height in autumn 2025

Species	Avoidance 99.5%	Avoidance 98%	Avoidance 95%	Risk
Black kite	14	56	139	Lowest
Black stork	0	1	3	Lowest
Booted eagle	0	2	4	Lowest
Crested Honey Buzzard	0	0	0	Lowest
Egyptian vulture	1	3	7	Lowest
Elenora's Falcon	0	0	0	Lowest
Eurasian sparrowhawk	0	0	0	Lowest
European Honey Buzzard	129	517	1293	Medium
Eastern Imperial eagle	0	1	1	Lowest
Great White pelican	561	2242	5601	Medium

Species	Avoidance 99.5%	Avoidance 98%	Avoidance 95%	Risk
Levant Sparrowhawk	0	0	0	Lowest
Lesser spotted eagle	0	0	1	Lowest
Long-legged Buzzard	1	3	8	Lowest
Marsh harrier	2	7	16	Lowest
Montagu's harrier	0	1	2	Lowest
Osprey	0	0	0	Lowest
Pallid harrier	0	1	2	Lowest
Short-toed eagle	0	0	1	Lowest
Eastern Imperial eagle	Species not recorded in the autumn 2025			
Steppe buzzard	5	18	46	Lowest
Steppe eagle	1	2	5	Lowest
Common Crane	Species not recorded in the autumn 2025			
White stork	1085	4329	10779	Highest

The table above shows the collision risk magnitudes. They are the highest for the White stork, followed by the Steppe buzzard and Marsh harrier, and a series of species with lower predictions. Among these, there is the Egyptian vulture and the Sooty falcon, the first classified under the Endangered (EN) category and the second as Vulnerable (VU) by the IUCN. As for the spring, the species with a higher risk is the White Stork, followed by the Steppe buzzard.

Knowledge about Existing Fatalities and Current Operational Wind Farms

The CRM makes several assumptions when data were not available including the monthly proportion of time operational (proportion of time when a turbine is rotating). It excludes occurrences when the wind is below cut-in wind speed, when the rotors may be stationary or idling; occurrences when the rotors are stopped and feathered for protection in very high wind speeds; and down-time for operations and maintenance (O&M). These proportions vary over the year, reflecting different wind conditions in different seasons, and the increased opportunities for maintenance access in summer. The frequency distribution of winds nor the tested effect that weather conditions (wind speed and direction, temperature) and their influence on flight altitudes, direction and bird sightings over the site were not available. These weather variables have been demonstrated to affect bird's occupancy and flight.

Because of the above, also represented is the proportion of risk flights according to time of the day, to inform how the risk varies and how the situations could require more or less active mitigation attention.

Some non-systematic processed information comes from the existing wind farms in the region, within the NREA area or current operational monitoring, e.g., Lekela West Bakr. A peer-review of the existing reports showed (pers. obs.) that there is still required a process on collecting and analysing the post-construction fatality data. Thus, only qualitative information was used about fatalities in the region. One of the representative papers is that from Riad³⁷ (2022) which collated data from March 2019 to May 2022 from wind farms in the NREA area, recording 59 fatalities with wind turbines. The most affected species in order of importance were the White stork, followed by a second group formed by the Black kite, Steppe Buzzard

³⁷ Riad, S. 2022. Egypt. Acad. J. Biolog. Sci., 14(2): 19-33 (2022)

and Honey Buzzard, and all the remaining species: Lesser Spotted and Steppe eagles, Eurasian Sparrowhawk, Montagu's and Marsh harriers, and Common Kestrel.

Sensitivity of the Project Site

The baseline assessments have recorded high numbers of migratory soaring birds over the Project site and its vicinity. Some of those recorded species have an important status on the international or national levels. The baseline assessment concludes that the site is considered within a highly sensitive area in terms of avifauna. Additionally, the Project site is considered to be located along an intensive migration route. Taking all of the above into account, the receiving environment is considered of high sensitivity.

Magnitude of the Impact

The collision risk model (CRM) assessment data in the tables above are helpful for assessing impacts. The results suggest:

- In general, collision risk to all species is significantly lower in the autumn compared with the spring migration period.
- For the majority of MSBs passing through the project site airspace during spring and autumn migration, the risk of collision is low or zero.
- Most species had low or zero predicted collision rates when assessed either seasonally or annually. Six species had higher CRM estimates (Steppe Buzzard, European Honey-buzzard, Black Kite, Greater White Pelican, and Steppe Eagle).
- Based on the predicted seasonal and annual collision rate estimates, two species have the potential to be substantially impacted by the project: the White stork Buzzard and the Steppe Buzzard. The impacts for both species are likely to be greatest during spring migration without mitigation. In the autumn season, impacts are of lower risk.
- Six globally threatened MSBs pass through the project airspace. These are Steppe Eagle and Egyptian Vulture, (IUCN – Endangered), Eastern Imperial Eagle, Sooty Falcon, Greater Spotted Eagle (IUCN – Vulnerable) and Pallid Harrier (IUCN-Near Threatened). All these species had a very low predicted collision rate (around 1) with the lowest avoidance rates (95%) with the exception of the Steppe Eagle.

The CRM estimates indicate that for most MSB species including those globally threatened or near-threatened the impacts are likely to be low, however uncertainty relating to migration activity between years may mean that impacts could be higher and, in some cases, reach or exceed acceptable thresholds. Overall, there is potential for a noticeable change to occur and acceptable limits are likely to be breached for non-threatened species but not for the majority of MSBs, therefore the assessment concludes medium magnitude of impact

Based on the above, the impact significance for the wind power project is assessed as Moderate, based on high receptor sensitivity and a medium magnitude of effect.

For the Golden eagle and Sooty falcon – until full assessments being done- the magnitude of the impact may be High, and the impact assessed as High as a precautionary principle in ESIA.

Residual Impacts

The Project will need to implement comprehensive turbine shutdown on demand with observers, or any other additional measure for resident species, and associated flight activity monitoring programs to mitigate turbine collision risk and identify and respond to emerging risks. This monitoring could include GPS tagging also during the operational phase for the breeding species.

The shutdown program will need to have the capacity to implement extended shutdown in response to predicted high migration intensity and/or environmental conditions that may lead to elevated risk situations. This type of shutdown will need to be implemented until the high collision risk situation has abated. Comprehensive and systematic fatality monitoring around turbines will be required to provide feedback on shutdown efficacy and as a trigger for adjusting the scale of shutdown required. Provided these measures are implemented to Good International Industry standards, evidence from operational wind projects in the Gulf of Suez operating this level of mitigation suggests that the significance of residual impact can be reduced to moderate.

The following identifies the mitigation and monitoring measures to be applied during operation phase. Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to moderate.

Mitigation and Monitoring Measures

(iii) Site Specific Design Requirements

As discussed within “Section 1.1” earlier the Strategic Environmental and Social Impact Assessment was undertaken for the 300 km² area identified specific requirements for site constraints related to avifauna. These included requirements such as the below:

- Avoid continuous lighting of turbines. Use minimum number of intermittent flashing lights in accordance with civil aviation authority requirements.
- After preliminary studies and permission, Assisted Automatic Shut-down on Demand Devices (ADS) may be tested to reduce fatalities. It will need permission and robust analyses of its effectiveness. This could be important for the resident Golden Eagle.
- Given the very 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 led Shut Down on Demand is considered necessary as predicted mortality for all species is likely to result in moderate or major negative impacts.
- Minimum distances between wind turbines to be not less than 2.5 of rotor-diameter (D) and 7D between the turbines rows to provide corridors for bird migration;
- Shutdown on demand will take place ensuring the following principles are followed:
 - All of the turbines and a buffer area will be covered by constant observation.
 - The buffer will ensure that enough time is available for WTG to be shut down when birds approach.
- Should shut down on demand be observer led:

- Observers will work in pairs and in shifts to ensure a vigilant effort from observers.
- Observers will communicate both with shut down operatives and other observers to ensure effective practices
- Shut down protocol will undertake discussion with other operatives in the region to discuss best practice for the location

EEAA has approved the installation of 200m or even bigger turbines in the GoS. Such conditions are now typically included within the environmental permit issued for each Project. Therefore, for this project such site-specific requirements are expected to be identified once the ESIA is submitted to EEAA and the environmental permit is issued. Based on the consultant's experience from other projects, this is expected to include the following which the current layout already meets:

- Minimum distances between wind turbines should not be shorter than $2.5 \times$ rotor-diameter;
- Adhere to a buffer area of $7 \times$ rotor-diameter between turbine rows;

(iv) Strategic E&S Assessment / Cumulative Impact Assessment for GoS

It is recommended that RCREEE undertake at the cumulative level for all wind farms within the GoS region a Strategic E&S Assessment / Cumulative Impact Assessment 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 – please refer to “Section 2.7” for full list of wind farm projects within the GoS region.

(v) Avi-Fauna Monitoring and On-Demand Turbine Shutdown

Good International Industry Practice implements the standard shutdown on demand with filed observers (SDOD) and a bird monitoring study protocol. It will be designed and implemented by the Project informed by baseline bird data and the results of similar monitoring at GoS wind projects.

Monitoring during the operation of the wind farm must be completed in order to inform the actual impact caused by the wind farm on resident and migratory birds – known as Active Turbine Management Plan (ATMP). The monitoring has the primary objective of collision avoidance but also secondary for migration monitoring behavior.

Monitoring will take place during the migration seasons. The start and end of the monitoring period will be agreed with the ATMP Technical Committee prior to commencement of each migration season. Based on current information, monitoring must take place during the spring migration season, from 20th February until 15th May, and autumn migration season from 10th August till 15th November). Throughout these periods, monitoring must take place continuously on a daily basis.

RCREEE developed an ATMP protocol that describes the shutdown criteria and communications protocol, timing of operation (seasonally and daily), number of vantage points, equipment used (optical and communications), and other as applicable.

As said before, there is a resident Golden eagle which raises conservation concern. The following measures should apply in addition to the shutdown on demand and bird monitoring:

- Specific cliff nesting raptor monitoring in the breeding seasons controlling for nest locations: Effort should be done for the Golden Eagle, within the Area of Influence of the project (Aoi) to the north and south. Period: Early February till the end of the breeding season (chicks fledge).
- Depending on nest location, which will be further investigated during the next bird monitoring seasons, which will be in the early stage of the construction phase, monitoring of the breeding success and fledgling success. The schedule and methods have to be developed by international consultants with experience on the species in arid environments.
- Recommended: Satellite tracking of the breeding pair (both individuals) as soon as possible to get as much information as possible related to 2) above. This requires specific consultant team for the capturing, managing, and monitoring of the tracked birds. This will allow confirming the foraging areas of the species on site and overlapping with the project footprint. This will assist on establishing mitigation throughout the year in addition to the SDOD for migratory birds.

Specific Measures for Further Post-Construction Studies:

- Potentially shut-down on demand during the whole year, to achieve no net loss of the breeding pair. Depending on the outcome of the pre-construction studies mentioned above.

(vi) Vertebrate carcass fatality searches during Operation

A Good International Industry Practice standard Post-Construction Fatality Monitoring program (PCFM) program has to be designed and implemented.

The PCFM program will assess the effectiveness of shutdown mitigation measures and allow a precise and accurate fatality estimation of vertebrate's mortality estimates.

PCFM reporting, including fatality rate estimates has to be reported every six months, better separately for each migratory season. In addition, it is recommended a comparative assessment between the fatality monitoring results and the outcomes of the pre-construction ESIA. Finally CRM will be provided on an annual basis.

An adaptive management strategy will be developed, and additional mitigation will 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 will be implemented and any carcasses seen by site workers will 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) will be removed to reduce the likelihood of scavenging birds landing within the Project site

8.8 Bats

This section identifies the anticipated impacts on bats 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 during the Construction Phase

Site preparation activities will be developed by the EPC Contractor for installation of the wind turbines and the associated infrastructure which include substation, transmission cables, access roads and internal road network, buildings. These require land clearing activities, levelling, excavation, and grading among others.

Such facilities are limited to small individual footprints, and the actual area of disturbance is relatively minimal. Nevertheless, they result in the alteration of the site's habitat and thus potentially impacts bats; particularly through loss of hunting habitat as well as roosting sites.

Such impacts on bats are of a long-term duration as they result in a permanent change in the landscape of the site. Thus, they are expected to be of negative nature, low magnitude, and low sensitivity and therefore not significant due to the reasons provided below.

- Based on literature review all bat species that are expected within the Project area are considered of Least Concern according to IUCN Red List of Threatened Species.
- The Project site being a feeding ground for bats is expected to be minimal and non-significant given the expected low nocturnal insect activity due to the arid nature of the Project site and vegetation coverage.
- Based on preliminary visits of the Project area it does not seem to support roosting sites for bats.

Taking the above into account, no mitigation measures are expected to be required.

8.8.2 Potential Impacts During the Operation Phase

The potential impacts from the Project during operation are related to risk of bat collision with the blades of the operating wind turbines.

Many reports demonstrated bat collisions with wind turbines; this includes reports in Germany (Dürr 2001; Trapp *et al.* 2002; Dürr & Bach 2004), Sweden (Ahlén, 2002) and Spain (Alcalde, 2003; Camiña *et al.* 2022). Evidences that turbines do not only kill bats from local populations but also from populations at far distance were established (Voigt *et al.*, 2012).

In addition, in reference to EUROBATS Guidelines for Considerations on Bats in Wind Farm Projects (Rodrigues *et al.*, 2014), some of the species that are listed to have their distribution range in the Project area and its vicinity are documented to be vulnerable to collisions with wind turbines. For instance, *Pipistrellus spp.* are known to be at high risk of collision from wind turbines. The literature shows that two (2) species of the genus have their distribution range in the area; *Pipistrellus kuhlii* and *P. rueppellii*.

Such impacts are anticipated to be of a long-term duration as negative nature, medium magnitude, and low sensitivity and therefore of minor significance due to the reasons provided below.

- Risk of collision of bats could potentially entail impacts on population on the species during specific periods of the year, like the migration period. Based on literature review all bat species that are expected within the Project area are considered of Least Concern according to IUCN Red List of Threatened Species.

- The Project site being a feeding ground for bats is expected to be minimal and non-significant given that the expected low nocturnal insect activity and vegetation coverage due to the arid nature of the Project site.
- Based on visits of the Project area it does not seem to support any roosting sites for bats.

Mitigation and Monitoring Measures

- The Developer will be required to undertake at height bat acoustic surveys for one (1) year during first or second year of operations to verify outcomes above. 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.
- To verify the outcomes above, as part of the PCFM Program to be developed for birds, it should cover bats as well. Based on the outcomes of the PCFM, additional management measures should apply such as curtailment of turbines and increase cut-in speed to 6 m/s.
- Anyway, the mitigation will be developed by an international expert on bat monitoring and interactions with wind energy facilities.

8.9 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.

8.9.1 Potential Impact 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.

The table below provides an overall summary of the impact on archaeology and cultural heritage during the construction phase. The overall impact assessment will be of minor significance.

Construction Phase		
Type	Negative	Impact is negative in nature as it could damage sites
Duration	Short-term	Limited to construction phase which is 24 months
Magnitude	Medium	Given that there are no sites within the area and unlikely that there will be underground discoveries, but if so such activities could damage these sites if inappropriately managed.
Reversibility	Irreversible	
Sensitivity	Low	
Likelihood	Low	In general such impacts are considered unlikely
Frequency	Rare	Expected to occur on minimal occasions during construction phase
Timing	Not relevant	N/A
Extent	Low	Limited to actual footprint of activities or recorded sites only
Significance	Minor	

Mitigation Measures

The following identifies the mitigation measures to be applied by the EPC Contractor during the construction phase and which include:

- As required by the Archaeology and Cultural Heritage expert, during excavation activities, the Ministry of Tourism and Antiquities 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, 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 Ministry of Tourism and Antiquities; 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.

8.10 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.

8.10.1 *Potential Impacts During the Construction Phase on Air Quality and Noise*

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 one key visual receptor was identified within and around the Project site which is Wadi Dara Village, located approximately 750m southeast of the Project. The other nearest potential visual receptor is Ras Gharib City, located about 32km to the northeast.

The table below provides an overall summary of the impact on air quality during the construction phase.

Construction Phase		
Type	Negative	Generation of dust
Duration	Short-term	Limited to construction period only and specifically activities such as the limited excavation which will be for a couple of weeks
Magnitude	Medium	Dust could be noticeable but dispersed
Reversibility	Reversible	Baseline restored after completion of construction works
Sensitivity	Low	Given that there are no key sensitive receptors within the area
Likelihood	Medium	Given that it is likely limited to activities such as the limited excavation which will be for a couple of weeks
Frequency	Periodic	Expected particularly during excavation and land clearing activities
Extent	Medium	Around 2km from active areas due to wind influence
Significance	Minor	

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 PM_{2.5} 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.

8.10.2 Potential Impacts During the Operation Phase

The main impacts foreseen 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 8.13.1 Public Health and Safety” along with other relevant impacts such as shadow flicker.

8.11 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.

8.11.1 Potential Impact 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 potable water requirements for a maximum of 800 workers onsite are not expected to exceed 50 liters per capita per day for a duration of 24 months. Thus, the daily water consumption at peak is likely to be around 40,000 liters per day – or 40 m³ per day. As a worst-case scenario, taking into account the full construction period (24 months), this is equivalent to an estimated total of 30,000 m³.

In addition, water for non-potable purposes, primarily used for dust suppression, and cleaning of machinery and vehicles will depend on site conditions, weather, and activity intensity. Water for dust control is estimated at 10 m³/day, sanitary use at 20 m³/day and construction related needs at 60 m³/day, resulting in a total non-potable water demand of 90 m³/day.

Thus, total water requirements during the construction phase are likely to be around 130 m³/day. The water requirements throughout the construction phase will be required temporarily (for construction period only) and are considered minimal and not significant.

In addition, water will be required during the operation phase, primarily for drinking and personal use by the onsite staff, estimated at a maximum of 25 personnel. Similar to the construction phase, the potable water demand is not expected to exceed 50 liters per capita per day, resulting in a daily consumption of approximately 1,250 liters, or 1.25 m³/day.

Therefore, the total maximum water consumption during the operation phase is expected to be approximately 1.25 m³/day, equivalent to about 456 m³/year. This volume is considered minimal and will not pose any significant pressure on local water resources.

As discussed earlier, based on consultations with RSWWC 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 RSWWC to secure water requirements for the Project most likely through tankers.

The table below provides an overall summary of the impact on water resources during the construction phase and operation phase. The overall impact is considered to be not significance during the construction and the operation phase.

Construction Phase			Operation Phase		
Type	Negative		Type	Negative	
Duration	Short-term	Relevant for construction period which is 24 months	Duration	Long-term	Relevant for operation period
Magnitude	Low	Amounts of water required is considered low level	Magnitude	Low	Amounts of water required is considered low level
Reversibility	Reversible	N/A	Reversibility	Reversible	N/A
Sensitivity	Low	Given that the amounts can be supplied without straining any existing resources	Sensitivity	Low	Given that the amounts can be supplied without straining any existing resources
Likelihood	High		Likelihood	High	
Extent	Low	Given that the amounts can be supplied without straining any existing resources	Extent	Low	Given that the amounts can be supplied without straining any existing resources
Significance	Not Significant		Significance	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.

With the implementation of the additional requirement, the significance of the impact remains unchanged and is expected to be not significant.

8.11.2 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 104,000 m³ 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 1,000 kg per day at peak taking into account the daily per capita waste generation factor in Egypt ($1.25\text{kg/capita/day}^{38}$) and number of 800 workers. During operation, this is only likely to include municipal waste at around 31 kg per day for 25 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 16.4 kg per day only.

Construction Phase			Operation Phase		
Type	Negative	N/A	Type	Negative	N/A
Duration	Short-term	Limited to construction phase which is 24 months	Duration	Long-Term	Throughout entire operational period
Magnitude	Medium	Given waste quantities above	Magnitude	Low	Given waste quantities during operation are minimal
Reversibility	Reversible	N/A	Reversibility	Reversible	N/A
Sensitivity	Low	Given waste quantities above	Sensitivity	Medium	Given waste quantities during operation are minimal
Likelihood	High	Given nature of activities expected	Likelihood	High	Given nature of activities expected
Extent	Medium	Could impact all resources / users relying on such waste utilities which could be more than 5 km away	Extent	Medium	Could impact all resources / users relying on such waste utilities which could be more than 5 km away
Significance	Minor		Significance	Minor	

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 RSWWC and Sanitation Authority in Ras Gharib and obtain list of authorized contractors for collection of wastewaters from the site to the Ras Gharib WWTP.
- Coordinate with the RSWWC and Sanitation Authority in Ras Gharib to hire a competent private contractor for the collection of solid waste from the site to the Ras Gharib Public Dumpsite.

³⁸ [A smart framework for municipal solid waste collection management: A case study in Greater Cairo Region - ScienceDirect](#)

- Coordinate with Environmental Management at RSWWC and Sanitation Authority in Ras Gharib to obtain list of authorized contractors for collection of hazardous waste from the site to the closest approved facility for final disposal.

8.11.3 *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

Planning and Construction Phase		
Type	Negative	
Duration	Long-term	Limited to construction period only which is 24 months
Magnitude	Low	Given the nature of construction activities
Reversibility	Reversible	Baseline restored after completion of construction works
Sensitivity	High	Given the nature of construction activities
Likelihood	Low	Limited to construction period only
Extent	Medium	Impacts could have an affect up to 5 km radius
Significance	Minor	

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 Defense 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

8.11.4 Potential Impacts on Electricity, Radio and Telecom Infrastructure during the Planning and Construction Phase

Inappropriate management of the various construction activities (to include but limited to transportation and traffic of vehicles in/out of the site, worker code of conduct, etc.) could damage or disturb the various nearby infrastructure and utility elements. This includes but is not limited to the electricity overhead transmission lines, radio and telecommunication tower.

In addition, 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.

The table below provides an overall summary of the impact on electricity, radio and telecom infrastructure during the construction phase. The overall impact is considered to be of minor significance.

Construction Phase		
Type	Negative	
Duration	Short-term	Limited to construction period only which is 24 months
Magnitude	Low	Given the nature of construction activities
Reversibility	Reversible	Baseline restored after completion of construction works
Sensitivity	Medium	Given the nature of construction activities
Likelihood	Low	Limited to construction period only
Extent	Medium	Impacts could have an effect up to 5 km radius
Significance	Minor	

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer during the planning phase and which include:

- NREA to coordinate with NTRA to provide information on the Project prior to the commencement of construction (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)

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 NREA to NTRA.

8.11.5 Potential Impacts on Nearby Wind Farms during Operation

As noted earlier within “Section 2.7”, there are several operating and planned wind farms within the GoS area.

Inappropriate management of planning activities (e.g. siting of turbines and proper buffer distance) could affect such nearby wind farms.

Operation Phase		
Type	Negative	N/A
Duration	Long-term	Throughout the operation phase
Magnitude	Low	Given the general project area
Reversibility	Reversible	With decommissioning of WTGs
Sensitivity	Medium	Given that there are no sensitive receptors in the area.
Likelihood	High	Given the nature of activities expected
Frequency	Frequent	Expected throughout entire operational phase
Timing	Not relevant	Applicable throughout entire operational phase
Extent	High	Cumulative turbines can be visible for distances greater than 10 km
Significance	Minor	

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 up/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.

8.12 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 generic occupational health and safety risks to workers, as working onsite increases 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

The table below provides an overall summary of the impact on occupational health and safety during the construction and operation phases. The overall impact is considered to be of moderate significance.

Construction Phase			Operation Phase		
Type	Negative	In extreme cases could entail permanent impacts (e.g. permanent disability) however such impacts are controlled through implementation of general best practice.	Type	Negative	In extreme cases could entail permanent impacts (e.g. permanent disability) however such impacts are controlled through implementation of general best practice.
Duration	Short-term		Duration	Long-term	
Magnitude	Medium		Magnitude	Medium	
Reversibility	Irreversible		Reversibility	Irreversible	
Sensitivity	High		Sensitivity	High	
Likelihood	Medium		Likelihood	Medium	
Extent	Low		Extent	Low	
Significance	Moderate		Significance	Moderate	

Mitigation Measures

Occupational Health and Safety

It is expected that the EPC Contractor will 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 will 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) heats 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).

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to minor.

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.

8.13 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.

8.13.1 Potential Impacts from Noise 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 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.
- All modelling should take account of the cumulative noise from all wind energy facilities in the vicinity having the potential to increase noise levels.

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); and
- Identify if any noise sensitive receptors are within this boundary.

Taking the above requirements into account, a preliminary noise assessment was undertaken for the Project as described below within this section.

As part of this preliminary noise study, the following main objectives have been identified and therefore proposed as outcomes for the assessment:

- Noise prediction calculations using SoundPLAN 9.1 for a reasonable worst-case noise scenario (W10 = 10 m/s).
- Determine the extent of the 35 dB(A) contour boundary emitted from the WTGs (from both proposed and existing wind farms).
- Determine if there are any noise sensitive receptors within the calculated contour boundary.

The assessment is based on the following information:

- General arrangement and layout drawings of the wind farm, including topography.
- Wind Turbine supplier data (vendor noise data).
- Noise sensitive receiver (NSR) locations.

A. WTG Specifications

As previously discussed in ‘Section 2.3.2’ above, the Project consists of 90 WTGs. These will consist of new types of wind turbine specifications, which are highlighted in the table below.

Table 75: Goldwind GWH 204-10.5 MW Specifications

General Details	
Rated Power	10,500 kW
Wind Class	IEC S (IIC)
Rotor Diameter	207.7 m
Swept Area	33,881.52 m ²
Power Density	295 W/m ²
Gearbox	3 stage (2 planetary + 1 parallel)
Generator	Synchronous permanent
Frequency	50 Hz
Physical Dimensions	
Hub Height	117.28 m
Tower Type	Tubular steel / Hybrid

GWH 204-10.5 Noise Source Data

Noise source emission data, sound level performance specifications, noise emission analysis and sound warranties for the proposed GWH 204-10.5 MW turbines are described below.

Sound power levels are derived from acoustics test measurements in accordance with IEC 61400-11 ed. 3 Wind Turbine Generator Systems – Part 11: Acoustic noise measurement techniques³⁹.

The sound power levels during standard operation mode lie at a center frequency of 500 Hz at 113 dB(A). The table below describes the modelling input for the wind turbines for this assessment. A 1 dB correction has been applied to account for uncertainty, provided by the manufacturer.

Table 76: GWH 204-10.5 MW Modelling Scenario for Assessment

Scenario Description	Wind Speed (at 10 m)	Sound Power Level dB(A)	Correction for Uncertainty
Worst-Case	> 10 m/s	114	+ 1 dB

Description of Wind Turbine Noise

Wind turbine noise is mainly generated from two sources: aerodynamic noise and mechanical noise. Aerodynamic noise is produced by airflow interacting with the rotating blades and is the dominant source during operation. It is typically broadband in nature and commonly perceived as a “wooshing” sound, resulting from blade interaction with atmospheric turbulence, trailing edge effects, blade tip turbulence, and flow separation along the blade surface.

³⁹ IEC, Wind Turbine Generator Systems - Part 11: Acoustic noise measurement techniques, 2012.

Mechanical noise originates from the mechanical and electrical components within the turbine nacelle. In modern wind turbines, this noise is largely minimized through improved design and insulation and is generally less significant than aerodynamic noise during normal operation.

B. Noise Sensitive Receptors

As discussed previously in 'Section 7.1' above, number of receptors have been identified; however, not all of these are considered noise sensitive. For the purposes of this assessment, four (4) receptors closest to the proposed wind farm location have been identified where only two (2) were selected as representative assessment NSRs. Given that Receptors 1, Receptor 2 (which is under construction) and Receptor 4 are mainly poultry farms that entail day-to-day works, and an accommodation that does not entail permanent housing but rather rotational arrangement for workers, they will not be considered as a Noise Sensitive Receptor (NSR).

The figure below displays the location of the selected representative NSRs and the table below displays the coordinates of the NSRs.

Table 77: Receptors

Receptor	Classification	UTM Coordinates		NSR
		Longitude (UTM Easting) mE	Latitude (UTM Northing) mN	
Receptor 1	New Wadi Dara Farm	512643	3096600	No
Receptor 2	New Wadi Dara Farm (under construction)	513887	3097048	No
Receptor 3	Residential	523436	3096786	Yes
Receptor 4	Livestock Farm	524285	3095499	No



Figure 103: Noise Sensitive Receptor Locations

C. Existing Wind Farms in Surrounding Area

As mentioned earlier in 'Section 2.7' above, there are existing wind farms present in the surrounding area of the proposed Project that have the potential to increase the cumulative noise level at the identified NSRs. Therefore, even during the screening, the assessment should consider all wind turbine noise emissions that have the potential to increase noise levels at noise sensitive receptors.

D. Noise Model Methodology

(i) Propagation of Sound Outdoors

Sound is a sequence of pressure waves which propagate through fluid medium. In the case of all outdoor propagation of sound in air the following factors affect the propagation and resultant sound levels from the source.

- Type of source (point, line, or area)
- Distance from the source
- Atmospheric absorption
- Wind
- Temperature and temperature gradient

- Obstacles such as barriers and buildings (Barrier effects)
- Ground Absorption
- Reflections
- Humidity and Precipitation

A brief description of the above is given as follows:

Types of Sources

Point sources are considered where the dimensions of a source are small compared to the distance of the receiver. An example of point sources are stacks and fans. Sound energy spreads spherically and the sound pressure level is the same for all points at the same distance from the source.

If the source is narrow and long in one direction perpendicular to the distance of the receiver, it is called a line source. The sound level propagates cylindrically such that the sound pressure level is equal at all points at the same distance from the line.

Barriers

Noise reduction caused by barriers is dependent on two main factors:

- Path difference of the sound wave as it travels over the barrier compared with the direct transmission to the receiver.
- The sound frequency of the noise in question.

Atmospheric Attenuation

Atmospheric attenuation is complex and therefore will be summarised in short. Atmospheric attenuation is dependent on the following main factors:

- Distance from source
- Frequency content of the noise
- Ambient temperature
- Relative Humidity
- Ambient Pressure

Distance from source and frequency content are the most influential to the atmospheric attenuation with source distance being the most influential to atmospheric absorption.

Wind and Temperature

For noise propagation over short distances, climatic conditions do not have a significant effect; however, for distances over 50 m, wind becomes more influential. Downwind, the level may increase by a few dB, depending on wind speed whereas on the upwind or side-wind, the level can drop by 10 dB.

Temperature gradients create effects similar to those of wind gradients, except that they are uniform in all directions from the source. On a sunny day with no wind, temperature decreases with altitude. On a clear night, temperature may increase with altitude (temperature inversion) focusing sound towards the ground surface.

Ground Effects

Reflections by the ground interact (interfere) with directly propagated sound and therefore effect the receiver level depending on the ground covering and surface. The ground effect varies according to the ground type. Generally hard ground (e.g., water or concrete) is reflective and adds an additional 3 dB whereas soft ground (e.g., grass and vegetation) decreases the sound at the receiver (varies with frequency).

Therefore, to effectively predict noise levels for the project the above would need to be considered and effectively modelled with the chosen software package for noise propagation prediction modelling.

(ii) Modelling the Propagation of Sound

The propagation methodology adopted within the SoundPLAN model was the International Organization for Standardization (ISO) 9613 'Acoustics – Attenuation of Sound During Propagation Outdoors' (ISO, 2024-01)⁴⁰. This document can be referred to for an in-depth description of the methodology SoundPLAN utilizes for attenuation of sound and propagation outdoors.

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. The method predicts the equivalent continuous A-weighted sound pressure level (LAeq) under meteorological conditions favorable to propagation from sources of known sound emission. The source (or sources) may be moving or stationary and takes account of the following physical effects:

- Geometrical divergence;
- Atmospheric absorption;
- Ground effect;
- Reflection from surfaces; and,
- Screening by obstacles.

Noise from WTGs is reduced by distance, atmospheric losses, screening effects and other 'miscellaneous' losses. ISO 9613-2 empirical formula calculates the predicted sound pressure level at a specified distance by taking into account the sound power level in octave frequency bands and subtracting a number of attenuating factors as described generally above.

A summary of the calculation settings and standards are detailed in the table below.

⁴⁰ "ISO9613-2 'Acoustics - Attenuation of Sound During Propagation Outdoors'," 2024

Table 78: Model Calculation and Parameter Settings

Model Parameter	Parameter Setting / Standard							
Calculation Standard	(ISO) 9613 'Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Calculation Method' (ISO, 2024-01) Application as per IOA GPG ⁴¹							
Wind Speed	10 m/s							
Ground Absorption Coefficient	0.5							
Receiver Height	1.5 m							
Meteorological Data	Humidity 70% Air Pressure 1013.3 mbar T = 25°C							
Atmospheric Attenuation Coefficients (dB / km)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
	0.1	0.3	1.1	2.8	5	9	22.9	76.6

(iii) **Modelling Assumptions and Limitations**

The following assumptions have been made for the modelling assessment, and wherever possible, a conservative approach has been taken:

- ISO 9613-2 calculates predicted noise levels with the assumption of moderate downwind conditions of propagation, therefore, attenuation due to metrological factors such as wind speed and wind direction are not taken into account.
- Due to the surrounding area being a mix of hard and soft ground surfaces, an absorption coefficient of 0.5 has been assumed.

E. **Predicted Noise Levels**

(i) **Noise Screening Assessment**

The noise screening assessment was carried out for the Project's 90 WTG layout in an isolated and cumulative scenario. Under the cumulative scenario, full operation of proposed and existing nearby wind farms that have the potential to increase noise levels at the Receptor 3 was included in the model. This was to determine whether noise levels at the identified NSRs exceeds the 35 dB(A) prescribed limit.

(ii) **Noise Contour Maps**

Noise contour maps for the worst-case noise scenario have been calculated for both the isolated and cumulative assessments and are presented in the figures below. The maps show noise contour lines as well as the noise contour limit line of 35 dB(A). The significance of the noise contour maps 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 NSRs. The table below displays the configuration for the grid noise map calculations.

⁴¹ IOA, "A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise," 2013

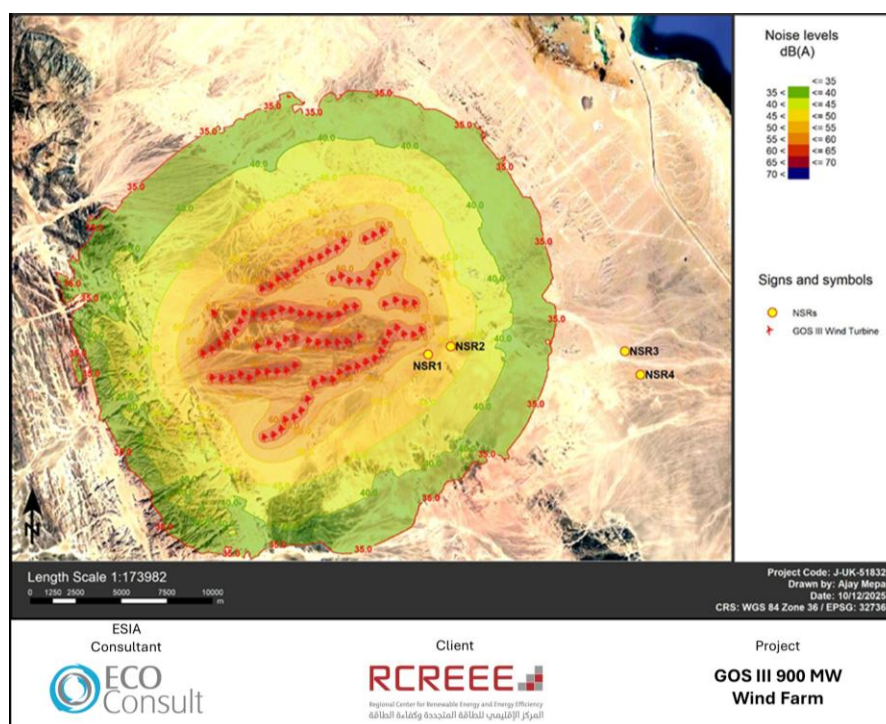


Figure 104: Noise Contour Map for GOS III Wind Farm Layout - W10: 10 m/s (Isolated Assessment)

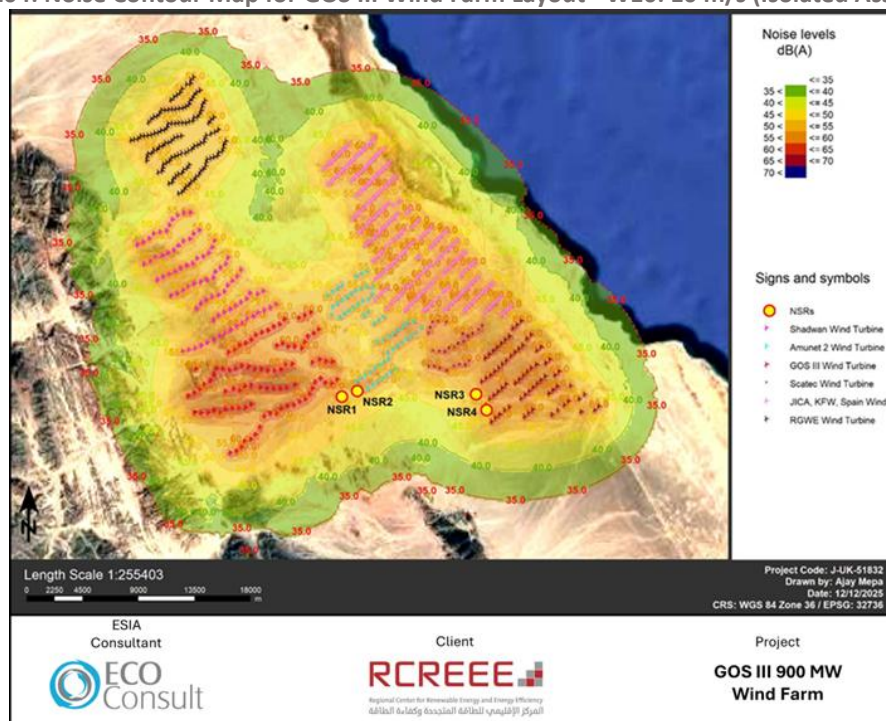


Figure 105: Noise Contour Map for GOS III Wind Farm Layout - W10: 10 m/s (Cumulative Assessment)

(iii) Predicted Noise Result at NSRs

Results Table

Based on the results of the noise contour map and the identification of the NSR, the table below displays the predicted noise level results at the NSR for both the isolated and cumulative WTG assessments.

Table 79: Predicted contribution noise levels at NSRs from GOS III Wind Farm (Isolation & Cumulative) (W₁₀)

NSR	Classification	Predicted Contribution Noise Level at 10 m/s Wind Speed (W ₁₀) – dB(A)	
		Project site (Isolation)	Project site (Cumulative)
Receptor 3	Residential	28.1	52.1

Isolation Wind Farm Results

The results show that under these conditions, the 35 dB(A) noise limit at Receptor 3 is not predicted to be exceeded in the isolation assessment.

Cumulative Wind Farm Results

Receptor 3 is predicted to exceed the 35 dB(A) noise limit when assessed cumulatively.

F. Conclusions and Recommendations

The noise emissions from the Project at the identified NSR (Receptor 3) is from other existing wind farm layouts located closer to them which are the dominant sources for noise exceedance. As shown from the isolated noise assessment results, Receptor 3 is not affected by noise generated from the Project.

Appropriate mitigation measures will include the implementation of a Stakeholder Grievance Mechanism to capture any grievances regarding noise. Should this be the case, further investigation to be undertaken to verify that noise levels are exceeding allowable standards, after which appropriate measure will be implemented which could include: Installation of double-glazed windows, façade retrofits, vegetative buffers or other as appropriate.

Based on the E&S Team's experience on other wind farms in the GoS area, detailed noise monitoring exercises undertaken in such similar situations indicated no impacts mainly due to the high wind speeds within the area. Finally, based on the E&S team's experience on other operating wind farms the above measures were considered sufficient to mitigate such impacts should they arise.

The E&S assessments undertaken for the Project, including the noise assessment, were based on a conservative worst-case layout scenario. This included assessment of the previous Project layout comprising up to 90 wind turbines. The current Project layout comprises 86 wind turbines and therefore represents a reduction in the number of turbines assessed. Accordingly, and subject to no material changes in turbine specifications, locations, or operational parameters, the current layout is expected to result in a reduced overall level of environmental and social risk compared to the previously assessed worst-case scenario.

8.13.2 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 flickers only occur 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. 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.

Mitigation measures will include the implementation of a Stakeholder Grievance Mechanism to capture any grievances regarding shadow flicker. Should this be the case, further investigation to be undertaken to verify that shadow flicker levels are exceeding allowable standards, after which appropriate measure will be implemented which could include: Installation of window blinds, vegetative buffers or other as appropriate.

The E&S assessments undertaken for the Project, including shadow flicker assessment, were based on a conservative worst-case layout scenario. This included assessment of the previous Project layout comprising up to 90 wind turbines. The current Project layout comprises 86 wind turbines and therefore represents a reduction in the number of turbines assessed. Accordingly, and subject to no material changes in turbine specifications, locations, or operational parameters, the current layout is expected to result in a reduced overall level of environmental and social risk compared to the previously assessed worst-case scenario.

8.13.3 Potential Impacts from Trespassing of Unauthorized Personnel during Construction and Operation

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.

Construction Phase			Operation Phase		
Type	Negative		Type	Negative	
Duration	Short-term	Limited to construction which is 24 months	Duration	Long-term	During entire operation period of 25 years
Magnitude	Medium	Extreme cases could entail permanent impacts	Magnitude	Medium	Extreme cases could entail permanent impacts
Reversibility	Irreversible		Reversibility	Irreversible	
Sensitivity	Medium		Sensitivity	Medium	
Likelihood	Low	No local community activity in the area	Likelihood	Low	No local community activity in the area
Extent	Low	Will have an effect on impacted area only	Extent	Low	Will have an effect on impacted area only
Significance	Moderate		Significance	Moderate	

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 is 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

8.13.4 Potential Impacts from Worker Influx during Construction

During construction the Project a relatively significant number of workers will be expected onsite (around 800 workers) for duration of approximately 24 months. However, as discussed earlier, at this point it is still unclear how many of these workers will be expatriates, Egyptians and/or from local communities and it is still unclear where accommodation of these works will take place.

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.

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, and other.

Increase in Competition for Public Services

The sudden increase in population due to the influx of workers and their families can put substantial pressure on existing local infrastructure, particularly water, electricity, and transportation systems. These services might not have been designed to handle such an increase in use, leading to overloads and service disruptions.

Local Inflation of Prices

The arrival of a large labor force can drive up the demand for goods and services, potentially leading to higher local prices and displacing regular consumers in the local community.

Increased Risk of Crime

The influx of workers in communities could lead to a rise in criminal activities or create a feeling of insecurity among local residents. Potential issues may include theft, physical assaults, substance abuse, prostitution and human trafficking. The local police force might be unprepared to handle the surge in population and associated challenges.

Construction Phase		
Type	Negative	N/A
Duration	Short-term	Limited to construction which is 24 months
Magnitude	Medium	Medium magnitude and sensitivity given that it could entail some impacts on local resources, spread of serious diseases which could impact community H&S, and other.
Reversibility	Reversible	
Sensitivity	Low	
Likelihood	Medium	Due to presence of nearby communities
Frequency	Frequent	Throughout entire construction phase
Timing	Not relevant	
Extent	Medium	Effects expected within 5 km radius from impact
Significance	Minor	

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 centres. 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 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.

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

8.13.5 Potential Impacts from Security Personnel during Construction and Operation

There could be interactions between security guards and personnel of the Project with local communities and nearby receptors. Inappropriate management of security issues and incidents by security personnel towards local communities (e.g. overreaction, mistreatment, use of excessive force) could result in potential for conflict, resentment, distrust and escalation of events.

Construction Phase			Operation Phase		
Type	Negative		Type	Negative	
Duration	Short-term	Limited to construction which is 24 months	Duration	Long-term	During entire operation period of 25 years
Magnitude	Medium	Extreme cases they could entail permanent impacts	Magnitude	Medium	Extreme cases they could entail permanent impacts
Reversibility	Irreversible		Reversibility	Irreversible	
Sensitivity	Medium		Sensitivity	Medium	
Likelihood	Low	No local community activity in the area	Likelihood	Low	No local community activity in the area
Extent	Low	Will have an effect on impacted area only	Extent	Low	Will have an effect on impacted area only
Significance	Minor		Significance	Minor	

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

8.13.6 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.

As discussed previously, one key visual receptor was identified within and around the Project site, which is Wadi Dara Village located approximately 750 m southeast of the Project, while the other nearest potential visual receptor is Ras Gharib City, located about 32 km to the northeast. However, the closest receptors to the Project site are not permanent residential areas but agricultural farms with workers employed for a limited period, typically up to 30 days, after which they leave for a similar period of up to 30 days before returning again, and this cycle continues accordingly. 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 once the blades have been soiled after a few months of operation.

Based on the above, and since there are no nearby receptors, this impact is scoped out and there are no further requirements to be considered for the ESIA study.

8.13.7 Potential Impacts from Blade and Ice Throws from Turbines during Operation

Failure in rotor blade can result in the ‘throwing’ of the blade. In addition, snow idling on a blade can also result in ice throwing when operated. Blade and ice throw impacts from operating turbines entail public health and safety concerns on receptors.

As noted within “Section 7.2” there are no receptors within the Project site and surrounding areas that would classify as blade and ice throws sensitive receptors.

For the purpose of clarity, the definition of receptor was followed as that defined within the “World Bank Group / IFC EHS Guidelines for Wind Energy” (IFC, 2015) which is defined as “populated locations”. In addition, 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 (**which is equivalent to around 300m**), 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.

The closest populated location would be the closest community located 750m from the Project site. Which is approximately 2.5 times the recommended setback distance requires by IFC EHS Guidelines on Wind Energy (IFC, 2015).

Based on the above, this impact is scoped out and there are no further requirements to be considered for the ESIA study.

8.14 Socioeconomics

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 800 job opportunity at peak during the construction phase for a duration of approximately 24 months. This will mainly include 250 skilled job opportunities (to include engineers, technicians, consultants, surveyors, etc.) and 550 semi-skilled and unskilled job opportunities (such as labourers, security personnel, housekeeping, etc.).
- Around 25 job opportunities during the operation phase for a duration of 25 years. This will include around 20 skilled job opportunities (such as engineers, technicians, administrative employees, etc.) and 5 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.

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, laborers, 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. Prioritizing employment from the community is 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. Prioritizing 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 prioritize projects for local communities based on available budget, vision, timeline for implementation and other factors.

8.15 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 80: Summary of Anticipated Impacts during Planning and Construction

Attribute / Issue	Likely Impact – Planning and Construction Phase	Impact Assessment									
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Likelihood	Extent	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	High	Frequent	Minor	Mitigation Available	Not Significant
Geology, Hydrology and hydrogeology	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	Short-term	Reversible	Medium	Low	Medium	Frequent	Minor	Mitigation Available	Not Significant
	Potential Impacts from erosion and runoff	Negative	Short-term	Irreversible	Medium	Low	Medium	Periodic	Minor	Mitigation Available	Not Significant
Biodiversity	Habitat loss, fragmentation and degradation	Negative	Short-term	Irreversible	Medium	Medium	High	Low	Minor	Mitigation available	Not Significant
	Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora	Negative	Long-term	Irreversible	Medium	Medium	Low to Medium	Medium	Moderate	Mitigation available	Not Significant
	Direct Impacts on Sensitive Receptors (Vertebrates) - Site Clearance and Earthworks	Negative	Medium-term	Irreversible	High	High	Medium	Low	Major	Mitigation available	Not Significant
	Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions	Negative	Long-term	Irreversible	Medium to High	High	Medium	Low	Moderate	Mitigation available	Not Significant
	Direct Impacts on Sensitive Receptors (Habitats, Vertebrates) – Poaching, Collection etc.	Negative	Long-term	Irreversible	Low to High	Low	Low	Low	Minor	Mitigation available	Not Significant
	Direct and indirect impacts on sensitive receptors (vertebrates) - Disturbance	Negative	Short-term	Reversible	Medium	Medium	Medium	Low	Moderate	Mitigation available	Not Significant
	Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Reduced Air Quality / Dust	Negative	Short-term	Reversible	Medium	High	Medium	Medium	Moderate	Mitigation available	Not Significant
	Direct Impacts on Sensitive Receptors (Vertebrates) – Noise	Negative	Short to Medium-term	Reversible	Low to Medium	High	Medium	Medium	Moderate	Mitigation available	Not Significant
	Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting	Negative	Short to Medium-term	Reversible	Low	Medium	Medium	Medium	Minor	Mitigation available	Not Significant
	Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Littering, Waste Management	Negative	Long-term	Irreversible	Medium	High	Medium	Low	Moderate	Mitigation available	Not Significant
	Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species	Negative	Long-term	Reversible or Irreversible	Low to high	High	Medium	Medium	Moderate	Mitigation available	Not Significant
Avi-Fauna	Improper management of construction activities could disturb breeding birds and damage relevant habitats	Negative	Long-term	Could be irreversible	Low	Medium	Medium	Medium	Minor	Mitigation Available	Not Significant
Bats	Site preparation activities of the wind turbines and the associated infrastructure which include substation, transmission cables, access roads and internal road network, buildings. These require land clearing activities, levelling, excavation, and grading among others.	Negative	Long-term	Could be irreversible	Low	Low	Low	Low	Minor	Mitigation available	Not significant
Archaeology	Improper management of construction activities could disturb/damage archaeological remains which could be buried in the ground (if any).	Negative	Short-term	Irreversible	Medium	Low	Low	Rare	Minor	Mitigation Available / Additional Recommendations	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	Medium	Medium	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	Medium	Medium	Minor	Mitigation Available	Not Significant
Infrastructure and Utilities	Water Resources – water requirements of the Project could entail constraints on the existing resources and users.	Negative	Short-term	Reversible	Low	Low	High	Low	Not Significant	Additional Requirements	Not Significant

Attribute / Issue	Likely Impact – Planning and Construction Phase	Impact Assessment									
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Likelihood	Extent	Significance	Management Action	Residual Significance
	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	Negative	Short-term	Reversible	Medium	Low	High	Medium	Minor	Additional Requirements	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	Low	Medium	Minor	Mitigation Available	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.	Negative	Short-term	Reversible	Low	Medium	Low	Medium	Minor	Additional Requirements	Not Significant
	Potential impact on nearby wind farms: Inappropriate management of planning activities (e.g. siting of turbines and proper buffer distance) could affect such nearby wind farms	Negative	Long-term	Reversible	Low	Medium	High	High	Minor	Mitigation Available	Not Significant
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.	Negative	Short-term	Irreversible	Medium	High	Medium	Low	Moderate	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.	Negative	Short-term	Irreversible	Medium	Medium	Low	Low	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	Low	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	Irreversible	Medium	Medium	Low	Low	Minor	Mitigation Available	Not Significant
Socio-economic	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.								

Table 81: Summary of Anticipated Impacts during Operation

Attribute / Issue	Likely Impact – Operation Phase	Impact Assessment									
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Likelihood	Extent	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.	Negative	Long-Term	Reversible	Medium	Medium	Medium	Frequent	Moderate	Mitigation Available	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	Reversible	Medium	Low	Medium	Frequent	Minor	Mitigation Available	Not Significant
Biodiversity	Indirect Impacts on Sensitive Receptors (Vertebrates) – Disturbance	Negative	Short-term	Reversible	Low	Medium	Medium	Medium	Minor	Mitigation available	Not significant
	Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions	Negative	Long-term	Irreversible	Medium to high	Low to High	Medium	Low	Major	Mitigation available	Not significant
	Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting	Negative	Variable	Reversible	Low to Medium	High	Medium	Low	Moderate	Mitigation available	Not significant
	Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora	Negative	Long-term	Irreversible	Low	Medium	Medium	Medium	Minor	Mitigation available	Not significant
	Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species	Negative	Long-term	Reversible or Irreversible	Low to High	High	Medium	Low	Minor to Major	Mitigation Available / Monitoring	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	Reversible or Irreversible	High	High	High	Medium	Major	Mitigation available	Moderate
Bats	The potential impacts from the Project during operation are related to risk of bat collision with the blades of the operating wind turbines.	Negative	Long-term	Reversible or Irreversible	Medium	Low	Low	Low	Minor	Mitigation available	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	High	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	Medium	High	Medium	Minor	Additional Requirements	Not Significant
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	Irreversible	Medium	High	Medium	Low	Moderate	Mitigation Available	Minor
Public Health and Safety	Public access of unauthorized personnel to the various Project components (turbines, substation) could result in various public safety hazards.	Negative	Long-term	Irreversible	Medium	Medium	Low	Low	Moderate	Mitigation Available	Minor
	Inappropriate conduct of security personnel towards local communities could result in resentment, distrust and escalation of events	Negative	Long-term	Irreversible	Medium	Medium	Low	Low	Minor	Mitigation Available	Minor

9. ASSESSMENT OF CUMULATIVE IMPACTS

As discussed earlier, the “NREA Concessionary Area” was zoned according to the weight of the expected environmental impact among competing environmental interests: renewable energy development and conservation. The area starts about 20km south of Ras Gharib and reaching up to the Gulf of Zayt (about 60 km in the North of Hurghada). The wind power target capacity for the area is between 2,000 – 3,000 MW by 2026/2027.

The following environmental surveys were carried out for the “NREA concession area”:

- Reconnaissance survey to assess the present land use in the area
- A survey on the fauna (others than avifauna) and flora
- An autumn and spring monitoring of bird migration and bird habitat
- A geological survey

The assessments evaluated the possibility of environmental impacts brought on by the development and operation of wind farm development in the NREA Concession Area. The results of the assessments affirmed that, overall, environmental and social impacts would be negligible due to the remoteness of the area, lack of residences and native ecosystems. However, concerning risks posed to migrating avi-fauna, they were determined to be significant.

This section provides an assessment of cumulative impacts mainly based on the outcomes of the NREA’s Feasibility Study for Large Wind Farm Development in the Gulf of El Zeit (2008).

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 82: Assessment of Cumulative Impacts

E&S Attributes	Outcomes of Strategic ESIA	Additional Requirements in Strategic ESIA
Landscape and Visual	No concerns reported as the landscape is sparse (desert plains) of sensitive receptors as well as ecological elements.	No additional requirements to be considered
Landscape and Visual	Area is mostly desert landscape (compacted gravel or rocky) and not ecologically sensitive. Very little deterioration expected.	Site-specific mitigation and housekeeping procedures.
Geology, Hydrology, Hydrogeology	▪ Negligible impacts on groundwater and surface water. ▪ Within the NREA Concession area, there are plans to construct service buildings, such as store, control and apartment buildings, of which will be connected to the existing water pipeline and equipped with an appropriate wastewater treatment system (e.g. septic tank with underground seepage and regular sludge collection).	Site-specific mitigation and monitoring requirement.
Biodiversity	▪ No serious impacts on biodiversity anticipated. The landscape is sparse in vegetation.	Site-specific mitigation and monitoring requirement.

E&S Attributes	Outcomes of Strategic ESIA	Additional Requirements in Strategic ESIA
Birds (avi-fauna)	- As the NREA area is located next to a registered Important Bird Area (IBA), the Gabal el Zeit IBA area, and near or partially in a major flyway area of migrating birds, impacts of wind power utilisation on migrating birds were likely to be significant. - The disturbance on the flyway against the heavy wind during spring were determined to be critical.	Site-specific mitigation and monitoring requirement.
Archaeology and Cultural Heritage	None reported	Precautionary Principle to be applied and coordination with the Ministry of Antiquities
Air Quality and Noise	- Some additional dust will occur locally during construction works; however, it is not anticipated to be critical due to the absence of population or wildlife, that would otherwise be affected. - Similarly for noise, the closest sensitive receptors reported are in Wadi Dara.	Site-specific mitigation and monitoring requirement.
Infrastructure and Utilities	- Water supply: Wind farms' water requirement not to affect the overall water supply in the region - Transport: Wind power development is not anticipated to cause traffic bottlenecks in the greater area	- Domestic wastewater originating from the construction yard facilities or permanently constructed service buildings shall undergo simplified treatment (septic tank) and infiltrated to the sandy underground for further natural treatment. - Site-specific mitigation (waste gathering and proper disposal) and monitoring requirement. A co-operation with the Rhas Gharib waste collection system is recommended. - The wind park internal grid shall be made by underground cables. Any wind park, which would be erected on the NREA area, shall be connected to a substation to be built by EEHC/ETC. The interconnections shall be either by underground cable or built according to accepted bird protection guidelines
Occupational Health and Safety	General risks associated to persons involved in construction, operation and decommissioning of wind farms.	Adhering to international standards of health and safety guidelines.

E&S Attributes	Outcomes of Strategic ESIA	Additional Requirements in Strategic ESIA
Socioeconomics	Few people reside in the immediate surrounding of the NREA area, who may be affected by wind power development. Wind farm construction will create employment.	No additional requirements to be considered

10. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

10.1 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, Social, Health and Safety Management System (ESHS-MS) 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 ESHS-MS components.

The table below identifies the staffing requirements that are expected for the Project. This should be expanded further in the Environment, Health, and safety (EHS) Manual that is required as part of the ESHS-MS (as discussed in further details below). This should include an organisational structure that identifies the lines of authority and roles and responsibilities of all involved entities.

Table 83: Roles and Responsibilities of Entities Involved in ESMP

Project Role	Entity	Responsibilities	Staffing Requirements
Project Owner and Developer	Shokeir Wind Energy	▪ 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 ESHS MS.	Appoint competent HSE Manager or as part of Third-Party Employer representative (e.g. Owner's Engineer) Appoint a Community Liaison Officer (CLO)
EPC Contractor	TBA	▪ 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 at a minimum full-time and onsite HSE Manager and one HSE officer is to be deployed for 50 workers.
Project Operator	TBA	▪ 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 HSSE Manager, where required, depending on the scope of responsibilities allocated between the Developer and the OE.

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 84: 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 ESHS-MS 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 85: 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 86: 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 EHSS MS plans as required
- 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 87: Reports

Reporting	EPC Contractor	Project Operator
Reporting	Monthly	Monthly

10.2 Environmental, Health, Safety and Social Management System (EHSS-MS)

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 Environmental, Health, Safety and Social Management System (EHSS-MS) must be implemented by all relevant parties (i.e. Developer, EPC Contractor and Project Operator). The EHSS-MS 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 EHSS-MS is considered a key requirement under IFC PS1, in addition the EHSS-MS must also be in line with the IFC PSs.

Summarised below is the overall framework, structure and key requirements for the EHSS-MS for the key entities involved in the Project.

Developer

- HSE Manual that should include: (i) HSE Policy; (ii) Human Resources Policy and Procedures; (iii) HSE Organisational Structure and Responsibilities; and (iv) HSE Training, Monitoring and Reporting Plan
- Stakeholder Engagement Plan;
- Community Grievance Mechanism
- Active Turbine Management Plan (ATMP)

EPC Contractor

- HSE Manual (in line with Developer) that should include: (i) HSE Policy; (ii) Human Resources Policy and Procedures; (iii) HSE Organizational Structure and Responsibilities; (iv) HSE 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

- HSE Manual (in line with Developer) that should include: (i) HSE Policy; (ii) Human Resources Policy and Procedures; (iii) HSE Organizational Structure and Responsibilities; (iv) HSE 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

10.3 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 E&S attribute (e.g. air quality) that is likely to be impacted;
- A summary of the potential E&S 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 88: ESMP for the Planning Phase

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
Infrastructure and Utilities	Inappropriate management of planning activities and site locations (e.g. siting of turbines) and construction activities (e.g. excavations) could disturb such aviation practices.	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.)	Mitigation	Submit formal communication letters from the relevant entities.	Not applicable	Once before commencement of construction	Developer
	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.	NREA to coordinate with NTRA to provide information on the prior to the commencement of construction (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)	Mitigation	Submit formal communication letters from the relevant entities.	Not applicable	Once before commencement of construction	EPC Contractor

Table 89:ESMP for the Construction Phase

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
Landscape and Visual	Visual and landscape impacts due to presence of typical elements of a construction site such as equipment and machinery (e.g. cranes, excavators, etc.).	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) to ensure proper storage, collection, and disposal of waste streams generated.	Mitigation	Visual inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	EPC Contractor
		Implementation of 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).	Mitigation	Visual Inspections			
Geology, Hydrology and Hydrogeology	Impacts from Flood Risks on the Project Site	(i) Construct protective concrete fencing around critical Project infrastructure located within or adjacent to drainage mainstreams to reduce exposure to extreme rainfall and unexpected flood events. Fences should be designed to provide effective physical protection against surface runoff. (ii) Locate turbines, as far as practicable, on elevated ground and away from drainage mainstreams to minimize flood risk. Where avoidance is not feasible, enhance structural resilience through measures such as reinforced turbine foundations, elevation of turbine bases above anticipated flood levels, and installation of reinforced concrete fencing around turbine bases to protect against surface runoff impacts. (iii) Install appropriately sized culverts beneath Project access roads at drainage crossing points to ensure unobstructed passage of surface water and to prevent damage to road infrastructure during rainfall events. (ix) Develop and implement a Project-specific flood management plan that includes rainfall monitoring, defined emergency response procedures, protection of critical infrastructure, and contingency measures during severe rainfall events, in coordination with relevant local authorities.	Mitigation	Visual inspections	Not applicable	Once before commencement of construction	EPC Contractor
	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities (e.g. spillage of hazardous material, random discharge of waste and wastewater to surrounding environment, etc.).	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);	Mitigation	Submit Contract	Not applicable	Once before commencement of construction	EPC Contractor
	Solid waste management	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."	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity	
		Adhere to waste hierarchy principles with associated mitigation measures to include prevent, minimize, reuse, recycle, recover and dispose.						
		Distribute a sufficient number of properly contained containers clearly marked as "Construction Waste" for the dumping and disposal of construction waste.						
		Recycling measures must be implemented as follows: (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, ways to reduce construction waste must be undertaken by reusing materials (for example through recycling of concrete for road base coarse). This is a key requirement given that with the Project’s workforce there could be huge amounts of waste that could be recycled.						
		Implement proper housekeeping practices on the construction site at all times.						
		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.	Mitigation	Submit manifests	Not applicable	Throughout entire construction period		
	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities (e.g. spillage of hazardous material, random discharge of waste and wastewater to surrounding environment, etc.). 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 (being Ras Gharib WWTP);	Mitigation	Submit contract	Not applicable	Once before commencement of construction	EPC Contractor	
		Ensure that constructed septic tanks during construction are well contained and impermeable to prevent leakage of wastewater into soil.	Mitigation	Submit detailed design				
		Prohibit illegal disposal of wastewater to the land.	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring		
		Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing.				Weekly site inspections		
		Wastewater management	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.	Mitigation	Submit manifests	Not applicable		Throughout construction period
		Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities (e.g. spillage of hazardous material, random discharge of waste and wastewater to surrounding environment, etc.).	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 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		Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections		

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Hazardous waste management	classifications and that they are labelled for each type of hazardous waste.				Monthly ESHS reporting	
		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.					
		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 construction period	
	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities (e.g. spillage of hazardous material, random discharge of waste and wastewater to surrounding environment, etc.). 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 construction active areas relevant for period of construction		EPC Contractor
		Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for.				Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	
		Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)					
		Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refueling) 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.					
		If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste					
	Construction activities could disturb soil, and result in erosion and runoff could result in siltation of surface water (during rain events)	Existing natural flows will be maintained where possible as part of the drainage system design and any change to the natural/pre-development surface water conditions within the site to be minimized to the extent possible.	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	EPC Contractor
		Scheduling to avoid construction activities during heavy rainfall periods (i.e., during the wet season) to the extent practical. In addition, this will include modifying or suspending					

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		activities during extreme rainfall and high winds to the extent practical. Salvage and store topsoil and subsoil before areas are excavated, with topsoil stripped and stockpiled separately. 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 sites during site preparation and construction to prevent silt runoff where applicable. This could include but not limited to silt fences, gravel bag berms, fiber rolls, or other similar applications. Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible. In terms of road design, all Project roads shall be appropriately graded and shaped, with access road gradients limited to reduce runoff-induced erosion. Effective short-term measures for slope stabilization, sediment control, and subsidence control shall be implemented, particularly during construction. On steep road sections, transverse drains (grips) shall be constructed, where appropriate, to divert surface runoff from the road surface into swales or roadside drains. In addition, the alignment, length, and width of both on-site and off-site roads shall be optimized to minimize soil disturbance and reduce the need for cut-and-fill activities, with suitable runoff and erosion control features incorporated into the road design.					
Biodiversity	Potential impacts of Habitat Loss, Fragmentation and Degradation	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.	Mitigation	Submit Induction Training Records Submit TBT records	At construction active areas	Throughout construction period	Developer/EPC Contractor
		Prior to construction works (habitat clearance, levelling or any other works), working areas will be clearly demarked 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 Contractor to check enforcement of working areas.	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	
		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.	Mitigation	Visual Inspections	At construction active areas	Once after completing construction	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		An area 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.	Mitigation	Visual Inspections	At construction active areas	Once after completing construction	
	Direct Impacts on sensitive receptors (Habitats and Flora) - Non-native Species and Introduced Flora	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.	Mitigation	Visual Inspections / site walkovers	Once before commencement of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	
		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.					
		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 as far as possible 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).					
		Areas of soil removed from close proximity of 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).	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Throughout construction period	
		Adequate wheel-washing facilities to be constructed at the entrance to the site and any wastewater will be disposed of correctly to prevent spread of undesirable species.	Mitigation	Visual Inspections	Once before commencement of construction	Once before commencement of construction	
		Soil imports to be taken from local quarries or borrow pits to avoid importing non-native and invasive species from further afield.	Mitigation	Submission of pre-construction survey report	At construction active areas relevant for period of construction	Throughout construction period	
	Direct Impacts on Sensitive Receptors (Vertebrates) – Site Clearance and Earthworks	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 AoI will be discussed.	Mitigation	Submit Induction Training Records Submit TBT records	At construction active areas	Throughout construction period	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Prior to construction works (habitat clearance, levelling or any other works), working areas will be clearly demarked so that site workers fully understand the working area. Working areas will be marked using orange netting fencing (or similar). Encroachment into areas outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Contractor and Developer's Biodiversity Team to check enforcement of working areas.	Mitigation	Visual Inspections Submission of pre-clearance and translocation report Visual Inspections on exclusion zones	At construction active areas relevant for period of construction	Once before commencement of construction	
		Pre-construction surveys for sensitive species (i.e. those qualifying Priority Biodiversity Features) of herpetofauna will take place. The locations of known/active burrows used by Egyptian Spiny-tailed Lizard will be marked throughout the Project Area and appropriate buffers around each burrow established.	Mitigation				
		Prior to the commencement of construction, suitable receptor sites for the release of relocated Egyptian Spiny-tailed Lizards shall be identified and mapped. Selected sites shall preferably be located within the Project-wide boundary and, in all cases, within 10 km of the Project site. Receptor sites shall contain appropriate vegetation to provide both food resources and cover, have suitable soil types that allow individuals to dig and establish new burrows, and not already be close to the carrying capacity for this species. In addition, receptor sites shall not be located within existing or proposed development areas, or in locations where future development is likely to occur.	Mitigation				
		Detailed design for the final infrastructure layout will take into account the results of the pre-construction 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.	Mitigation				
		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.	Mitigation				
		Prior to work in an area containing Egyptian Spiny-tailed Lizard burrows any remaining burrows within 100m 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 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	Mitigation	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	At construction active areas relevant for period of construction	Upon occurrence	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		translocation to the receptor site. Once the lizard is removed from the burrow the hole will be collapsed and made unsuitable for future use.	Mitigation				
		Where possible animals will be moved to existing, but inactive, burrow sites – as long as the site is still suitable for use, with nearby food and cover plants etc.					
		All translocated Egyptian Spiny-tailed Lizards shall be soft-released to enhance post-release survival. Each individual shall be placed within a dedicated mesh enclosure located in suitable habitat, with a minimum size of 2 m × 2 m and covered to provide shade and protection from aerial predators. A starter burrow shall be created within each enclosure using an auger of approximately 20 cm diameter to a depth of around 30 cm to provide initial shelter. Supplementary feeding shall be provided during the acclimation period, and the enclosure shall be removed after approximately seven days to allow the lizards to disperse and forage naturally.					
		Working areas should avoid trees / shrubs as these are likely, due to their sporadic distribution across the AoI to be of importance to breeding birds (e.g. passerines, raptors).	Mitigation	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	At construction active areas relevant for period of construction	Throughout the construction period	
		Capture and movement of Egyptian Spiny-tailed Lizards will only be completed as a last resort. All works will aim to be completed at least 100m from active burrows. Locations where burrows are present up to 200m 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 captured and translocated to holding areas in accordance with the below protocols for the duration of the construction window in that location.	Mitigation	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	At construction active areas relevant for period of construction	Upon occurrence	
		A post-relocation report shall be prepared following completion of the relocation activities. The report shall document the survey dates and timing of capture and release, prevailing weather conditions during the survey and relocation efforts, locations of captured individuals, and the number of individuals captured during each relocation event. It shall also include a breakdown of individuals by age class and sex (juveniles, mature males, and mature females), details of the release sites used for each relocation effort, the number of males and females released at each site, and records of any mortalities occurring during the relocation process.	Mitigation	Submission of post-relocation report	At construction active areas relevant for period of construction	Post-relocation period	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity	
	Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions	Appropriate speed limits will be enforced on internal road network and working areas (30 km/h).	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	EPC 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 20 kph	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting		
		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 last 50m from the road to reduce the likelihood of hitting scavengers, including birds of prey.						
		A chance find procedure will be developed by the EPC Contractors so that all workers report any road collisions so that any such incident can be investigated in full.	Mitigation	Submission of chance find procedure	At construction active areas relevant for period of construction	Once prior commencement of construction		
	Direct Impacts on Sensitive Receptors (Habitats, Vertebrates) – Poaching, Collection etc.	The Project will enforce strict controls on hunting, gathering, poaching and otherwise disturbing flora and fauna within the Project Aol. 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.	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting		
		The ban on hunting etc. will be included in the site induction along with discussions about the sanctions for breaches of this control measure.	Mitigation	Submit Induction Training Records Submit TBT records	At construction active areas	Throughout construction period		
		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.	Mitigation	Submission of report	Not applicable	Throughout construction period		
		Direct and Indirect Impacts on Sensitive Receptors – Reduced Air Quality / Dust	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.	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	EPC Contractor
			Vehicles will be properly maintained to reduce emissions.					
	Emissions from the batching plant will be monitored in line with control plans to minimize air pollution.							
	Direct Impacts on Sensitive Receptors (Vertebrates) – Noise	Vehicles will be properly maintained to reduce noise emissions.	Mitigation	Visual Inspections		Daily HSE monitoring		

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Use of available technology and management practices with construction methodologies to reduce noise and vibration.	Mitigation	Noise Monitoring Program & Submission of report	At construction active areas relevant for period of construction	Weekly site inspections Monthly ESHS reporting	
		Regular monitoring of noise and vibration levels within works compounds and works areas and applying corrective measures as necessary. Quarterly noise monitoring will be undertaken.			At applicable areas	Quarterly	
	Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting	Limit the amount of lighting, especially within the wider AoI (e.g. at turbine construction sites). Night-time working is not anticipated and will certainly not be a regular occurrence. This will be achieved by ensuring that night-time working is only undertaken with appropriate justification, e.g. emergency works	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring	
		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.				Weekly site inspections	
		For external security lights PIR trigger units will be used and these should be timed to automatically switch off after five minutes.				Monthly ESHS reporting	
	Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Littering, Waste Management	Waste Management will be included in the Site Induction so that all site workers understand their responsibilities of maintaining a clean and tidy site. Where possible all materials than can be recycled will be.	Mitigation	Submit Induction Training Records Submit TBT records	At construction active areas	Throughout construction period	
		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.	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring	
		Daily inspections of working areas and worker compound should be completed, and corrective actions applied, where necessary.				Weekly site inspections Monthly ESHS reporting	
	Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species	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 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. If poison baits are to be used it must be certain that any poisoned animal cannot move out on to the wider AoI to reduce the risk of natural predators eating poisoned animals.	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE Monitoring Weekly site inspections Monthly ESHS reporting	
Avifauna	Direct and indirect impacts during site preparation activities	- Implementation of proper housekeeping measures to reduce impacts including: - Restrict activities exclusively to the allocated construction areas, including	Mitigation	Construction Schedule Plan Submission of an animal handling protocol, either dead or alive	At construction active areas relevant for period of construction	At commencement of construction activities Continuous	EPC Contractor / Developer

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		movement of workers and vehicles to allocated roads within the site, prohibiting off-roading to minimize disturbances. - Ban hunting of birds on site at any time and under any condition to anyone, especially workers. - Implement measures, preventing bird attraction to the site. This includes measures such as prohibiting littering, dumping, and ensuring waste streams are disposed appropriately. - Avoid unnecessary elevated noise levels at all times. In addition, apply adequate noise abatement measures. This could include the use of well-maintained mufflers and suppressants for high noise generating equipment and machinery. Develop a regular maintenance schedule of vehicles, machinery, and equipment for early detection of issues to avoid unnecessary elevated noise level, etc. Reduced speed limits inside the footprint to avoid road kills and dust. Report any incidental finding and killing of wildlife. Develop a protocol to report dispose of any deaths and injured wildlife or animals recorded onsite.					
	Direct and indirect impact on resident and breeding birds from risks of collision and electrocution.	▪ A complete additional survey comprising the entire breeding cycle of the Golden Eagle species would be necessary to properly assess the potential impact of this and other similar projects planned near the mountains and suitable cliffs. This monitoring should be developed with experts on the species, and GPS tagging highly recommended to save time and improve budgets. This monitoring could be shared by other developers in a similar situation. ▪ A species-specific additional study with experts for the observed Scooty Eagles (apart of the normal migration monitoring) on the potential breeding of the species in the Project area, and others in the vicinity should be completed PRIOR TO COMENCEMENT OF CONSTRUCTION. ▪ Should the additional assessments indicate highly sensitive areas for resident species, then additional mitigation and monitoring measures will be required. This could include the use of Automatic Detection Cameras (ADC) or additional resources. The	Additional Study	Submission of survey reports	Entire project footprint	Before commencement of construction	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		most feasible option considering biodiversity and commercial criteria should be determined based on the outcomes of the additional assessment in compliance with the experts' opinion of the two affected species. IF CONFIRMED, and depending on the distance of the works to potential breeding sites, works will be restricted to be performed out of the breeding seasons. A buffer of 2 km will apply to any nest (occupied or not by the eagles /colony for the falcons. Restrictions to apply after detailed study for both species, at least for one complete breeding season					
Archaeology and Cultural Heritage	Improper management could potentially disturb or damage potential archaeological remains on the surface as well as some of which could be buried in the ground (if any).	During excavation activities, the Ministry of Tourism and Antiquities 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	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	EPC Contractor
		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.	Mitigation	Submission of chance-find procedure			
Air Quality and Noise	Construction activities will likely result in an increased level of dust and particulate matter emissions as well as noise emission to surrounding environment which in turn will directly impact ambient air quality. This could entail indirect impacts on workers' health and safety.	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;	Mitigation	Dust and Noise monitoring program	This will include at least one (1) monitoring point which represents activities undertaken. The monitoring should include TSP, PM10 and PM2.5 and noise levels. Results should be compared with national limits or IFC standards as included within the General EHS Guidelines or EU limits, whichever is more stringent	Quarterly	EPC Contractor
		Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Egyptian Codes	Mitigation	Dust and Noise monitoring report			
		Basic dust control and suppression measures will be applied throughout the construction period to minimize dust generation and dispersion. These measures will include regular watering of access roads and active work areas, careful planning and scheduling of dust-generating activities to avoid their simultaneous occurrence where possible, and proper management of stockpiles and excavated materials through practices such as	Mitigation	Visual Inspections			

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		watering, containment, covering, or bundling. In addition, all trucks transporting aggregates and fine materials will be adequately covered, for example using tarpaulins, and a maximum speed limit of 15 km/h will be strictly enforced for construction vehicles within the site.	Mitigation	Visual Inspections	At construction active areas relevant for period of construction	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	
		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;					
		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.					
Infrastructure and Utilities	Waste handling requirements generated from the Project could entail constraints on existing users	Coordinate with the RSWWC and Sanitation Authority in Ras Gharib and obtain list of authorized contractors for collection of wastewaters from the site to the Ras Gharib WWTP.	Additional Requirement	Submit formal communication letters from the relevant entities.	Not applicable	Once before commencement of construction	EPC Contractor
		Coordinate with the RSWWC and Sanitation Authority in Ras Gharib 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 RSWWC and Sanitation Authority in Ras Gharib to obtain list of authorized contractors for collection of hazardous waste from the site to the closest approved facility for final disposal.					
	Water requirements of the Project could entail constraints on existing users such as local communities or industrial establishments.	Coordinate with the Ras Gharib Water Company to sector the water requirements of the Project.	Additional Requirement	Submit formal communication letters from the relevant entities.	Not applicable	Once before commencement of construction	
	Inappropriate management of planning activities and site locations (e.g. siting of turbines) and construction activities (e.g. excavations) could disturb such aviation practices.	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.	Mitigation	Submit formal communication letters from the relevant entities.	Not applicable	Once before commencement of construction	
	Construction activities could damage/disturb underground communication cables (if present	Establish coordination via NREA with NTRA to provide information on the at least six (6) months prior to the commencement of	Mitigation	Submit formal communication letters from the relevant entities.	Not applicable	Once before commencement of construction	EPC Contractor

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
	within the area), while rotating turbines during operation could disrupt Line of Sight (LoS) connections between telecommunication transmission towers.	construction (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)					
Occupational Health and Safety and Worker Accommodation	Generic occupational health and safety risks to workers, as working onsite increases the risk of injury or death due to accidents	Prepare an Occupational Health and Safety Plan (OHSP). Adopt and implement the recommendations/provisions of the OHSP which includes: (i) Risk assessment and job safety planning procedure, (ii) PTW system procedure, (iii) LOTO procedure, (iv) Site control occupational health and safety procedure to include requirements for personal Protective Equipment (PPE), requirements for site risks (fall protection, powered and hand tools, compressed air / gas cylinders, fire prevention, hot works, electrical works, material handling, machinery use and safety, excavation/concrete works/civil works, confined space activity, storage, medical requirements, and communicable disease management),, (v) Occupational health and safety signage requirements, (vii) Identification of OHS training requirements, (viii) Identification of monitoring and reporting requirements, (ix) Identification of roles and responsibilities, and (x) Identification of measures to reduce the risk of COVID-19 exposure and transmission.	Mitigation	Submit OHSP	Not applicable	Once before commencement of construction	EPC Contractor
		Prepare an Emergency Preparedness and Response Plan (EPRP) which should include: (i) communication and management process, (ii) emergency procedure and an onsite notification process (iii) emergency response procedure, (iv) emergency control measures to include but not limited to fire, accidents, spillage, traffic accidents, natural disasters and other. In addition, of particular importance within the Project area are also risks related to remoteness of the Project site (e.g. in case of a medical emergency), risks from sand and salt storms including windy conditions, risks from extreme hot and cold weather and conditions and low/high temperatures, (v) requirements for emergency kits, (vi) onsite assembly points, (vii) emergency signs, (viii) training requirements, (ix) monitoring and reporting requirements, and (x) roles and responsibilities of the personnel involved in implementation of the plan		Submit EPRP			
		Prepare and establish and implement a worker grievance mechanism to ensure that all worker complaints are properly received, documented, addressed, and closed out in a timely and transparent manner. The mechanism will provide multiple channels for submitting		Submit Worker grievance mechanism			

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		grievances, including anonymous options, ensure formal registration and assignment of a case handler, define clear timelines for acknowledgement, response, resolution, and monitoring, and require documented verification and reporting upon grievance close-out.					
		Follow the Workers' accommodation: process and standards" (EBRD/IFC Guidance Note, 2009). In case there is an accommodation onsite. The document provides guidance notes on general living facilities, room facilities, medical facilities, management of accommodation units, etc.		Submit Worker Accommodation document			
	Trespassing of unauthorized personnel into construction active areas could result in health and safety impacts	Develop a Security Risk Assessment to identify and manage potential security risks. The assessment will ensure that each turbine is fitted with locked doors to prevent unauthorized access, that the substation area is fully enclosed with concrete fencing to restrict entry, and that trained onsite security guards are present across the Project site at all times to safeguard assets and prevent trespassing. In addition, clear and visible safety signage will be installed on turbines and at the substation, providing warnings on public safety hazards and emergency contact information, with signs presented in both pictorial and written formats to ensure they are understood by all individuals, including those who are unable to read.	Mitigation	Submit Security Risk Assessment	Not applicable	Once before commencement of construction	EPC Contractor
Public Health and Safety	Influx of workers to the area could result in community impacts such as pressure on infrastructure elements, increase in social vices, risk of spread of disease, and other.	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 centres. Copies of medical examination results of all workers must be retained onsite.	Mitigation	Submission of medical examination records	Not applicable	Once before commencement of construction	EPC Contractor
		Ensure and maintain hygienic conditions onsite at all times specifically related to toilet and washing facilities, eating areas, etc.		Visual Inspections			
		Develop a code of conduct for workers which takes into account appropriate behaviour by workers 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.		Submission of signed code of conduct and associated disciplinary measures			
		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		Submit induction training modules and Toolbox Talks on hygiene and code of conduct.			

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		expected to be implemented and other as appropriate					
	Inappropriate management of security issues and incidents by security personnel towards local communities (e.g. overreaction, mistreatment, use of excessive force) could result in potential for conflict, resentment, distrust and escalation of events.	Develop a Security Management Plan (SMP) plan to 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.	Mitigation	Submit SMP	Not applicable	Once before commencement of construction	EPC Contractor
Socioeconomics	It is expected to have positive impacts through direct and indirect employment and local economic stimulation. Additional indirect benefits are expected through local procurement and increased demand for local services and businesses. Although detailed employment figures are not yet available, the Developer is committed to prioritising local communities where feasible.	Develop a Local Recruitment Procedure to prioritize employment opportunities for local communities, including Bedouin groups, by identifying targeted numbers of skilled and unskilled positions such as fresh graduate engineers, technicians, and labourers from the surrounding area. The Procedure will define clear and transparent mechanisms for announcing vacancies and implementing a fair, non-discriminatory selection process that ensures equal opportunities, including for females. It will also assess the potential for joint implementation with other wind farm developers in the area to maximize local employment benefits, with local hiring priorities formally reflected in the EPC Contract and all subsequent subcontracts.	Additional Requirement	Submit Local Recruitment Procedure	Not applicable	Once before commencement of construction	Developer / EPC Contractor Developer
		Develop a Local Procurement Procedure to prioritize procurement opportunities for local communities, including Bedouin groups, by identifying eligible local subcontractors and locally sourced goods and services such as supplies, equipment, cleaning, and support services. The Procedure will define clear and transparent mechanisms for announcing procurement opportunities and establish a fair, competitive, and non-discriminatory selection process that ensures equal opportunities for all qualified local suppliers. It will also assess the potential for joint implementation with other wind farm developers in the area to enhance local participation and efficiency, with local		Submit Local Procurement Procedure			

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		procurement priorities formally embedded in the EPC Contract and all subsequent					
		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, vision, timeline for implementation and other factors.		Submit Social Responsibility Program			

Table 90: ESMP for the Operation Phase

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
Landscape and Visual	Impacts related to interaction of wind turbines within the overall landscape and visual character of the area including any potential sensitive visual receptors.	Coordinate with the Traffic and Transport Authority, install clear and informative signage in Arabic and English language at Hurghada – Cairo Highway and on the road leaving the highway and into Wadi Dara Village to alert drivers of the wind farm ahead and provide guidance on safe driving practices.	Mitigation	Visual Inspections	Not applicable	Throughout entire operational period	Project Operator
Geology, Hydrology, and Hydrogeology	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities (e.g. spillage of hazardous material, random discharge of waste and wastewater to surrounding environment, etc.). 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) or for recycling (as discussed in further details below);	Mitigation	Submit contract	Not applicable	Once before commencement of operation	Project Operator
		Prohibit fly-dumping of any solid waste to the land	Mitigation	Visual Inspections	Entire project footprint	Daily HSE monitoring	
		Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste"				Weekly site inspections	
		Adhere to waste hierarchy principles with associated mitigation measures to include prevent, minimize, reuse, recycle, recover and dispose				Monthly ESHS reporting	
		Implement proper housekeeping practices onsite at all times					
		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	Mitigation	Submit manifests	Not applicable	Throughout operational period	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities (e.g. spillage of hazardous material, random discharge of waste and wastewater to surrounding environment, etc.). 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 (being Ras Gharib WWTP);	Mitigation	Submit contract	Not applicable	Once before commencement of operation	
		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	Mitigation	Submit manifests	Not applicable	Throughout operational period	
		Prohibit illegal disposal of wastewater to the land	Mitigation	Visual Inspections	Entire project footprint	Daily HSE monitoring	
		Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing.				Weekly site inspections Monthly ESHS reporting	
	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities (e.g. spillage of hazardous material, random discharge of waste and wastewater to surrounding environment, etc.). Hazardous waste management	Coordinate and hire a 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	
		Ensure that hazardous waste is disposed in a dedicated area that is enclosed; roofed and 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	Entire project footprint	Daily HSE monitoring	
		Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available				Weekly site inspections	
		Prohibit illegal disposal of hazardous waste to the land				Monthly ESHS reporting	
		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					
		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					
	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities (e.g. spillage of hazardous material, random discharge of waste and	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, with a hard roof, 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	Entire project footprint	Daily HSE monitoring Weekly site inspections Monthly ESHS reporting	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
Biodiversity	wastewater to surrounding environment, etc.).	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					
	Hazardous Material Management	Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)					
		Maintenance of all equipment and machinery used onsite. Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refueling) 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					
		If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste					
	Indirect Impacts on Sensitive Receptors (Vertebrates) – Disturbance	Speed limits of 30 kph will be enforced	Mitigation	Visual Inspections	Entire project footprint	Daily HSE monitoring	Project Operator
		Sensitive species are to be included in the site induction for all operational staff where additional control measures will be discussed including allowing animals to move around the site, not chasing after them in vehicles or approaching them on foot	Mitigation	Submit Induction training record		Weekly site inspections Monthly ESHS reporting	
	Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions	Speed limits of 30 kph will be enforced by the O&M Contractor	Mitigation	Visual Inspections	Entire project footprint	Daily HSE monitoring	
		Regular signage will be installed along the internal roads informing all drivers of the speed limit				Weekly site inspections	
		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				Monthly ESHS reporting	
		A ban on driving at night will be enforced and if absolutely necessary the speed limit will be reduced to 15 km/h on any internal roads.					
		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 50 m from the road to reduce the likelihood of hitting scavengers, including birds of prey					

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		A chance find procedure will be developed by the O&M Contractors so that all workers report any road collisions so that any such incident can be investigated in full and included in ongoing mortality monitoring at the site.					
	Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting	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.	Mitigation	Visual Inspections	Entire project footprint	Daily HSE monitoring	
		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.				Weekly site inspections	
		For external security lights PIR trigger units should be used and these should be timed to automatically switch off after five minutes.				Monthly ESHS reporting	
		No lighting will be installed along access road					
	Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora	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 the operational 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.	Mitigation	Visual Inspections	Entire project footprint	Daily HSE monitoring	
		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	Mitigation	Submission of survey report	Entire project footprint	Years 1, 2, 5, 10, 15	
Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species	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. 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.	Mitigation	Visual Inspections	Entire project footprint	Daily HSE monitoring		
					Weekly site inspections		
					Monthly ESHS reporting		

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Other	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 / non-native 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.	Mitigation	Submission of monitoring report	Entire project footprint	Throughout the operation phase	Project Operator
		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 Biodiversity Management Plans which will include Key Performance Indicators (KPIs) against which the results of the monitoring will be assessed.					
Avifauna	Direct and indirect collision impact on birds from risks of collision and electrocution for any kind of bird.	(i) Apply site specific turbine design and layout requirements to reduce avifauna collision risk, including avoidance of continuous turbine lighting, use of the minimum number of intermittent flashing lights in accordance with civil aviation requirements, compliance with minimum turbine spacing of 2.5 times rotor diameter and 7 times rotor diameter between turbine rows, and implementation of upfront mitigation measures including observer led Shut Down on Demand based on migration intensity and CRM results, subject to regulatory approval. (ii) Implement Shut Down on Demand procedures during operation, ensuring continuous observer coverage of turbines and buffer areas, adequate buffer distances to allow timely turbine shutdown, deployment of trained observers working in pairs and shifts, effective communication between observers and shutdown operators, and periodic review of shutdown protocols in coordination with regional projects and best practice.	Mitigation	(i) Conduct regular visual inspections and design compliance checks to confirm implementation of approved turbine lighting, layout, and spacing requirements, with records maintained by the Project Environmental Team. (ii) Maintain logs of Shut Down on Demand events and bird observations, and include summaries within periodic avifauna monitoring and environmental compliance reports. (iii) Implement visual bird monitoring during migration seasons in accordance with the approved Active Turbine Management Plan, with monitoring results summarized in seasonal monitoring reports.	Entire project footprint	Daily HSE monitoring and visual inspections; weekly site inspections; monthly ESHS reporting; daily avifauna monitoring during migration seasons; six monthly and annual biodiversity monitoring reporting.	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		(iii) Design and implement an Active Turbine Management Plan during operation in line with Good International Industry Practice, including bird monitoring and observer led shutdown on demand during migration seasons, with continuous daily monitoring during spring migration from 20 February to 15 May and autumn migration from 10 August to 15 November, in accordance with the RCREEE ATMP protocol and Technical Committee guidance. (iv) Undertake targeted monitoring and mitigation measures for resident Golden Eagle, including cliff nesting raptor monitoring during the breeding season, assessment of breeding and fledgling success, and implementation of additional studies such as satellite tracking where required to identify foraging areas and inform year round mitigation, with the potential for year round shutdown on demand if necessary to achieve no net loss of the breeding pair. (v) Design and implement a Post Construction Fatality Monitoring program during operation to assess vertebrate mortality and the effectiveness of mitigation measures, with fatality rate estimates reported every six months by migration season, annual CRM updates, comparison against ESIA predictions, and application of adaptive management measures where higher than predicted mortality is recorded. (vi) Implement a chance find procedure for vertebrate carcasses during operation, requiring site personnel to report findings to the Project Ecologist, and remove prey species carcasses from roads and on site areas to reduce the attraction of scavenging birds.		(iv) Undertake targeted visual monitoring of resident raptor activity during the breeding season, and document observations and findings in dedicated raptor monitoring reports. (v) Conduct Post Construction Fatality Monitoring surveys during operation, record carcass findings, and report results within six monthly and annual environmental monitoring reports. (vi) Record all chance finds of vertebrate carcasses by site personnel and report findings to the Project Ecologist, with outcomes documented in monitoring records and included in periodic reporting.			
Bats	Direct or indirect impacts due to the risk of bat collision with the blades of the operating wind turbines.	- The Developer will be required to undertake at height bat acoustic surveys for one (1) year during first or second year of operations to verify outcomes above. 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. - To verify the outcomes above, as part of the PCFM Program to be developed for birds, it should cover bats as well. Based on the outcomes of the PCFM, additional management measures should apply such as curtailment of turbines and increase cut-in speed to 6 m/s.	Mitigation	Submission of survey reports	Entire project footprint	During the 1 st or 2 nd year of operation.	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		The mitigation will be developed by an international expert on bat monitoring and interactions with wind energy facilities.					
Infrastructure and Utilities	Waste handling requirements generated from the Project could entail constraints on existing users	Coordinate with the RSWWC and Sanitation Authority in Ras Gharib and obtain list of authorized contractors for collection of wastewaters from the site to the Ras Gharib WWTP.	Additional Requirement	Submit formal communication letters from the relevant entities.	Not applicable	Once commencement before of operation	Project Operator
		Coordinate with the RSWWC and Sanitation Authority in Ras Gharib 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 RSWWC and Sanitation Authority in Ras Gharib to obtain list of authorized contractors for collection of hazardous waste from the site to the closest approved facility for final disposal.					
	Water requirements of the Project could entail constraints on existing users such as local communities or industrial establishments.	Coordinate with the Ras Gharib Water Company to sector the water requirements of the Project.	Additional Requirement	Submit formal communication letters from the relevant entities.	Not applicable	Once commencement before of operation	
	Inappropriate management of planning activities (e.g. siting of turbines and proper buffer distance) could affect such nearby wind farms.	Further follow up/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	Mitigation	Submit formal communication letters from the relevant entities.	Not applicable	Once commencement before of operation	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
Occupational Health and Safety and Worker Accommodation	Generic occupational health and safety risks to workers, as working onsite increases the risk of injury or death due to accidents	Prepare an Occupational Health and Safety Plan (OHSP). Adopt and implement the recommendations/provisions of the OHSP which includes: (i) Risk assessment and job safety planning procedure, (ii) PTW system procedure, (iii) LOTO procedure, (iv) Site control occupational health and safety procedure to include requirements for personal Protective Equipment (PPE), requirements for site risks (fall protection, powered and hand tools, compressed air / gas cylinders, fire prevention, hot works, electrical works, material handling, machinery use and safety, excavation/concrete works/civil works, confined space activity, storage, medical requirements, and communicable disease management),, (v) Occupational health and safety signage requirements, (vii) Identification of OHS training requirements, (viii) Identification of monitoring and reporting requirements, (ix) Identification of roles and responsibilities, and (x) Identification of measures to reduce the risk of COVID-19 exposure and transmission.	Mitigation	Submit OHSP	Not applicable	Once before commencement of operation	Project Operator
		Prepare an Emergency Preparedness and Response Plan (EPRP) which should include: (i) communication and management process, (ii) emergency procedure and an onsite notification process (iii) emergency response procedure, (iv) emergency control measures to include but not limited to fire, accidents, spillage, traffic accidents, natural disasters and other. In addition, of particular importance within the Project area are also risks related to remoteness of the Project site (e.g. in case of a medical emergency), risks from sand and salt storms including windy conditions, risks from extreme hot and cold weather and conditions and low/high temperatures, (v) requirements for emergency kits, (vi) onsite assembly points, (vii) emergency signs, (viii) training requirements, (ix) monitoring and reporting requirements, and (x) roles and responsibilities of the personnel involved in implementation of the plan		Submit EPRP			

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Prepare and establish and implement a worker grievance mechanism to ensure that all worker complaints are properly received, documented, addressed, and closed out in a timely and transparent manner. The mechanism will provide multiple channels for submitting grievances, including anonymous options, ensure formal registration and assignment of a case handler, define clear timelines for acknowledgement, response, resolution, and monitoring, and require documented verification and reporting upon grievance close-out. Follow the Workers' accommodation: process and standards" (EBRD/IFC Guidance Note, 2009). In case there is an accommodation onsite. The document provides guidance notes on general living facilities, room facilities, medical facilities, management of accommodation units, etc.		Submit Worker grievance mechanism Submit Worker Accommodation document			
Public Health and Safety	Trespassing of unauthorized personnel into construction active areas could result in health and safety impacts	Develop a Security Risk Assessment to identify and manage potential security risks. The assessment will ensure that each turbine is fitted with locked doors to prevent unauthorized access, that the substation area is fully enclosed with concrete fencing to restrict entry, and that trained onsite security guards are present across the Project site at all times to safeguard assets and prevent trespassing. In addition, clear and visible safety signage will be installed on turbines and at the substation, providing warnings on public safety hazards and emergency contact information, with signs presented in both pictorial and written formats to ensure they are understood by all individuals, including those who are unable to read.	Mitigation	Submit Security Risk Assessment	Not applicable	Once commencement before of operation	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Inappropriate management of security issues and incidents by security personnel towards local communities (e.g. overreaction, mistreatment, use of excessive force) could result in potential for conflict, resentment, distrust and escalation of events.	Develop a Security Management Plan (SMP) plan to 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.	Mitigation	Submit SMP	Not applicable	Once commencement before of operation	Project Operator
Socioeconomics		Develop a Local Recruitment Procedure to prioritize employment opportunities for local communities, including Bedouin groups, by identifying targeted numbers of skilled and unskilled positions such as fresh graduate engineers, technicians, and labourers from the surrounding area. The Procedure will define clear and transparent mechanisms for announcing vacancies and implementing a fair, non-discriminatory selection process that ensures equal opportunities, including for females. It will also assess the potential for joint implementation with other wind farm developers in the area to maximize local employment benefits, with local hiring priorities formally reflected in the EPC Contract and all subsequent subcontracts.	Additional Requirement	Submit Local Recruitment Procedure	Not applicable	Once commencement before of operation	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring & Reporting Action	Parameters to be monitored / location	Frequency	Responsible Entity
	It is expected to have positive impacts through direct and indirect employment and local economic stimulation. Additional indirect benefits are expected through local procurement and increased demand for local services and businesses. Although detailed employment figures are not yet available, the Developer is committed to prioritising local communities where feasible.	Develop a Local Procurement Procedure to prioritize procurement opportunities for local communities, including Bedouin groups, by identifying eligible local subcontractors and locally sourced goods and services such as supplies, equipment, cleaning, and support services. The Procedure will define clear and transparent mechanisms for announcing procurement opportunities and establish a fair, competitive, and non-discriminatory selection process that ensures equal opportunities for all qualified local suppliers. It will also assess the potential for joint implementation with other wind farm developers in the area to enhance local participation and efficiency, with local procurement priorities formally embedded in the EPC Contract and all subsequent		Submit Local Procurement Procedure		Once commencement before of operation	Project Operator
		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, vision, timeline for implementation and other factors.		Submit Social Responsibility Program		Once commencement before of operation	Project Operator