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Environmental and Social Impact Assessment (ESIA) Report

KARAVASTA 140 MW SOLAR PV PROJECT, ALBANIA

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	CONSULTANT			**CONTRACTOR**	
	Originator	**Checker**	**Approver**	**Checked**	**Approved**
Name/ Surname	Redion Biba Enkeleda Sopaj Johan Shyti Bledar Shehu Klodian Cipo Taulant Bino Ferdinand Bego Arjan Beqiraj Sulejman Sulce Spase Shumka Arsen Proko	Mark Grundy Redion Biba Linda Zaqaj Klara Hoxhallari Neil Fairburn	Redion Biba Mark Grundy		
Signature					
Date					
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Abbreviations

ALL	Albanian Lek
AB	Albanian Bank
AEWA	African-Eurasian Migratory Water Birds Agreement
API	Area of Project Influence
AoI	Area of Influence
AU	Administrative Unit
BOD	Biological Oxygen Demand
CEC	Cation Exchange Capacity
CEMP	Construction Environmental Management Plan
CH	Critical Habitat
CH	Cultural Heritage
COD	Chemical Oxygen Demand
CR	Critically Endangered
DCM	Decision of the Council of Ministers
EBRD	European Bank for Reconstruction and Development
EC	Electrical Conductivity
EHSSMP	Environmental, Health, Safety, and Social Management Plan
EIA	Environmental Impact Assessment
EMF	Electro Magnetic Field
EMMP	Environmental Management and Monitoring Plan
EN	Endangered
EPC	Engineering, Procurement and Construction
ESIA	Environmental and Social Impact Assessment
E&S	Environmental and Social
EU	European Union
GDP	Gross Domestic Product
GHGs	Greenhouse Gases
GIP	Good International Practice
GLAC	Guide to Land Acquisition and Compensation
GPG	Gender Pay Gap
GPS	Global Positioning System
GW	Giga Watts
GW	Ground Water

Ha	Hectares
HCC	Health Care Centre
HH	Household
HSE	Health, Safety and Environment
H&S	Health and Safety
HV	High Voltage
IA	Impact Assessment
IAP	Interested and Affected People
IBA	Important Bird Area
IEC	Independent Environmental Consultant
IFC	International Finance Corporation
IGEWE	Institute of Geosciences, Energy, Water and Environment
ALARP	As Low as Reasonably Practicable
IPP	Independent Power Plants
ISO	International Organization for Standardization
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
KI	Key Informant
Km	Kilometre
LALRF	Land Acquisition and Livelihood Restoration Framework
LC	Least Concern
LRP	Livelihood Restoration Plan
LSD	Low sulphur Diesel
MTE	Ministry of Tourism and Environment
MW	Mega watts
NEA	National Environmental Agency
NICH	National Institute of Cultural Heritage
NM	Natural Monument
NT	Near Threatened
OHL	Overhead Line
OHS	Occupational Health and Safety
OHSAS	Occupational Health and Safety Assessment Series
O&M	Operation and Maintenance
OST/Albanian TSO	Transmission System Operator

PA	Project Area
PAH	Project Affected Households
PIA	Project Impacted Area
PAC	Project Affected Community
PAP	Project Affected Person
PDA	Project Development Area
PDCA	Plan, Do, Check, Act
PGA	Peak Ground Acceleration
PR	Performance Requirement
PV	Photovoltaic
RED	Regional Environmental Directorate
RES	Renewable Energy Sources
RF	Resettlement Framework
RLMP	Recruitment and Labour Management Plan
RoW	Right of Way
SCADA	Supervisory Control and Data Acquisition
SESQ	Socio-Economic Survey Questionnaire
SEP	Stakeholder Engagement Plan
SER	Socio-Economic Report
SES	Socio-Economic Survey
SIA	Social Impact Assessment
SAR	Sodium Adsorption Ratio
SQ	Soil Quality
SSES	Sample Socio-Economic Survey
SW	Surface Water
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TV	Television
UNDP	United Nations Development Programme
UNFCCC	The UN Framework Convention on Climate Change
US EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
VU	Vulnerable
WB	World Bank

WFD	Water Framework Directive
WHO	World Health Organisation
WMP	Waste Management Plan
WP	Waypoint

1. Introduction

This ESIA Report has been compiled on behalf of Voltalia S.A, as part of the Environmental and Social Impact Assessment (ESIA) process for the proposed 140 MW Karavasta Solar PV Project, and associated overhead transmission line (OHL), in the Divjaka region of Albania (the Project). Voltalia has appointed Abkons shpk (Abkons) to act as Independent Environmental Consultant (IEC) and perform the ESIA for the Project.

Abkons has identified and assessed the potential environmental and social impacts associated with the development of the Project by conducting an objective and independent ESIA process, including relevant information and opinions of Interested and Affected Parties (IAPs) which have been collected and passed on to the Ministry of Tourism and Environment (MTE) and National Environmental Agency (NEA), to enable an informed decision-making process to take place. This ESIA Report presents the outcome from the ESIA process, presenting the identified potential impacts, outcomes from the engagement process, and makes recommendations for measures to mitigate and manage such impacts.

1.1. Project Background and Overview

Karavasta Solar sh.p.k established by Voltalia S.A is the developer for the proposed 140 MW Karavasta Solar PV Project located in the Divjaka and Fier municipalities of Albania. Albania has a considerable potential of Renewable Energy Sources (RES) and therefore represents an important energy resource potential in Albania. The use of such resources for energy production supports the long-term objective of the country's energy policies, including support for the overall economic development, increase in security of energy supply and protection of the environment. The use of renewable energy can help decrease the dependence on energy imports and improve the security of energy supply and can even help with macroeconomic and political security of the country, decreasing the domestic budget deficit. The implementation of the Project shall also help strengthen the reliability and stability of the energy sector.

The European Bank for Reconstruction and Development (EBRD) has categorized the Project as "A" in terms of its 2019 Environmental and Social (E&S) Policy, as it was considered that this Project could result in potentially significant adverse environmental and/or social impacts, and therefore a comprehensive Environmental and Social Impact Assessment (ESIA) and review of associated documents is required, followed by their public disclosure for a minimum period of 120 days. Furthermore, IFC has also categorised the project as "A"due to 'potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented from the project'[1].

Furthermore, the MTE has confirmed that the project is considered to be covered by Annex 1 under Decision of the Council of Ministers (DCM) No. 686 dated 29.7.2015 (amended) on EIA Procedure and categorised as requiring an in-depth ESIA.

1.2. Purpose and Structure of the ESIA Report

This report presents the findings of the ESIA process undertaken for the Project. The ESIA is specifically developed to demonstrate compliance with international Lender, namely EBRD, IFC, WB and Albanian requirements.

An ESIA is undertaken to establish the effects of a Project on the environment and the socio-economic implications for the local community, relating to the construction, operation and decommissioning of the proposed project. In line with National and international standards, the overall ESIA process generally includes the steps outlined in

Figure 1 below, which can be summarised as follows:

[1] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/es-categorization

- Scoping to identify key environmental issues at an early stage and determine the scope of the ESIA – completed in January 2021;
- Baseline studies as necessary, to establish the state of the environment and socio-economic conditions prior to the implementation of the Project - presented in Section 4 of this report;
- Prediction of the potential impact on the established baseline conditions due to implementation of the proposed Project - presented in Section 6 of this report;
- Identification of mitigation and management techniques to mitigate any negative impacts - presented in Section 7 of this report;
- ESIA report preparation (Statement) detailing the ESIA process undertaken and its findings - this report;
- Development of an Environmental and Social Management and Monitoring Plan (ESMMP) and associated plans documenting the actions required to address the project's environmental and social impacts and issues, to be developed following the recommendations made within this report;
- Monitoring of the environmental and social performance of the Project - to be undertaken during the construction and operational phases of the Project;
- Public consultation performed throughout the ESIA process - summary of consultation is provided within this report and the detail of stakeholder engagement process is presented within the separate Stakeholder Engagement Plan (SEP).
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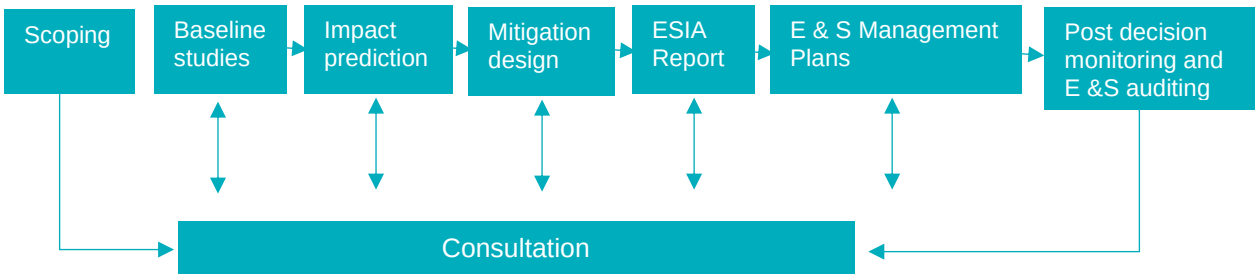


Figure 1. Overall ESIA Process

This report is structured as follows:

- Chapter 1: provides an introduction to the Project, its participants, and the overall approach of the ESIA scoping process
- Chapter 2: provides a description of the Project and its location, and alternatives
- Chapter 3: provides the relevant legal and relevant administrative framework for the Project
- Chapter 4: presents the environmental and social baseline conditions of the Project area
- Chapter 5. Presents the public participation and stakeholder engagement undertaken as part of the ESIA process
- Chapter 6: presents the impact assessment methodology applied and the outcomes from the impact assessment process.
- Chapter 7: provides an outline of the proposed plan for the management of the identified impacts

- Chapter 8: summarises the main conclusions and recommendations identified from the ESIA process.

1.3. Introduction to Project Proponent - Voltalia

Founded in 2005, Voltalia Group is a global renewable energy producer and service provider. The Company develops, finances, builds and operates solar, hybrid, wind, hydro and biomass power plants. With its main activity residing in the generation and sale of electricity from self-owned renewable Independent Power Producer (IPP), Voltalia Group also provides services related to Engineering, Procurement and Construction (EPC) and Operations & Maintenance (O&M) for its own power plants as well as for third-party Clients.

With over a thousand employees, Voltalia Group has an established presence in 20 countries and covers a large diversity of markets in Africa, Europe, Latin America, as well as some parts of the Middle-East and Central Asia. The acquisition of Martifer Solar in 2016 accelerated Voltalia Group's growth and diversification towards new countries, technologies and business models.

Voltalia Group has an extensive track-record throughout four continents. As of March 2021, the Company directly owns and operates a total installed capacity of 1,015 gigawatts. As a service provider, Voltalia currently operates 2.4 GW of power plants (mainly solar PV) through O&M contracts for third party clients.

Voltalia Group has an additional project pipeline exceeding 9GW, currently in under development or under construction, in line with the Company's 2.6 GW target of installed capacity in 2023.

Technical Expertise & Experience

Voltalia Group has extensive and renowned experience and capacity in developing and building renewable energy plants. The Company has dedicated EPC teams, which includes a highly-technical engineering body with extensive experience in designing power stations using solar, wind and hydro technologies, as well as battery storages, electrical systems and grid connections. In the last years, the Company has also been deploying new capacities in hybrid power plants design and engineering.

Voltalia Group has successfully developed projects across the world, mainly in Europe (France, Portugal, Italy, Spain, UK), East Africa (Kenya, Tanzania), Latin America (Mexico, Brazil) and Middle-East (Egypt, Jordan). Most of those projects were built by the Company as main EPC contractor. Regarding wind power, the largest project that Voltalia has successfully developed has the capacity of 163 MW, located in the Serra Branca cluster, Brazil with the 20-year power sale contract.

In addition to EPC services, Voltalia Group offers best-in-class O&M services to the renewable energy market. The Company performs plant's supervision in real-time, 24/7, and acts with local O&M teams to ensure fast failures detection, reducing the plant production losses and maximizing revenues.

Health, Safety and Environment Policy

Voltalia Group is steadfast in its commitment to the highest standards and principals in Health, Safety and Environmental (HSE) practices. Within the Voltalia Group the following certifications are held:

- ISO 14001:2015 (Environment);
- ISO9001:2015 (Quality); and,
- ISO 45001:2018 (H&S and Security).

In 2015, the Group introduced standard HSE rules to be complied with at all construction and operation sites. Compliance with these rules is an integral part of new contracts signed by the Group and its suppliers/subcontractors.

For each project, Voltalia Group develops, implements, manages and revises a Health & Safety Plan (H&S Plan), a document that describes and organizes the works to be developed on site, in order to satisfy legal, regulatory and Client requirements. The H&S Plan is part of the Integrated Management System of Voltalia Group and aligns with the requirements of the EN ISO 9001:2015 and ISO 45001:2018 standards. Voltalia Group follows a PDCA (Plan, Do, Check, Act) framework, identifying the key actions needed in each part of

that cycle and relating them back, where appropriate, to leadership, management, worker involvement and competence.

Voltalia will ensure that its collaborators and others who are employed in the project obtain a high standard of safety awareness. In addition, Voltalia will endeavour to protect the Environment in all of its activities.

2. Project Description

2.1. Project Summary

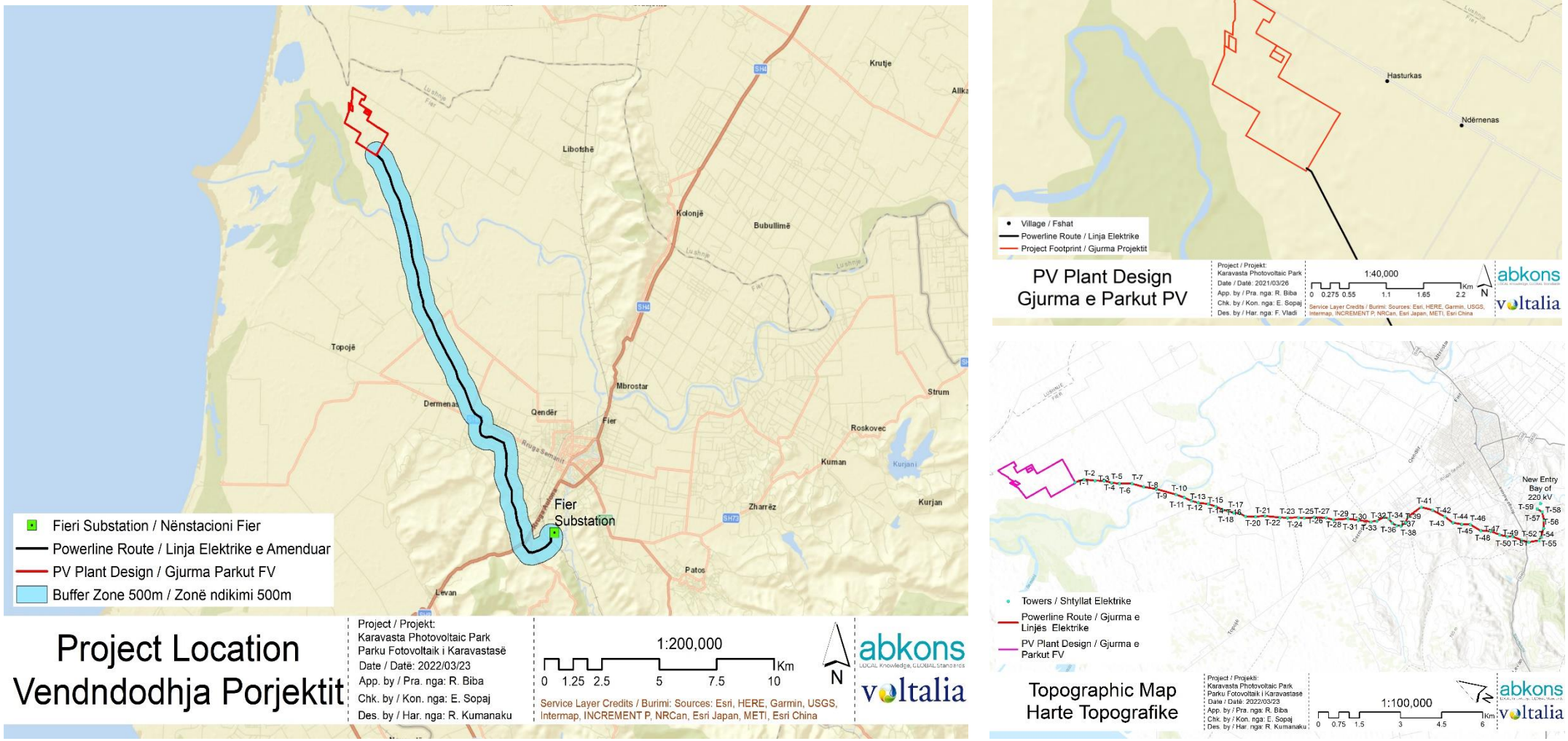
The Power Plant is called Karavasta Solar, and is located at Remas – Karavasta Divjak, Lushnje, and Libofsha Fier at the following coordinates: 40°50'56.44"N, 19°27'12.50"E. All project information herein is based on Voltalia Group internal know-how, market sounding and/or proposals from potential counter-parties. Negotiations are still ongoing and all final figures may vary.

Installed capacity	140 MW peak
Asset type	IPP
Concession	30 years
Location	Fier
Available land	196 ha
PV Project footprint	185 ha
Performance Ratio	85%
Yield (P50) / (P90)	271 / 246 GWh//y



2.2. Project Location and Routing

The proposed Project is located within Libofsha administrative unit, municipality of Fier, Albania and lies approximately 5 km south of the Karavasta Lagoon. The available land for the PV Project is **196 Ha** with the proposed PV layout footprint occupying a total of 185 Ha of land. The Project site is situated between the villages of Ndërmenas and Hasturkas to the East, the villages of Adriatik and Metaj to the Southeast and the Karavasta Lagoon to the North. The associated 220 kV overhead transmission line (OHL) will run approximately 19.2 km in a southeasterly direction from the Project site to the Fier substation, connecting the PV Plant to the national grid.



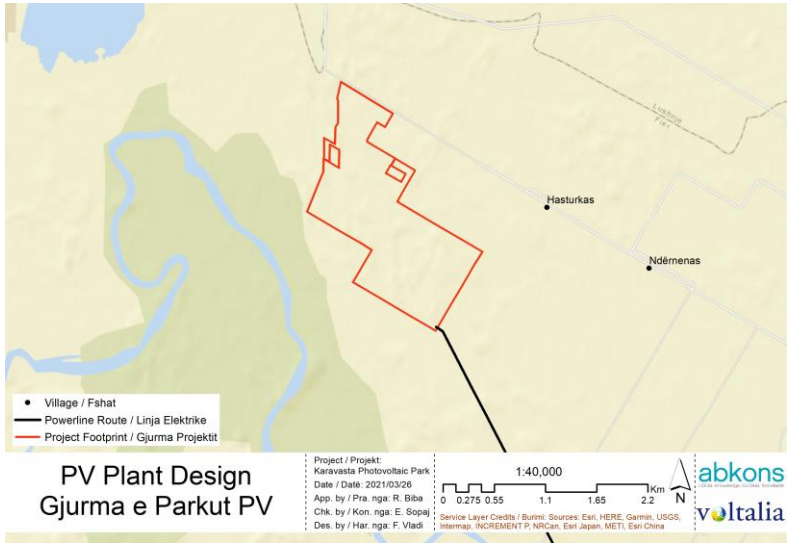


Figure 2. PV and OHL Project location and AoI

The nearest villages are Hasturkas and Ndërnenas which lie 800 m and 1500 m respectively to the east of the project area, while the villages of Adriatik and Metaj are situated 4 km and 5.3 km, respectively, southeast from the project area. The village of Karavasta e Re is situated around 5 km north of the project site. The villages of Seman and Seman i Ri are located nearly 5 km to the south of the Project site.

The main landform elements in the Divjaka – Karavasta region are represented by a large plain area in which the Project site is located, the small hills of Divjaka located approximately 8.5 km northeast from the Project site, the coastal lagoon of Karavasta located to the northwest, the Seman and Shkumbin deltas located southwest and northwest (respectively), and sand dunes and sandy beaches to the east. A detailed description of the project area and surrounding areas are provided in chapter 4 Environmental and Social Baseline Conditions.

2.3. Rational for the Project

The Albanian Government is working towards a reliable and more sustainable energy sector, development of which shall be based on exploiting all energy options to meet Albania's energy demand and create added value for Albanian citizens, in alignment with the principles of environmental, economic and social responsibility.

Historically, the electricity generation has been generated almost exclusively by hydropower plants. In 2017 the country had a total installed capacity of about 2,100 MW of which only 100 MW was thermal. In 2017 annual electricity consumption was about 7.1 TWh with a peak load demand of 1.4 GW.

Albania also imports electricity from neighbouring countries. However, these imports have progressively dropped in the last ten years following the increase in domestic power generation and the reduction in electricity losses, which have been reduced from 45% in 2013 to 23% at the end of 2018, with an investment and management plan to have further reduced them to 17% by the end of 2020.

Albania is a country that in certain areas have an average of 360 days of sunshine and therefore energy production from solar photovoltaic (PV) is an important potential source of electricity that will help diversify energy sources and reduce Albania's dependence on hydro and imported electricity.

According to Albanian National Strategy on Energy (https://qbz.gov.al/) 2018 -2030, Albania is aiming at "Enhancing security of energy supply and minimising environmental impacts at affordable cost for Albanian citizens"; the guiding principles of the strategy are:

- Increasing the reliability and security of energy supply, while ensuring growth in welfare;
- Developing internal energy sources of primary energy in a sustainable and competitive manner;
- Improving the cost effectiveness of power supply systems;
- Achieving objectives for renewable energy sources and energy efficiency set out in the National Energy Efficiency Action Plans and Renewable Energy Sources;
- Integration of the Albanian electricity market and natural gas with Kosovo, the region and European markets;
- Achieving National Targeted Target Contribution (NDC) Objectives for Reducing Greenhouse Gas Emissions (GHGs).

In this context the investment in and development of solar PV projects is an important element in achieving the principles of this strategy, and therefore this Project is aligned with the overall objectives of Albania's national energy strategy. The Project will support Albania's strategy to meet its growing energy needs and reduce reliance on energy imports while taking advantage of Albania's optimal features for solar PV power generation.

2.4. Technical Overview and Project Components

Voltalia has considered a number of possible designs and layouts for the Plant; the overall layout of the PV Project is shown in Figure 5below. The Project is designed as a 140 MWpDC (Direct current)) horizontal single-axis tracking photovoltaic (PV) park and will deliver 120 MW AC (Alternating current)) to the grid.

Figure 3 gives an overview of a utility scale grid-connected solar PV power plant; the main components include:

- **Solar PV modules**: These convert solar radiation directly into electricity through the photovoltaic effect in a silent and clean process that requires no moving parts. The PV effect is a semiconductor effect whereby solar radiation falling onto the semiconductor PV cells generates electron movement. The output from a solar PV cell is DC electricity. A PV power plant contains many cells connected together in modules and many modules connected together in strings to produce the required DC power output. The current design has a total of 241,400 PV modules, each generating up to 580 W; the final number of PV panels may vary from this figure based on the finalised layouts.
- **Module tracking systems**: These allow PV modules to be securely attached to the ground on tracking frames. The selected tracking system for the Project is a horizontal single axis tracker (North-South orientation) with the PV modules rotating from East (sunrise) to West (sunset), with a rotational angle of ±50° (see Figure 3below). The purpose of the tracking system is to maximise the yield of the Project by increasing the time PV modules face the sun at their optimum angle, from the early hours until the end of the day, significantly increasing the electricity generated compared to fixed structure systems.
- **Inverters**: These are required to convert the DC electricity to alternating current (AC) for connection to the utility grid. Many modules in series strings and parallel strings are connected to the inverters. The Project will require a total of 32 inverters.
- **Step-up transformers**: The output from the inverters require a step-up in voltage to reach the AC grid voltage level. The step-up transformer takes the output from the inverters (600 V) and initially steps this voltage up to 20 kV which will be collected and stepped-up again at the Project sub-station to the required grid voltage of 220 kV.
- **The grid connection interface**: This is where the electricity is exported into the grid network. The substation will also have the required grid interface switchgear such as circuit breakers (CBs) and disconnects for protection and isolation of the PV power plant, as well as metering equipment. The Project will connect to the Albanian National Grid at Fier Substation located approximately 20 km southeast from the Project Site via a 220-kV overhead transmission line.

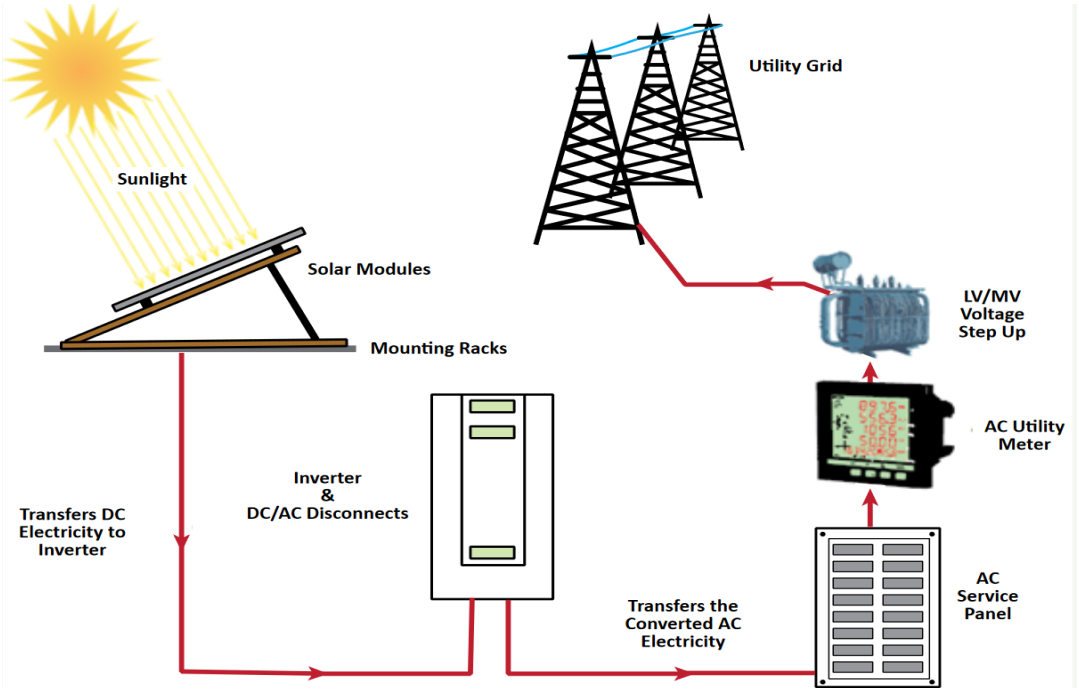


Figure 3. Overview of Utility Scale Solar PV Plant (IFC, 2015)

The Project will also require a building to accommodate the SCADA (Supervisory Control and Data Acquisition) equipment for the command, control and protection of the Project. This will be manned by the technicians employed for the control, operation and maintenance of the Project.

In addition to the above key components a large-scale solar PV project also requires the following infrastructure:

- Onsite (buried) cabling;
- Fencing and security measures;
- Access tracks;
- Material storage facilities.

During the construction phase, one or more temporary construction compound(s), including site offices, material and equipment storage etc., will be required as well as temporary roadways to facilitate access to all parts of the Development site.

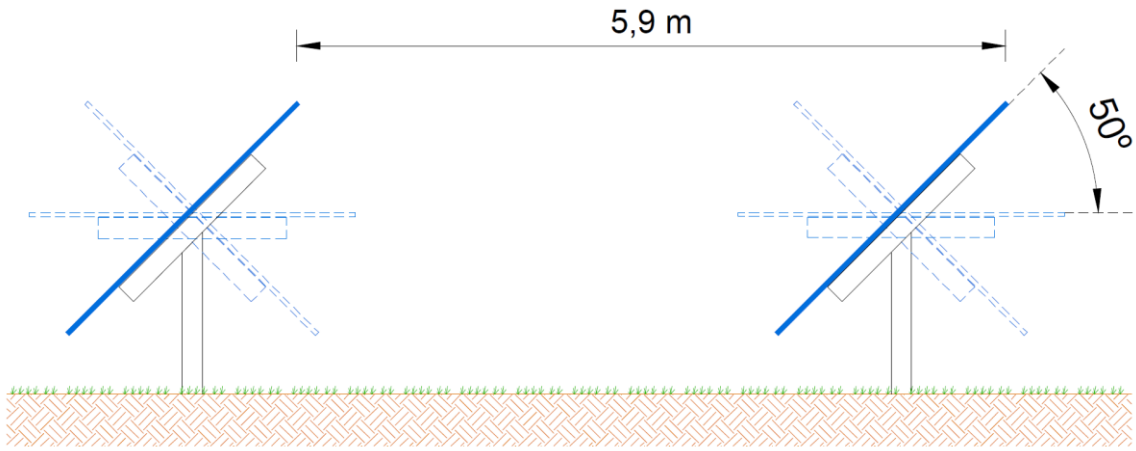


Figure 4. Lateral view of the tracker

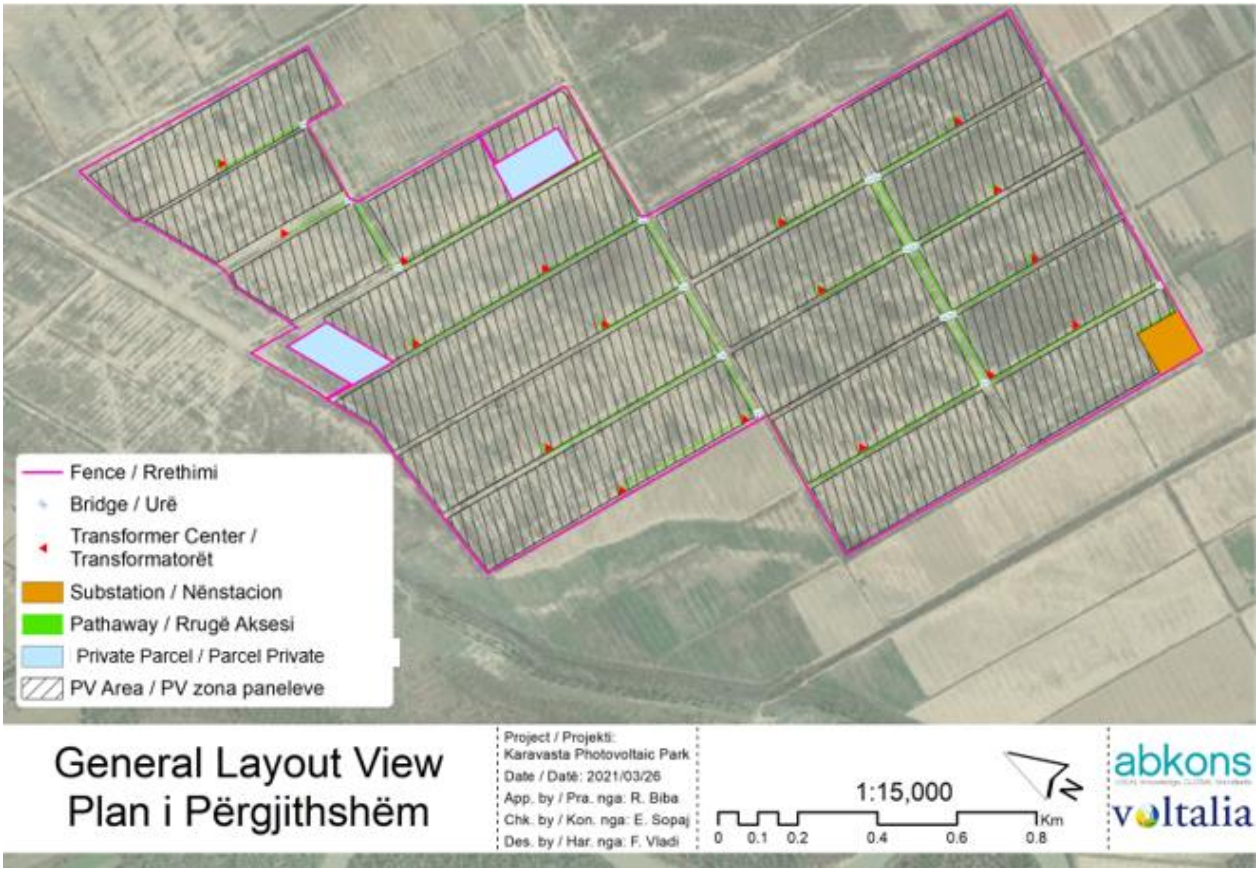


Figure 5. Initial Project Layout

2.4.1. Drainage

Drainage system of PV Karavasta Plant consists of a gravity network with open trapezoidal channels. Generally, the existing drainage system will remain in place as it is, with the project to undertake maintenance works on the channels to ensure they function effectively as per their original design; such improvement works will include the reshaping of some tertiary channels. At intersection with access routes appropriate bridges will be constructed. All the drainage systems within the PV Karavasta Plant area will be designed to safely convey the discharge with a return period of 1 in 100 years.

Below is shown the map with the drainage system and location of Drainage structures.



Figure 6. Drainage System Management

2.4.2. Step-Up Substation & Control House

The Step-up Substation will be designed to collect the energy produced at 30kV (MV) by the PV Power Plant and step-up to 220 kV (HV). Then, will be erected a single circuit overhead line that will assure the evacuation of energy up to Fier Substation.

The 220kV equipment and the Power Transformer will be installed in an outdoor switchyard, while the 30kV equipment will be installed in the Control House together with the command, protection and control systems.

The Step-up Substation will comply with the most stringent safety, environmental and technical standards in accordance with Albanian requirements, and if these standards do not exist, international standards will be applied.

The Step-up Substation will have a Control House that will accommodate the medium voltage switchgear, auxiliary services, batteries, power supply system, SCADA system, communication system, and control and protection systems.

Complete lighting installations shall be provided internally and externally in all buildings, and in all areas of the Substation.

The Control House will be a masonry building with appropriate dimensions and architecture to receive all the equipment and to allow their correct operation. There will be installed the following equipment:

- Medium Voltage Switchgear;
- Protection Systems;
- Monitoring Systems;
- Communication Systems;
- Auxiliary Services Switchboards (AC & DC);
- Battery Bank and Battery Chargers.

Site surfacing shall consist of 200 mm clean, hard, natural, gravel or crushed stone graded from 10 to 30 mm and to extend 1 meter beyond the substation fence. Prior to the start of the construction works, a site surface conditioning will be included, in order to remove all the obstacles that could disturb or be a problem during construction stage, such as site clearing, trees grubbing and earthworks for platforms levelling.

Since this area is a flooded area, the control building will be elevated 50 cm above the ground.

The Step-up Substation will be delimited by a fence which will have the purpose to delimit the area and to prevent the entry of unauthorized people and large animals in the facilities.

Site surfacing shall consist of 200 mm clean, hard, natural, gravel or crushed stone graded from 10 to 30 mm and to extend 1 meter beyond the substation fence.

Chain link fences with height of 1.20m, made of plastic-coated galvanized steel wire, shall be erected on 0.80m high (above the ground level, not including the foundation) perimeter walls, made of reinforced concrete and provided with adequate foundations. The total height of the fence about the ground shall be at least 2.0m.

The main entrance gate shall be an electric-operated sliding gate with barrier. The main entrance gate and the related barrier shall be electrically operated from the control room (window view shall be provided in the control room, in the direction of the main entrance gate).

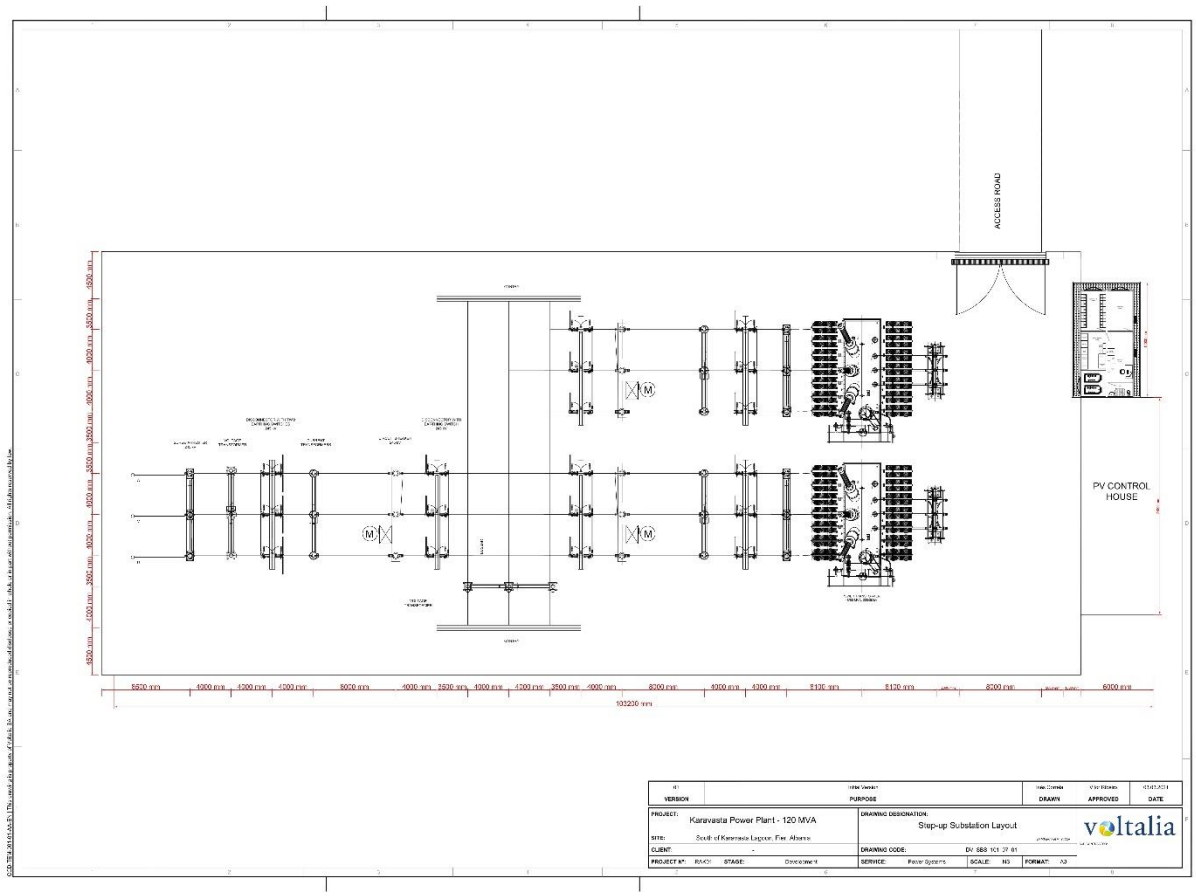


Figure 7. Step-up Substation Layout

2.4.2.1. Drainage of the substation

For the Step-up Substation will be implemented a drainage system according to the needs, to protect the equipment against damage caused by rainwater. The drainage system will consider among other aspects hydrological data, characteristics of the soil and the topography of the terrain.

The excavated areas, foundation levels and pits are to be kept free of water down to at least 0.5 m below the foundation level. If necessary, in the drainage channel crossing the substation will be placed a concrete pipe below the foundation level to allow the continuity of the drainage flow.

2.4.3. Fire Detection and Alarm System

This system shall comprise fire detectors to be installed in the operational plant rooms, control and indicating equipment, as well as linear heat detection systems to be designed and installed in all concrete cable trenches, cable distribution rooms and tunnels and below raised floors in the Control Building, so as to provide early detection of any possible fire which might occur to the cabling system. Portable fire extinguishers shall be provided.

The fire alarm system devices shall be wired to the fire alarm control panel located adjacent to the main entrance to the substation building and shall repeat on a mimic panel in the control room.

The general audible alarm shall be enunciated immediately upon initiation of a fire alarm signal, the system controls shall cause the alarm sounders to pulse 1.0 s 'ON' and 1.0 s ‘OFF’. A 'SILENCE ALARM' blue colored push button shall be incorporated in the control panel which shall silence the alarm. A 'RESET' green colored push button shall be incorporated in the control panel which shall restore the system to normal non-alarm mode.

2.4.4. Overhead Transmission Line (OHL)

The Project also requires a 220-kV overhead transmission line (OHL) to connect the Project to the National grid. This will be achieved via 19.2 km OHL connecting the Project to the substation located in the suburban area of the city of Fier; the proposed OHL route lies within the county of Fier and the Administrative Units of Fier Municipality. The OHL route and Area of influence as identified during the Scoping Phase is shown below.

All interconnection infrastructures shall be designed to ensure continuity of operation under all working conditions at the site as the first consideration and to facilitate inspection, maintenance and repairs.

The Overhead Line shall be 1 x (3 x 1 x 490/65 mm^2) ACSR (Aluminium Conductor Steel-Reinforced).

The wayleave required for the line will be 25 m on each side. In order to avoid the collision of birds against the evacuation line, bird diverters will be installed along the wires.

2.4.4.1. Towers

Towers to support the OHL will be made of galvanized steel, lattice type, provided with six cross-arms (three on each side, in a vertical plan), suitable for mounting of two three-phase power lines.

At the top is foreseen to run two Ground Wire, with enough resistance to support the efforts. The trunk consists of a steel tower divided into several shafts, according to the overall height of the structure. Metallic structures grounding shall be performed with vertical diffusion in Steel core rods and in closed rings to the three phasic lines connecting the end cables of the interconnection Line.

All the towers must have them own order number according with order criterion adopted. It will be installed electric hazard signaling boards at a height of 2 meters at least. Each tower will have a warning plate stating “DANGER OF DEATH” and the tower order number of the evacuation line and an identification plate with the name (acronym) of the evacuation line and the telephone number of the entity responsible for operating it that will be clearly visible from the ground.

2.5. Overview of Project Phases and Activities

The general development phases for large scale solar PV project can be categorised as follows:

- **Mobilisation/Pre-construction:** such as site preparation, mobilisation of equipment and materials to site.
- **Construction and Installation:** including civil works, electrical works, and equipment installation.
- **Operation:** Plant operation and routine maintenance.
- **Decommissioning:** Dismantling of equipment and associated facilities and site restoration.

The proposed total capacity of the PV plant is 140 MW and it is proposed to be built in a single phase. The construction of the Project is planned to commence with Plant Site early works in Quarter 3 of 2022, and be in full operations in second half of 2023. The expected duration of the construction period consists of 2 months early works, and 11 months construction. The final construction schedule will be specified during the detailed design phase.. Electricity generated from the project will be exported via power lines to the nearby substation for transmission and distribution via the national network, construction of which is planned to occur in parallel with the PV element of the Project.

Potential environmental and social impacts can result as a consequence to activities undertaken during construction, operation and decommissioning phases; key activities during these phases are summarised in the sections below.

2.5.1. Mobilisation/Pre-construction

The mobilisation phase needs to take place before construction and installation work can begin at the project site. The pre-construction phase includes development of detailed design, mobilisation and site preparation. The project will be implemented by Voltalia acting as the EPC Contractor. As EPC Contractor, Voltalia will be responsible for development of detailed design, construction and commissioning of the plant.

The mobilization phase includes the ordering of materials and equipment, signing contracts with subcontractors and hiring of staff. This phase also involves the mobilisation of workers, planning and transportation of the project components, equipment and materials to the site (e.g., PV modules), as well as site preparation which involves clearing, grading and levelling of the site and establishment of on-site facilities and construction compound.

Voltalia would locate the base camp where the EPC team can have access to the main amenities (water, electricity, telecom, etc.). Base camp will not provide accommodation to the work force, but only temporary offices for daytime occupation and storage area. The base camp location is proposed inside the PV plant site, on parcels where no trackers will be installed. The Parcel 221/2 is considered the most viable option. Priite plots will be rented has been included with reference to the LRP which provides more detail on how the land parcels are being dealt with. As an alternative will be considered the Parcel 220/2, close to the entrance of site.

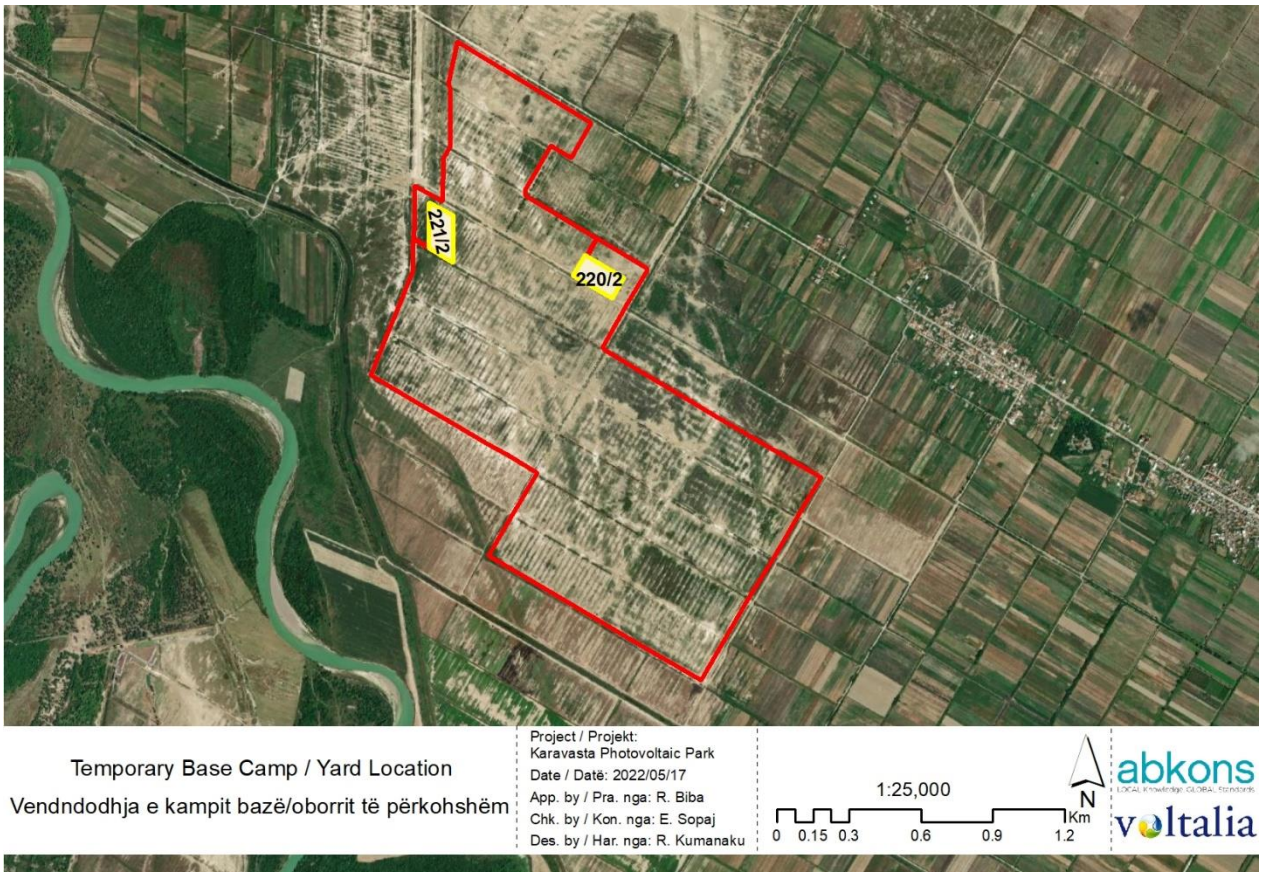


Figure 8. Temporary Base Camp Location Alternatives

Heavy-duty and other pieces of equipment will be moved to the project site at the beginning of construction activities for civil work activities and equipment installation. It is expected a total delivery of ~700 x 40" containers on site. All PV modules, electrical and structural equipment is planned to arrive to site via road in “containers”. Besides equipment the project would also require large construction vehicles, such as bulldozers, excavators, cranes etc. to assemble the facility.

During the site preparation period, the workforce required for site security, manual labour, civil works, transportation of goods and other similar services will most likely be drawn from the local labour pool.

2.5.2. Construction and Installation Phase

The construction phase of the project will include many activities and phases, such as:

- Construction/improvement of internal and external access roads;
- Levelling off the ground;
- Fencing around the site;
- Installation of PV Power Units;
- Pile driving for mounting structure;
- Construction of electrical substation and foundations;
- Excavation, trenching and cable laying;
- Fixing and wiring of the panels;
- Installing CCTV (if applicable) around the fence line and access points;
- Installing water tank for staff and O&M activities;
- Installation of septic tank;
- Construction of buildings;
- Erection of overhead HV power lines;
- Testing and commissioning of equipment and the project as a whole;
- Site clean-up.

During the construction phase the piles need to be driven into the ground to form the structural base of the PV arrays. Once the PV components have arrived on site, technicians will supervise the assembly of the panels and test the facility. The PV panels will be installed on galvanized steel structures. There will be a basic untarred roadway providing internal access for the construction activities. A phased approach will be adopted during the Project construction.

A section of the site will be used as a laydown area where shelters, equipment, sanitary facilities (portable) and containers will be located.

To provide access to the site from the nearby public road a short access route will need to be prepared to levels that will be acceptable for the transport of equipment, material and people to and from the site. It is estimated that around 5 digger/loaders/bulldozers will be required for land clearing and 5 to 10 trucks with cranes will be required for the construction. Approximately 600-800 x 40-foot container loads would be required to construct the PV solar facility. The need for cut and fill areas and/or borrow pits at the PV sites, along roads and at substation/ transformer sites, will only be known after the final design has been completed.

Auxiliary buildings, such as guard rooms, O&M buildings, water treatment facilities, etc., will also be required.

The expected duration of construction period are is shown in Table 1). The final construction schedule will be specified during the detailed design phase based on the defined work to be performed.

It is envisaged that during the construction phase up to around 200 people will be employed. This would include around 20 experienced engineers, 10 experts and 150-180 local skilled, semi-skilled and unskilled workers. The number of workers on site will build up over time until peak construction activity is reached and then will start to tail-off as construction nears completion and the Project enters the commissioning phase. No onsite workers' accommodation is planned as part of the project. The project will aim to employ unskilled and skilled labour from the surrounding communities for construction where possible, and non-local workers will be housed within the existing near-by accommodations.

Tentative timings and schedule for the construction of the Project are shown in the Tables below:

Table 1. Construction Schedule

The construction of the Project is planned to commence with Plant Site early works in Quarter 3 of 2022, and be in full operations in second half of 2023. The expected duration of the PV construction period consists of 2 months early works, and 11 months construction. The final construction schedule will be specified during the detailed design phase.

Project Stage	Estimated Duration	Estimated Date Range
PV Plant Site		
Permits and Approvals	3 months	Oct 20 - May 22
Early Works	2 months	July 22 – Aug 22
Construction Phase	11 months	Jul 22 – Aug 23
Testing & Commissioning	3 months	Aug 23 – Oct 23
OHL		
Permits and Approvals	3 months	Aug 22 – Oct 22
Construction Phase	10 months	Sep 22 – Aug 23
Testing & Commissioning	2 months	Aug 23 – Oct 23

OHL Transmission Line

The overhead transmission line (OHL) will be supported and guided by pylons connecting the Project to the Fier substation. The construction of the transmission line will be undertaken in the following sequential steps:

- Preparatory work:
  - Micro-siting and finalisation of the locations of towers and route of OHL;
  - Mobilisation of engineering machinery on the OHL route;
  - Construction of platforms for pylons and delivery of materials along the OHL route;
- Construction work:
  - Marking out of foundation, earth works and excavations;
  - Installation of foundations and grounding devices;
  - Assembly, installation, alignment and fixing of pylons;
- Installation work:
  - Rolling out and connecting wires and cables, lifting them onto pylons, stretching and fixing on pylons;
  - Installation of vibration dampers and remote spacers, mounting loops.

During the winter intensity of construction activities will be depended on the weather conditions. If weather condition will be good than we will be able to work during some of these days, otherwise, the construction will stop between December and February due to the waterlogged conditions and associated challenges.

2.5.3. Operations and Maintenance

Once the facility is complete and operational, it is expected that it will have a lifespan of approximately 30 years.

Due to the passive nature of solar PV plants, there are no emissions or very limited waste generated during the operation of the project, no significant noise generating equipment or machinery, and limited need for hazardous materials to be stored on site.

The Project will be controlled and managed through SCADA system which will be manned during the daytime by fully qualified and trained technicians.

Day to day facility operations will involve both regular on-site preventive and corrective maintenance tasks in order to keep the PV power plant in optimal working order throughout the operational period, to ensure extended system lifetime, as well as compliance with manufacturer warranty. The preventive maintenance follows a routine service schedule aimed at preventing faults from occurring and keeping the plant operating at its optimum level. The frequency of the preventive maintenance depends on a number of factors such as the technology selected, environmental conditions of the site, warranty terms and seasonal variances. It contains for example activities like PV module cleaning, inverter servicing, checks on structural integrity of the mounting structure, and vegetation management. Corrective maintenance is carried out in response to failures for example, the repair/exchange of damaged or faulty equipment. Typical O&M activities include:

- Monthly cleaning of PV modules;
- Control of vegetation (weeds, bushes etc.) within the site;
- Routine inspection of all PV modules and associated structures, such as cables, transformers, inverters, mounting structures etc.;
- Operation and maintenance of ancillary facilities such as substation;
- Inspection and maintenance of transmission lines; and,
- Inspection and maintenance of internal pathways and access roads.

One of the key activities during the operation phase is the regular cleaning of PV modules to prevent dust build-up which could affect their performance; this is known as soiling losses. This has the potential to consume significant quantities of water. In order to reduce the water demand of the project it is planned that the PV modules will be cleaned monthly using dry cleaning techniques. The frequency of wet module cleaning is assumed to be twice per year, this is based on the characteristics of the location, the meteorological conditions, and the type of structure in which the modules will be installed on. For wet cleaning it is estimated that on average around 1 litre of water per PV module is required, which equates to around 300 m^3 of water per wet clean, and up to a total of 600 m^3 per year. It is not expected to require the use of any additive. Nevertheless, in case of usage, it must be biodegradable with low environmental impact and contain no Volatile organic compounds (VOCs), Phosphate and be Chlorine Free.

The water for cleaning, and potable use, will be sourced from local permitted water suppliers, municipality or fire station, and trucked to site and stored as and when demand requires. The water for module cleaning should have a low mineral content and be non-abrasive.

It is planned that the buildings (guard house, O&M buildings) will be heated using electric heaters.

A total of around 20 job opportunities will arise during the operation phase, including skilled and semi-skilled labour (such as electrical and mechanical technicians) and unskilled labour (such as module cleaners and security personnel) for a duration of 30 years.

Once the OHL has been completed and commissioned it will be handed over to the Transmission System Operator (OST/Albanian TSO) to manage its operation and maintenance.

2.5.4. Decommissioning and Closure

The Project is expected to have an economic useful lifespan 30 years and the power plant infrastructure would either be decommissioned, extended or upgraded (if a new license is granted) once it has reached the end of its economic life. Upgrading the Project would consist of replacing old PV modules for new ones, increasing the total peak power of the plant (a process called “repowering”) or increasing the power of the plant by adding new elements such as trackers, PV modules or transformers.

If the Project is to be decommissioned, then the site will be returned to close to its original state. The components of a PV plant have an intrinsic value either for re-use or recycling. This value will cover the cost of decommissioning the plant and rehabilitating the site.

PV panels and ancillary structure consist of numerous recyclable materials, including glass, semiconductor material, steel, concrete, wood, aluminium, copper and plastic. When the PV Project reaches the end of its operational life, the component parts will be dismantled and recycled. The Project will be dismantled and removed using conventional equipment with minimal impact on the environment. These materials will then

be safely recycled or disposed of in accordance with all applicable laws and regulations at the time of dismantling.

Decommissioning is expected is 3 months for the PV Plant and 2 months for the OHL. The effects of decommissioning are often similar to, or of a lesser magnitude than, construction effects and will be considered where possible in the relevant sections of the ESIA. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Project. A Decommissioning Plan, to include timescales and transportation methods, will be developed by the Project and agreed in advance with the relevant authorities.

2.6. Project Alternatives

Analysis of Alternatives and Project Justification As per IFC Performance Standards, an analysis of probable alternatives for the chosen technology and location of project site along with other similar factors that contribute to the project as a whole has been carried out.

The following scenarios have been taken into consideration:

- No-Project Alternative or Do Nothing;
- Alternate Source for Power Generation;
- Alternate Location for Project Site;

2.6.1. No-Project Alternative or Do Nothing

Under the 'Do nothing' option, the proposed PV Project and associated OHL would not be built, therefore no capital investment costs will be incurred, and any negative environmental and social impacts associated with the construction and operation of the project would be avoided; however, the benefits of the Project, as outlined in section 2.3 would not be realized.

Furthermore, any benefits that the solar PV Project can bring to the local economy during the construction and operation phase, as specified in the Impact Assessment Section, would also be lost in the do-nothing scenario. In a wider context, the 'Do nothing' option would limit overall economic development and possibilities for the improvement in the social welfare of people in the region.

2.6.2. Alternative forms of electricity generation

Besides solar PV technology, other forms of potential power generation include thermal (use of fossil fuels), biomass, hydro, wind farms and/or nuclear power; these options are discussed below:

Thermal generation is not considered a good choice as fuel sources (such as gas and/or coal) must be imported or generated at high cost. For example, the use of coal or oil as a fuel is highly noted with the environmental impacts of pollutant emissions inherent in coal combustion, for which control technology adds significantly to project costs. As a result, transport costs would be high, which are stated as a reason why there are no coal-fired power plants in Albania. In addition, the generation of greenhouse gases as a result of operating thermal power plants contributes to global warming and air emissions associated with thermal generation are often problematic.

Nuclear power is an expensive and very complex energy generation system with a number of technical, safety and environmental challenges. Currently, the possibility of installing nuclear power plant in Albania is considered almost non-existent.

Gas: Albania is connected to international gas networks only though Trans-Adriatic Pipeline which is under construction in its territory. The country does produce a small amount of gas. However, it has an outdated pipeline network, which is mostly not operational. Gas development plans will require considerable additional infrastructure planning and development, and give rise to emissions to air and require significant quantities of clean water.

Hydro: Almost 100 per cent of the country's domestically produced electricity comes from hydropower. The mountainous nation is home to eight major river systems. The Drin River, located in northern Albania, is the largest river in the country and hosts the Fierzë (500 MW), Komani (600 MW) and Vau I Dejës (250 MW)

hydropower stations. This cascade provides around three-quarters of the country's total electricity capacity and 90 per cent of domestic electricity production. However, the feasibility of a hydro project wholly depends on having the correct resources and topography to enable the construction and operation of such a facility. A hydro project is not feasible at the proposed Project site.

Wind energy: the wind resource is considered unknown in Albania; the challenges of supply-demand balancing are considered challenging and the resource intermittent. The economics of wind projects are wholly dependent on having sufficient wind resource at a given location. The wind resources at the proposed Project site are unknown. Furthermore, a large-scale wind farm also presents risks to local and migratory bird species, and given the sites close proximity to the protected Karavasta National Park, which is recognised for its importance for bird species, and therefore this would present a major ecological risk for a large-scale wind farm.

2.6.3. Alternative Sites / Routes

Before the tendering process, MIE contracted an independent consultant (Golder srl.) to conduct a preliminary E&S assessment[2]. Although Golder identified some environmental concerns, the proposed Project location was selected by MIE, as the preferred option considering technical aspects, highest radiation capacity, soil quality, land use, etc. The Project site was then approved by National Territory Council. The Project site was proposed to all competitors in the IPP tender, therefore, Voltalia as the winner of the tender has no right to consider other alternative project sites. All land relating to the Plant Site is State owned and has not previously been in private hands or previously expropriated. The area of the Plant Site is used informally for grazing of sheep. The entire PV Plant area is not ideal for grazing, due to the patchy and sparse vegetation. Within 5 km of the site, the PV Plant covers ~12% of the accessible/non-cultivated grazing land, which is of similar or better quality.

Solar projects are non-polluting energy generation projects which are site specific and dependent on the availability of solar irradiance resource. Solar irradiance mapping of Albania shows the area as suitable for Photovoltaic Power Plant, area is notified by Golder report.

The proposed PV site offers highest solar radiation in country, land value is low (marsh and salty land) and state property, which avoid the direct impacts on land acquisition from private owners; these elements are discussed further below.

The main outcomes of the assessment carried out by Golder for the Karavasta site and related powerline hypothetical route identified:

- 3 aspects have been given high priority in view of future studies and for filling information gaps: Salinity and shallow groundwater (technical); topography and natural hazards related to flooding risk (environmental); and direct impact on habitat, related to PR6 (habitat in Annex 1 and key habitat for migratory birds, environmental).
- 11 aspects have been given a medium priority: 4 are related to technical issues (availability of construction materials, assessment of shadowing obstacles, grid connection and presence of other buildings and facilities); and 6 are related to Environmental issues, namely:
  - Presence of halophiles plant communities (Annex 1 EU Habitat Directive);
  - Site location on the Adriatic flyway of migratory birds;
  - Impact on species of conservation concern (Solar farm);
  - Impact on IBAs and RAMSAR site (Solar farm);
  - Impact on Candidate Emerald Site (Solar farm);
  - Collision of birds with the powerline.
  - 2 are related to Socio-economic issues (activities in the area and impact on landscape).
  -

The region is not very populated and supply of energy from the grid is problematic, and the Project may be a good opportunity to improve the supply of energy.

[2] Karavasta Site Initial Technical, Environmental and Social Assessment Report/ March 6th, 2019

The PDA site itself is mostly saline due to its vicinity to the seashore and the infiltration of sea waters, and therefore, as confirmed from the community meetings, is not used for growing crops but is used for pasture / grazing however, no specific users identified since most of them are from other areas of Albania that travel to the project area during the summer season. The farmers stated that only a small portion of the land (nearly 5 Ha) is used for animal grazing and crops for animal grazing. These farmers are users of this land, which is state owned.

Another good reason for choosing this site is because it is under state ownership.

One of the principal benefits of the proposed PDA site is that it avoids land acquisition from the farmers eliminating direct impacts on farmers.

The location of the PDA Plant is in an area with low traffic and far from the inhabited areas, minimising potential impact on local communities, such as:

- Increase of traffic;
- Risks associated with safety for the communities;
- Negative impact on local commercial activities due to traffic increase and interruption of everyday activities;
- Interruption, or accidental interruption, of utility services associated with the construction works.

The principle to design OHL route was to avoid as much as is possible the following areas:

- Populated areas;
- Forested areas and implicitly avoid deforestations;
- Farming lands, especially with vineyards and orchards;
- Parks and natural reserves;
- Geologically unstable areas;
- Special landscape or with an architectural and historical value.

The OHL route runs principally within agricultural land. The proposed route has been selected specifically to avoid the need for any physical displacement, and importantly a large portion of the OHL follows the same route of the proposed 220 kV OHL that has already received the necessary approvals but has yet to start construction; the proposed route of the Project 220 kV OHL as well as the planned 220 kV line are shown in Figure below. OHL routing has considered land use restrictions in the zone around the OHL which are mandated by Albanian legislation, as well as land needed for pylon footings. Furthermore, the ESIA has identified sensitive ecological areas. The findings of the ESIA have been used to inform final route selection in this area, to further minimise the potential for economic displacement with regards to agricultural land use, as well as limit the potential ecological impact.

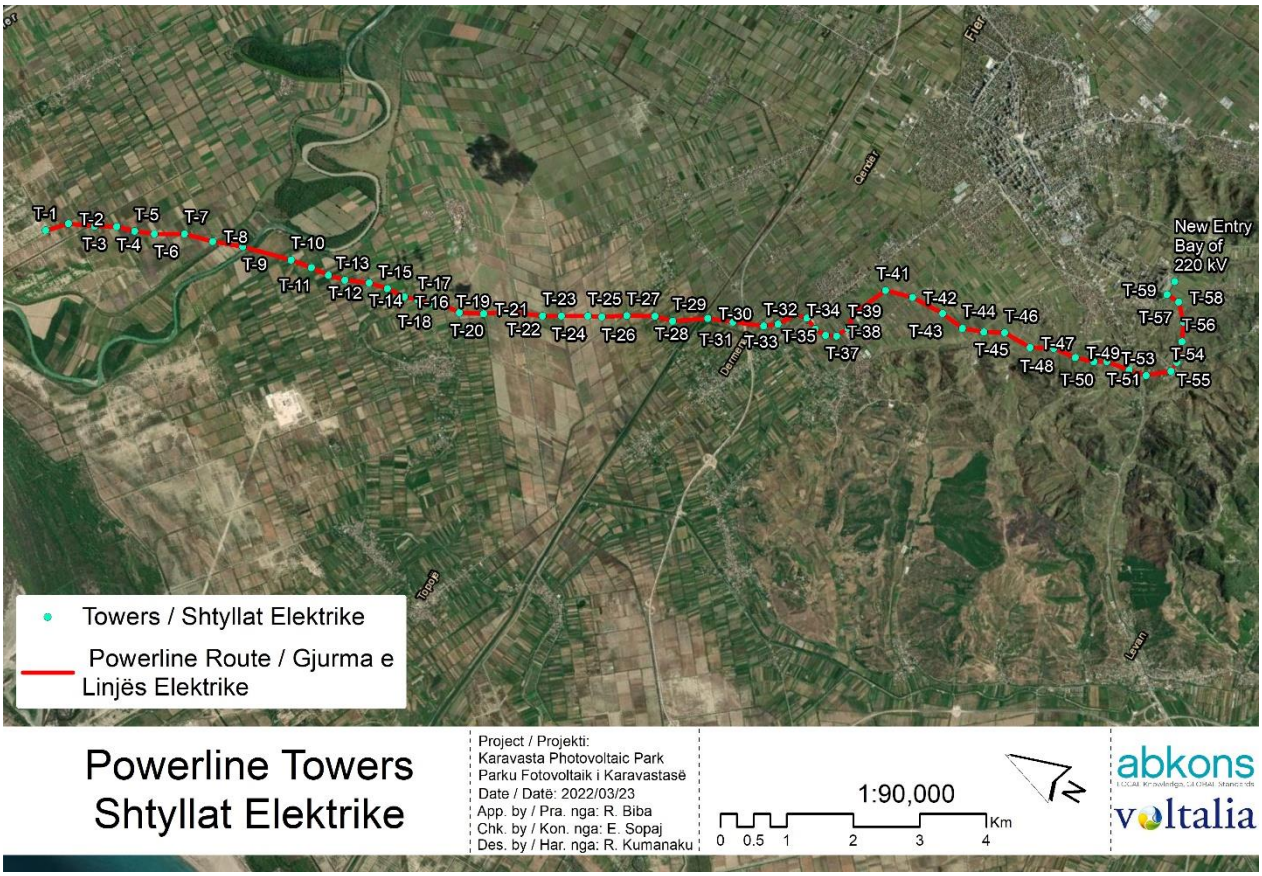


Figure 9. Powerline Towers

2.6.4. Iterative Design

The Project design will evolve throughout the ESIA process, with an iterative design process applied, whereby site-specific constraints and design criteria will be identified to guide the final layout of the Project. If necessary, areas of the Project site may not be developed in order to avoid, reduce or remove major adverse effects or due to physical constraints. The iterative design process will take account of comments received during consultation, as well as the findings of the ESIA process and relevant design mitigation measures identified.

3. Legal and Administrative Framework

3.1. Introduction

This section outlines the regulatory national and international requirements and standards relating to the management of E&S risks that are applicable to the Project.

3.2. National Legislative Requirements

Albania has specific legislation requiring the need for an Environmental Impact Assessment (EIA). The 2002 Law on Environmental Protection established certain requirements, including the requirement to conduct an EIA and to obtain an environmental permit before initiating a project. It establishes monitoring requirements to help identify project impacts during construction, operation and decommissioning, as well as requirements during the project closure phase. The law was substituted by Law No.10431, dated 09.06.2011 "On Environmental Protection" amended, which aims to mirror EU Directives and best practice towards environment management. The 2011 Law on Environmental Protection (as amended) establishes the environmental protection framework, institutional framework and competencies, environmental impact assessment principles and environmental permitting. It defines activities affecting the environment as "any economic and social activity that uses the environment or part of it, or that discharges materials and energy by changing its characteristics".

The legal framework for the EIA procedure in Albania is based on Law No. 10440 "On Environmental Impact Assessment", approved on 07.07, 2011 and later amended with Law No. 12/2015 "On some changes to the law No. 10440, dated 07.07.2011, On the Environment Impact Assessment" and Law No. 52/2020 "On some changes on the Law No. 10 448, dated 14.07.2011 "On Environmental Permits" amended. An important legal framework for EIA is also the DCM No. 686, dated 29.07.2015 "On the rules, responsibilities, timelines for the EIA procedure and the transfer procedure of the decision for the environmental declaration" amended and DCM No. 247, date 30.04.2014 "On the determination of rules, requirements and procedures for public information and involvement in the environment decision-making process". The framework and procedural legislation relevant for the undertaking of an EIA is provided in Table 2 below.

Table 2. Albanian Legislation for an EIA

Legislation	Overview	Relevance to the Project
Law No. 10431 (09.06.2011) Amended	"On Environmental Protection" (as amended) – This law establishes the environmental protection framework, institutional framework and competencies, environmental impact assessment principles and environmental permitting. The law is based on EU principles and best practice toward environment management.	It requires that an EIA is conducted and an environmental permit obtained before initiating the Project. It establishes monitoring requirements to identify project impacts during construction, operation and rehabilitation, as well as requirements during the project closure phase.
Law No. 10440 (07.07.2011) amended	"On Environmental Impact Assessment" (as amended) - sets the principles of an EIA, determines the project categories with environmental impacts, and establishes the responsibilities and rights of institutions and public in the EIA	The EIA for the Project will be submitted to MTE and NEA for control, review and approval.

Legislation	Overview	Relevance to the Project
	procedure. The law determines the competencies of National Environmental Agency (NEA) and Ministry of Tourism and Environment (MTE) in the procedure, review of EIA report and final approval.	
Law No. 52/2020 on some changes on the Law No. 10448 (14/07/2011) Amended	"On Environmental Permits" (as amended) - defines the terms and conditions for granting environmental permits to industrial operators and determines measures for the prevention and control of pollution emissions and the safe management of chemicals. Generally, the objective of the regulatory regime is to prevent environmental damage, comply with health and environmental standards, and protect against any residual liability.	Environmental Declaration applies for the construction of the proposed Project (regulated under law 10440/2011)
DCM No.686 (29.07.2015) Amended	"On the rules, responsibilities, timelines for the EIA procedure and the transfer procedure of the decision for the environmental declaration" amended - The act sets specific and detailed rules for the procedure, framework and structure of EIA report and appendices, timeframe of the procedure, application for approval, final decision and impact monitoring and reporting during the project execution.	The ESIA report will be prepared in accordance with this DCM.
DMC No. 247 (30.04.2014)	"On the determination of rules, requirements and procedures for public information and involvement in the environment decision-making process" - The act sets specific requirements for consultation with stakeholders, focusing on consultation with local communities. It also gives details on the procedure to be followed, timeline and media publishing.	Stakeholders will be engaged/consulted throughout the ESIA process; a Stakeholder Engagement Plan (SEP) has been developed and will be implemented by the developer and consultant.

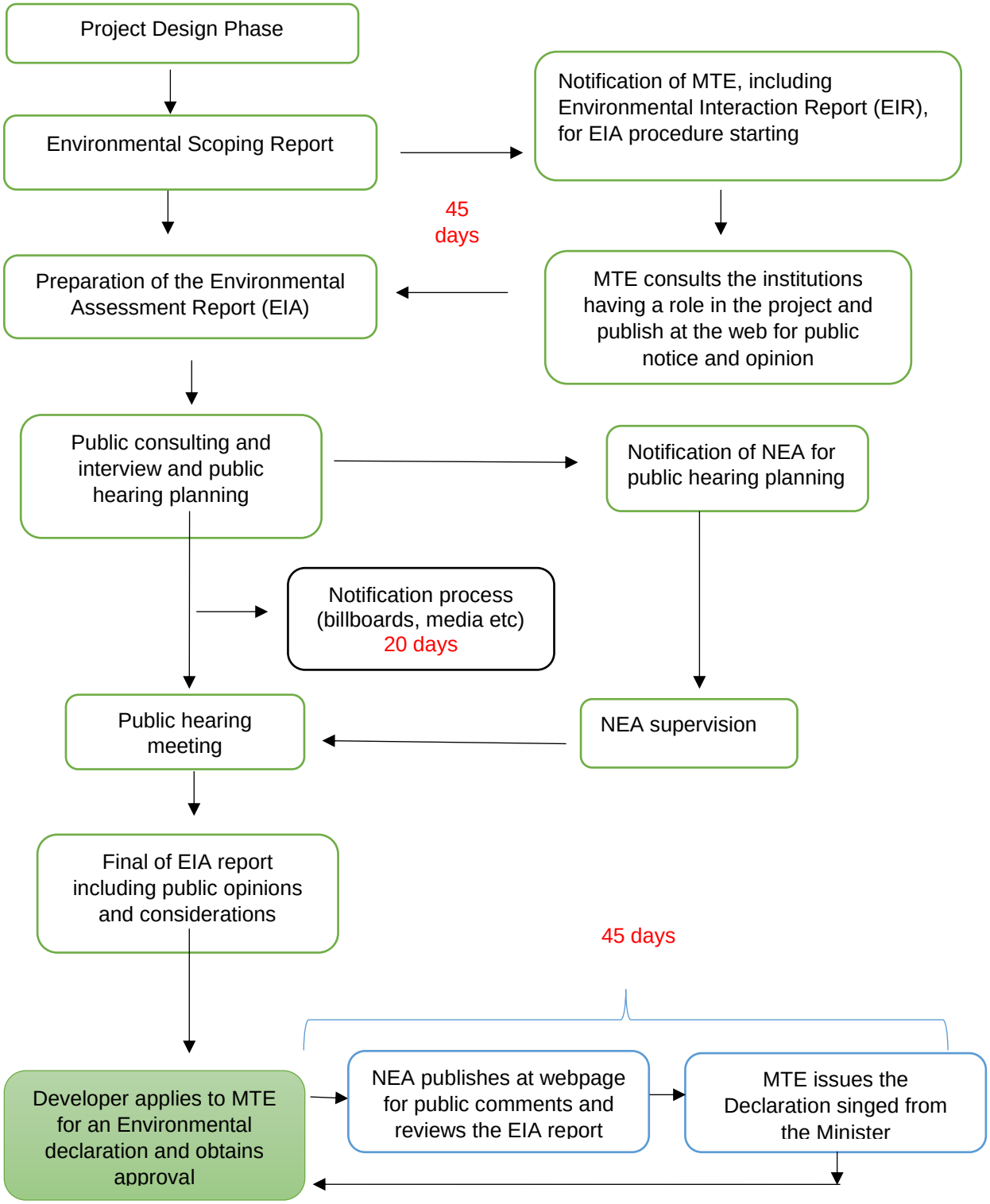


Figure 10. Procedure for In-depth EIA and Timeline according to Albanian Legislation

According to Law No.10440/ 2011 (Article 11), at the conclusion of the EIA process, NEA will decide if an Environmental Declaration will be issued or if further studies are required (i.e., an 'in depth' EIA is required). It has been anticipated that at the end of the EIA process, an Environmental Declaration will be issued by the Ministry; hence an application to MTE will be made for an Environmental Declaration. The documents required to be submitted to MTE along with the application for the Environmental Declaration include:

- Environmental Interaction Report;
- Full EIA report;
- Non-technical Summary;

- Technical report summarizing the project;
- A summary of the consultation process with the public and other stakeholders, conducted during the EIA process;
- A copy of the payment of the service fee as defined in the relevant legislation.

The National, Regional and Local institutions with a role in the EIA process include:

- Ministry of Tourism and Environment (MTE);
- National Environmental Agency;
- Regional Directory of Environment;
- National Agency of Protected Area;
- Regional Administration of Protected Areas;
- Municipality of Fier;
- Municipality of Divjaka.

In addition to the legislation specifically pertaining to the need for an EIA, there are national policies, laws, and regulations applicable to the proposed Project and its environmental and social aspects. Furthermore, Albania has developed environmental standards that are mainly based on European Commission Directives. Existing standards include: protection of biodiversity, cultural heritage, air emissions, noise levels, water quality and discharge, and waste management.

3.2.1. Protection of Biodiversity and Protected Areas Framework

The MTE is responsible for natural resources conservation and management in Albania, including the protection of the environment, forest resources, biodiversity, pastures and watercourses. Biodiversity within Albania is protected by specific legislation and practical measures as foreseen under the system of Protected Areas (PAs). Albanian legislation for the protection of biodiversity and relevance to the Project is summarized in Table 3 below.

The central government is currently restructuring and decentralizing the administration and management system of nature conservation, focused mainly in the forest resources and pastures. The aim is to strengthen the existing policy and regulatory framework; create a more effective PAs administration, enable participation and active involvement of local governments in the management of PAs, Forest Areas and pasturelands, facilitate appropriate training of administration staff, and provide financial support and technical assistance for PAs management and biodiversity conservation.

Table 3. Albanian Legislation on Biodiversity Relevant to the Project

Legislation	Overview	Relevance to the Project
Biodiversity		
Law No. 9587 (20.07.2006)	"On the Protection of Biodiversity" (as amended) – This law establishes requirements for the preservation and protection of biological diversity, including protected areas, sensitive habitats and species. The law requires a biological assessment as part of environmental assessment and collection of all relevant data for the decision-making process.	The EIA baseline characterization of biodiversity in the Project Area includes a description of protected areas, sensitive habitats and species based on a desktop review of available literature, supplemented by data collected as part of the baseline field studies. The impact assessment considers potential impacts on biodiversity and proposes mitigation measures for the protection of biodiversity.
Protected Areas		

Legislation	Overview	Relevance to the Project
Law No. 81/2017 dated 04.07.2017	"On Protected Areas" – This law governs all matters related to Protected Areas in Albania. It determines the categories of the protected areas in Albania, management rules and roles on decision making process. It requires compliance with the specific rules when accessing, working and performing any other related activities nearby and/ or within the protected areas.	The Project's construction activity will occur close to a protected area - National Park Divjake - Karavasta Category II of protected areas.
Ordinance No. 1280, dated 20.11.2013	"On the approval of the Red List of Wild Flora and Fauna" (as amended) - This ordinance lists the status of the conservation for flora and fauna species in Albania	Species of conservation interest based on literature and recent studies conducted. Further studies will be conducted within the scope of the EIA.

Law No. 81/2017 "On Protected Areas" defines the different categories of the PAs in Albania, and their management prescriptions. Albanian Law No. 81/2017 on PA's defines 7 categories of PA, each with varying degrees of protection as follows:

- Strict Nature Reserve (Category I);
- National Park (Category II);
- Natural Monument (Category III);
- Municipal Natural Park (Category IV);
- Protected Landscape (Category V);
- Protected Area of Managed Resource (Category VI);
- Protected areas of international interest (no specific protection category).

The category designation does not necessarily define the protection afforded to a protected area. Additional information on protected areas in the Study Area is provided in Section 4.2.2.5.

3.2.2. Protection of Cultural Heritage

Albanian legislation for the protection of cultural heritage and relevance to the Project is summarised in Table 4.

Table 4. Legislation for the protection of cultural heritage

Legislation	Overview	Relevance to the Project
Law 27/2018 (17.05.2018)	"On Cultural Heritage and Museums" - All matters relating to cultural heritage in Albania are governed by this law". The law defines the preservation and chance finds procedures (archaeological objects or items of cultural heritage value which are discovered by chance) to be used during Project implementation.	Cultural heritage monuments in the vicinity of the project area have been preliminary identified based on literature data and ASIG portal and ICM Portal. Further studies will be performed during EIA baseline.

Legislation	Overview	Relevance to the Project
Article 146 of the law	Requires and obliges any person who discovers or excavates objects of cultural heritage value, by chance during construction works, to suspend work immediately and inform the relevant local authorities within three days. The relevant local authorities consist of the local government office (municipality), the Police Department and the Regional Directory of Cultural Heritage (RDCH). The RDCH verifies the situation/findings and reports to the Institute of Cultural Monuments (IoCM). These institutions are responsible for assessing the archaeological value of the objects found, and determining whether work may continue or whether it must remain suspended until further ground investigations have been undertaken.	A chance find procedure will be developed and implemented prior to construction of the Project and in the event of a chance find, the authorities will be notified as required. The local authority responsible for the preservation, restoration, and management of cultural monuments is the RDCH, under the authority of Ministry of Culture. The regional directorate that covers this project is Fier County RDCH.
Article 5, paragraph 64 and article 31	Defines the conservation of non-material cultural heritage by measures that aim of long-lasting preservation of such cultural assets.	At this moment the project has not identified any non-tangible (non-material) cultural assets.

3.2.3. Protection of physical environment framework

Albania has developed legislation for the protection of the physical environment including guidelines, thresholds and limits for emissions. Legislation related to water, air, noise, vehicle and equipment emissions, fuel quality, waste and wastewater is summarised in Table 5.

Table 5. Legislation related to protection of the physical environment

Legislation	Overview	Relevance to the Project
Water		
Law No. 111/2012, amended with Law Nr. 6/2018	"On integrated management of water resources" amended with Law No. 6/2018 "On some changes and updates "On integrated management of water resources" based on Directive 2000/60/EC Water Framework. The aim of the law focuses on: (i) environmental protection and improvement of water, surface water, either temporary or permanent, internal sea waters, territorial waters, exclusive	For purposes of protection of water and aquatic ecosystems it is necessary to undertake special protection measures. Protected areas shall be determined, based on this Law and other specific laws. Protected areas may include the following: a) sanitary protected zones for potable water; b) areas for fish and shellfish farming, according to the fishing legislation; c) areas for bathing and recreation; d) areas

Legislation	Overview	Relevance to the Project
	economic zones, continental shelf, trans-boundary waters, groundwater, and their status; (ii) security, protection, development and rational utilization of water resources, protection of water resources from pollution etc. This law provides the definition of water bodies and sets some protection and usage restrictions, and requires others to be approved by several by-laws. The law defines the banks of the water resources, restriction of certain harmful construction activities in the banks[3]/ shores and water protection areas.	prone to eutrophication and areas vulnerable to nitrates; and e) areas intended for protection of humans, plants or animals or habitats were maintaining or improving water status is a significant element for their protection. Mitigation measures for the protection of groundwater and surface water quality have been proposed.
DCM No. 177 (31.3.2005)	"On the allowed norms of liquid discharges and host water environmental criteria" - provides the allowed norms for effluent discharges on the environment, for the protection water resources.	All liquid effluents must comply with Albanian standards and regulations for quality, temperature and odour before being discharged to the environment. The water discharge standards related to the project are limited to the construction of the temporary construction facilities. Several options for wastewater will be evaluated within the scope of the EIA process. It shall be noted that there are no standards for small waste water discharge facilities and current standards consider only community discharge after treatment in a specific plant. Currently, there are no specific standards for the discharges of small agglomerates (as might be generated by faculties for the 200 or so workers). In the absence of such emission standards for the project, international standards can be applied but this shall be agreed with authorities through a clarification procedure for (potential) construction facilities.

[3] Banks" are strips of land adjoining seas, lakes, reservoirs, lagoons, ponds, rivers and streams which comprise a minimum of two areas of land: i. 5 meters at a right angle upper edge of the natural banks on steep banks and 20 meters from the maximum water level over a period of 25 years on flat banks, which can be used, on the basis of special provisions, for public purposes, ii. 100 meters at a right angle from the upper edge of the natural banks on the steep banks, and 200 meters from the maximum water level over a period of 25 years on flat banks, where every activity undertaken will be determined by the water authorities.

Legislation	Overview	Relevance to the Project
DCM No. 379 (25.5.2016)	"On the approval of the regulation[4] on Drinking Water Quality" - Its objective is to protect human health from adverse effects of any contamination of water intended for human consumption, by ensuring that it is wholesome and clean. Regulates several issues related to testing of drinking water and protection zones around the water well or community ground water deposit. The regulation determines three protection zones (buffer zones) around ground water wells or water deposit places on the ground. The immediate zone of protection ranges from 15 to 100 m from the axis of the well or the deposit. The precise distance is determined based on the evaluation of the geological formations by the hydrogeological expert. The second and third buffer zones surround the first one. For these zones the regulation does not set out any distance criteria, but restricts the activities that can impact the water quality such as disposal or burial of waste, mining, etc.	The standard set by this regulation (immediate zone of protection) has been considered in the EIA and appropriate mitigation measures have been proposed.
Air		
Law No. 162 (04.12.2014 enforced by the January 2018)	"On protection of ambient air quality", fully transpose Directive 2008/50/EC on ambient air quality and cleaner air for Europe, as well as Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. This Law entered in force in 1st of January 2018 and provides the institutional framework, regulations, roles and penalties to ensure compliance. The law stipulates that natural and legal persons, public or private, native or foreign, have a	Mitigation measures to limit the impact of project activities have been proposed in the EIA.

[4] Based on Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption) concerns the quality of water intended for human consumption.

Legislation	Overview	Relevance to the Project
	duty to keep the air clean and protect it from pollution caused by the activities they conduct in the territory of the Republic of Albania.	
Vehicle Emissions		
Guideline No. 6527 (24.12.2004)	Minister of Environment and Minister of Transport "Over the permissible values of the elements of air pollutants from the environment and noise emissions caused through road vehicles and methods to control them" amended by Guideline No. 12, dated 15.6.2010 "On amendments and addenda to Guidelines No 6527, of 24.12.2004 accompanied by the Manual of Vehicles Control.	Certificate of technical compliance is issued by SGS-Albania[5] and it is mandatory for all vehicles registered in Albania (with Albanian license plate). Compliance with this guideline has been considered in the development of mitigation measures of the EIA.
Transport, vehicle and equipment emissions		
Order of Minister of Transport and Infrastructure No. 149 (07.04.2014)	"On the approval of the rules on implementing the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organizations", fully aligned with the EU Regulation No 748/2012 of 3 August 2012, laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organizations.	Compliance with this order has been considered in the development of mitigation measures of the EIA.
Instruction No.6527 (24.12.2004)	"On allowed vehicle air emission, noise generation levels, and control methods "amended - This instruction includes requirements for annual vehicle inspections and allowed air emissions. All vehicles must comply with these norms.	Heavy machinery, 4-wheel drive vehicles and pick-up trucks will be used for the construction of the Project. The Certificate of technical compliance is issued by SGS Albania and it is mandatory for all vehicles registered in Albania (with Albanian licence plate). Compliance with this instruction has been considered in

[5] https://www.automotivealbania.sgs.com

Legislation	Overview	Relevance to the Project
		the development of mitigation measures of the EIA.
DCM No.613 (07.9.2011)	"Approval of the technical rules for the assessment of the noise conformity for the equipment installed in open spaces or environment". Set noise release norms for certain equipment generating noise, such as electricity generators, tractors, compressors, etc. The regulation lists set thresholds.	Heavy machinery will be used for the construction of the Project. Compliance with this decision has been considered in the development of mitigation measures of the EIA.
Guidance No.10 (30.5.2015)	"Relating to the type-approval of agricultural or forestry tractors, their trailers and interchangeable towed machinery, together with their systems, components and separate technical units" based on EU Directive 2003/37/EC dated 26.5.2003.	Compliance with this guidance has been considered as mitigation and recommendation measures at the EIA report.
Noise		
Law No. 9774, dated 12.07.2007, amended by Law No. 39/2013	"On the assessment and administration of ambient noise" – defines the requirements for environmental protection from noise, how to avoid and prevent, reduce and eliminate the harmful effects of exposure to them, including inconvenience from noise. This Law aims to protect human health and the environment from adverse effects caused by noise emissions and sets general rules, authorities, inspection etc.	Heavy machinery and trucks will be used during the construction of the Project. It is important for the EIA process, to operate with noise generating machinery during daytime hours. Compliance with this law will be considered as a relevant document for suggesting mitigation and management measures within the scope of the EIA process.
DCM No. 587, dated 07.07.2010	"On monitoring and control of noise levels in urban and touristic areas" – sets the rules and regulations on the protection from noise generation and noise level administration in urban and touristic areas.	Compliance with this law will be considered as a relevant document for suggesting mitigation and management measures within the scope of the EIA process.
DCM No. 1063 (23.12.2015)	"On the Approval of the technical rules for the assessment of the noise conformity for the equipment installed in open spaces or environment" sets the noise release norms for certain equipment's generation noise	Compliance with this decision has been considered in the development of mitigation measures of the EIA. Application of these rules needs to be ensured from sub-contractor based on list

Legislation	Overview	Relevance to the Project
	such as electricity generators, tractors, compressors etc. The regulation lists set thresholds (mainly power capacity - kW).	of equipment and vehicles that will be employed for operations.
Guideline No. 6527/2004	The guideline regulates vehicle noise generation levels and control methods. This includes requirements for the annual vehicle inspections and to comply with predetermined norms. The compliance of these norms shall be verified with certification of control issued from SGS-Albania[6].	Compliance with this guideline has been considered in the development of mitigation measures of the EIA. Application of these rules needs to be ensured from sub-contractors, based on the list of equipment and vehicles that will be employed for operations.
Instruction No.8 (27.11.2007)	Ministry of Environment and Ministry of Health on "Noise levels in different media", sets the numerical values of noise in specific zones and aims to ensure adequate noise exposure protection for human health.	Compliance with this instruction has been considered in the development of mitigation measures of the EIA.
Instruction No.6527 (24.12.2004)	"On allowed vehicle air emission, noise generation levels, and control methods" amended - This includes requirements for annual vehicle inspections and allowed air emissions. All vehicles must comply with these norms.	Compliance with this instruction has been considered in the development of mitigation measures of the EIA.
Fuel Quality		
DCM No. 147 (21.03.2007)	"On the quality of petrol and diesel fuels".	Only fuel available in Albania that is in compliance with this decision will be used.
DCM No.781 (14.11.2012)	"On the quality of certain liquid fuels for thermal, civil, industrial and water transport use (sea, river and lake)".	Only fuel available in Albania that is in compliance with this decision will be used.
Waste		
Law No.10463 (22.09.2011) amended	"On the integrated waste management" (as amended) - aims to protect human health and the environment, and to ensure environmental sound management of waste through integrated management.	Both hazardous and non-hazardous wastes will be generated principally only during the construction of the Project. Waste management has been considered in the development of mitigation measures and will be addressed in the Environmental Management and Monitoring Plan (EMMP)

[6] https://www.automotivealbania.sgs.com

Legislation	Overview	Relevance to the Project
DMC No.99 (18.02.2005) amended	"Albanian waste catalogue" (as amended) - which makes the classification of the waste, based on industry types, and the criteria to assess the hazardousness of the waste. The regulation codifies the waste types based on the European Waste Catalogue.	This Law has been considered in the classification of the wastes to be generated during the construction and operation of the Project.
DCM No. 229 (23.04.2014)	"On the approval of the rules for non-hazardous waste transfer and the data to register in the transferring document" - The newly enforced regulation requires transferring the waste at licensed companies and ensuring final disposal in approved facilities. This act requires documenting the waste transfers and providing the final disposal certificate to the NEA. The regulation requires for all waste generating companies to be registered at NEA and obtain a personal waste generation number.	Non-hazardous wastes generated during the construction of the Project will be transferred and disposed of in accordance with this directive.
DCM No. 371 (11.06.2014)	"On the approval of the rules for transferring the hazardous waste and the data to register in the transferring document" - The newly enforced regulation requires transferring the waste at the licensed company and ensuring final disposal in approved facilities. This act requires documenting the waste transfer and delivering the final disposal certificate at the NEA. The regulation requires for all waste generating companies to be registered at NEA and obtain a personal waste generation number.	Hazardous wastes will be considered within the scope of the ESIA process. A personal waste generation number with be registered to the NEA in compliance with Albanian law requirements.
DCM No. 418 (25.06.2014)	On the differentiated collection of waste at source.	The object of this decision is the realization of differentiated collection for these wastes: paper, metal, plastics, glass.
DCM No. 575 (24.06.2015)	On the approval of requirements for inert waste management.	Inert waste management
Wastewater		

Legislation	Overview	Relevance to the Project
Law No. 9115/2003 (24/07/2003)	"On the Treatment of polluted water" provides regulations that state the need for treatment of polluted water before it is discharged. Article 6 sets the obligations of physical and legal entities that discharge polluted waters. Physical and legal entities, the activity of which discharges polluted waters, are obligated to take measures to: a) Continuously reduce the quantity of used waters they discharge in the receiving environment; b) reduce the degree of pollution in discharged waters, especially such pollution as caused by hazardous substances and waste; c) manage and treat polluted waters. To comply with these obligations, the physical and legal entities whose activities discharge polluted waters must design a program of technical, technological and organizational measures. This program is subject to control by the Environmental Inspectorate, the licensing authority and the local government structures	Compliance with this law has been considered in the development of mitigation measures of the EIA.

3.2.4. Health and Safety Framework

Law No. 10237/2010 "On safety and health at work" ensures the security and protection of health through prevention of professional risks, eliminating the factors that constitute risk and accidents, inform, advice, balanced participation, in accordance with the law. The present law applies the following:

- The Directive of the European Council 89/391/EEC, dated 12 July 1989 "On the introduction of measures to encourage improvements in the safety and health of workers at work";
- The Directive of the European Council 94/33 EEC, dated 22 July 1994 "On the protection of young people at work," article 6; and,
- The Directive of the European Council 92/85 EEC "On the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding".

Albanian legislation on health and safety and the relevance to the project are presented in the Table 6.

Table 6. Legislation for health and safety

Legislation	Overview	Relevance to the Project
Law No. 10237/2010 (18/02/2010)	"On Safety and Health at Work" - This law regulates the framework of health and safety in the workplace and determines the roles of each party subject to the law.	The project will comply with this law to ensure the health and safety of its workers. Specific measures will be included in the mitigation plan.
Law No. 9863/2008	The State Sanitary Inspectorate aims to protect workers from the impacts of adverse working conditions, such as exposure to toxic substances, radiation, unworkable noise, vibrations, unfavourable microclimate, and controls the level of occupational diseases and accidents as a result of adverse conditions.	The project will comply with this law to protect the health safety of its workers. Specific measures will be included in the mitigation plan.
Law No. 9863/2008 (28/01/2008)	"On food" specifies the rules of food safety in Albania	The project needs to ensure the safety of food consumed by its workers. Specific measures will be included in the mitigation plan.
Law No. 10433/2011 (16/06/2011)	"On Inspection in the Republic of Albania"	The project is subject to inspections for adherence to health and safety regulations.
DCM No. 562/2013 (3/07/2013)	Decision of the Council of Ministers concerning the approval of the regulation on minimum safety and health requirements for the workplace.	The project/ employer needs to ensure the safety of its workers in the work place. A specific set of rules are to be drafted in the Safety Regulation of the Employer. Specific measures will be included in the mitigation plan.
DCM No. 312/2010 (5/5/2010)	"On safety in site construction" sets the rules of safety for construction activities.	The installation of worker facilities needs to comply with the rules of this decision. Specific measures will be included in the mitigation plan.
DCM No. 410/2015 (13/05/2015)	"On the establishment, organization and operation of technical and industrial state inspectorate". This act regulates the inspection of the installations related with industrial processes in Albania.	The project may be the subject of several inspections as regulated in Albanian legislation and standards. Compliance with these rules is to be ensured by the Sub-contractor for power plant operations. An initial screening of equipment that will be used, and communication with the appropriate inspectorate, is required in order to determine any obligation before starting the field operations of importing the equipment.
Decision No. 692/2001 (13/12/2001)	"On special measures on safety and health protection at work"	The project will comply with this law to protect the health safety of its workers. Specific measures will be included in the mitigation plan.
DCM No. 842/2014 (3/12/2014)	"For the health safety and protection of the employee from noise risks in the working places" requires the employer	Specific measures will be included in the mitigation plan.

Legislation	Overview	Relevance to the Project
	to assess the noise levels at the working place and ensure the protection of its workers	
DCM No. 841 (03.12.2014)	For the protection of employees from risk related to vibration mechanics at the workplace	Sets minimum requirements to protect employees from risks for safety and health, which are created or may are created by exposure to mechanical vibration

3.2.5. Other Relevant National Legislation

Other Albanian legislation of relevance to the project is highlighted in Table 7.

Table 7. Other Relevant national legislation

Legislation	Overview	Relevance to the Project
Land Use and territory planning		
Law No. 107/2014	"On Territory Planning and Development" - The law aims to integrate the urban planning legislative framework into a single law, and includes the concept of the protection of natural and cultural heritage, and community's health and safety for territory planning.	The law and its by-laws require declaration for any construction. The protection of natural and cultural heritage, and community's health and safety will be included in the EIA mitigation measures.
DCM No. 408 (13.5.2015 amended by DCM 231/2017)	The regulation for territorial development.	This regulation specifies the type of installations that require a construction permit. A preliminary clearance should be sought for construction facilities. The installations of mobile structures require a preliminary clearance (or declaration of works) issued by the municipality.
Law No. 9244/2004	"On Agricultural Land Protection" determines the protection status of given agricultural fields.	The project is obliged to inform the local authority of any damage to agricultural land from the operations. The authority assesses the damage and requires that the land user restore any damage in agricultural land. Mitigation measures will be proposed.
Law No. 8752/2001 (26/03/2001 amended several times)	"On the establishment and functioning of the structures for land administration and protection", amended by Law No. 10257/2010 regulates land uses issues, and their compatibility with Regional Planning.	The land administration department of each municipality is responsible for land management and leasing of state-owned land. This authority will be responsible for the coordination of the implementation procedures and execution of the compensation during the project implementation.
Explosive and detonating substances		

Legislation	Overview	Relevance to the Project
Decision No. 467/2011 (29/06/2011)	This decision defines procedures for issuing import, export, and production licenses for civilian use of explosive material. The governing institution is the Ministry of Defence, which is responsible for issuing the licenses. Upon evaluation by the licensing committee of the Ministry of Defence, an import license is issued for a period of one year, subject to renewal.	The contractor will be responsible for abiding by all the requirements of this decision for any explosives required for the construction of the Project.
Decision No. 533/2005 (07/08/ 2005) amended by 467/2011	This decision defines the procedures for issuing import, export, and production licenses for civilian use of explosive material.	The project needs to comply with the explosive importation rules. The application for explosives importation and the required documentation is to be submitted to the Ministry of Defence.

3.2.5.1. Albanian Legislation for the Energy Sector

Table 8. Albanian Legislation on the Energy Sector

Legislation	Overview	Relevance to the Project
Law No. 125/2013 dates 25/04/2013 amended by 88/2014	For concessions and private public partnership. The purpose of this law is to create a favourable and sustainable framework for promoting, absorbing and creating facilities for investments that are realized as private public concessions / partnerships.	Article 4 of the law requires the Operator of the concessions Agreement to comply with environmental legislation during the implementation of its operations. The Project will comply with national and international environmental standards.

3.2.6. International Conventions and Agreements

Albania is signatory to a number of international agreements relevant to the Project as listed in Table 9.

Table 9. International Conventions and agreements signed/ratified Albania

Convention/Agreement	Overview	Relevance to the Project
General		
Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (1998) Ratified- 26/10/2000	The Convention establishes a number of rights to the public, with regard to the environment; including access to environmental information; public participation in environmental decision-making and access to justice[7].	Arrangements are to be made by public authorities to enable the public potentially affected by the project and environmental NGOs, to comment on proposals for projects affecting the environment, or plans and programmes relating to the environment. The comments received are to be taken into

[7] http://ec.europa.eu/environment/aarhus/index.htm

Convention/Agreement	Overview	Relevance to the Project
		consideration in decision-making, and information to be provided on the final decisions and the reasons for it.
Climate Change		
UN Framework Convention on Climate Change (UNFCCC) (1992) entered into force in 1994 Ratified- 01/01/1994	The UN Framework Convention on Climate Change (UNFCCC) has been crucial in addressing climate change and the need for a reduction of emissions of greenhouse gases. The ultimate objective of the Convention is to stabilize greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous human interference with the climate system.	As Albania is signatory to the convention, every effort should be made to limit GHGs, and as this Project is a renewable energy project meets this requirement.
Paris Agreement at the COP21 in Paris on 12 December 2015, entered into force on 4 November 2016 Ratified- 21/09/2016	The Paris Agreement builds on the Climate Change Convention to combat climate change[8].	The Project is a renewable energy project and therefore in general fulfils this requirement.
Kyoto Protocol Ratified- 01/04/2005	The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change; signatories commit to setting internationally binding emission reduction targets[9].	The Project is a renewable energy project and therefore in general fulfils this requirement.
Water		
Convention on the Protection and Use of Trans boundary Watercourses and International Lakes (1992) Ratified- 05/01/1994	Avoid or minimize adverse effects on water resources and water quality	The study area is situated near the Karavasta Lagoon.
Biodiversity		
Convention on Biological Diversity (CBD) (1992) Ratified- 05/04/1994	Avoid or minimize adverse effects on important habitats and species, internationally and naturally designated nature conservation sites; conservation, sustainable and equitable use of biodiversity.	The Convention requires, under Principle 17, that EIA shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

[8] http://unfccc.int/files/paris_agreement/application/pdf/qa_paris_agreement_entry_into_force.pdf
[9] https://unfccc.int/resource/docs/convkp/kpeng.pdf

Convention/Agreement	Overview	Relevance to the Project
Convention on the Protection of Wild Flora and Fauna and Natural Habitats in Europe (Bern Convention) (1976) Ratified- 02/03/1998	The Convention aims to ensure conservation of wild flora and fauna species and their habitats. Special attention is given to endangered and vulnerable species, including endangered and vulnerable migratory species[10]; to avoid or minimize adverse effects upon important habitats and species, internationally and naturally designated nature conservation sites.	There are IUCN protected areas within the Study area including Category 1a (Strict Nature Reserve), Category II (National Park), Category III (Natural Monument) and Category IV (Species Management Area.
Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) (1979) Ratified- 01/09/2001	Avoid or minimize adverse effects upon migratory species	The Project Area includes protected sites that may contain globally vulnerable species of birds as well as migratory birds. There are specific resolutions and instruments such as species action plans under this convention that apply to Albania.
Agreement on the Conservation of African-Eurasian Migratory Water birds (1995) Ratified- 01/09/2001	African-Eurasian Migratory Water birds Agreement (AEWA) covers 254 species of birds ecologically dependent on wetlands for at least part of their annual cycle. All AEWA species cross international boundaries during their migrations and require good quality habitat for breeding as well as a network of suitable sites to support their annual journeys[11]. Avoid or minimize adverse effects upon migratory water bird species.	Species and habitats protected by this agreement may be present in the study area. Mitigation measures for the protection of flora and fauna will be identified in the ESIA.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1975) Ratified- 27/06/2003	CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival[12].	Threatened and endangered species and their habitats along with mitigation measures for the protection of flora and fauna will be identified in the ESIA.
Cultural Heritage		
Convention on the Protection of the World Cultural and Natural Heritage (1989)	Avoid adverse effects upon Albanian and World Cultural Heritage sites; minimize adverse effects on unknown and	Cultural and natural heritage sites along with mitigation measures for their will be identified in the ESIA.

[10] https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/104
[11] https://www.cms.int/en/legalinstrument/aewa
[12] https://www.cites.org/eng/disc/what.php

Convention/Agreement	Overview	Relevance to the Project
Ratified- 10/07/1989	intangible cultural heritage sites, material assets and another infrastructure.	
Labour		
ILO Convention 29 Forced Labour Convention (1930) and ILO 105 Abolition of Forced Labour Convention (1957)) Ratified- 25/06/1957 & 27/02/1997	Its object and purpose are to suppress the use of forced labour in all its forms, irrespective of the nature of the work or the sector of activity in which it may be performed.	Local workers will be employed on the project. The project will adopt monitoring measures to ensure compliance with the convention.
ILO Convention 87 Freedom of Association and Protection of the Right to Organize (1948) Ratified- 03/06/1957	Protects the rights of workers and employers to "join organizations of their own choosing without previous authorization.	Local workers will be employed on the project. The project will adopt monitoring measures to ensure compliance with the convention.
ILO Convention 98 Right to Organize and Collective Bargaining Ratified- 03/06/1957	The convention provides for workers to be able to join unions and engage in collective bargaining.	Local workers will be employed on the project. The project will adopt monitoring measures to ensure compliance with the convention.
ILO Convention 100 Equal Remuneration Convention (1951) Ratified- 03/06/1957	Each Member shall, by means appropriate to the methods in operation for determining rates of remuneration, promote and, in so far as is consistent with such methods, ensure the application to all workers of the principle of equal remuneration for men and women workers for work of equal value.	Local workers will be employed on the project. The project will adopt monitoring measures to ensure compliance with the convention.

3.2.6.1. WHO Guidelines

Relevant WHO guidelines that will be considered within the ESIA Report include:

- WHO Guidelines for Community Noise (1999);
- WHO Air Quality Guidelines (2005);
- WHO Guidelines for Drinking Water Quality (2011).

3.3. Lender E&S Standards

3.3.1. EBRD Requirements

The European Bank for Reconstruction and Development (EBRD) is committed to promoting "environmentally sound and sustainable development" in the full range of its activities. The Bank recognises that environmental and social sustainability is a fundamental aspect of achieving outcomes consistent with its mandate.

The Environmental and Social Policy (2019) is the key document that guides the EBRD's commitment to promoting "environmentally sound and sustainable development" in the full range of its investment and technical cooperation activities. It sets out the ways in which they implement this commitment in practice and on projects.

To enable clients and their Projects achieve their E&S Policy requirements, EBRD has defined specific Performance Requirements (PRs) within the E&S Policy for key areas of environmental and social sustainability. EBRD has adopted ten PRs, which are consistent with and mirror the overall structure, approach and issue coverage of the IFC's 2012 Performance Standards while specifically requiring projects to meet EU environmental standards.

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EBRD has adopted a comprehensive set of specific PRs for key areas of environmental and social sustainability that projects are required to meet. Central to the PRs is the application of the mitigation hierarchy and good international practice. As the Project will involve funding from EBRD the Project will also need to meet the following specific PRs defined in EBRD's E&S Policy:

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

PR7 - Indigenous Peoples and PR9 - Financial Intermediaries are not applicable to the Project.

A summary of the overall objectives of each of the relevant PRs is summarised below:

EBRD PR No.	Description	Objectives and Applicability to Project
PR 1	Assessment and Management of Environmental and Social Impacts and Issues	**Applicable** • identify and evaluate environmental and social impacts and issues of the project • adopt a mitigation hierarchy (avoid, minimise, offset/compensate) approach to address adverse environmental or social impacts and issues to workers, affected communities, and the environment from project activities • promote improved environmental and social performance of clients through the effective use of management systems

EBRD PR No.	Description	Objectives and Applicability to Project
		• develop an ESMS tailored to the nature of the project, for assessing and managing environmental and social issues and impacts in a manner consistent with relevant PRs.
PR 2	Labour and Working condition	**Applicabile** • respect and protect the fundamental principles and rights of workers • promote the decent work agenda, including fair treatment, non-discrimination and equal opportunities of workers • establish, maintain and improve a sound worker-management relationship • promote compliance with any collective agreements to which the client is a party, national labour and employment laws • protect and promote the safety and health of workers, especially by promoting safe and healthy working conditions • prevent the use of forced labour and child labour (as defined by the ILO) as it relates to project activities.
PR 3	Resource Efficiency and Pollution Prevention and Control	**Applicabile** • identify project-related opportunities for energy, water and resource efficiency improvements and waste minimisation • adopt the mitigation hierarchy approach to addressing adverse impacts on human health and the environment arising from the resource use and pollution released from the project • promote the reduction of project-related greenhouse gas emissions.
PR 4	Health and Safety	**Applicabile** • protect and promote the safety and health of workers by ensuring safe and healthy working conditions and implementing a health and safety management system, appropriate to the relevant issues and risks associated with the project. • anticipate, assess, and prevent or minimise adverse impacts on the health and safety of project-affected communities and consumers during the project life cycle from both routine and non-routine circumstances.

EBRD PR No.	Description	Objectives and Applicability to Project

PR 5	Land Acquisition, Involuntary Resettlement and Economic Displacement	Applicabile
		• avoid or, when unavoidable, minimise, involuntary resettlement by exploring alternative project designs
		• mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of and access to assets and land by:
		  ○ providing compensation for loss of assets at replacement cost; and
		  ○ ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those affected;
		• restore or, where possible, improve the livelihoods and standards of living of displaced persons to pre-displacement levels
		• improve living conditions among physically displaced persons through the provision of adequate housing, including security of tenure at resettlement sites.

PR 6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	Applicabile • protect and conserve biodiversity using a precautionary approach • adopt the mitigation hierarchy (avoid, minimise, offset) approach, with the aim of achieving no net loss of biodiversity, and where appropriate, a net gain of biodiversity • promote good international practice (GIP) in the sustainable management and use of living natural resources.
PR 7	**Indigenous People**	**Not Applicabile** Whilst there is a systematic process for engaging with stakeholders of all types, no specific governance mechanisms or Project-specific measures have been identified as necessary to comply with PR 7. During the extensive stakeholder identification at the various Project stages, it was determined that there were no indigenous peoples as defined by PR7 predicted to be impacted during the course of Project construction or operation. No groups or communities were identified in the project area of influence during the engagements at these stages of the Project, which would meet all 4 criteria for consideration as "indigenous peoples" as per PR7.
PR8	**Cultural Heritage**	**Applicabile** • support the protection and conservation of cultural heritage • adopt the mitigation hierarchy approach to protecting cultural heritage from adverse impacts arising from the project

EBRD PR No.	Description	Objectives and Applicability to Project
		• promote the equitable sharing of benefits from the use of cultural heritage in business activities • promote the awareness and appreciation of cultural heritage where possible.
PR 9	**Financial Intermediaries**	**Not Applicabile**
PR10	**Information Disclosure and Stakeholder Engagement**	**Applicabile** • outline a systematic approach to stakeholder engagement that will help clients build and maintain a constructive relationship with their stakeholders, in particular the directly affected communities • promote improved environmental and social performance of clients through effective engagement with the project's stakeholders • promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them and to ensure that meaningful environmental and social information is disclosed to the project's stakeholders • ensure that grievances from affected communities and other stakeholders are responded to and managed appropriately.

3.3.1.2. EU EIA Legislation

The EBRD is committed to promoting the European Union's (EU) environmental requirements and is a signatory of the European Principles for the Environment. EU Directives relevant to this Project are outlined below.

The EIA was introduced for the first time in Europe in 1985 by the EIA Directive (85/337/EEC) and represents a key instrument for EU environmental policy. The EIA Directive as amended by Directive 2014/52/EU requires that Member States adopt all measures necessary to ensure that projects likely to have significant effects on the environment are subject to a requirement for development consent and assessment of their environmental effects.

The Project is located in Albania, which is not an EU Member State, and therefore the EU EIA Directive 2014/52/EU is not applicable through law in Albania; although Albanian Law No.10431 (09.06.2011) "On Environmental Protection" aims to mirror EU EIA Directives. Furthermore, EBRD as a signatory requires a

review against EU requirements and as the Project has been defined as a Category A Project by EBRD the ESIA will be drafted in line with these requirements.

EU EIA Annex I Projects are considered as having significant effects on the environment and require a mandatory full EIA in the EU. For Annex II projects, an EIA is not compulsory, but the national authorities have to decide whether an EIA is needed. This is done by the "screening procedure", which determines the effects of projects on the basis of thresholds/criteria or a case-by-case examination. The Project requires development of the following:

- Construction of 140 MW of photovoltaic plant;
- Construction of 19,205 km 220 kV overhead transmission line (OHL).

Based on the above the main PV Project is not considered to fall under the definition of projects listed under Annex I of the EIA Directive but is covered under the following Annex II activities for 'Energy Industry':

- Industrial installations for the production of electricity, steam and hot water (projects not included in Annex I);
- As an Annex II Project an EIA would not be mandatory, rather subject to local authority screening for potential requirement for local EIA. However, it is noted that the OHL element of the Project falls under the following Annex I project definition:
- 20. Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km.

3.3.2. The IFC Performance Standards

The IFC applies Performance Standards (PSs) to manage social and environmental risks and impacts and to enhance development opportunities in the private sector. The PSs may be applied by other financial institutions electing to apply them to projects in emerging markets. Together, the eight PSs establish standards that a project is to meet throughout the life of an investment by IFC or other relevant financial institutions. Based on IFC PSs on Environmental and Social Sustainability, approved January 1, 2012, these PSs are;

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

With respect to the Albanian requirements for the ESIA, the application of IFC Standards requires the following additional processes:

- **Focus on Scoping Phase**: a process by which stakeholders are consulted to contribute to the identification of key issues to be investigated as part of the ESIA. This ESIA Report was prepared in line with this requirement.
- **Stakeholder Engagement Plan**: a comprehensive approach to the communication and consultation with the identified stakeholders throughout the whole project lifecycle.
- **Focus on Social Issues**: whereas the Albanian legislation mainly refers to environmental impacts, the IFC approach also focuses on the identification of impacts on the affected communities and subsequent definition of necessary mitigation measures.

3.3.2.1. IFC Environmental, Social and Stakeholder Engagement Guidelines

This ESIA Report was prepared in line with best practices put forward in the IFC guidelines and in particular:

- 2007 Systems EHS Guidelines for Electric Power Transmission and Distribution;
- 2007 Environmental, Health and Safety Guidelines;
- 2007 Stakeholder Engagement Handbook;
- 2009 Good Practice Note Addressing Grievances from Project-Affected Communities
- 2009 Handbook for Addressing Project-Induced In-Migration; and
- 2009 Introduction to Health Impact Assessment.

3.3.2.2. Compliance Applicability of this project with the IFC Performance Standards

IFC PS No.	Description	Objectives and Applicability to Project
1.	Assessment and Management of Environmental and Social Risks and Impacts	**Applicable** This PS aims to assess the existing social and environmental management systems of Voltalia and to identify the gaps with respect to their functioning, existence, and implementation of an environmental and social management plan (ESMP), a defined EHS Policy, organization chart with defined roles and responsibilities, risk identification and management procedures as well as processes like stakeholder engagement and grievance management.
2.	Labour and Working Conditions	**Applicable** The project activities will involve hiring approximately 200 skilled, semiskilled and unskilled laborers during the construction phase and solar plant staff during the operation phase. The project will have to develop a human resource policy and ensure non-discrimination and equal opportunity, protection of the workforce, and occupational health and safety. Therefore, PS 2 is applicable to the Project.
3.	Resource Efficiency and Pollution Prevention	**Applicable** The Project construction activities will lead to increased fugitive dust emissions, especially in the area it is being developed due to the presence of loose sandy soil and limited vegetation. The project activities will also lead to an increase in ambient noise levels during the construction phase, which may impact the nearest villages of Fieri. Furthermore, the project activities will involve the generation of waste and may involve the abstraction of groundwater. Therefore, PS 3 is applicable to the Project.
4.	Community Health, Safety and Security	**Applicable** The Project activities will involve up-gradation/widening of one of the 2 access routes identified and construction activities will lead to stress on the Project access road and on the area in general. Transportation of equipment and increased traffic in the area may lead to accidents and other threats to community health and safety, therefore PS 4 is applicable to the project.

IFC PS No.	Description	Objectives and Applicability to Project
5.	Land Acquisition and Involuntary Resettlement	**Applicable** Project activities will require land acquisition, land lease and easement. Although no physical displacement of people is foreseen for the project, it will surely lead to economic displacement through loss of assets and of income of sources of livelihood. Therefore, PS5 is applicable to the project.
6.	Biodiversity conservation and sustainable management of natural living resources	**Applicable** Referring to actual geo-coordinates available for the project, based on an onsite visit, the project seemed to be located near a “Natural Park” (Karavasta National Park) as well as “Modified Habitat” (Agricultural Fields). Though no Threatened species (IUCN version 2019-1), was recorded or reported from the study area and the proposed project is not expected to cause any significant habitat loss (as such habitats are present in abundance in the landscape), PS 6 is applicable due to the presence of significant biodiversity value representing Flora and Fauna of “Karavasta National Park”.
7.	Indigenous Peoples	**Not Applicable** According to the Census records and consultations with the local community, the study areas do not report a significant presence of Scheduled Tribe population within the study area. No direct impacts on indigenous people are envisaged.
8.	Cultural Heritage	**Not Applicable** No structures bearing cultural, historical, religious or spiritual significance were reported to be located within the vicinity of the project or on the land parcels procured or identified for the Project. Community consultations and discussions also confirmed that the project would not impact any such structure.

4. Environmental and Social Baseline Conditions

4.1. Physical Environment

4.1.1. Introduction

This section presents the physical baseline of the project area under the following headings:

- Climate and meteorology;
- Air quality;
- Noise in the Project Area;
- Geology;
- Soils;
- Hydrology;
- Topography and Landscape;
- Waste administration in the project area.

Baseline data has been collected based on desktop research of available information (secondary data), as well as primary data collected for air quality, noise, soils, surface water and groundwater, as part of field studies undertaken in the Project area between January- February 2021, appendix 2. Secondary data was collected from various government agencies.

4.1.2. Climate and Meteorology

Climatic data from Fier meteorologic station on temperature, wind and extremal weather conditions was obtained from the Institute of Geo-Sciences, Energy, Water and Environment (IGEWE).

The climate in the coastal plain is typical Mediterranean, with a low annual rainfall (average rainfall of 893 mm) in the Project area, with 70 to 75% of rainfall occurring from October to March. The average annual temperature is 18.8°C, with a mild winter.

Maximum and minimum temperatures are observed in August (maximum) and January, while the lowest rainfall was in August and the highest in November. The highest evapotranspiration is in July and August while the lowest is predictably in the winter months. The humidity deficit, as in the whole Mediterranean area, is in the summer and autumn seasons until November.

Evaporation estimated from climatic data of Vlora station (Hydrometeorological Institute, 2001) reach an annual value of about 1200 mm. This means that the nearby lagoon and hence surrounding area has always faced strong seasonality in its water regime and salinity, as is usually the case for Mediterranean coastal lagoons.

Table 10. Average monthly temperature

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Divjaka	8.4	9.4	11.1	14.2	18.2	22.1	24.2	24.1	21.3	17.1	13.3	10.1
Ndermenas	9	10.5	12.5	15	18.5	22.5	25.5	26.5	23	18.5	15	10.5
Fier	8.5	9.4	11	14.2	18.1	22.1	24.2	24.1	21.3	17.2	13.4	10.2
Fier Seman	8.3	9.3	11.1	14.1	18.2	22.2	24.1	24.1	21.2	17.1	13.2	9.9

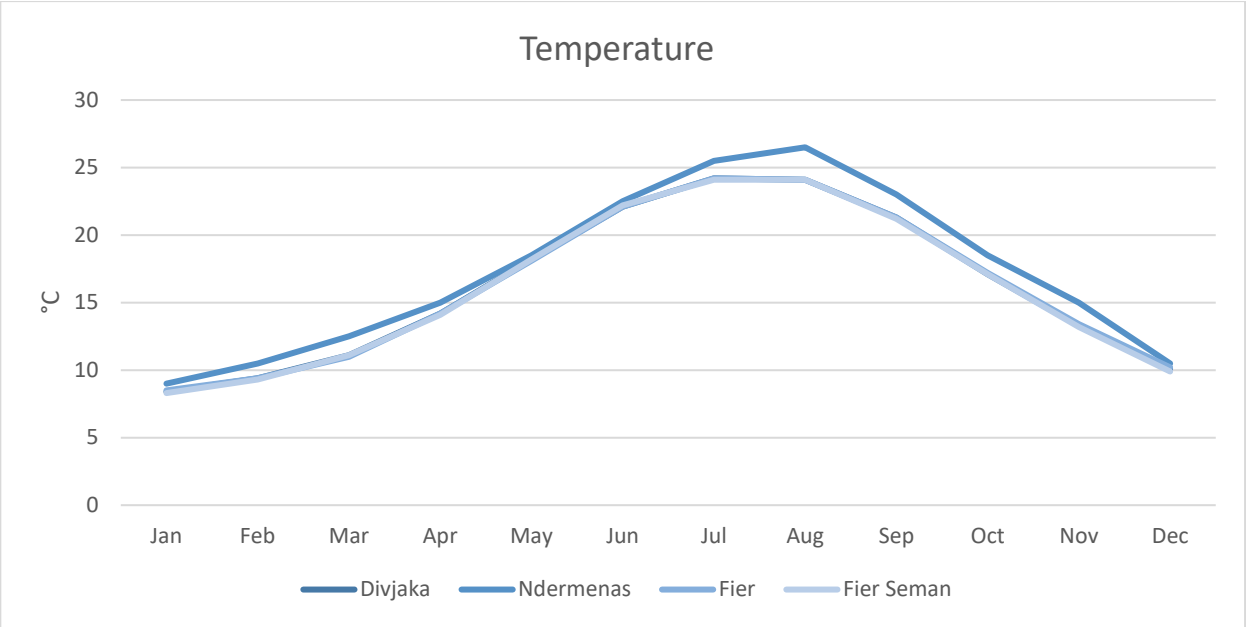
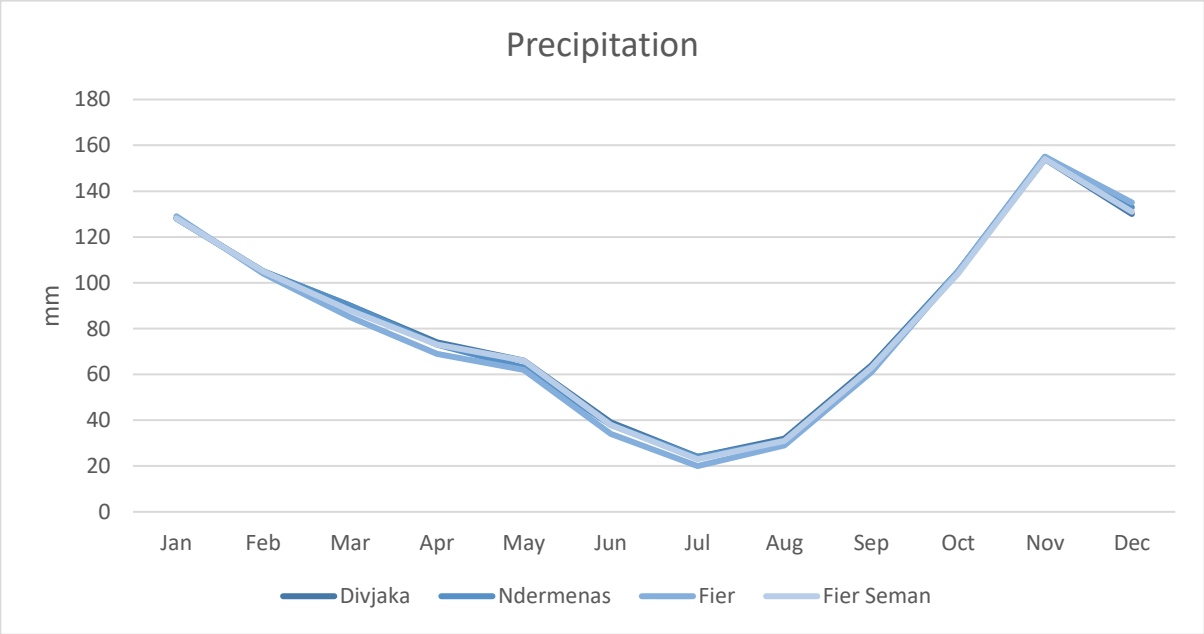


Figure 11. Average monthly temperature in the project area[13]

Table 11. Average monthly precipitation[14]

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Divjaka	128	105	90	74	66	39	24	32	64	105	154	130
Ndërmenas	128	105	90	73	63	38	24	31	63	105	155	133
Fier	129	104	85	69	62	34	20	29	61	105	155	135
Fier Seman	128	105	88	73	66	38	23	31	63	104	154	131



[13] Institute of Geo-Sciences, Energy, Water and Environment
[14] Institute of Geo-Sciences, Energy, Water and Environment

Figure 12. Average monthly precipitation in the project area[15]

The wind rose (Figure 13) shows that two main directions prevail: South - North and North - South with dominance that South-North.

Month of year	Jan 01	Feb 02	Mar 03	Apr 04	May 05	Jun 06	Jul 07	Aug 08	Sep 09	Oct 10	Nov 11	Dec 12	Year 1-12
Dominant Wind dir.													
Wind probability >= 4 Beaufort (%)	11	16	18	15	9	10	11	14	8	7	6	11	11
Average Wind speed (kts)	7	7	8	7	7	7	7	8	7	6	6	6	6
Average air temp. (°C)	10	11	14	18	22	27	28	29	25	19	16	11	19

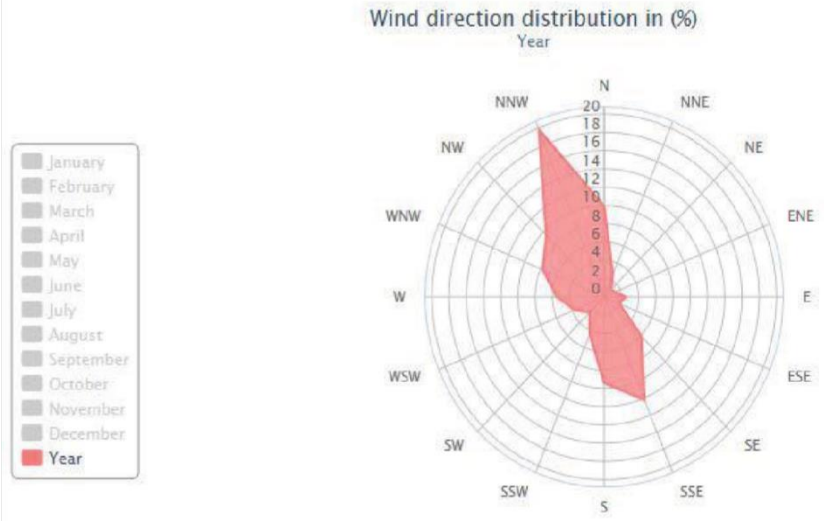


Figure 13. Predominant wind direction in the project area[16]

The climate zone conditions play an important role in how the area has developed and in the formation of special phenomena, such as:

- The presence of a characteristic flora and fauna throughout the year;
- The presence of a number of diverse habitats located in this region, and hence relatively high biodiversity;
- Rich offers of climate potentials for recreational and tourism development;
- Intensive agricultural activities development during the year (on suitable land).

The local climatic conditions impact on community life is significant especially during the summer when agricultural activities rely on artificial watering techniques.

4.1.3. Air Quality

There is no air quality monitoring data available from national databases for the project are, therefore a rapid ambient air quality monitoring regime was established at 2 locations to covering upstream and downstream of the proposed PV project area and OHL. One monitoring was located just north of the PV project site, near the settlement of Hastukasi, the other was located toward the end of the OHL route close to Fier (the location is shown below in Figure 14).

The air quality parameters considered for the study included Particulate Matter (PM_{10}), Particulate Matter ($PM_{2.5}$), Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2), Hydrogen Sulphide (H_2S) and Volatile organic compound (VOC). 24 hourly air samples were collected and analysed.

[15] Institute of Geo-Sciences, Energy, Water and Environment
[16] Institute of Geo-Sciences, Energy, Water and Environment

The meteorological conditions on the day of measurement were clear and dry; temperature varies from 7°C to 4°C, humidity 54% and Pressure 1010 mb.

To analyse the air component the contracted laboratory used a Wet Chemicals measurement method. Standard used for SO_2 measurement is S SH ISO4221:1980, for NO_2 is S SH ISO6768:2000; for H_2S is S EPA (2000) Method 11; for VOC is ISO 16000-5:2007.

The main sources of air pollution near the project area are from transport vehicles used in the area, such as from Iliria Farm, tourists and local residents. These activities generate dust (particulate matter, PM) and noise. Air pollution from vehicle traffic is currently unmeasured. The poor condition of the roads, particularly in rural areas, can create large quantities of dust, especially in the dry periods (summer months).

Table 12. Locations of air quality sample

Waypoint No.	Coordinates (UTM)	Distance from of the waypoint from PV (in m)	Location/Area
WP1	370729.00 m E 4522941.00 m N	750 m	Located near Hastukasi Village Road crossing

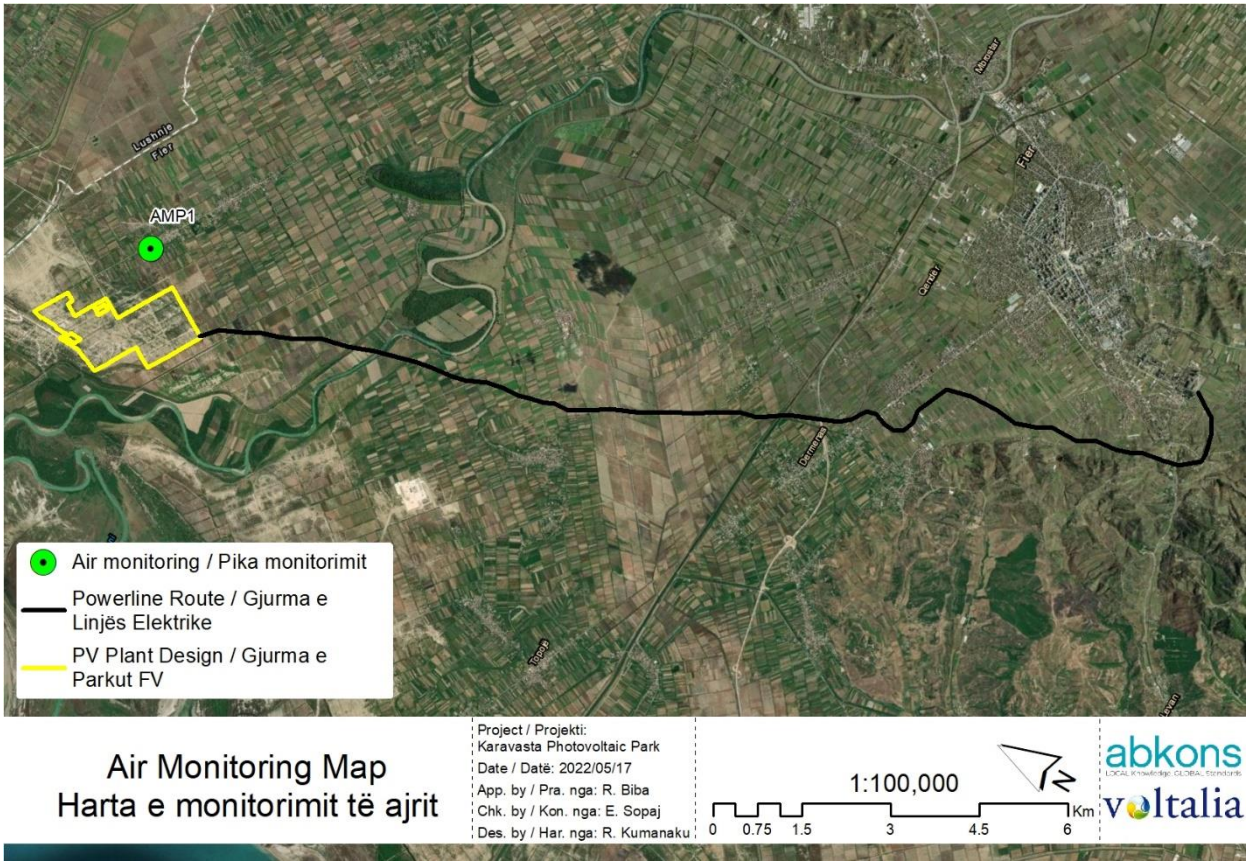


Figure 14. Air Monitoring Location Map

The results of the air quality monitoring results are presented in Table 13 below. According to the results the ambient air quality meets national and international norms (EU)[17] and WHO) for dust parameters (PM_{10} and $PM_{2.5}$), Monitoring results for SO_2, and H_2S were above national and international limits. Table 13 compares 24-hour levels of air quality background in the study area against national and international standards.

[17] https://ec.europa.eu/environment/air/quality/standards.htm

Parameters	Results of Analysis (µg/m^3)				Limit AL (µg/m^3)[18]				WHO Ambient Air Quality Guidelines[1920](µg/m^3)		Limit EU (µg/m^3)[21]				Best practice (µg/m^3)
	24-hour	8-hour	4-hour	1-hour	annual	24-hour	8-hour	1-hour	annual	24-hour	annual	24-hour	8-hour	1-hour	1-hour
H_2S	54.975									150		350			
SO_2	293.963					125		350[22]		125 (Interim target-1)[23] 50 (IT2) 20 (IFC)[24]	40	350			
NO_2	81.29				40			200	40	200	40			200	
PM10	29.0				40	50			70 (IT1) 50 (IT2) 30 (IT3) 20 (IFC)	150 (IT1) 100 (IT2) 75 (IT3) 50 (IFC)	40	50			
PM2.5	4.15								35 (IT1) 25 (IT2) 15 (IT3) 10 (IFC)	75 (IT1) 50 (IT2) 37.5 (IT3) 25 (IFC)	25	-			
VOC	262.69														500

Table 13. Compared 24-hour levels of air quality background in the study area to national and international limits

[18] DCM No. 352/2015 “For the assessment of ambient air quality and requirements for certain pollutants related with it, fully approximate Directive 2004/107/EC”
[19] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile
[20] Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.
[21] https://eur-lex.europa.eu/eli/dir/2008/50/oj/ Directive 2008/50/EC on ambient air quality and cleaner Air for Europe
[22] Alarm threshold value= 500 µg/m3
[23] Interim targets (IT) are provided in recognition of the need for a staged approach to achieving the recommended guidelines.
[24] IFC Environmental, Health, and Safety Guidelines GENERAL EHS GUIDELINES: AIR EMISSIONS AND AMBIENT AIR QUALITY

Discussion/Conclusion

This is a rural area with limited emission sources and therefore a generally reasonable air quality in the area, as shown by the monitoring results. However, the data obtained from the air quality monitoring did show levels above the EU and Albanian norms for air pollutants like SO_2 and H_2S. This higher level of SO_2 could be attributed to the oil industry present in region and from house heating systems in village. All the villages use oil or wood for heating. Furthermore, during the site visit we identified an informal waste disposal, where wastes were burnt during the night (see Figure below). This informal waste site is about 1 km from the Air quality monitoring point and this might have influence the SO_2 and H_2S level rising.



Figure 15. Illegal Waste disposal

4.1.4. Noise in the Project area

Along the project area the baseline noise environment varies insignificantly as it extends through uncultivated and undeveloped areas. The majority of the potential receptors are villages which can be considered sensitive. In the area surrounding the project area, the nearest settlements are Ndërmenas (1 km from PDA), Hoxharë (300 m from OHL), Seman i Ri (600 m from OHL Route), Dermenas 100 m from OHL route), Hastukas (615 m from PDA), Lagjia e Romëve (50 m from OHL), Zhupan (50 m from OHL) and the City of Fieri (50 m from OHL). The sensitive receptors that may be affected by the Project were identified through a desktop analysis of the local cartography and satellite imagery.

Current anthropogenic noise in the vicinity of the project area is related to agricultural (humans working, machinery and animals), human domestic activities, vehicular traffic along the rural roads and pathways. In general, for the area, ambient noise levels would be expected to be higher during the dry season due to the arrival of tourists that come to visit Divjaka Park, increase of traffic movement and agriculture activities. In rural areas, there is no published data for ambient noise levels. In order to present an accurate description of the noise environment at sensitive receptors, the closest urban settlements (houses) in the surrounding villages closest to the areas where the proposed construction activities will occur (near the PV footprint and along the main road axis) were considered within the potential area of influence for noise. The two closest locations were selected and noise measurements were undertaken during the last week of January 2021.

Table 14 and Figure 16. shows the locations of the noise monitoring understaken.

Table 14. Locations of noise monitoring samples

Waypoint No.	Coordinates (UTM)	Distance from of the waypoint from PV Footprint (in m)	Location/Area
WP1	369787.00 m E 4523502.00 m N	380 m	Hastukas village road and PV Road cross
WP2	370719.00 m E 4522920.00 m N	718 m	Nearest house in Hastukasi village

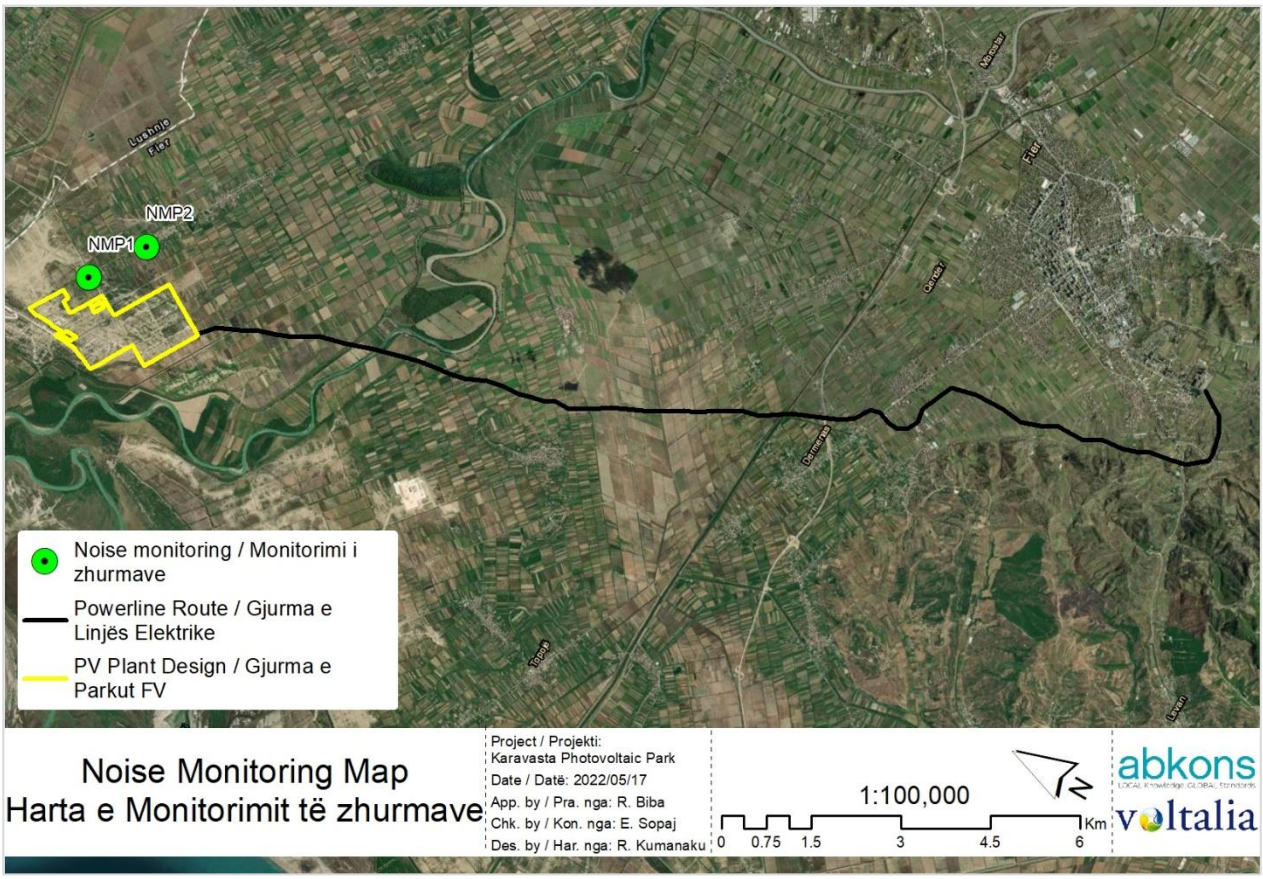


Figure 16. Noise Monitoring Location Map

Noise Level 24 hourly ambient noise level was measured using a noise level meter at 2 locations around the project area during day and night-time. The selection of sampling locations was based on land use. The noise levels have been expressed as an equivalent noise level (Leq), which is the measurement of sound pressure level over the averaging time.

Table 15. Summary of Noise Measurements

No	Location	Approximate distance to noise source	Measuring duration (h)[25]	LAeq T [dB] Day time	LAeq T [dB] Night time	IFC World Bank Group		National standards[26]			
						Residential Institutional/Educational Day-time	Residential Institutional/Educational Night-time	Serious nuisance (16hr duration) [27]	Moderate nuisance (16hr duration) [28]	Critical (24h duration) [29]	Critical 1h duration) [30]
1	Sample 1	Noise sources were dispersed (agricultural and transport activities) rather than specific point sources	15h day/ 9 h night	49.712	41.15	55 dBA	45 dBA	55 dBA	50 dBA	70 dBA	85 dBA
2	Sample 2		15h day/ 9 h night	47.0	47.15	55 dBA	45 dBA	55 dBA	50 dBA	70 dBA	85 dBA

According to the noise monitoring results that was obtained at the residential settlement and close to the project site, the average daily noise levels were below to 55 dB(A) which is the maximum level according to Albanian standards.

Discussion/Conclusion

Generally, baseline levels were measured at or around 49.7 – 41.5 dBA. This is a normal noise level for rural areas. In the area of Influence there are no declared industrial sources. Elevated noise levels above standard background levels are due to the following noise sources; vehicles traveling along the main road, agricultural activities, animals (dogs, chickens, and goats), village life and sporadic agricultural activities (use of pumps and rural vehicles), wind during the day and animals (dogs, chickens, goats during night). Sensitivity can be considered moderate to high in residential areas and in the vicinity of populated areas.

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[25] 1.5 hours measurement on site, divided by 3 measuring periods of 30 minutes, respectively morning, noon and afternoon.

[26] Albanian Directive No 8 dated 27/11/2007 "Noise limits in the design environments" defines limits for residential areas (in detail, for areas "outside the house") affected by operation activities.

[27] Residential areas Serious nuisance during the day and evening duration 16 hours

[28] Residential areas- Moderate nuisance during the day and evening duration 16 hours

[29] Industrial, commercial area, traffic flow (outdoor and indoor environment) during 24 hours

[30] Public, outdoor or indoor environments during 1 hour

4.1.5. Geology

Geological data was provided by Institute of Geo-Sciences, Energy, Water and Environment (IGEWE).

The geology of the Karavasta – Semani region consists of recent Pliocene and Quaternary geological formations which compose the low Ardenica – Divjaka hills and Karavasta – Semani plain area, respectively.

Molasses of Pliocene

According to the lithology, the Pliocene molasses belong to two different lithological unitss: Helmesi suite and Rrogozhina formation. The Helmesi suite consists mainly of massive grey mudstone intercalated with scarce and thin sandstone layers (4 – 5 cm to 20 – 30 cm thickness) and siltstone. The total thickness of Helmesi suite ranges from 100 – 200 m. The Helmesi mudstone constitute the nucleus of the Ardenica – Divjaka anticline chain. The Rrogozhina formation consists mainly of sandstone and conglomerate with subordinate mudstone and siltstone intercalations. The sandstones are fine – medium to coarse grain. The conglomerate consists of medium to coarse pebbles. The matrix of conglomerates is represented by clay, silt and fine sand materials. The apparent thickness of Rrogozhina formation on the site varies from 50 m to 100 m. The Rrogozhina conglomerate-sandstone constitute the eastern and western flanks of Ardenica – Divjaka anticline chain.

Holocene sediments

- **Alluvial sediments:** The Quaternary alluvial sediments spread out along the Seman River valley, especially in its middle and lower flow course. After the joint point of Devolli and Osumi rivers (which together form Semani), this later forms a wide alluvial field, with a predominance of fine material (sandy clay and clayey sand) which in depth is changed to scarcely gravel layers. The thickness of these sediments to the west increases to 70-80 m and more (Fier).
- **Alluvial – prolluvial sediments:** These sediments spread out at the foot of the Pliocene hills in the form of surrounding rings. Consist of sand, graves and also of irregular pebble forms, not-cemented, distributed within a clay-silt up to fine sand matrix.
- **Marshy and lagoon sediments:** These sediments are especially encountered in the sector of Karavasta lagoon. They are usually located behind the belt of coastal dunes, with a width (as a swampy area) that goes up to 5-6 km and thickness that ranges from a few meters to 20-40 m, maybe even more in some places. They are represented by a combination of clay, sandy clay and loam layers with grey to dark colour, including scarce sand layers and lentils. They are often rich in organic material and peat. The clays on the surface appear compacted and plastic.
- **Marine sediments:** They spread in the coastal area but also continue in the sea (shelf). They are covered by marshy and alluvial deposits and are mostly represented by sand and, to a less extent, sandy clay and gravel as intercalated layers. Concentrations of heavy minerals, mainly chromium, are also found in some places. They are rich in organic materials. They have a thickness of several meters to tens of meters and more. Towards the sea this thickness tends to increase.

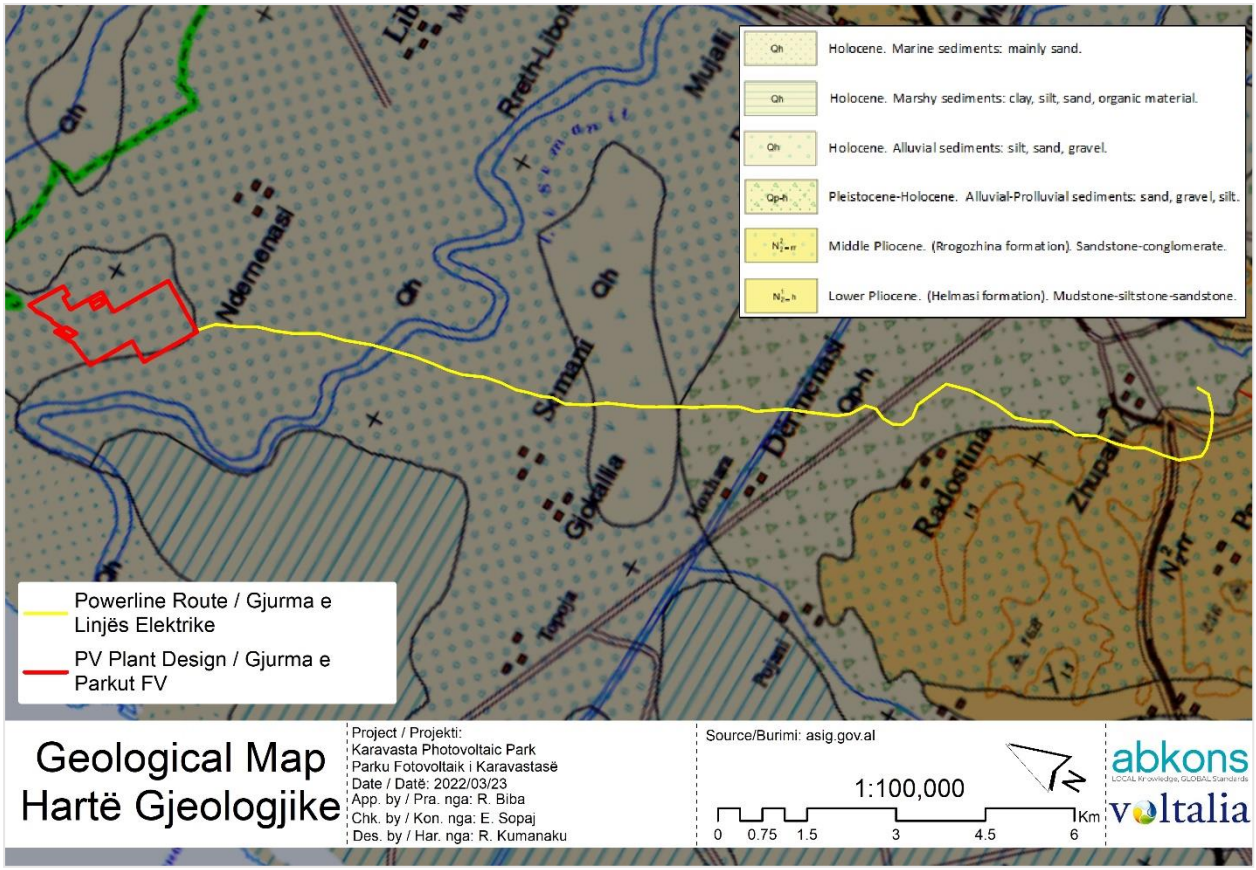


Figure 17. Geological map of Karavasta – Semani region (PV site, OHL and Fieri substation is shown)

- The PV site is mostly located on the marshy and lagoon sediments which consist of grey to dark clay, sandy clay and loam layers, including scarce sand layers and lentils, and partially on the alluvial sediments composed of sandy clay and clayey sand. The marshy sediments have thickness of 20-40m while the alluvial sediments are thicker (up to 8m).

The OHL passes through three Pleistocene-Holocene sediment types, as follows:

- From Fieri substation up to Hoxhara, it passes through Plesistocene – Holocene alluvial – prolluvial sediments, composed of not-cemented sand, graves and also of irregular pebble forms, surrounding the Pliocene hills of Levani-Peshtani.
- From Hoxhara to Semani village, it passes through marshy sediments, composed of clay, silt, sand and peat.
- From Semani village to PV site, it passes completely through alluvial sediments of Semani river, composed of sandy clay and clayey sand with scarce gravel layers to the depth.

Discussion/Conclusion

The geological profile of PV and OHL area shows that it passes through terrain composed of clay, silt, sand, not-cemented sand and peat. The project site belongs to the Plesistocene – Holocene alluvial – prolluvial sediments. In terms of sedimentary rocks these formations consist of composed of clay, silt, sand and peat.

This is an area that has no slippage and erosion as it is a flat surface but is problematic due to the low durability in construction as the sand itself does not support large reinforced concrete structures. However, referring to the project which will contain only structures not higher than 5 m, mainly metal, this is not a matter of concern.

4.1.5.1. Seismic Conditions

The peak ground acceleration (PGA) for a 475-return period seismic event in the region of the Divjake dam was calculated from seismic research undertaken by Aliaj et al (2004), that also presented a relationship between PGA and annual probability. Divjake lies in a zone of medium to high seismic hazard probability.

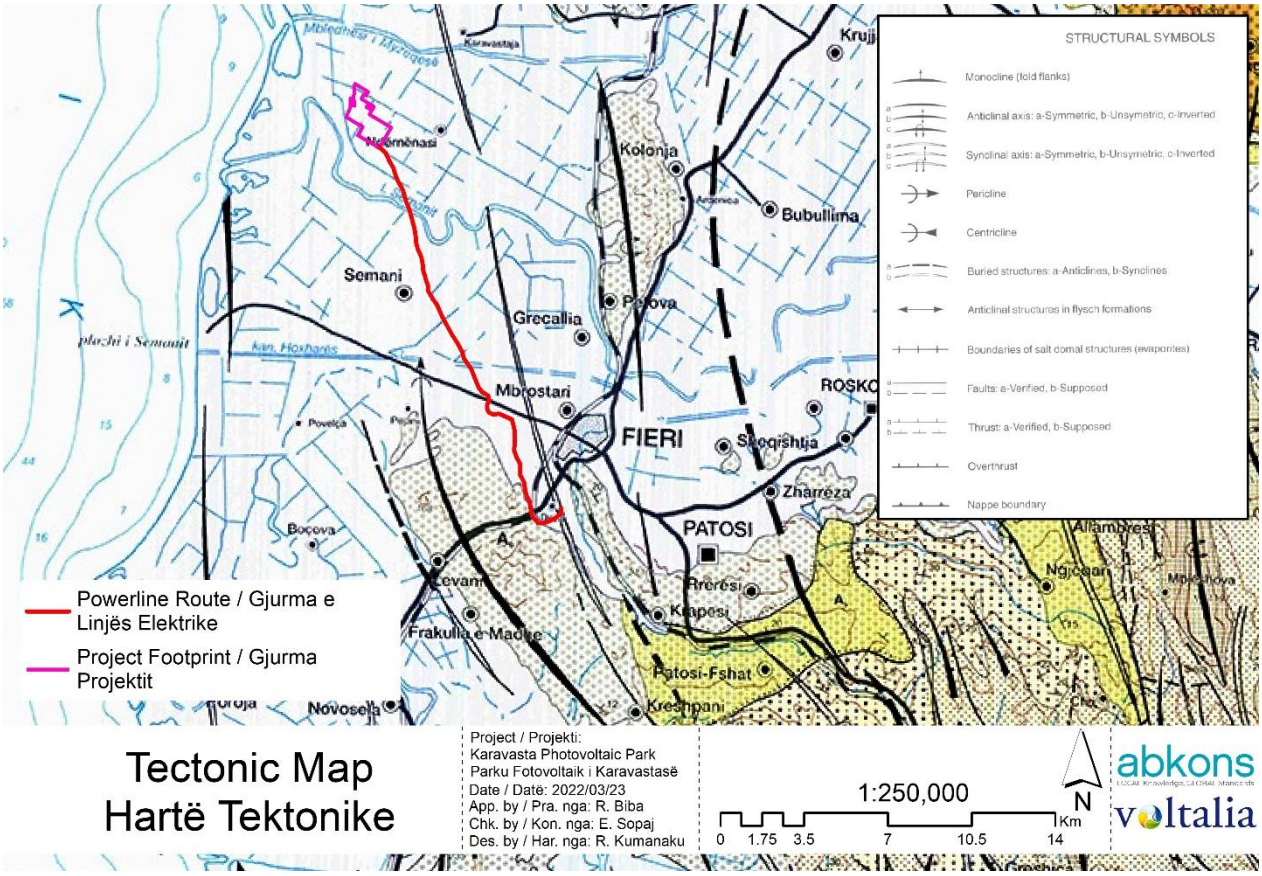


Figure 18. Tectonic Map

4.1.6. Soils

According Gjoka F., (2012)[31] empathized that: "Divjakë-Karavasta National Park soils are of different types such as gray brown soils, according to the national classification; saline soils (around the Karavasta lagoon), alluvial soils (flooded by river deltas of Shkumbin and Seman), uncultured sandy soils and sandy old dunes soils.

The main types found in this study are: Salty, Alluvional/sandy and Divjaka hill soils briefly described following:

- **Salty lands** are presented with a clear profile. They are formed under the conditions of rare natural vegetation, mainly halofites, are represented by Salicornia europea, Statice gmelini and Alnus glutinosa. Salt comes from the sea water in these soils through capilay raise. Under natural conditions, they serve well as natural ecosystems with a particular flora and fauna. On the surface there is a thin layer, in the form of crust, about 25 cm in thickness. This layer is a mixture of salt with fine mineral particles. Below are the layers A-B-C. The Horizon A has a thickness of about 25 cm, with a dark blue colour, but stained with rust and gloss of fine salt crystals. In this layer there is a low level of organic matter and carbonates. The Horizon (B) is deeper and has a shorter colour than the Horizon (A). In some places, the process of glamorization is noted. Characteristic of this horizon is the layer of materials, which is typical for alluvial deposits. In the horizon (C) there are sand, sea and river spikes

[31] Gjoka, F., (2012), Pedogjeografia, MirGeerAlb Published House, pp. 55, 183, 187)

as well as glittery clays (hydromorphic clay) of the swamp. Groundwater is shallow and with high salt content (20-50 g/l). Salted soils during the summer dry up and drain in different degrees. These soils have a high percentage of Na+ ions and low biological activity.

- **Semi salty soils** are located in the last 3 km of the location Project on the east and northeast part. have low and very low agricultural potentials. In the last period of the socialist system, a national-scale action was undertaken to improve them, based on the principle if leaching their chlorines and sulphates from the surface towards the deepness, accompanied by drainage and irrigation canals. During this period, modest yields were achieved on some crops like wheat and forages, using large quantities of water for irrigation. On the last 30 years, these soils have been refused by the villagers and are abandoned. Currently, a good part of them is state property. Saline soils have a Sodium Adsorption Ratio (SAR), which expresses the sodium adsorbed in the adsorption complex, varies from 15 to 26 C mol/l. These are heavy soils: up to 50% clay, 33% sand and 16% silt. Saline soils are dried and fissured in different deepness depending on the content of salt during summer. During winter, soils become very sticky and the adsorption complex is dominated by Na and Mg chlorides. Water permeability is very low and the capillarity very strong.

- **Soils on the Divjaka hilly system** are shallow soils, leached, reddish and with a developed profile. They are characterised by an average fertility and are appropriate for fruit trees, especially olive trees. For the last decade, there is a trend of growing fruit trees in plantations.

    - **Sandy soils** are the soil with a high percentage of sand, or large soil particles. It mainly consists of rock particles such as limestone, shale, granite and quartz. Sandy Soil has a low percentage of organic material. Water travels through sandy soil very easily, so nutrients leach out quickly. The weak cohesion between the particles, the low particle binding agents, namely organic matter, clay, oxide, and Ca causes this soil to have a high permeability, low moisture and nutrient retention. The sandy soil only contains a small amount of clay and organic matter which causes low cation exchange capacity (CEC), soil buffering capacity and easily leached cations.

During the field visit (28.08.2020) were observed mainly: ground cover, slope, presence of stones on the surface, soil texture and structure, moisture condition, dominant vegetation, presence of surface salt and the potential for cultivation of agricultural plants in them.

Main findings during field visit are summarized as follows:

- The presence of vegetation varied from 30 to 80% and was dominated by Salicornia europea (in 50-70% of vegetation) followed by Spartina alterniflora and spartina spartinae. Salt affected soils commonly contain a mixture of cations of sodium, calcium, magnesium and potassium and anions of chloride, sulphate, bicarbonate or carbonate. The total salt, individual salt or combination of salts in the soil is high enough to retard plant growth, injure plant tissue, and / or decrease yields, the soil is referred to as salt affected;
- The Project area is located on a flat land with a height of up to 2 m above sea level and the slope on the whole surface varies from 0.5 to 1.0%. Soil drainage is damaged due to non-functioning of the drainage channel system
- There are no stones on the surface of the soil; there are only strong clay aggregate, formed by the high presence of clayey and saline fractions. In dry weather their firmness makes them visible and stable;
- Soils have prismatic -resistant structures that are unstable and sticky in the presence of moisture from winter rains;
- The soil texture is dominated by clays (> 40%) and silt (20-40%). The percentage of sand is less than 15% giving the soil clayey, sticky and unstructured characteristics;

- The presence of salt on the surface is visible on the entire surface. It is deposited on the surface due to evaporation during the summer period. The intensity of deposition depends on the presence of clay and consequently on the temporary capillary network tubes; the higher the percentage of salt the higher the amount of salt deposited on the surface. Also plants resistant to high salinization had deposited salt crystals on the surface of the leaves due to transpiration;
- The lands are abandoned and not distributed to the private sector due to the very low productivity they possess. In the 60s and 70s years of the last century they were reclaimed and an attempt was made through a plan to desalinization them and place them in agricultural cultivation; unsuccessful test due to deposition of large amounts of salt during dry months. Despite the efforts for cultivation, the yields of wheat and fodder that were planted were low and very low, with high and very high costs, so with very low effectiveness. Today they are not under culture but modern fruit tree cultivation techniques (creation of high plant planting and irrigation / artificial fertilization enables their cultivation for specific trees, however at high cost. The salinity rate is medium saline (6- 12 gL-1) high saline (more than 12 g L-1) of water filtered from soil.
- The lands were with poor drainage system and irrigation system totally destroyed. They belong to category IX according to soil categorisation (bonity) scales (Soil Study Institute, 1992).



Figure 19. View of salty soil on Project area (Karavasta 28.08.2020)

4.1.6.1. Soil Quality

These soils are mostly sandy to sandy loam in texture. They are porous and grey to black in colour. Due to leaching of bases from heavy rains in this region, the soil reaction is typically moderate alkaline (pH 7.0 to 8.5). Organic matter content in this type of soil is low to medium and is not well decomposed (raw humus type). Available phosphorus and potassium are medium to low in the soil. Deficiency of some micronutrients is also found in certain areas. To determine the quality of soils, (existing level of pollution and soil/ agricultural productivity) four samples were taken in the footprint PV area as shown in Figure 20 and Table 16.

Table 16. Soil sampling locations

Site Name	X	Y
Sample 01	369648.00 m E	4521841.00 m N
Sample 02	368746.00 m E	4522817.00 m N
Sample 03	368982.00 m E	4523683.00 m N

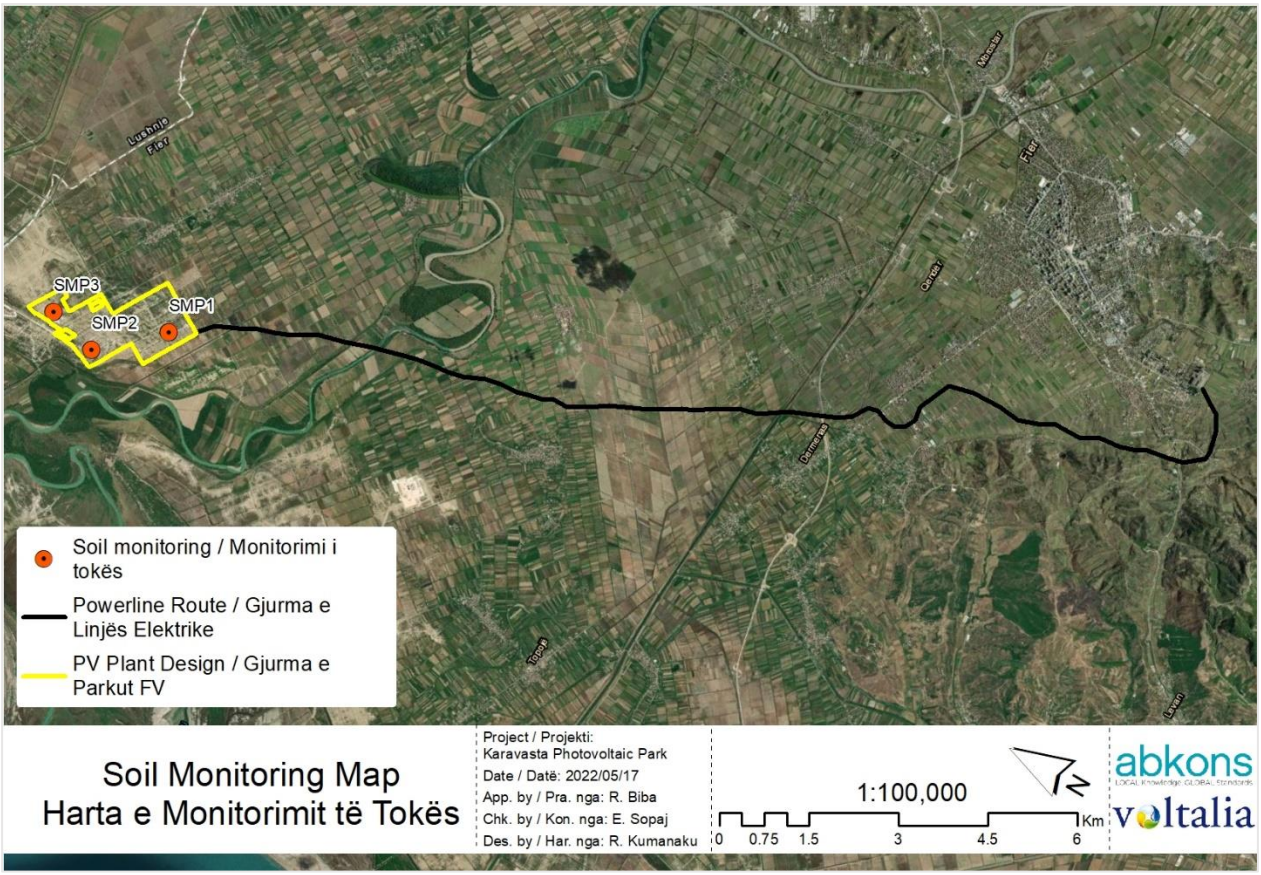


Figure 20. Location map of Soil Quality Monitoring Samples

Composite soil samples have been collected from 3 locations within the PDA areacovering PV Plant footprint area. Soil analyses was considered only for the PDA area, withvisual inspection undertaken for the transmission tower locations. The soil samples were analysed for relevant physic-chemical parameters using standard analytical methods to assess the soil quality of the area. It is proposed to test the soil quality in terms of pH, sand, silt, clay, texture, moisture retention capacity, infiltration rate, bulk density, porosity, organic matter, Nitrogen, potassium, phosphorous, Pb, organic carbon, etc.

In Albania there is no standard for estimating soil quality threshold value for any substances or parameters considered as pollutants. For this reason, references for the substance contents, thresholds and the impact they cause to the environment were made to international standards. Due to the difficulty of categorizing the degree of impact on the environment, as well as the high variability of geological value, the parental rock formation of the lands, climate and the affinity with the natural geochemical background, soil quality standards do not have a standardization or approved guideline. There are also no guidelines for standardization and categorization from the EU, WB or IFC; in general, the guidelines are local and for this reference are the Dutch soil standards.

Table 17. Analysis of Soil Samples

Parameter	Unit	Measured Values			Dutch Soil Standards (mg/kg dry matter)	
		Sample 01	Sample 02	Sample 03	Target value	Intervention value
pH	Adimens.	7.55	7.01	8.43	-	-
Lead (Pb)	mg/kg	<15	<15	<15	85	530
Zinc (Zn)	mg/kg	62.79	57.73	62.94	140	720
Copper (Cu)	mg/kg	32.02	29.98	32.56	36	190

Parameter	Unit	Measured Values			Dutch Soil Standards (mg/kg dry matter)	
		Sample 01	Sample 02	Sample 03	Target value	Intervention value
Cadmium (Cd)	mg/kg	<2	<2	<2	0.8	12
Mercury (Hg)	mg/kg	<0.03	<0.03	<0.03	0.3	10
Nickel (Ni)	mg/kg	278.3	270.7	262.8	35	210
Total Nitrogen TN	mg/kg	<0.5	<0.5	<0.5	-	-
Chromium (Cr)	mg/kg	73.34	73.12	69.11	100	380
Total Phosphorus TP	mg/kg	29.8	31.7	26.9	-	-
Molybdenum (Mo)	mg/kg	<0.1	<0.1	<0.1	3	200
Selenium (Se)	mg/kg	<0.3	<0.3	<0.3	0.7	100
Total Dissolved Organic Carbon	mg/kg	3244.2	3080.8	2727.2	-	-
Chloride	mg/kg	6816.2	5611.6	11177.1	-	-
Fluoride	mg/kg	11.5	15.8	9.3	-	-
Sulphates	mg/kg	1454.6	571.1	209.6	-	-
Phenol Index	mg/kg	31.7	139.5	5.6	-	14
Potassium	mg/kg(ss)	1432.7	1515.8	1700.4	-	-
Sodium	mg/kg	4338.8	4723.5	4994.5	-	-
Sand	%	84.78	33.33	84	-	-
Loam	%	4.35	55	4	-	-
Clay	%	10.87	11.67	12	-	-

Discussion/Conclusion

Texture: The texture of soil samples analysed at three locations (SQ-1, SQ-2 and SQ-3) was found to be sand, whereas soil texture was found sandy loam at SQ-2.

pH: Generally, soil pH in the range of 6.50-7.00 is considered to be best suited for growing most crops. The pH level in soil samples varied from 7.01 to 8.43 indicating slightly alkaline to strongly alkaline soil as per standard soil classification.

Metals: Copper, Lead and zinc are important soil micronutrients considered essential for the normal growth of plants. Deficiencies of micronutrient drastically affect plant growth and metabolism. The level of Copper, Lead and Zinc in the soil samples were found below detectable limit respectively (36, 140, 85 mg/kg) at SQ-1, SQ-2 and SQ-3. Level of zinc in the soil sample varied from 57.73 mg/kg (SQ-2) to 62.94 mg/kg (SQ-3). Ni is normal at these high values in the lowlands (Seman delta) and the values are justified. The threshold values we refer for limits belong to the Netherlands or Finland. The Devoll River from the Maliqi gorge in Gramsh flows through serpentinite geological formations rich in Ni and such values are found normal.

NPK: Nitrogen, phosphorous and potassium are essential plant macronutrient elements that indicate productivity of soil. The nitrogen content in all the soil samples is below 0.5 mg/kg (SQ-1; SQ-2; SQ-3). Level of phosphorous in three soil samples varied from 26.9 (SQ-3) to 31.7 mg/kg (SQ-2). Potassium content in four soil samples varied from 1432.7 mg/kg (SQ-1) to 1700.4 mg/kg (SQ-3). Phosphorous and potassium content of the soil samples were found to be normal.

Phenol Index: is high referred to Dutch limits maybe from the oil industry, because in the area of Fier are more than 3 Rafineries and 7 Oil and Gas wells. In biological origin phenolic compounds come from decomposed plant tissues abiotic / biotic way.

4.1.7. Soil types, and agronomic potential of OHL Route

The land surface and soils, at selected tower locations along the 19 km route of the power transmission line, were evaluated in terms of their use, pedological, chemical qualities, and fertility. 7 locations / WayPoints (WP) were observed at around one-kilometre intervals (see Figure 21). The approximate volume to be excavated for OHL towers foundations is estimated at ~ 7000 m^3.

There are two types of soils: Fluvisol (Eutric/Vertic Fluvisol[32]) which were identified at WP 01, WP02, WP03, WP04, and slightly saline clay soils (Salic Fluvisol[33]) which were identified at WP05 and WP06. The soils of the first group are generally soils with high agronomic fertility while the soils of the second group due to the presence, although low, of salt (sodic) and clays, possess low agronomic fertility.

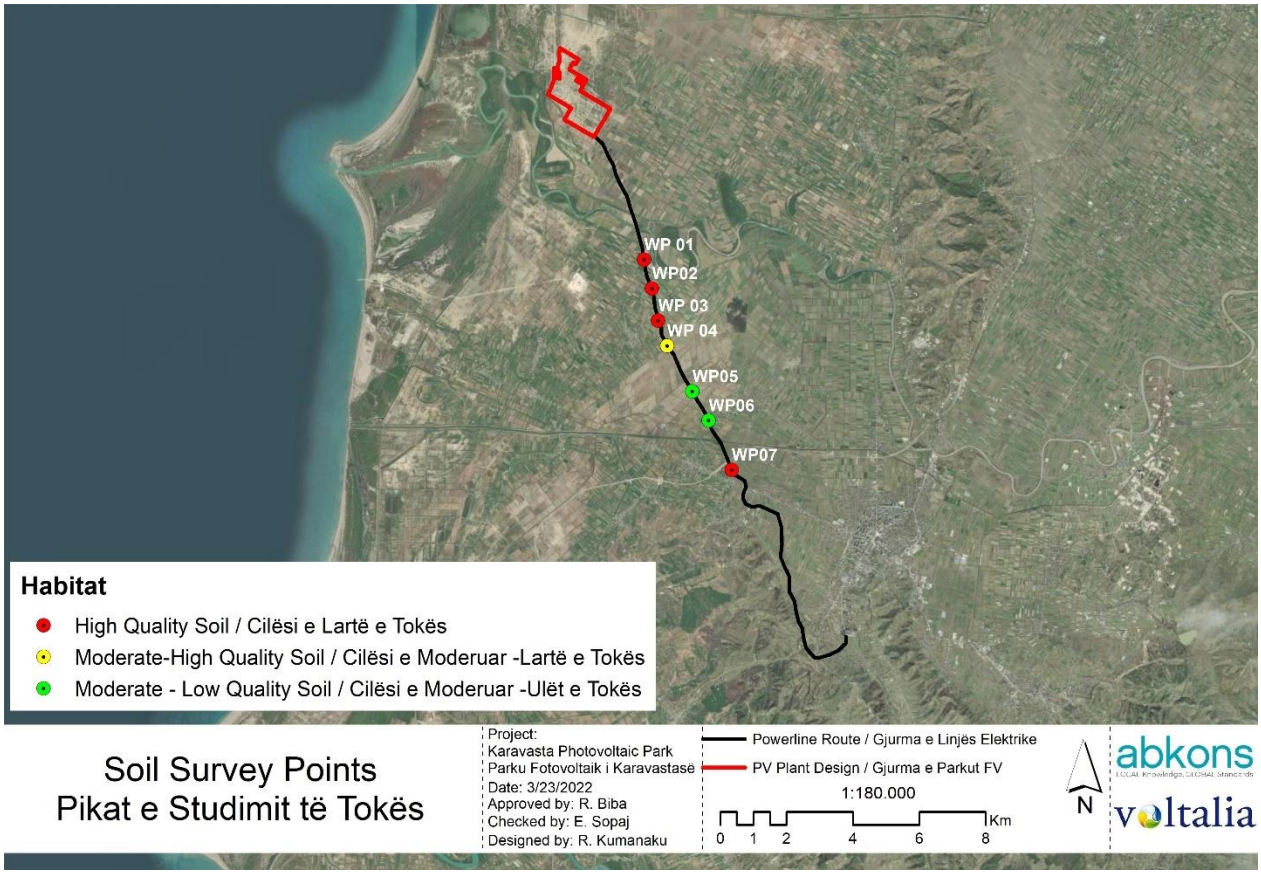


Figure 21. Soil surveys during OHL realignment

4.1.7.1. General Characterization

Fluvisols are common in periodically flooded areas such as alluvial plains. Fluvisols shows the layering of the sediments rather than pedogenic horizons. Their characteristics and fertility depend on the nature and sequence of the sediments and the length of periods of soil formation after or between flood events.

During summer saline soils are dried and fissured to different deepths depending on the content of salt . During winter, soils become very sticky and the adsorption complex is dominated by Na chlorides. Water permeability is very low and the capillarity very strong. These are heavy soils: up to 50% clay. Their texture

[32] Soil Atlas of Europe (2005). European Soil Bureau Network, European Commission, 128pp.
[33] Soil Atlas of Europe (2005). European Soil Bureau Network, European Commission, 128pp.

is mostly clay-silty and they are cultivated but have not been planted for more than 20 years and are now pasture, presence of plants is rare.

Both soils are in a flat plain and their parent rock comes from the alluvial deposits of the Seman River; depending on level sea altitude and communication with salt groundwater their chemical characteristics are different; the first type is high potentiality soils versus moderate and low agronomic for saline soil.

4.1.7.2. Soil Profile

The soil profile is deep and sand and silt fractions predominate. The mother rock consists of alluvial material brought by watercourses (in this case the Seman River) and the profile is stratified according to river deposits with periodic floods. Although they originate from alluvium, the soils are developed in generally hydromorphic conditions and alternate with rinsing of oxides and fine particles, therefore in the depth of the profile, hydromorphic clays are found.

According to a study in 2011[34] the description of Fluvisol profile is as follows:

- **Ao** - there is no distinct humus layer due to the small and unstable content of organic matter but also due to the mixing of layers by plows during cultivation.
- **Ap 0-30 cm**: grayish to whitish, fresh, with spaces and porous structure, with the presence of roots, with a gradual transition to the horizon below, foams with HCl.
- **B 30-65 cm**: darker in color, fresher, with less presence of roots, more compact and less porous, with particle structure, gradual transition.
- **BC 65-90 cm**: grayish-brown in color with slight traces of gleying phenomenon and iron oxides, low presence of gravelly grains, compact, fresh and with a more clay texture.

Saline soils have a differentiated profile into horizons. Underground waters are shallow and salts are intensively accumulated on the superficial soil layers or close to the surface, mainly on solonece soils. Horizon A has a thickness of 25 cm, with grey to sky-blue colour, with rusty spots and brightness of thin salt crystals. Horizon B is thick more sky-colored than horizon A, gleyied in different levels, compact.

4.1.7.3. Chemical Properties

The main chemical characteristics of Fluvisol (eutric) type are presented in the Table below. The data in this table are the result of chemical and physical analyzes performed by the author in the study on soil quality in the context of ESIA - TAP (2011) study.

Table 18. Chemical properties and texture of Fluvisol

No	Parameter	Reference	Unit	Values
1	pH (water) (t=24.5°C, RH=51.5%)	S SH EN ISO 10523:2008	Unit pH	7.84
2	pH (KCl)	S SH EN 5815-1:2009 S SH EN 5815-2:2009	Unit pH	8.1
3	CEC	S SH ISO 15705: 2002	Cmol/kg	11.56
4	EC		µS/cm	870
4	Total N	S SH EN 872:2005	mg/kg	1849
5	Total P	ISO 15923-1:2013	mg/kg	366.27
6	P as (M3)	ISO 6439:1990	mg/kg	0.67

[34] Sulce, S. & Kullaj, E., 2011, Soil Type and their Agricultural Values, Trans Adriatic Pipeline ESIA study (Soil Quality and Land use section), 64p.

No	Parameter	Reference	Unit	Values
7	Total K)	EPA 1664	mg/kg	1651.44
8	Total Mg	EPA 206.4: 1987	mg/kg	94.7
9	Total Fe	Internal Testing Method	mg/kg	14.200
10	Total Cooper (Cu)	APHA 3500 Cu B:1992	mg/kg	64.5
12	Total Ca	APHA 3500-Ca D:1992	mg/kg	230
13	Texture	Pipette method	In % of the total sample	
13/1	Sand			43.3
13/2	Loam/Silt			31.5
13/3	Clay			25.2
Soil Category (Bonity classification)				III

The above soil chemical data (Fluvisol) show that the soil has a pH above the alkaline-prone neutral that is most evident at the alkaline pH (> 8.0), as well as from the hydrochloric acid sparking observed in the soil profile analysis. Cation exchange capacity is average (> 11 Cmol / ka) due to the nature of the texture and the average presence of clays. The electrical conductivity of 870 µS / cm indicates the presence of salts in the upper layer which is most likely due to periodic chemical thickening and also due to intensive oxidation-reduction processes. Total nitrogen contents are average up to high, while phosphorus contents are average. Total potassium contents are medium to low. Calcium, Iron, and Magnesium are in the high values, characteristic of primary materials deposited by the watercourse. The content of copper (Cu) is relatively low, characteristic of soils of the western region of the country due to the transport of solid materials from the eastern area rich in magmatic minerals (ultra basic) (Korca, Maliq area and the middle course of Devollit).

The soil texture is balanced with the dominance of sand fractions (> 43% of the content in the total fractions) and loam (31.5%). Clay fractions are in average values (26%) of dominating the soil classification in soil: Loam – Clay soil or, in more general terms, balanced soil with average fertility.

4.1.8. Hydrology

Baseline data has been collected based on desktop research of available information secondary data from:

- Institute of Geo-Sciences, Energy, Water and Environment (IGEWE).
- ICE-000-P06-V01 Karavasta 140MW - Hydrological Survey.

4.1.8.1. Surface Water Resources

Seman Basin, which is composed of four rivers (Semani, Osumi, Devolli, and Gjanica), has a catchment area of 5,649 km^2 and an average altitude of 863 meters above sea level. Precipitations in the Basin are around 1,084 mm / year, resulting in an average annual flow of 95.7 m^3/s. Approximately about 60% of water is provided by the Devoll watershed. Regarding the land cover, the Seman river consists of agricultural areas with a sparse cover that is subject to erosion. Seman River is 281 km long, and discharges its waters into the Adriatic Sea, south of the Karavasta lagoon. Before reaching the sea, the Seman River joins the Gjanica River, which flows through the city of Fier. The Devoll River, which flows from the south-eastern slopes of the Morava Mountains, is one of the two main tributaries of the Semani River. The Devoll River is 196 km long with a catchment area of 3,139 km^2 and an average altitude above sea level an average of 960 meters. The Devoll River has an average flow of 49.5 m^3/s, mainly fed by surface waters. The Osum River is the second major tributary of the Seman River. It is 161 km long with a catchment area of 2,150 km^2 and

an average altitude of 828 meters above sea level. The average annual flow is 32.5 m^3/s with a low flow of 17.5 liters/s/km^2. Gjanica River, although not considered a major tributary, is considered the most polluted river in Albania with contamination coming from oil extraction in the Patos-Marinza area and also from the Oil Refinery in Ballsh. Furthermore, after passing through Fier (before joining the Seman River), polluted water untreated urban wastewater is mixed with untreated industrial wastewater discharged without treatment. it's estimated that every month about 12,587-18,091 m^3 of liquid wastewater is discharged into the river Gjanica that contain hydrocarbons and industrial oils (benzene, toluene, ethyl-benzene, and xylene). Except it causes damage to the aquatic natural flora and fauna, the use of surface water for irrigation and livestock is also quite dangerous.

The Study Area (200 ha) is located in the West of Albania (40°50'56.44''N Latitude and 19°27'12.5''E Longitude) close to the Adriatic coast (about 4 km). The nearest cities are Fier about 16 km, and Divjaka about 19 km and the nearest village is Hastukas about 2 km. Regarding the water stream, Study Area is situated between South Drainage Canal and the Semani River in South-Southwest, Myzeqe Drainage Canal, and Karavasta Lagoon in the North, drainage canals and Adriatic coast in the West, and drainage canals in East. All the Project area drains northwards towards Dokollarëve Drainage Canal, and ultimately to the Karavasta Pumping Station which discharges the water into the Adriatic Sea.

There are several water bodies present in the Project area, as follows:

- part of the Adriatic Sea - over 4 km to the west;
- the lagoon of Karavasta - 3.5 km to the north;
- Seman River - 400 m to the south;
- the Shkumbin River - 21 km to the north;
- Tėrbuf and Myzeqe emissaries/drainage channels - 20 km to the north, etc.

Rivers

River Seman is one of the most important and interesting rivers of the Albanian hydrography. It has a catchment surface area (F) of 5,649 km^2, average altitude (H) of 889 m and length (L) of 281 km. It has two tributaries, River Osumi (F=2,073 km2, H=852 m) and River Devolli (F=3,122 km^2, L=193 km).

River Shkumbin originates in the eastern Valamara Mountains (South-eastern Albania) and flows inside a narrow and deep valley between the Mokra and Shebenik Mountains to the east and the Polis Mountains to the west. The River Shkumbin is 187.4 km long with a catchment area of 2,459 km^2, and an average flow of 48 m^3/sec. At the end of its course, the river crosses the Myzeqe Plain in a distance of 35-40 km, meandering through it, and forms a small delta in Karavasta Lagoon.

Both Seman and Shkumbin rivers have suffered different human interventions caused by the removal of the riparian zone, inert material (sand, gravel, and stones) exploitation, collapse of embankments, which have resulted in the alteration of river hydro-morphology.

These interventions along with climate change, have resulted in several consequences, such as i) lowering of the river bed due bottom erosion, ii) flooding over the lower area, iii) erosion of agricultural land, iv) destruction of embankments, and v) lowering of groundwater level in water wells. The damage of the green (riparian) belt is observed almost along the entire course of the Seman River. The lack of a green belt at the mouth of the river (in Topoja area) has also allowed the penetration of the salt water over the plain area, turning agricultural land uncultivable. The erosion of agricultural land is mainly observed in the lower river course zone.

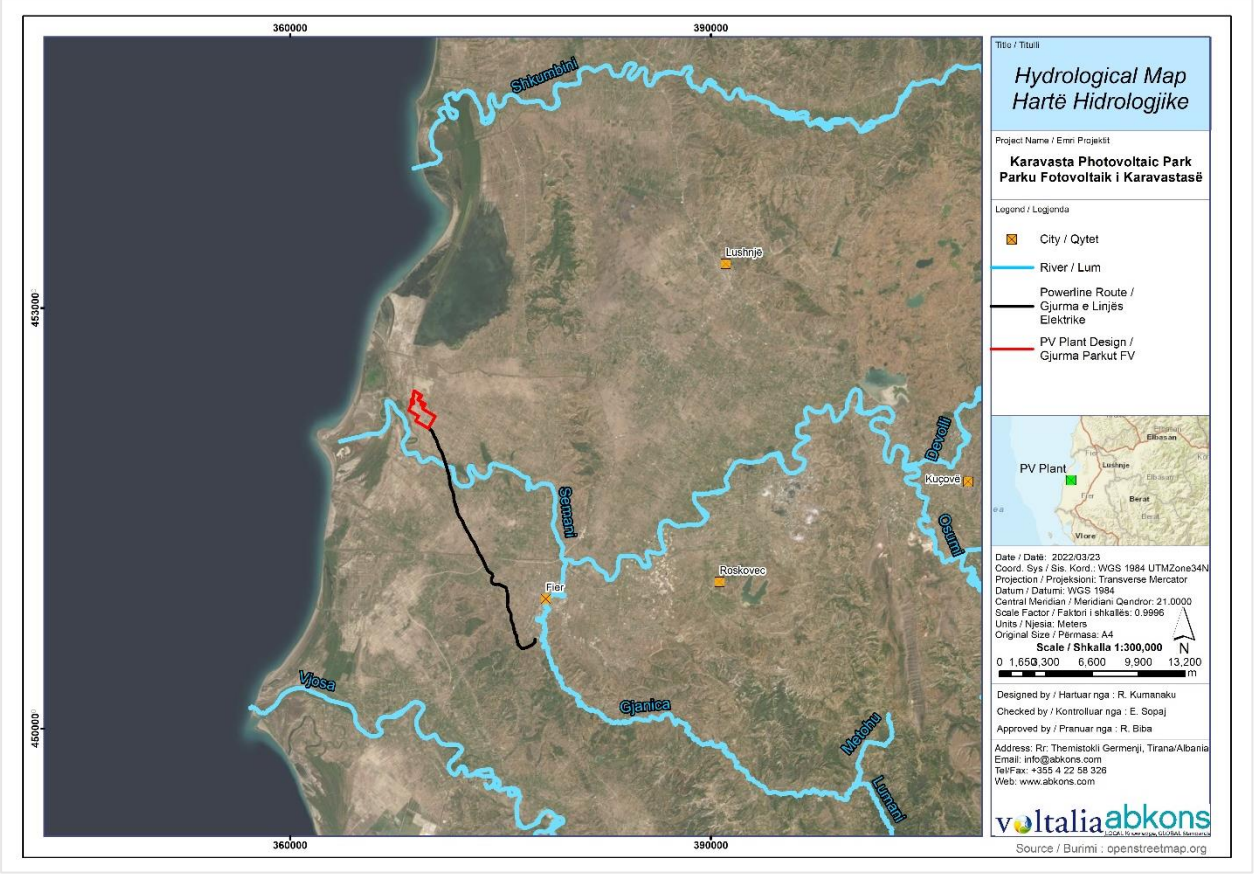


Figure 22. Hydrological Map

Irrigation and Drainage Systems

The irrigation-drainage system in the Project area comprises the first, second and third drainage (see Figure 27) and irrigation channels (see Figure 28), of which the Terbufi and Myzeqe emissaries are the main ones in the region. The Karavasta e Vogel area, Divjaka - Karavasta area and former swamp area of Terbuf were liberated from water due to improvements made during the period 1946 -1983 and protective embankment along the river banks. The irrigation-drainage system is not as functional as it once was before “90s and the plain agricultural area frequently comes under the flooding water.

The irrigation and drainage systems, although present, are not functioning properly, and only a small portion of the agriculture land in the area benefits from these services. This is mostly because maintenance through the years has not been performed correctly, and the channels has been filled with various materials that do not allow their correct function. Out of 6,200 Ha in the area, only 320 Ha are irrigated through the system.

Recently, only some second range drainage channels, mostly with south – north extension, have recovered, as they have been excavated and the sediments removed on both sites of the channel; their scarps are also cut giving the necessary steepness of about 45-50^0. After excavation and soil removal, their trapezoidal transversal section was evident: long base = 7-8 m, short base = 4 m, depth = 4 m (Figure 23). Not all the excavated channels were observed to be filled with water. The south-north extension channels along their southern extreme were dry (without water), while their north extension and east-west channel were filled with water up to depth 1.5-2.0 m.

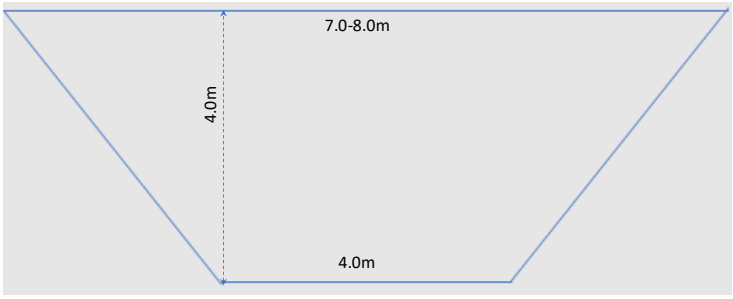


Figure 23. Transversal section of the second range channel

Figure 24 below shows views across a range of drainage and irrigation channels.

The Study Area is located in the watershed of the Dokollarëve drainage canal. This canal joins with North Canal (which crosses the Myzeqe Drainage Canal via Inverted Siphon (2 concrete boxes 2x2 m)). Dokollarëve Canal (44 km^2) and North Canal (21 km^2) have a total drainage area of 65 km^2. Due to the low elevations and slopes (almost at sea level), the fields drain from Dokollarëve and North Canal discharge to the Adriatic Sea via Karavasta pumping station. The South Canal (area 33 km^2) located on the south of the Study Area drains via gravity towards the Adriatic Sea. The surrounding terrain is almost flat (slope 0.3-0.4%). The elevations at Study Area variate from south to north 1.5 m to 0.3 m respectively. While minimum elevations are observed near the pumping station -3.4 m and the highest at the hills on the east, 150 m. The entire Study Area (200 ha) drains via tertiary and secondary trapezoidal earth canals. Tertiary canals are spaced every 200 m. The east area drains from east to west and the west area from west to east. Water drained from both zones discharge to the secondary canal in between them and from it, water goes to the primary Dokollarëve canal.

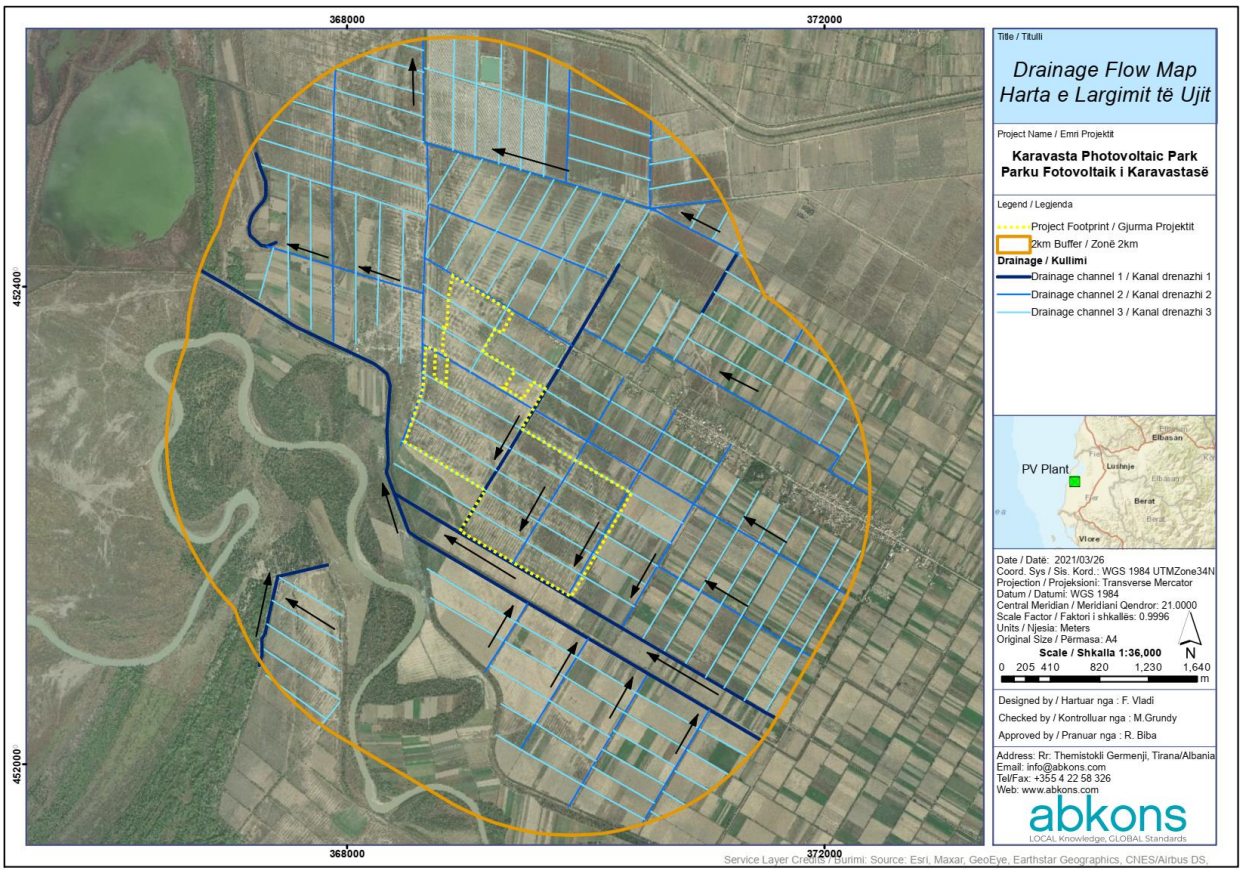


Figure 24. Drainage channel system/ network

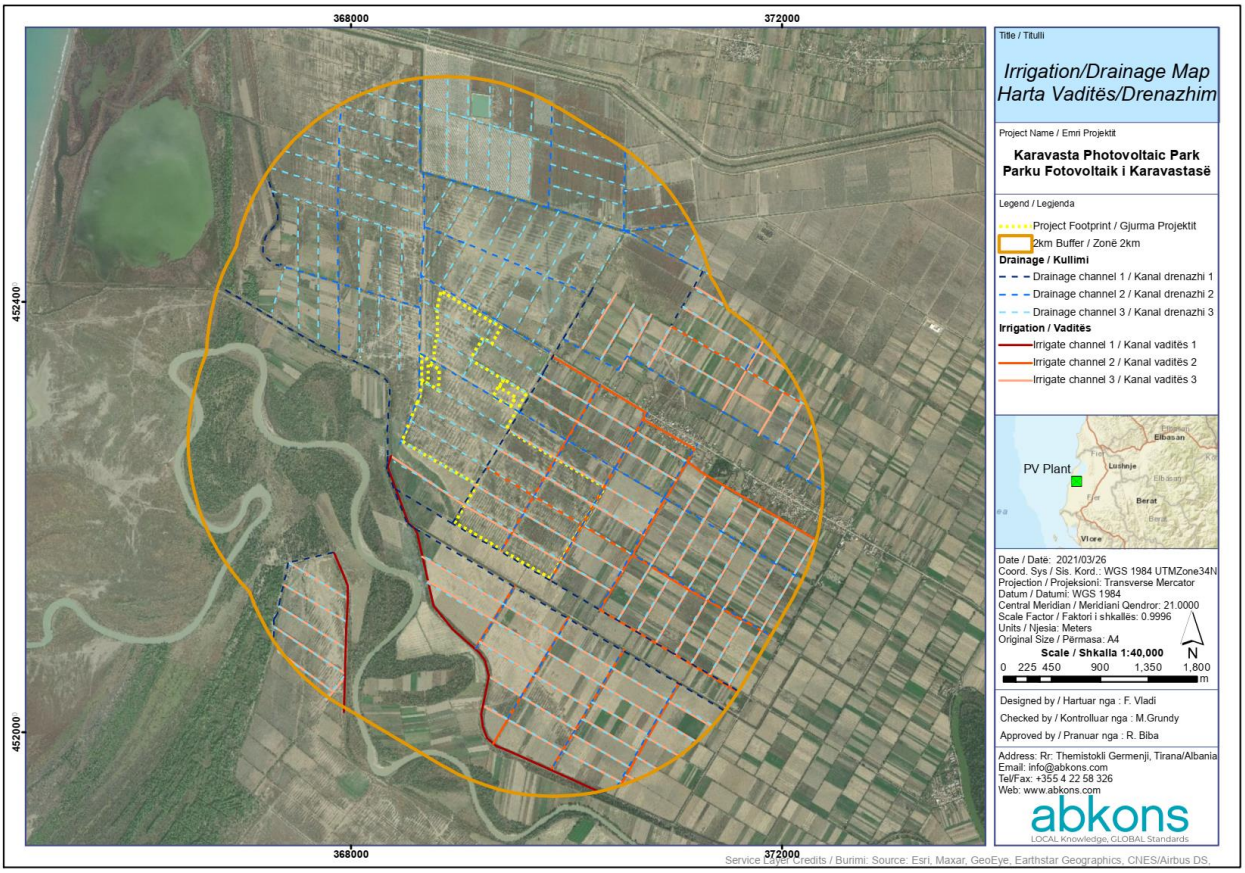


Figure 25. Irrigation system / network



Figure 26. Views of the second range drainage channels in the project area



Figure 27. Drainage Channel in the PV Area



Figure 28. Irrigation Channel in the PV Area

Karavasta Lagoon

The Karavasta lagoon is one of the youngest natural water bodies in the hydrographical network of Albania, formed recently as a result of the solid discharge accumulation of Seman and Shkumbin rivers. It is situated between the Shkumbin River and Terbufi Canal in the north, and the Canal of Myzeqe and Seman River in the south. The eastern part the complex is surrounded by Divjaka hills. Agricultural land borders the lagoon and it is separated from the sea by the Divjaka pine forest and Godulla lagoon.

The overall wetland complex, composed of lagoons, sand dunes and a river mouth, covers a surface area of 10,000 Ha. The Karavasta lagoon is the largest area (4,100 Ha) of this wetland complex, being 15.4 km long and 4.1 km wide. Its maximum depth is only 1.3 m, with an average depth of 0.7 m.

The coastal morphology of Karavasta lagoon has been highly dynamic during the last 135 years because of the changes which occurred to the Shkumbin and Seman river deltas (Mathers et al., 1999). The major events occurred when the Seman river changed its course moving northwards in the 1950s, then again southward in the late 1970s. The erosion of its abandoned delta progressively created a spit growing northward, which closed in a few years to form the small Godulla lagoon.

Karavasta is connected to the sea via three channels (Brew, 2003). The northern inlet is currently completely blocked and disconnected from the sea. The central and southern inlets connect with the Godulla lagoon, which in turn is connected to the sea by two other shallow channels. The creation of the drainage canals of Terbufi and Myzeqe in the 1980s, together with associated irrigation and drainage schemes, has isolated Karavasta from a significant part of its former drainage basin area. Early in its formation, which goes back to about 1860, the Karavasta lagoon covered double the area it now occupies.

Surface Water quality

A study was undertaken to generate the baseline water quality (physio-chemical and biological) of the region and in total two sampling locations were identified. Samples were collected from two surface water streams in the study area. The sample of surface water was collected depending upon the availability of water in surface water bodies in the study area. Grab samples from water channels at two locations were collected in the month of January. The water samples were tested for different physic-chemical parameters such as Temperature, pH, Turbidity, EC, Colour, TSS, TDS, Odour, Salinity, DO, BOD, COD, TKN, Total Hardness, Sodium, Potassium, Calcium, Magnesium, Ammonia, Chloride, Sulphate, Phosphate, Nitrate, Nitrite, Fluoride, Surfactants, Dissolved Iron, Aluminum, Nickel, Copper, Zinc, Manganese, Arsenic, lead, Cobalt, Mercury, Boron, Chromium, Phenols, Cadmium, Petroleum Hydrocarbon, Total Coliform, etc. Similarly, for

assessing the ground water quality in the study area, grab samples were collected from nearby 2 Ground water bore wells situated around the project area.

The sampling locations are listed in Table 19.

Table 19. Locations Surface Water Quality Monitoring Sites

Waypoint No.	E	N
Surface Water Sample 1	368646.00 m E	4523259.00 m N
Surface Water Sample 2	368939.00 m E	4521928.00 m N

References for surface water quality are based on the EU Water Framework Directive, adopted on 23 October 2000 (Directive 2000/60/EC). Albania has not adopted yet the limit values/ standard for surface water quality and as a potential candidate country it often refers to the WFD. The reference values, classification criteria and priority substances according the WFD were used as a basis for the characterization and evaluation of analytical data/ results from surface water samples that were collected in the study/ project area. Directive 2000/60/EC was amended by the Directive 2008/105/EC, which sets environmental quality standards (EQS) for the substances in surface waters. This list of parameters was replaced again in 2013 by Annex I to Directive 2013/39/EU, which also included EQS and some other provisions on chemical pollutants.

The results obtained for physio-chemical characteristics of surface water quality during winter season are presented in Table 20.

Table 20. Results of Surface Water Analysis – Samples 1 & 2

No.	Parameter	Unit	Measured Values		EU WFD Limit Values	Albania Maximum Levels
			Sample 1	Sample 2		
1	Biochemical oxygen demand (BOD)	mg / l	35.8	34.4	7-9 (high quality) 9-11 (good quality) 14 (moderate quality) 16-19 (poor quality)	
2	Chemical Oxygen Demand (COD)	mg / l	46	43	-	125
3	Total suspended solids	mg / l	17.8	15.8	-	60
4	Electrical conductivity	µS / cm	645	1759		
5	Total dissolved solids (TDS)	mg / l	424	1160		
6	Total alkalinity	mg / l	175	265		
7	Calcium (Ca)	mg / l	18	42		
8	Magnesium (Mg)	mg / l	47.2	43.5		
9	Chloride	mg / l	140	469.7		
10	Sulfate SO4	mg / l	21.6	78.8		
11	Iron (Fe)	µg / l	59.2	24.2		
12	Residual Free Chlorine (RFC)	mg / l	<2.5	<2.5		
13	Nitrate NO3	mg / l	1.8	2.3		
14	Sulfure S2-	mg / l	0.64	1.28		
15	Phenolic compounds	mg / l	0.82	0.14		1
16	E-Coli	No. / 100 ml	<1	<1		
17	Total coliforms	No. / 100 ml	4	20		
18	Cadmium (Cd)	µg / l	<30	<30	≤ 0,08 (Class 1); 0,08 (Class 2); 0,09 (Class 3); 0,15	

No.	Parameter	Unit	Measured Values		EU WFD Limit Values	Albania Maximum Levels
			Sample 1	Sample 2		
					(Class 4); 0,25 (Class 5)	
19	Total chrome (Cr)	µg / l	<30	<30		
20	Chromium 6-valent Cr (VI)	µg / l	<50	<50		
21	Copper (Cu)	µg / l	<30	<30		
22	Lead (Pb)	µg / l	<30	<30	7,2	
23	Nickel (Ni)	µg / l	<30	<30	20	
24	Zinc (Zn)	µg / l	<30	<30		
25	Mercury (Hg)	µg / l	<0.01	<0.01	0.05 [35]	
26	TOC	mg / l	24.3	23.3		
27	Color	-	Not clear, yellow, turbid	Not clear, yellow, turbid		
28	Odour	-	Not acceptable for consumption	Not acceptable for consumption		
29	Taste	-	Not acceptable for consumption	Not acceptable for consumption		
30	Tin	µg / l	<1.7	<1.7		

The baseline data and locations for surface water sampling were evaluated on the basis of water usage, in particular use for drainage purposes by the local residents of the villages. Surface water in the study area showed low to moderate mineral content. The variations in the levels of various parameters are: total dissolved solids 424-1160 mg/l; The total alkalinity ranges between 175-265 mg/l.

[35] If Member States do not apply EQS for biota they shall introduce stricter EQS for water in order to achieve the same level of protection as the EQS for biota set out in Article 3(2) of this Directive. They shall notify the Commission and other Member States, through the Committee referred to in Article 21 of Directive 2000/60/EC, of the reasons and basis for using this approach, the alternative EQS for water established, including the data and the methodology by which the alternative EQS were derived, and the categories of surface water to which they would apply.

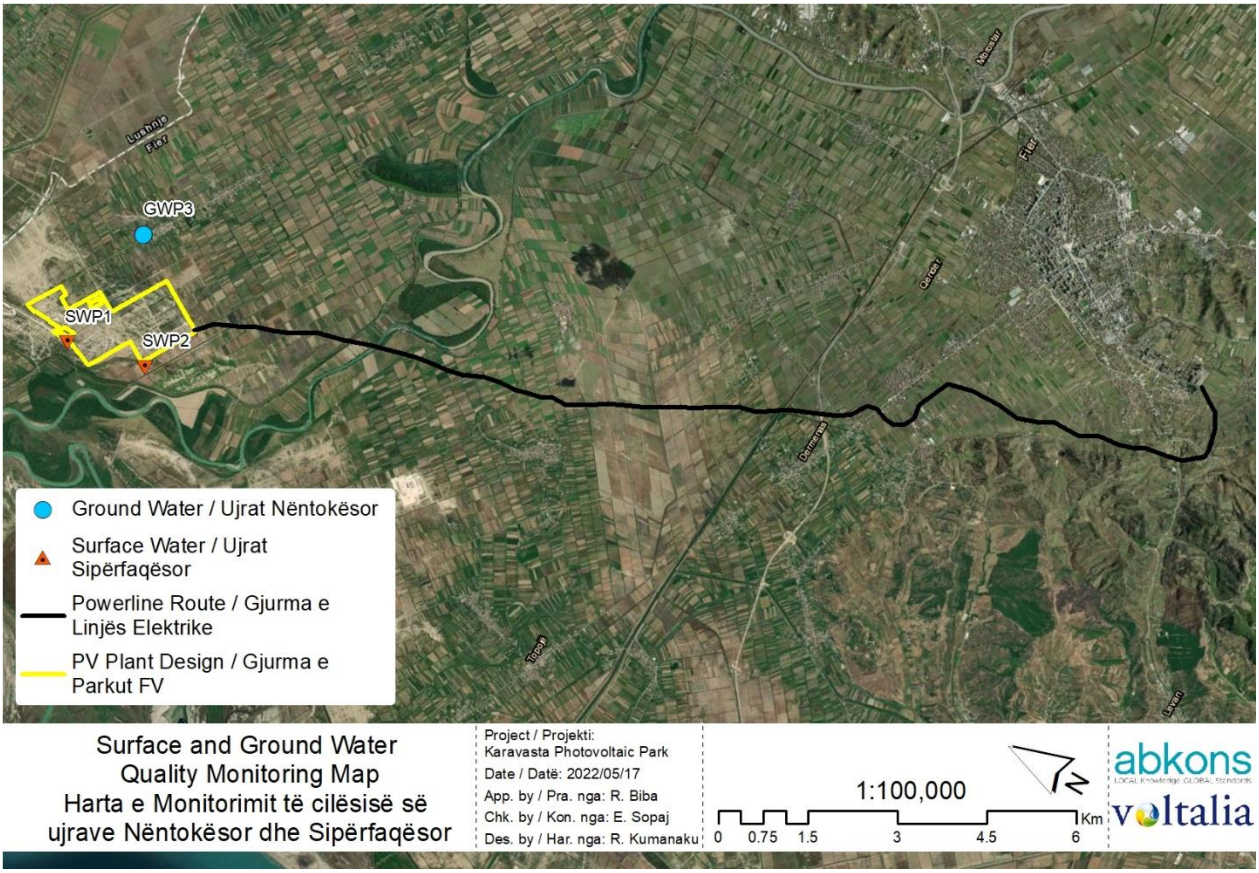


Figure 29. Location map of Water Monitoring Sample

Discussion/Conclusion

Electrical conductivity (EC) of the surface water sample was recorded in an interval of 645 -1759 µs/cm.

The presence of contaminants in the form of oil and grease in both the surface water samples were found to be below detectable limit (<1.4 mg/l). Iron content in the surface water sample was found to be 1.48 mg/l.

TDS: Total dissolved solids (TDS) in the surface water samples were found to be 424 mg/l for SW-1, and 1160 mg/l for SW-2. Thus, TDS level in surface water sample collected from SW-1 doesn't exceeded the permissible limits.

Alkalinity: Total Alkalinity values of the surface water samples were found to be 175 mg/l at SW-1, and 265 mg/l at SW-2.

Chloride: Chloride concentrations at SW-1 (140 mg/l), SW-2 (469.7 mg/l) were found to comply to the acceptable limits.

Metals: Concentrations of heavy metals viz. copper, cadmium, chromium, lead, Tin, and zinc were found in a below range than 30 µg/l. Cadmium levels are above the WDF limits for class 1 surface waters (≤ 0.08 µg / l). Nickel levels are close to or above the WDF limit of 20 µg / l for surface waters. In terms of BOD levels, measurements indicate a poor water quality of surface waters in the two locations. Ni is normal at these high values in the Seman delta and the values are justified. Devoll River and Semani from the Maliqi gorge in Gramsh flows through serpentinite geological formations rich in Ni and such values are found normal.

Phenolic compounds: is high because in the area of Fier are more than 3 Rafineries and 7 Oil and Gas wells. In biological origin phenolic compounds come from decomposed plant tissues abiotic / biotic way.

4.1.8.2. Hydrogeology (Groundwater)

There is not a typical alluvial aquifer in the plain area on both sides of the river Semani, due to the lack of the pure alluvial gravel layers. The alluvial sediments, as described in the geology paragraph, are widespread but they are mostly represented by silt and sand with scarce intercalations of gravel. Because of an aquifer medium dominated by sandy clay and fine sand, the aquifer is classified as low porosity intergranular aquifer with low-medium transmissivity (102 – 10-1m^2/day). In general, this aquifer is distinguished for having good quality water except in the area Ndërmenas – Metaj where the presence of poor-quality water has been noticed. Water quantity is scarce and can therefore only be used to supply small communities and private subjects.

The alluvial aquifer with high hydraulic parameters is located northward of Gradishta village up to river Shkumbini. It is composed of pure gravel and sand. It represents the source for potable water supply of Lushnja and Kavaja towns and some surrounding villages.

The significant demographic growth during the last 30 years, especially in the low pre-Adriatic plain and coastal area, was accompanied by the very high increase in demand for drinking, agrarian and process water. The increase of pumping rates above the aquifer capacity caused stress to the hydraulic parameters of the aquifer, and groundwater quality deteriorations, as it's the case fr the alluvial aquifer of Konjat (Lushnje) used for Lushnja water supply. Oil exploitation and agricultural development have led to the pollution of the main rivers (Seman River) and, consequently, of the groundwater of the alluvial aquifer which has hydraulic connections with the river bed water.

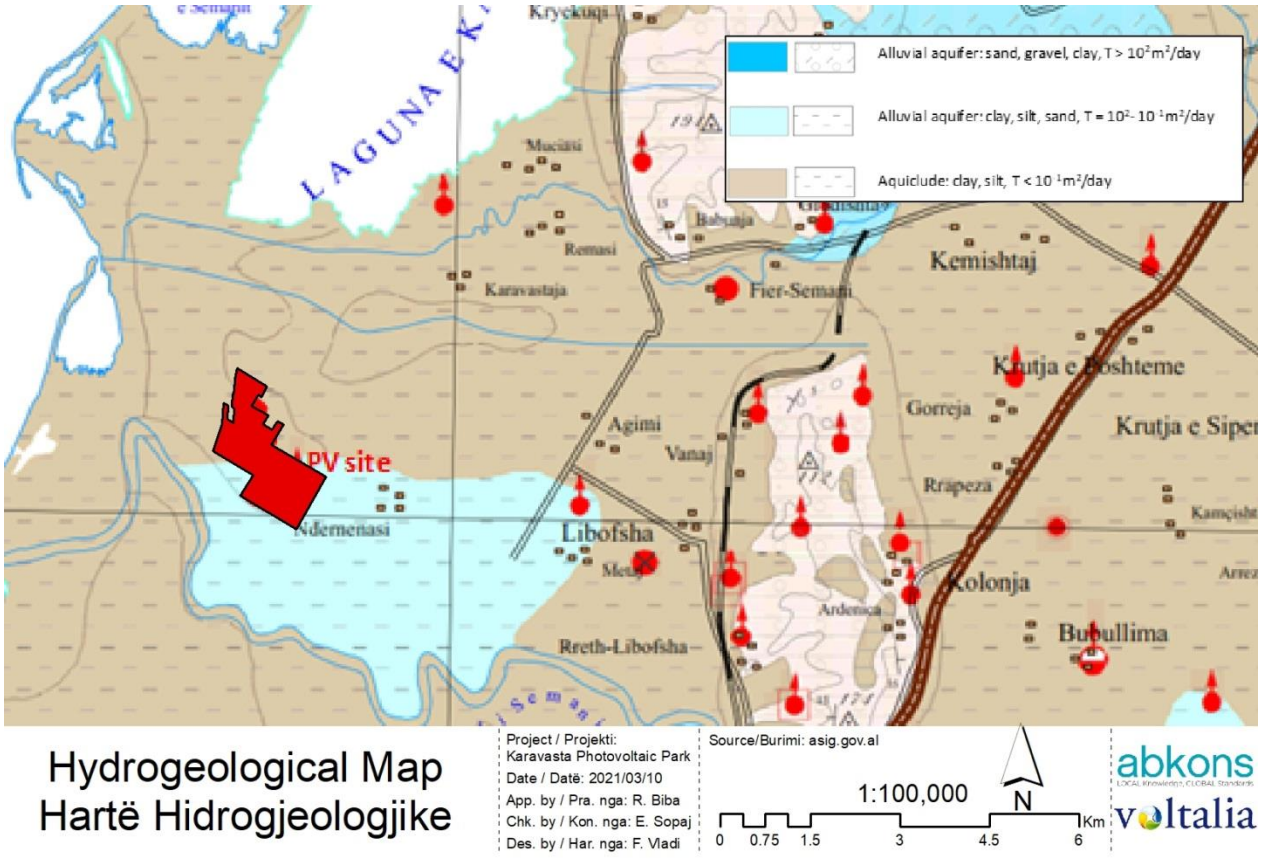


Figure 30. Hydrogeological map of the Karavasta region[36]

Only alluvial type aquifer is present in the study area and its surroundings, which spreads on both sides of the lower Seman River course and has intergranular porosity and medium-low water permeability. The aquifer medium consists of gravel and sand, mainly of carbonate and less magmatic composition. This

[36] https://geoportal.asig.gov.al/map/?auto=true

aquifer is distinguished for having good quality water except in the area Ndërmenas – Metaj where the presence of poor-quality water has been noticed. Water quantity is scarce and can therefore only be used for water supply to families of the local community. The significant demographic growth during the last 30 years, especially in the low pre-Adriatic plain and coastal area, was accompanied by the very high increase in demand for drinking, agrarian and process water. The increase of pumping rates above the aquifer capacity caused stress to the hydraulic parameters of the aquifer, and groundwater quality deteriorations, etc. Oil exploitation and agricultural development have led to the pollution of the main rivers (Seman River) and, consequently, of the groundwater of the alluvial aquifer which has hydraulic connections with the river bed water.

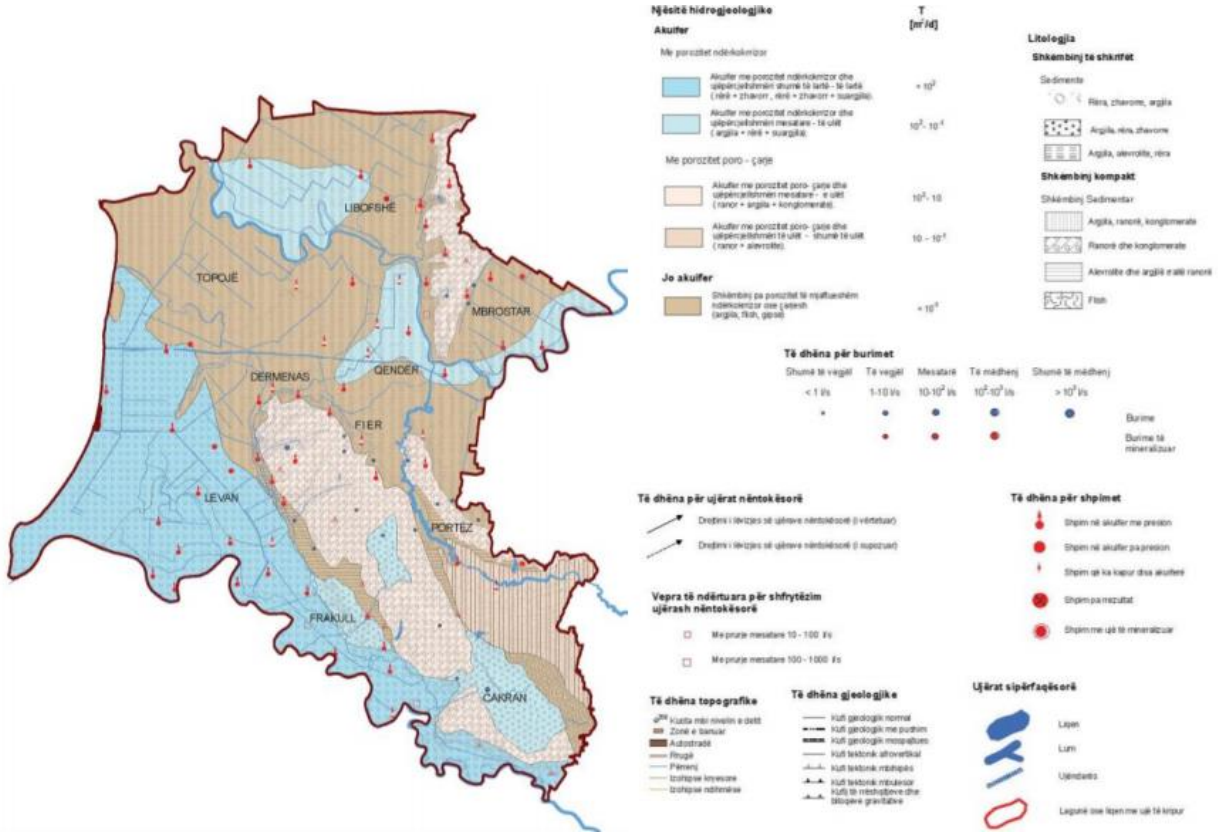


Figure 31. Ground Water Map, Fieri Village

4.1.8.3. Groundwater quality

A study was undertaken to generate the baseline groundwater quality (physic-chemical and biological) of the region. The most vicinity well was selected to monitor the ground water quality in the Area. Ground water sample collected from tube well were analysed for physicochemical and bacteriological parameters and the results were compared with National Limits on drinking water to identify and interpret any deviation in the statutory limits set for parameters under this standard. Referring to discussion with residents they have declared that no one in area use ground water as drinking water because it's salinity. The detail of sampling location is presented in Table 21.

Table 21. Details of Water Quality Monitoring Sites

Waypoint No.	E	N
Ground Water Smp 1	370824.00 m E	4522985.00 m N

The results obtained for the physio-chemical parameters of groundwater quality in the nearest well during winter season are presented in Table 22.

Table 22. Results of Groundwater Quality Analysis – Samples 1 & 2

Parameter	Sample 1	The unit of measurement	National Limits[37]
Chlorides	53.2	mg/l	<250
Electrical conductivity	1133	µS/cm	<2500
Total Alcality	425	mg/l	10–20 °dH/ 178.5-357 mg/l
TDS (Total Dissolved Solid)	747	mg/l	<500
Escherichia Coli	<1	UFC/100ml	<1
Sulfates SO4	85.8	mg/l	<250
Nitrates NO3	15.5	mg/l	<50
Nitrites NO2	0.01	mg/l	<0.5
Sulphide S2-	0.32	mg/l	
Turbidity	3.44	NTU	Consumer acceptable and without abnormal changes
Lead	<30	µg/l	<10
Copper Cu	0.19	mg/l	<2
Nickel Ni	<30	µg/l	<20
Mercury Hg	<0.01	µg/l	<1
Iron Fe	83	µg/l	< 200
Chromium Cr	<30	mg/l	<50
Sodium Na	43.26	mg/l	<200
Calcium Ca	35	mg/l	<200
Zinc Zn	<0.03	mg/l	<3
Dissolved Oxygen DO	4.46	mg/l	>=80
Phenolic Compounds	<0.1	µg/l	<0.5
Hardness as $CaCO_3$	352	mg/l	10–20 °dH/ 178.5-357 mg/l
Count of bacterial colonies in 22	8500	[7,7E+02;2,6E+03µFC/ml	<100
Count of bacterial colonies in 36	3100	[7,7E+02;2,6E+03µFC/ml	<20
Colour	Light yellow		No abnormal changes
Total pesticides	<0.5	µg/l	<0.5

The baseline data and locations for groundwater sampling were evaluated on the basis of water usage, in particular use for irrigation water purposes by the local residents of the villages. Groundwater of the study area showed low to moderate mineral content. TDS, Lead, Nickel, Hardness as $CaCO_3$, count of bacterial colonies in 22 °C and in 36 °C are above the national limits. Same for colour and odour parameter there

[37] DCM 379, dated 25.05.2016 "On the approval of Drinking Water Quality Regulation"/ transposing Directive 98/83/EC on the quality of water intended for human consumption

aren't acceptable for drinking water. The most problematic parameters that influence the quality of drinking water are the bacteriological colonies count and salinity.

Discussion/Conclusion

TDS: Total dissolved solids (TDS) in the groundwater sample were found to be 747 mg/l. Thus, TDS level in ground water sample collected from GW-1 doesn't exceed the permissible Albanian national limit of DCM 379, dated 25.05.2016 (<500 mg/l).

Hardness: Hardness of water is considered to be an important parameter in determining the suitability of water for domestic uses particularly washing. Total hardness of water is correlated to the presence of bivalent metallic ions *viz*. calcium and magnesium. Total hardness values in the groundwater sample were found to be 352 mg/l Value of total hardness in ground water sample collected does not exceed the permissible National Limits of DCM 379, dated 25.05.2016, 357mg/l.

Alkalinity: Total Alkalinity values of the ground water sample were found to be 425 mg/l. Total alkalinity values doesn't exceed the permissible Albanian national limit of DCM 379, dated 25.05.2016 (357mg/l).

Chloride: Chloride concentrations at GW-1 (53.2 mg/l), were found to be in compliance to the acceptable limit of DCM 379, dated 25.05.2016 (<250 mg/l).

Metals: Concentration of Lead and nickel in ground water samples was respectively <30 µg/l and < 30 µg/l extending DCM 379, dated 25.05.2016 limits <10 µg/l for lead and <20 for Nickel. Concentration of heavy metals viz. Coper, mercury, chromium and Iron were found to be below the detection National limit.

Bacterial: Count of bacterial colonies in 22° and 36 ° is above national limit, due to waste water discharges in sewerage home tanks and surface water channels.

4.1.8.4. Flooding

The project area is located in the Seman Flood plain. The Seman river bed was unregulated up to the year 1965 and this area was subject to numerous floods.

During the period 1962-1963, a plain area of 26,738 Ha was flooded on both sides of the river Seman and remained under the water for 35 days. According to UNDP, after 1962-1963, structural prevention measures and flood control measures (excluding dams) were undertaken locally to support prolongation of the period of flood occurrence flooding period of 50 years. These measures included the reconstruction of new embankments at the upper stream of the major rivers. Floods with 50 years return are predictable as proven during the 1970-1971 flooding when severe consequences were successfully prevented. Meanwhile in the Fieri Municipality no measures have been taken for a return flooding period of 100 years. The consequences of this flood type, as provided by the UNDP for the Municipality of Fier, will enhance the map of the flooding area. It is estimated that the floods would multiply in the event of simultaneous flooding from some ponds.

Forecasts on the impact of floods in the country were carried out in 2003, but during the 17-year period the precipitation regime has changed. It is thought that the consequences of floods with a return of 50 or 100 years to be more pronounced. For this reason, in parallel with appropriate flood prevention measures, more up-to-date studies on flooding is required.

In the location of the project, there is the old flood protection infrastructure with soil materials (L. Seman Argj Ciplla-Det) 17.9438 kilometers long constructed in 1965. The level of protection is 2 meters according to the data from the Fier Drainage Board. From the opposite side of the river, there is constructed the (L. Seman Gorican -Belina) flood protection infrastructure, 43.3741 kilometers long. Near the river mouth from the opposite side of the project location, there is 5 km of the river that are without protection from floods up to the Adriatic Sea. The tides have little influence on the Adriatic coast as their range in this area of the Mediterranean is less than 1.0 m. This is reflected in the type of water-borne landforms preserved along the coast, which are dominated by deltas, spits and beaches, formed predominantly by fluvial and wave processes.

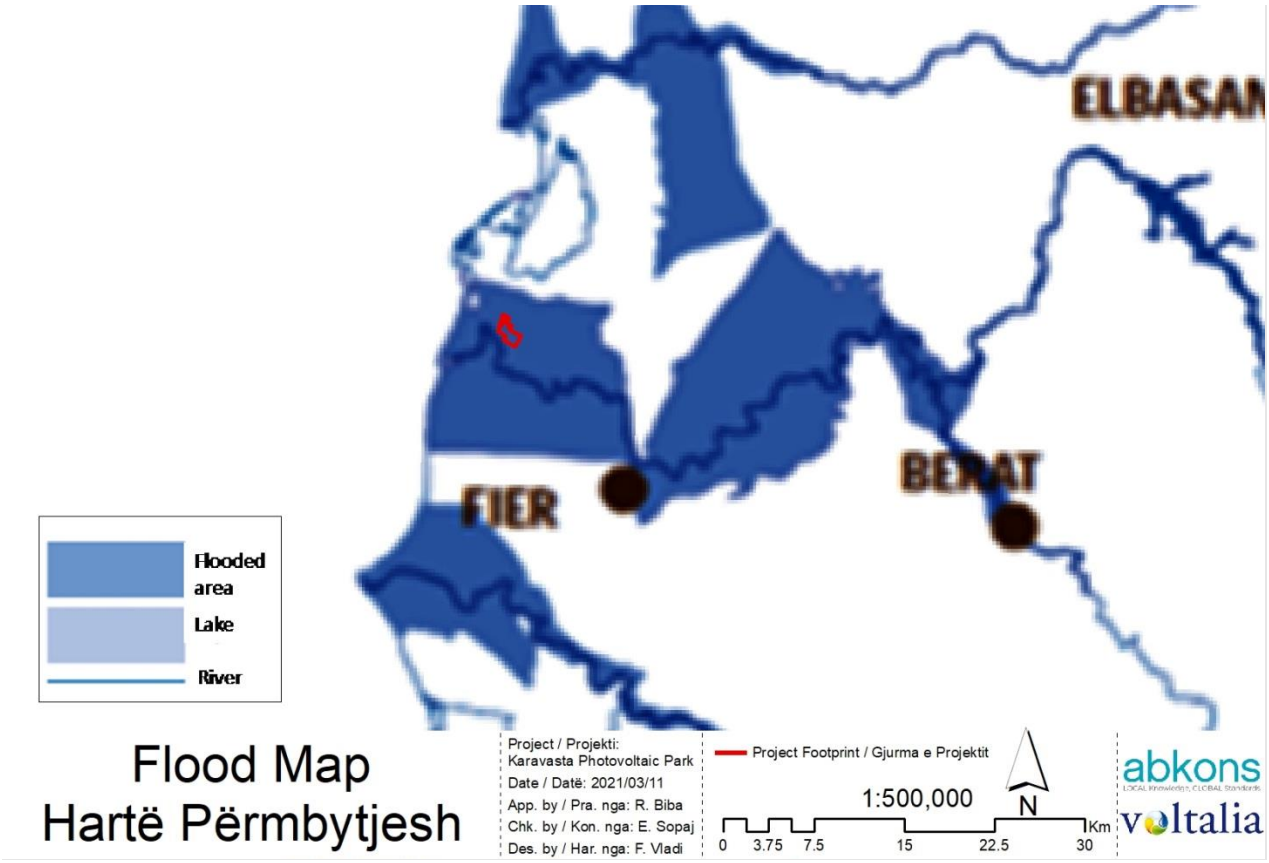


Figure 32. Western Low Flood Map with a 100-year return period (UNDP, 2003)

According to Pano (2013), the water flow distribution through the average year as monitored at the two hydrometric stations of Kuci and Mbrostar are presented in Table 23 below.

Table 23. The water flow distribution through the real average year[38]

Nr.	Hydrometric Station	Unit	Months											
			X	XI	XII	I	II	III	IV	V	VI	VII	VIII	XI
1	Osumi- Ura e Kucit	m^3/s	38.0	97.1	11.6	145	154	155	135	119	49.9	18.2	10.5	19.2
2	Seman-Mbrostar	m^3/s	41.2	99.7	117	143	161	161	143	116	52.2	19.9	11.7	22.0

Pano (2013) reported that the maximum water flow in Kuci Bridge was 2,870 m3/s and 2,580 m3/s corresponding to a flood return period of 100 year and 50 years, respectively.

According to Pano (2013), the annual distribution of solid discharge-Ro (in kg/s) and turbidity-ρo (gr/m^3) is presented in Table 24 below.

Table 24. The annual distribution of solid discharge-Ro (in kg/s) and turbidity-ρo (gr/m^3)[39]

No.	Hydrometric Station	Symbol	Unit	Months											Year
				X	XI	XII	I	II	III	IV	V	VI	VII	VIII	XI	

[38] (August 1981, July 1989 and October 2001) and its inverted active fractures (received by: Aliaj Sh. etj. 2000, Frashëri A. etj. 2011, Pano N. etj. 2005; Përgatiti: Co-PLAN, 2016)
[39] (August 1981, July 1989 and October 2001) and its inverted active fractures (received by: Aliaj Sh. etj. 2000, Frashëri A. etj. 2011, Pano N. etj. 2005; Përgatiti: Co-PLAN, 2016)

1	Semani Ura e Kucit)	R_o	kg/s	303	743	862	619	495	303	298	393	304	145	109	198	398
3982		ρ_0	gr/m^3	7970	7360	7070	4100	3110	1810	1970	3390	6090	7970	10400	10300	4330

Flooding Risk including events related to possible sea level rise

From the hydrological report there are done the calculation as below:

- Collection and review of available data and a site visits to verify the existing catchment conditions.
- Catchment delineation for the Project area and upstream.
- Determination of the critical catchment storm for the 1%, 2%, 5% 10% Annual Exceedance Probability for Rain on Grid Model.
- Derive inflow hydrographs for the 1%, 2%, 5% 10% Annual Exceedance Probability design floods using the hydrological model and statistical analysis for Myzeqe Canal and Semani River.
- Develop an HEC RAS hydraulic model within the study area to determine flood extents, velocity, and depth of flow for 1%, 2%, 5% 10% Annual Exceedance Probability design floods.

The 2D HEC-RAS hydraulic models are developed for three streams which may cause flooding at the Study Area. The first model is developed for Myzeqe Drainage Canal located in North of Study Area, the second model is developed for Semani River located in South of Study Area and the third is developed for the drainage area where the Study Area (North Canal and Dokollarëve watershed drain Via Karavasta Pumping Station, and South Canal watershed) is located.

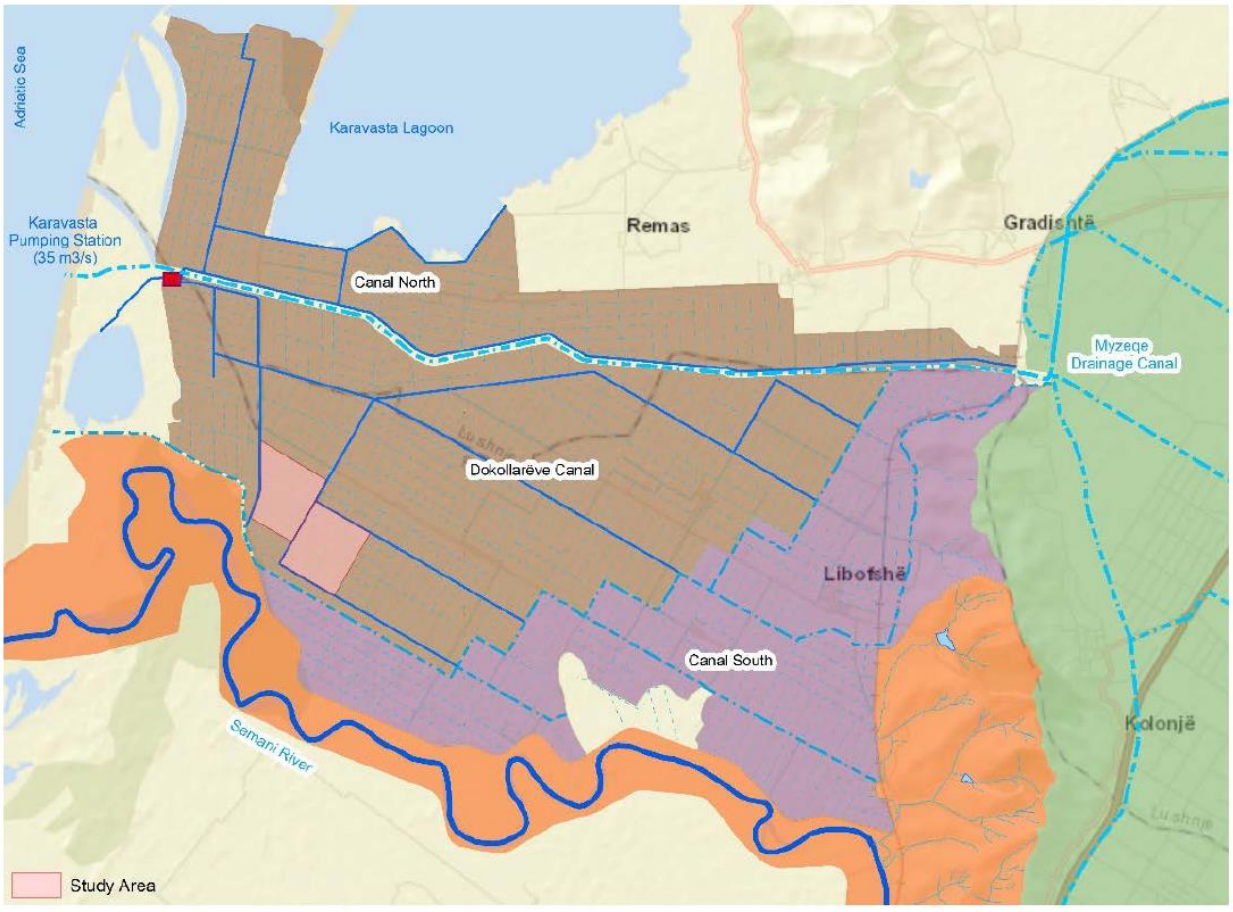


Figure 33: Water Currents Modeled

Inflow boundary conditions were derived using:

- Inflow hydrographs from hydrologic models for Myzeqe Drainage Canal.
- Probabilistic maximal flow discharges using unit hydrograph at Semani River at Mbrostar Station
- Rain on-Grid net precipitation was adopted to represent runoff at Study Drainage Area

Rainfall and Stream Gauging records are collected from Meteorological and Hydrological Bulletins. The Bulletins are published by the Albanian Meteorological Institute and are available from 1950 to 1990.

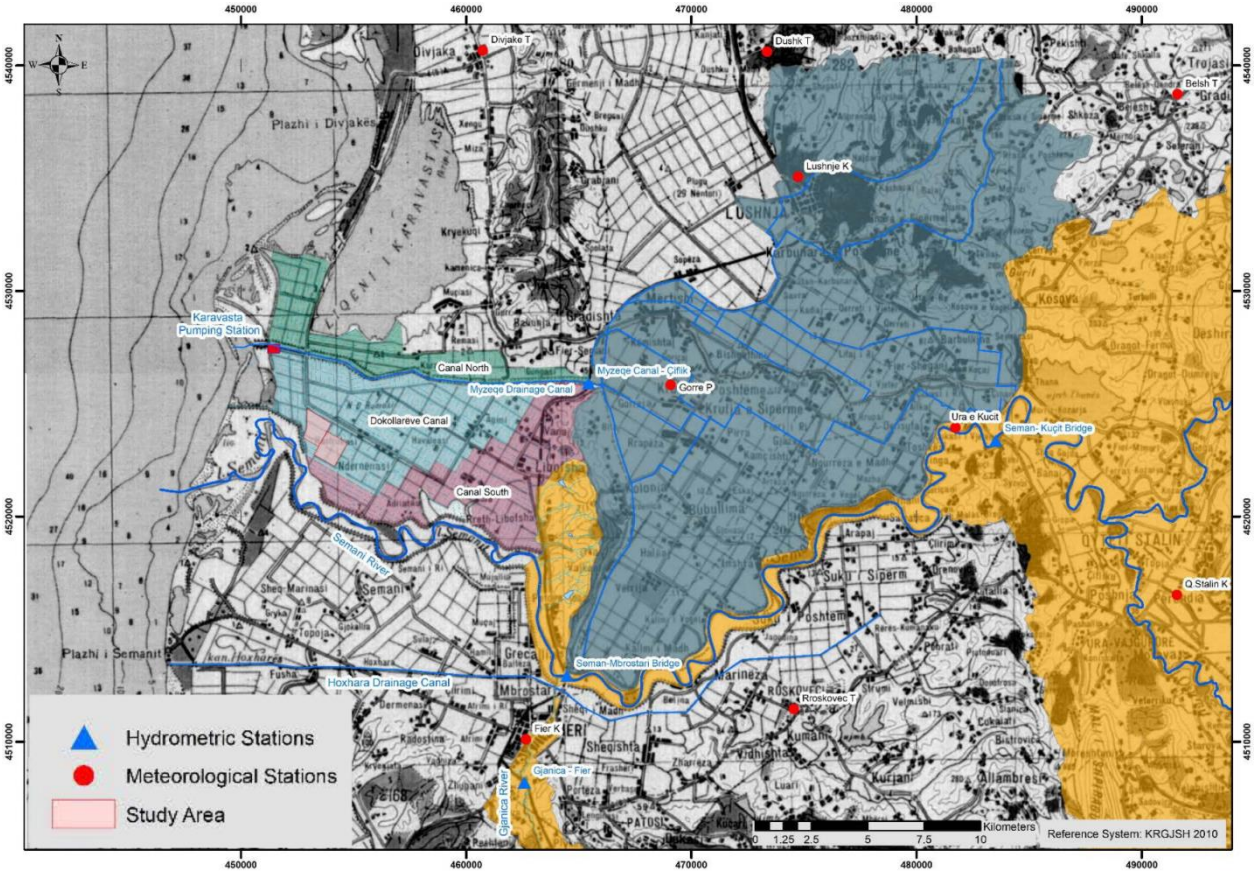


Figure 34: Location of Meteorological and Hydrometric Stations

During the site inspection, it was observed that the secondary canal when the Study Area drains was cleaned and excavated, while the tertiary canals were in bad conditions and almost filled. The Karavasta Pumping Station was equipped with 7 pumps, each of them with a discharge capacity of 5 m3/s and head 5 m. The pumps are too old and are not replaced since the first starting of the station. The pumping station has also a by-pass which should work during high water levels. Nowadays the by-pas outlet is blocked. Besides the site inspection is conducted also the terrain and bathymetry survey and a few cross-sections, which are used to control the embankment crest elevation of Semani River, also to smooth the river and canal bed at DEM using the surveyed bathymetry.

The analysis used to guide the hydrological inputs for the hydraulic models are:

- Rainfall-runoff hydrological modeling for Myzeqe Drainage Canal in HEC-HMS using frequency storm and SCS unit hydrograph.
- Evaluation of Hydrographs with different return periods for Semani River using the regression equations of Area versus Maximal Discharges with different return periods.
- Precipitation Hyetograph (Rain-on-Grid) will be used across the relatively flat catchments within the HEC RAS hydraulic model.



Figure 35: Semani river flood map[40]

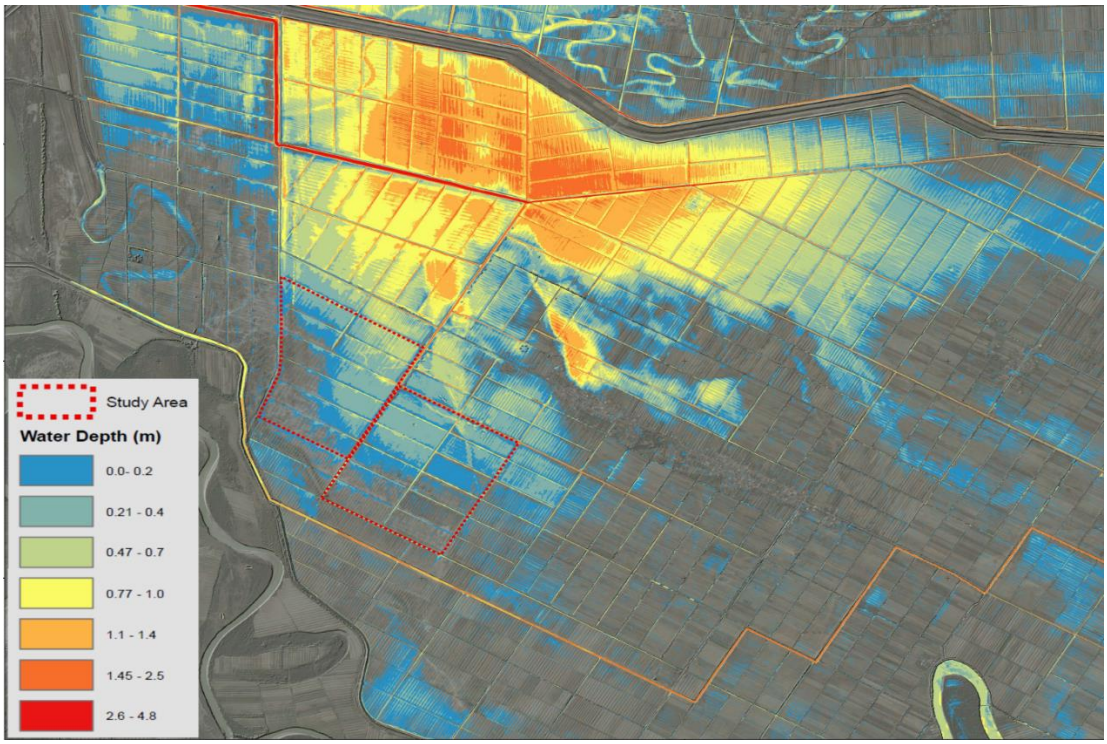


Figure 36: Flood from the rain with 100 years return period[41]

[40] Hydrodynamic Report Karavasta PV Project, Volatile
[41] Hydrodynamic Report Karavasta PV Project, Volatile

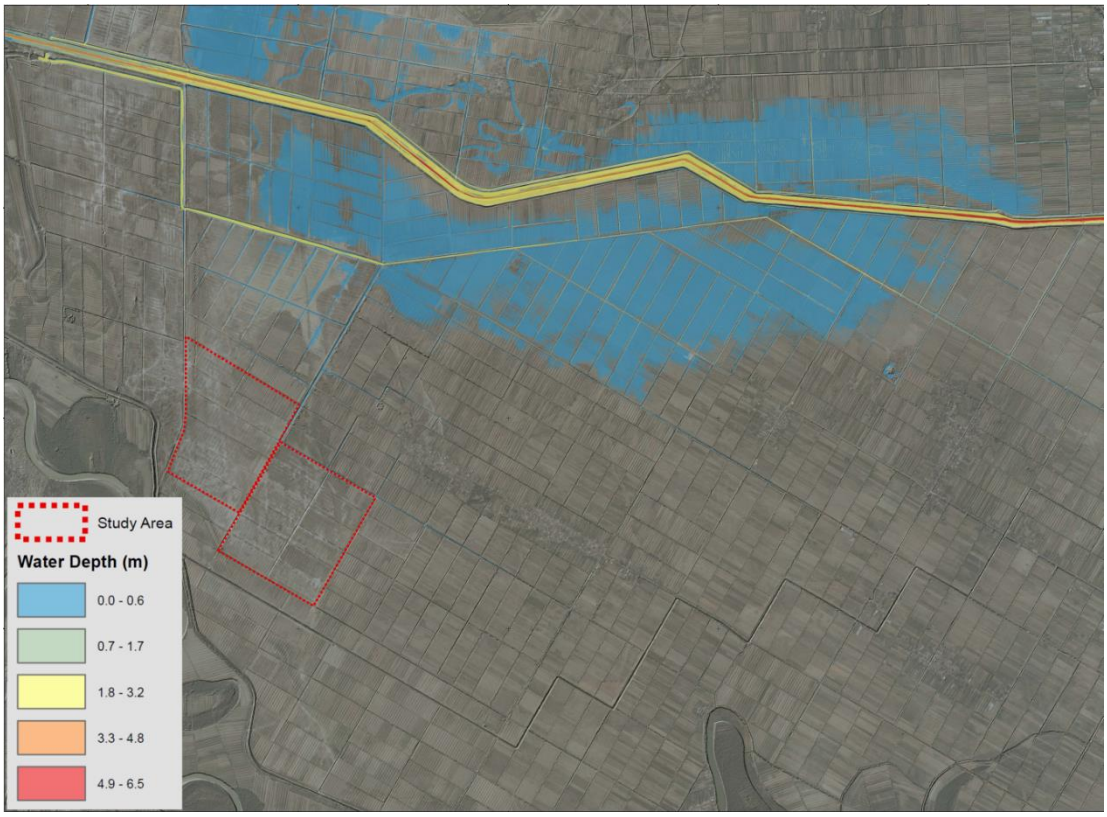


Figure 37: Myzeqe Canal flood map with 100 years return period[42]

According to the hydrological report are given the conclusions and recommendations as below:

Hydrodynamic modeling for the proposed PV Karavasta Plant shows that the Site is flooded, from a 24-hour storm occurring within the watershed of the Study Area. The highest flood depth resulted from the Rain on Grid model for the 24-hour storm hyetograph with a return period of 1 in 100 years when the pumping station is out of work. The flood depth arrives up to 85 cm. In this case, when the pumping station is out of work and the by-pass is blocked, the water cannot discharge to the sea and will be locked on the field. While the same storm and pumping station is working in full capacity the water depth is about 70 cm and it takes 4-6 days to dry out. For two other storms, 50 and 20 years return period water depth is 60 cm and 55 cm respectively. Flood velocities are below 0.6 m/s which is below the level that would require erosion protection. While the hydrodynamic modeling of the Semani River and the Myzeqe canal shows that the Study area is not prone to flooding.

Within the area of inundation, the mounting height of the solar module frames should be designed such that the lower edge of the module is clear of the predicted 1 in 100 years flood level (pumping station is out of work) so as not to impact on existing flood behavior and to prevent the infrastructure from being damaged as a result of flooding. In the event of a significant flood event, the modules should be rotated to provide maximum clearance from the panels to the ground to keep them positioned well above the predicted flood level. All electrical infrastructure, including inverters, should be located above the 1 in 100 years flood level. Where electrical cabling is required to be constructed below the 1 in 100 years flood level it should be capable of continuous submergence in water. The proposed perimeter security fencing should be constructed in a manner that does not adversely affect the flow of floodwater. Any proposed crossings (vehicular or service) of existing watercourses/canals on the Study Area should be designed properly to minimize any hydraulic impact. A survey of embankments of Semani River and Myzeqe Canal would be necessary to check their condition also to measure their crest elevation, to propose repairing measures.

[42] Hydrodynamic Report Karavasta PV Project, Volatile

The by-pass (nowadays blocked) of Karavasta Pumping Station should be reshaped and aligned to connect its outlet with the sea or the canal downstream of the pumping station.



Figure 38: Calculation of the water depth according to the series 1990-2018 with 100 years return period[43]

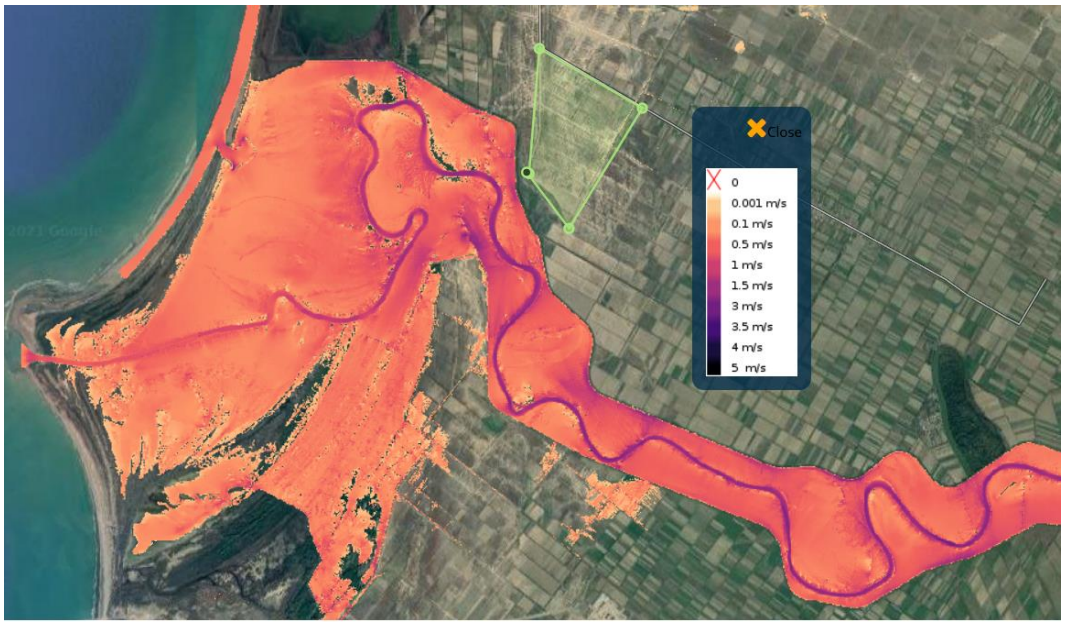


Figure 39: Calculation of the water velocity according to the series 1990-2018 with 100 years return period[44]

Conclusion of the Flood risk in the project location

The study has taken into consideration some hydrological scenarios from pluvial floods, malfunction of the drainage infrastructure, and Semani River flooding. The project location is placed in an old river bed of Seman river. In the location of the project, there is old flood protection infrastructure with soil materials (L. Seman Argj Ciplla-Det) 17.9438 kilometers long constructed in 1965. The level of protection is 2 meters according to the data from the Fier Drainage Board. According to the observations from the same board the

[43] Project: National Early Warning System and flood prevention in Albania

[44] Project: National Early Warning System and flood prevention in Albania

flood protection infrastructure is working properly but has some serious damages due to the time of construction up to now has passed 55 years. In this condition and according to the hydraulic calculations this flood protection is not in a condition to protect with 100 years return period. The hydraulic calculations have not taken into consideration the dam failure that can happen at any point of the flood protection infrastructure with soil materials (L. Seman Argj Ciplla-Det) 17.9438 kilometers. The flood velocity map shows high water speeds from the side of the project. In a scenario of a dam failure near the project location, the damage to be considered is not only from the water depth in the lowland of the project but also the water speed can create damage to the project infrastructure. From the project are used data up to 1990 that are 30 years old and not representative for the present hydrological condition in the project location. In order to have more accurate results, there are needed hydrological investigation with hydrometeorological data up to the present. Even with the old data up to the 90s, there is evidence in the calculation for possible pluvial floods in the area of the project up to 70 centimeters depth. The accurate calculation of the pluvial depth together with the Seman river flood depth and the Seman river speed is crucial for the security of the project. The additional flood protection system is suggested to be taken into consideration not dependent only on the present old infrastructure of the Semani River. The return period flood discharge calculated from the recent data shows a big increase of the discharge calculated in the river mouth. The cross-sections are not available for hydraulic calculation and the estimation is done with DTM interpolation. This data can lead to wrong calculation and overestimating the flood protection from the present infrastructure.

Sea level rise

The whole project area has got a great natural value and is characterized by the presence of lagoons, salt marshes, lowlands and dunal belts. These belts are both near the coast, with heights close to 1-2 m, and in the internal part of the coastline. The project area is characterized by highly variable physiography the Seman delta lead over vast areas covered by alluvial soils and over the marshy stretch of coast. The coastal zone is divided into sectors with sandy areas or alluvial deposits and lagoons. In the project area, the more frequent and intensive storm surges come from the south and south-west. This arrangement creates a strong net long-shore transportation with a south-north direction. Also, in conjunction with events, there are increases in the average sea level, for the wind set-up, that can reach the height of a meter, as measured at the tides-measurement station of Vlore. Given the topography of the coastline, characterized by low values of height, the meteo-marine conditions, along with the set-up by waves and tides, results in a strong rise of the sea on the emerged beach with consequent slope value decreasing and strong erosion phenomena. As the large number of beaches characterized by low values of height, the coastline is very sensitive to excursions of the average sea level and it is at serious risk if it had to experience the lifting of the average sea level due to future climate change.

Sea level change was analysed by Pirazzoli (1986) and showed that there is an increase of the Adriatic Sea level that ranges from less than 1 mm/year to over 2 mm/year, but it also indicates an increasing trend due to climate change. For the period 1961 – 2003, the data show an average increase from 1.3 to 2.3 mm/year, while during the period 1993 - 2003 there was an average increase from 2.4 to 3.8 mm/year. At the World Climate Change Summit (ICCP 2007) it was reported that during 1980 -1999 and 2000 – 2099, the average sea level rise will range between 0.18 m - 0.59 m due to melting glaciers.

The rise of the sea level, causes changes of the coastline position and will have a very big impact on the lowlands near the sea and the deltas of the rivers. Measurements carried out at several stations in the Adriatic Sea during the period 1993-2014, show that the maximum (7.13 + -1.67 mm/year) value of sea-level rising of the Adriatic Sea is measured at Ravenna station (Italy), while the minimum (2.48 + -1.53 mm/year) value is measured at Zadar in Croatia.

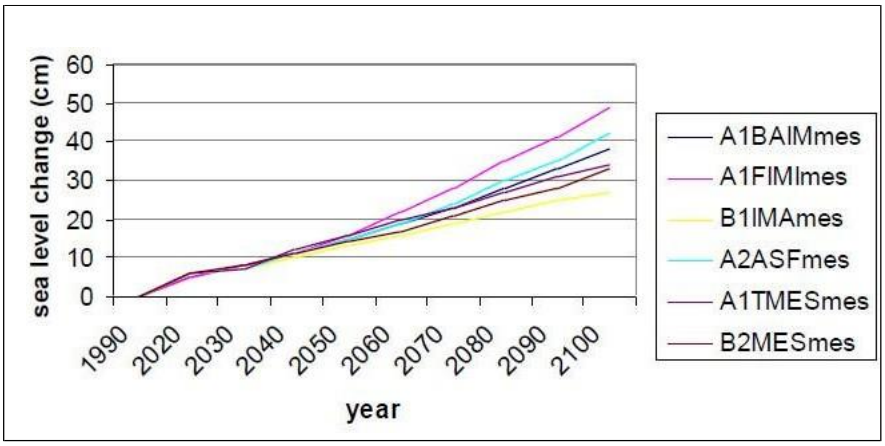


Figure 40: The projection of the sea level in the future according to some global calculation for Adriatic Sea

Field observations at the Project site distinguished two areas that can be referred to as sea water affection: a) salty soils extending within the Project area south-westward up to the coast and b) cultivated soils surrounding the salty area along the north, east and south sides. The salty soil area is easily distinguished not only by the characteristic vegetation but also by the presence of thin white salt screens on the soil surface after evaporation.



Figure 41. Flooding events

4.1.9. Topography and Landscape

The main morphological elements developed in the Divjaka – Karavasta region are represented by a large plain area, the small hills of Divjaka located about 8.5 km northeast of Project site, and the coastal lagoon of Karavasta which lies to the northwest, the Seman and Shkumbin deltas to the southwest and northwest, respectively, and the sand dunes and sandy beaches to the west.

The most important morphological features are related to the deltaic coastal Karavasta area to the northwest of the Project site, which are the result of the action of the wind and wave regime, sea currents, sediment discharges, etc. Intensive winds, up to maximal speed of 40 – 45 m/s, particularly of NW, W and SW direction are observed in the coastal area.

Periods with the wave height of H = 0.1-0.2 m represents around 80% of the general cases, with the remaining 20% with height H = 0.2-4.5 m. The dynamics of solid material deposition along the coastal zone and the accumulation intensity of sand are closely tied up with the waving process and particularly with the effects of maximum waves.

This coastline corresponds to an extensive deltaic coast (microtidal: 0.50 tidal range) with a large alluvial plain of Myzeqe, many coastal lagoons (including the Karavasta Lagoon), temporary marches, deltas, offshore bards, sand dunes and sandy beaches (Simeoni U. et al, 1997).

The dunes along the coastline of the Seman beach (southwest of the Project site) are a typical element of the coastal morphology. According to NEA report (2015), they extend for about 1 km, have a width of 15 m

and a height of 6 m. Climatic changes and human activity have significantly influenced their position and dimensions. From Povelca (northwest) to the beginning of Seman beach (southwest), the dunes are fragmented with a height not more than 1.5 m. The highest (6.0 m) height is evidenced only at the end of the Seman section beach.



Figure 42. The highest segment (over 4 m) of the Dunes along the coastal line of the Fier Municipality. Co-PLAN, 2016

According to Albanian Geological Survey data, reported by the NEA (2014), the coastal area of Divjaka-Karavasta has two distinguished geomorphological zones, showing domination of erosion or deposition processes:

- the northern and southern segments of Divjaka beach and abandoned river Seman mouths, where erosion dominates;
- the central part of Divjaka beach and zones adjacent to current mouth of river Seman, where deposition prevails.

South of current Seman delta extends the Seman beach which represents a sector that subsides due to the differentiated tectonic movements that are still active. The subsidence of Seman beach zone is evidenced by the fact that several objects that 35-40 years ago were inland now are under the sea water. The most apparent example is the platform of the deep oil well “Seman 3”, drilled in 1969 some 265 m inland and now is under seawater. Based on the above facts, the inland advancing rate of sea water was estimated to be 9.4 m/year and 8.1 m/year during the periods 1969-1983 and 1983-2004, respectively.

The studies have shown that the coastal sedimentary environments around Karavasta Lagoon are extremely dynamic and dominated by large amounts of sediment delivered by the Shkumbini and Seman rivers.

The long-term evolution of the coast has been accretionary, built seaward by wave-dominated deltas, forming a wide lowland plain above sea level, composed of stacked beach ridges.

Over the last 150 years (short-term) the mouth of Seman River has often changed its position. In 1870 (Boci, 1994), the main river mouth and delta was about 20 km to the south of Karavasta lagoon. Between the end of the nineteenth century and 1950s the sediment input to the delta decreased and the delta complex moved north. Around 1962-63 its mouth moved again 15 km further south. The changing position of the river system is still creating serious erosional problems for the coast in this area, because the abandoned delta is eroded and material of erosion is transported north. It is envisaged (Brew, 2003) that the end product of this erosion may be the loss of the lagunal areas through the removal of the spits and barrier beaches that currently separate them from the sea.

According to Boci (1994), the position of the Shkumbini Delta in 1870 was in the same area as the present delta. Maps published in 1918 show that the main river course was split into two channels that existed until 1968. The northern channel was probably carrying more sediment than the southern channel because the coastline on the 1968 map shows accretion to the north. After 1968, the coastline adjacent to northern channel started to erode while the southern channel continued to produce shoreline accretion. Between

1943 and 1986, the Shkumbini Delta has become more rounded at its mouth as a result of wave action and attendant southerly longshore transport.

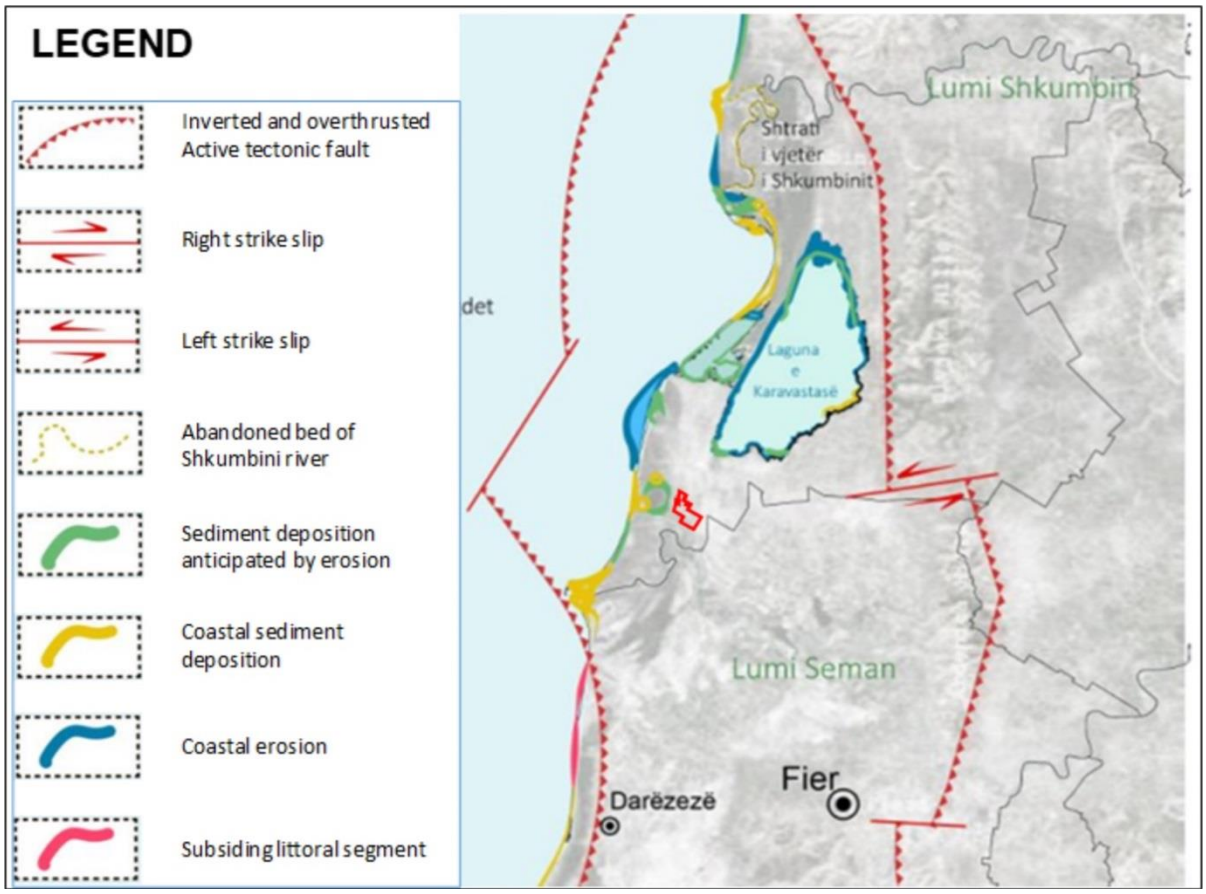


Figure 43. Satellite view of the geomorphological evolution of the coast from the estuary the Vjosa River to the mouth of the Shkumbin River in the Albanian littoral, for the period of summer[45]

The geomorphology of the Project area is generally very flat showing a very smooth westward inclination, with the site elevation ranging from -1 m to +1 m above sea level (see Figure 44). In the frame of this plain relief, there is a slight difference in quotas between the project zone and eastern-south-eastern cultivated soils, the latter being about 0.5 -1.0 m higher. This difference is reflected in the salt content of the soil which is higher in the Project area, as shown by the white coloured surface soils. The salty soil is developed above a marshy-lagoon sediment section, composed of clay-silt-loam with scarce peat lentils. Such a soil composition shows that the salt sea water has invaded the earth and was retreated back due to effects of different factors like climatic changes, tectonic movements, etc.

[45] (August 1981, July 1989 and October 2001) and its inverted active fractures (received by: Aliaj Sh. etj. 2000, Frashëri A. etj. 2011, Pano N. etj. 2005; Përgatiti: Co-PLAN, 2016)

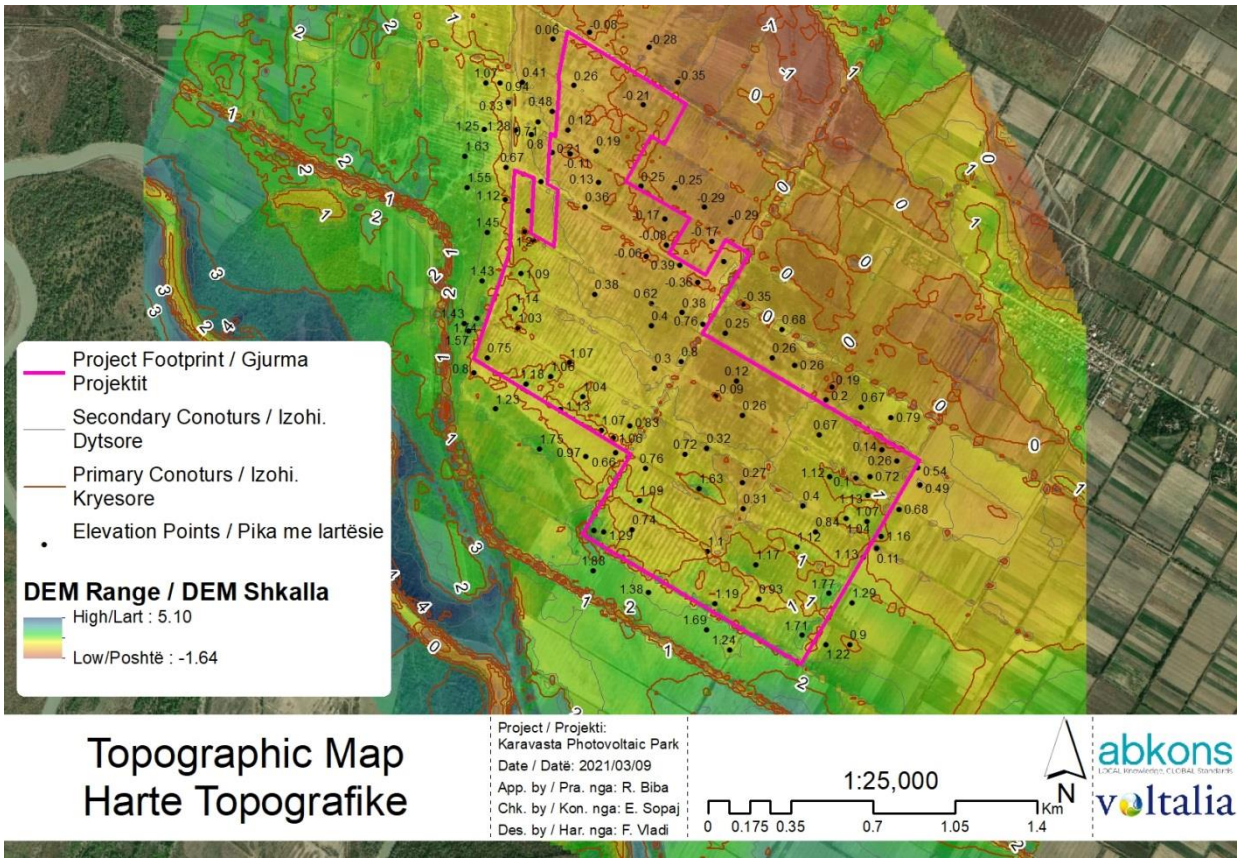


Figure 44. Topographic Map PDA

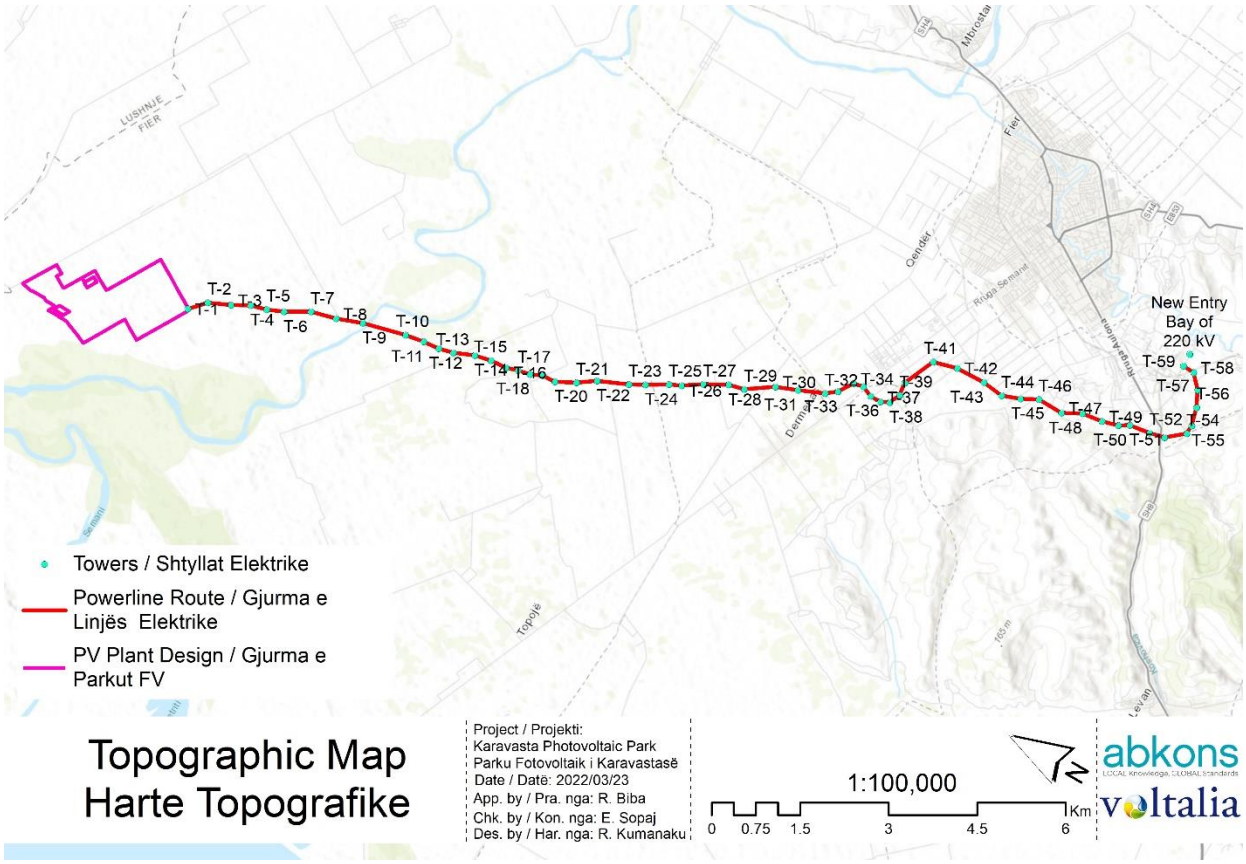


Figure 45. Topographic Map PDA and OHL area



Figure 46. Views of the white coloured salty soils

4.1.9.1. Geographical position and geographical features of the area

Geographically the Project site is part of the Myzeqe e Madhe (agricultural fields), which lie on the shores of the Adriatic Sea, in the central part of the Western Lowland; it is bordered to the north by Shkumbin River, to the south by Seman River, to the east by the hills of Divjaka - Ardenica and to the west by the Adriatic Sea. This geographical position is evaluated for facilitation of services and activities of the human community living in the municipality and its villages.

This area is part of the Ionian tectonic zone, near the Adriatic Lowland, in the Mediterranean central climate zone, in the belt of brown and grey soils and on the belt of the Mediterranean forest and shrubs. Neo-tectonic Map of Albania, on the book of “Physical Geography of Albania”, Pumo et. al., (1990, p. 72), shows an inclined sinking region during neotectonic period and consists of terrigenous sediments represented by the Miocene and Pliocene molasses. The plain landform is prevailing and in the eastern area the hilly backbone of Divjaka Ardenica hills emerges, with a maximum height of 192 m (Stone of Gomares). The area also has coastal dunes, beaches, deltas and lagoons. Within the plain landform area agricultural activities are favoured for the production of field plants, especially vegetables, whilst the hilly areas are used for the cultivation of fruit trees and vineyards.

4.1.10. Waste administration in the project area

The Municipality of Fier approved the Local Solid Waste Management Plan In 2010. At the time of adoption of this Plan, territorial administrative reform had not been implemented and the National Waste Management Strategy had not been adopted. For this reason, this plan is unenforceable. Also, the Municipality has not drafted and approved regulations or orders in the Municipal Council for integrated waste management (considering recycling, reduction, composting or waste separation process).

Currently the waste is deposited in open fields, where a portion is authorized (but can no longer obtain environmental authorization) as in the city of Fier (1), NJ Portez (1), Levan (1), Libofsha (2) and Topoja (5). In other administrative units the waste is mainly deposited in open places, along the road, or along the river valleys (about 13 unauthorized landfills have been identified). Although the service is performed regularly and according to a certain standard only in the city of Fier, from the data collected by the administrative units, they declare that they provide the service in their unit with a certain frequency, which in many cases

is not regular, often causing problems with the environmental situation, as waste at collection points can remain for several days without being evacuated.

According to the way of service provided, two main areas have been identified, as: Zone 1 which includes the city of Fier divided into 4 sub-zones and Zone 2 which includes 9 rural administrative units.

In zone 1 the waste management service is performed by the Cleaning and Greening Enterprise under the auspices of the Municipality.

While in zone 2, the service is performed through the Service Contract by a private company "Victoria Invest". Zone 2 (Part of wich is and Libofsha unit) has engaged in the private company 45 employees for the collection, transportation of waste and cleaning of roads and public squares.

The frequency of service is done daily. In zone 2, the service is realized with 2 technological trucks, 2 self-loading trucks and 3 rails with a capacity of 16 m^3.

The Libofsha unit declare that there are waste collection points equipped with containers as you can see in photos below.



Figure 47. Waste collection bins in Hastukas village



Figure 48. Waste collection bins in Ndërmenas village

Waste generated by industrial activity, mainly from oil extraction and processing, is a major problem in the territory of the Municipality of Fier. The river and streams that pass through the territory of the Municipality of Fier are polluted with heavy metals created by this activity.

Referring to site village assessment is notified an illegal disposal of waste at a distance of 400 m in north of PDA as you can see in the photo below.



Figure 49. Photo of illegal waste disposal (Photo taken in Hastukas)

4.1.10.1. Current waste management scheme Municipality of Fier

The current management scheme consists of 493 Garbage Contention (GC) 1.1 m^3 in the city and 381 GC 1.1 m^3 in rural areas (total 874 GC 1.1 m^3), 42 GC static in the city and 80 GC static in rural areas (total 122 GC static) and 25 GC 2 x 3.5 m^2 = 7 m^3. The itinerary described by the technological means is 402.5 km linear in the AUs and 108.4 km linear in the city (510.9 km in total). In the Municipality of Fier there is 1 active landfill and 7 transitional areas which serve for urban waste in rural areas. Based on the scenarios, the rehabilitation of the active landfill in Sheq will be required, the closure of at least 5 transit landfills and the replacement of 122 open station points in the territory of the OUs and the city with 1.1 containers and 2 x 3.5 m^3 containers = 7 m^3

4.1.10.2. Landfills in the Municipality of Fier

The main landfill of the Municipality of Fier is in the neighborhood Sheq i Madh, 4 km from the city center of Fier, on the left side of the street "Teodor II Muzaka". The location is inconvenient, very close to the Gjanica River bed, the Roskovec-Hoxhar collector, the settlements and the railway line, which makes this landfill present at the same time several risks for the environment and the community of the area. Meanwhile, the dumping of waste for a long time, in large quantities and without treatment according to standards with compaction, stratification, sludge system, etc., has made this surface very problematic. Inert waste is also deposited in a separate parcel in this landfill.

- The area of Sheq landfill is 6.2 ha.
- The amount of waste dumped at the landfill is 72,146 tons per year, of which only the urban area of the Fier city for 2018 has deposited a quantity of waste of 49,731 tons / year.
- The amount of inert waste 8.833 m^3 / year.
- Differentiated waste collection is not performed.

Finally, the landfill in Sheq has undergone rehabilitation works by covering the waste with soil.

The best option is to move this waste to the regional incinerator / landfill, which is being built in the village of Verri, Nj. A. Mbrostar, of the Municipality of Fier.

Figure 50 shows all the landfill and dumpsites in regions of Project area.

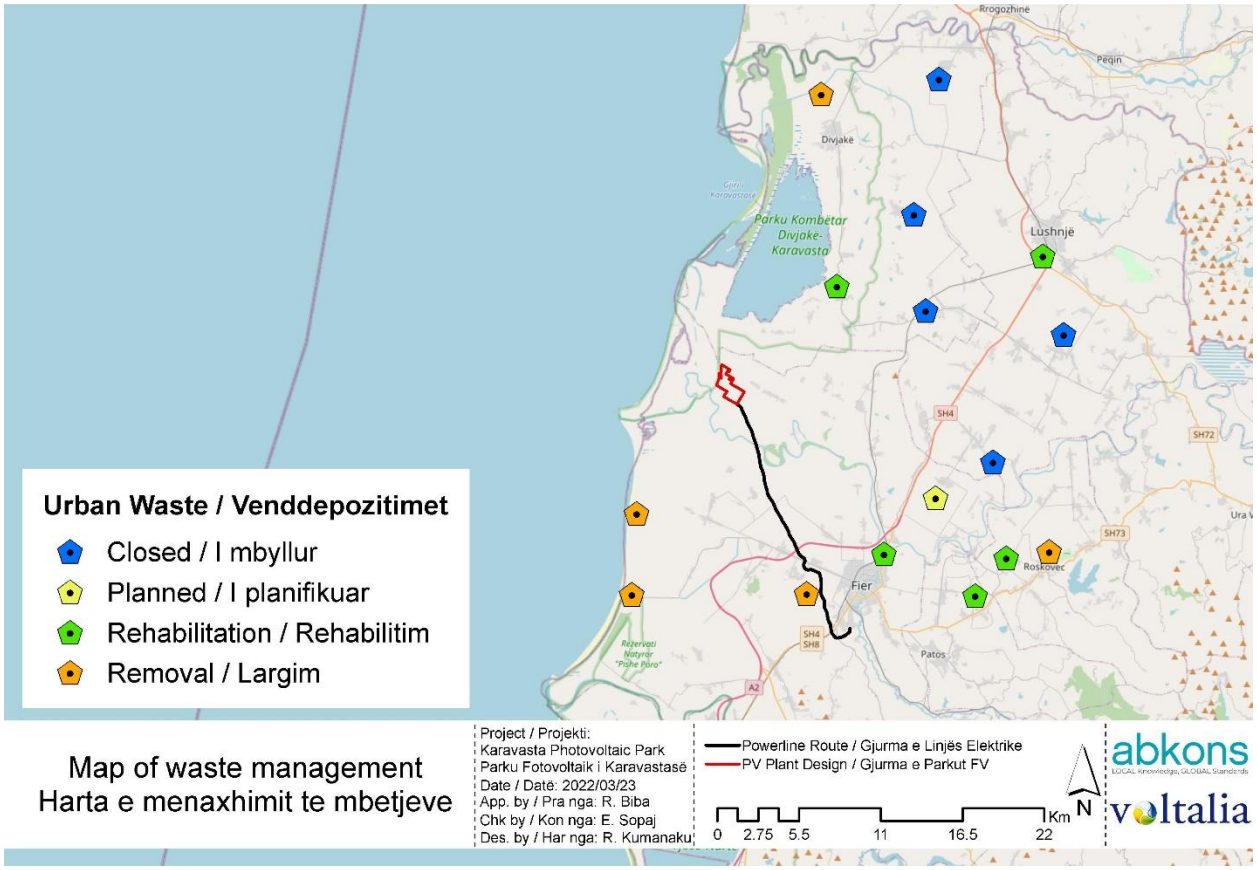


Figure 50. Map of existing (with proposed actions) and planned waste disposals in the region of Fier

4.1.10.3. Inert Waste

Inert wastes in the Municipality of Fier are deposited in the landfill of urban waste in Sheq in a separate plot. Even in this way their treatment is inappropriate as it does not respect the legal and environmental criteria. Furthermore, with the commissioning of the regional landfill / incinerator, the landfill in Sheq should be closed and according to the priorities of the Municipality of Fier this area will be turned into a park. In this way the determination of a suitable landfill for inert waste from demolition and new construction is necessary. It is proposed that this landfill be in the administrative unit Mbrostar due to its proximity to the city of Fier as the largest generator of inert waste.

The amount of inert waste generated per year is about 8,833 m^3 per year.

4.1.10.4. Wastewater

The Municipality of Fier covers with its water sewerage service only a part of the population of the city of Fier. In the rural areas of the Municipality of Fier there is no organized engineering system for the collection and disposal of wastewater.

The wastewater system for the city is combined, which means that wastewater is collected together with rainwater (white water). The pipes of this system are in the size of Ø200 - Ø1,000 of concrete which in linear length composed, together in the form of the collection network of these waters, reach about 29km of pipes and collector.

Discharge and treatment of these waters, as well as industrial waters is the biggest sanitary problem that can occur today in the Municipality of Fier because all collectors discharge untreated wastewater into surface water and drainage chanals as can be seen in the photo below.



Figure 51. Photo of waste water discharge in the drainage's channels (Photo taken in Hastukas 369737.00 m E; 4523563.00 m N)

4.2. Biological Environment

4.2.1. Introduction

This section presents the baseline data that has been collected based on desktop research of available data and primary data collected as part of field studies undertaken in the Project area in August and November 2020. The studies included surveys of the Project Development Area (PDA) and proposed OHL route with respect to the natural landscape and terrain, determination of the composition and distribution of fauna elements within the Project site and in the immediately adjacent areas and identification of potential animal movement pathways in relation to the Project.

The literature and online sources consulted include but are not limited to:

- International Union for Conservation of Nature (IUCN, 2018)
- Red List of Threatened Species (IUCN, 2018)
- Local sources etc.
- Integrated Biodiversity Assessment Tool (IBAT, 2018)
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive)
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (The Birds Directive).
-

Biodiversity has been assessed through a combination of walking/hiking, stationary and driving observations. Reptiles, birds, mammals and flora have been studied through standard in-vivo methods, which included registration of all fauna and traces of their activity (voices, footprints, excrements, biting marks, scrapes). Exact coordinates were applied for all points of registration. The most significant areas and objects of study were photographed.

This section presents the biological baseline under the following headings:

- Habitats and Protected Areas;
- Vegetation and Flora;
- Terrestrial Fauna;
- Aquatic ecology
- Avifauna.

4.2.2. Habitats and Protected Areas

This section presents the general habitat types that lie within the Project area of influence and identifies all significant protected biodiversity areas that lie within or in the surrounding areas, in order to provide the context for the subsequent sections which present flora, terrestrial fauna, aquatic ecology, and avifauna baseline data.

4.2.2.1. Data Sources

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, known as the Habitats Directive was adopted in 1992. The Directive is the means by which the European Union meets its obligations under the Bern Convention.

Natural features in the study area were identified as priority biodiversity features or potential critical habitat triggers if they were found to meet one or more of the following designations:

- Habitats identified under the EU Habitats Directive Annex I
- Species identified under the EU Habitats Directive Annex II or Annex IV
- Species identified under the EU Birds Directive Annex I
- Protected or internationally recognised areas (including Key Biodiversity Areas (KBA) and Important Bird and Biodiversity Areas (IBA);
- Nationally and internationally important species or sites for conservation of biodiversity.

- Besides the natural habitats, the majority of project area is composed of artificial areas (arable land, other urban and industrial areas), known as Modified Habitats.
-

4.2.2.2. Habitat Types

The following types of habitats have been identified as being present in the Project and surrounding areas,

- 1310: Salicornia and other annuals colonising mud and sand.
- 1410: Salted Mediterranean meadows (Juncetalia maritimi)
- 92A0: Salix alba and Populus alba galleries
- 2270: Wooded dunes with Pinus pinea and/or Pinus pinaster
- 6510: Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
- 6310 Dehesas with evergreen Quercus spp
- 2110 embryonicshifting dunes (Refering to European Commission 2016 – threat status B1.3b Mediterranean and Black Sea shifting coastal dune – VU)
- 1150 Coastal lagoons]

Below follows a description of the habitat types that have been identified within the PDA and along the proposed OHL route, along with discussion on areas that can be considered as Modfield or Natural habitats.

4.2.2.3. Natural and Modified Habitats

Classification of natural and modified habitats (as defined by the IFC) within the aquatic and terrestrial scoping areas is complicated due to the different habitats classification systems used by different data sources. This section attempts to align these classification systems and determine which habitat types meet the IFC definition of natural and modified habitats.

Within the Karavasta KBA, four broad habitat categories (as defined by the IUCN6) have been recorded as present (Key Biodiversity Areas Partnership 2022):

- forest (alluvial and very wet forest, broadleaved deciduous woodland, mixed woodland and native coniferous woodland);
- shrubland (scrub);
- wetlands (rivers and streams, standing brackish and salt water, water fringe vegetation); and
- artificial areas (arable land, other urban and industrial areas).

Section 4.3 “Natural and Modified Habitats” of the Critical Habitat Assessment (CHA) Report (March 2022), prepared by TBC, concludes that almost all other habitats in the vicinity of the project are likely to have been degraded to some extent through human modification. The majority of the area coverede by the proposed Project infrastructure is considered as cultivated areas. Attempts to cultivate the PDA appear to have ceased some years ago, leading to a heterogeneous mixture of degraded habitats, including areas that are starting to naturally rehabilitate into the Mediterranean and thermo-Atlantic salt marshes and salt meadows. However, due to the isolation of the area from the influence of the sea and the extensive drainage that has been installed, the area does not function as a natural saltmarsh habitat. Furthermore, the CHA report states that the only natural habitat (as defined by IFC) within the project area is the area of 92A0: Salix alba and Populus alba galleries along the Semani river between pylons 10-15. Figure 52 shows the general distribution of habitats within and surrounding the Project and OHL route areas based on Corine landcover mapping.

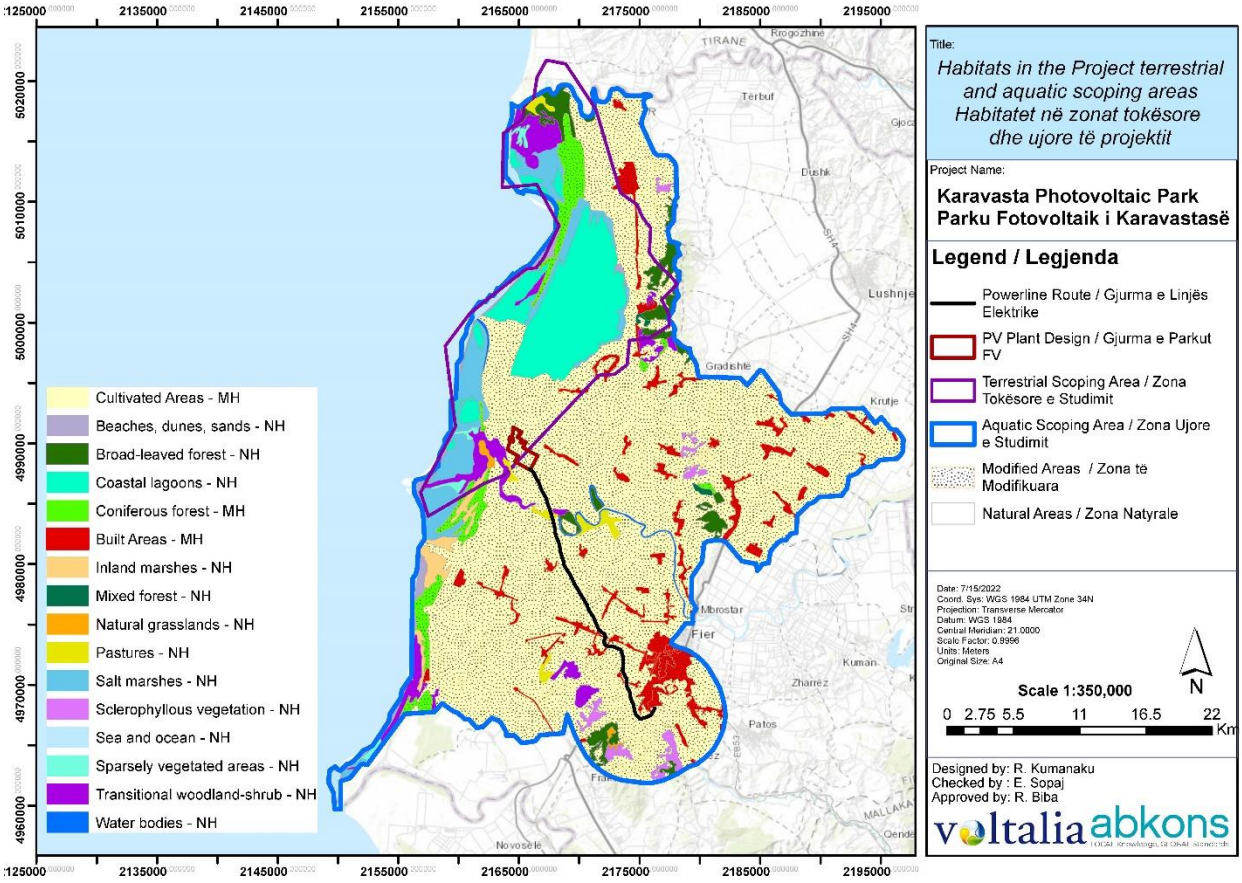


Figure 52. Habitats in the Project terrestrial and aquatic scoping areas, based on Corine landcover layers (Copernicus 2018).

In addition, the CHA Report concludes that no ecosystem or habitat was identified as present in the immediate Project area that meets the threshold for IFC Criterion 4 'highly threatened and/or unique ecosystems'.

For more information on natural and modified habitats, please refer to TBCs CHA Report. Section 4.3.

PV Project Development Area (PDA)

Two types of natural habitats are identified in the PDA, as follows:

- Salted Mediterranean meadows (Juncetalia maritimi) Mediterranean salt marshes and salt meadows (Code 1310, 1410).
- 72A0: Reed beds

With a further three natural habitats within the AoI, as follows:

- Coastal Coniferous Forest 2270
- Embryonic shifting dunes.2110
- 1150 Coastal Wetlands/ Lagoons.

These habitats are described in more detail below.

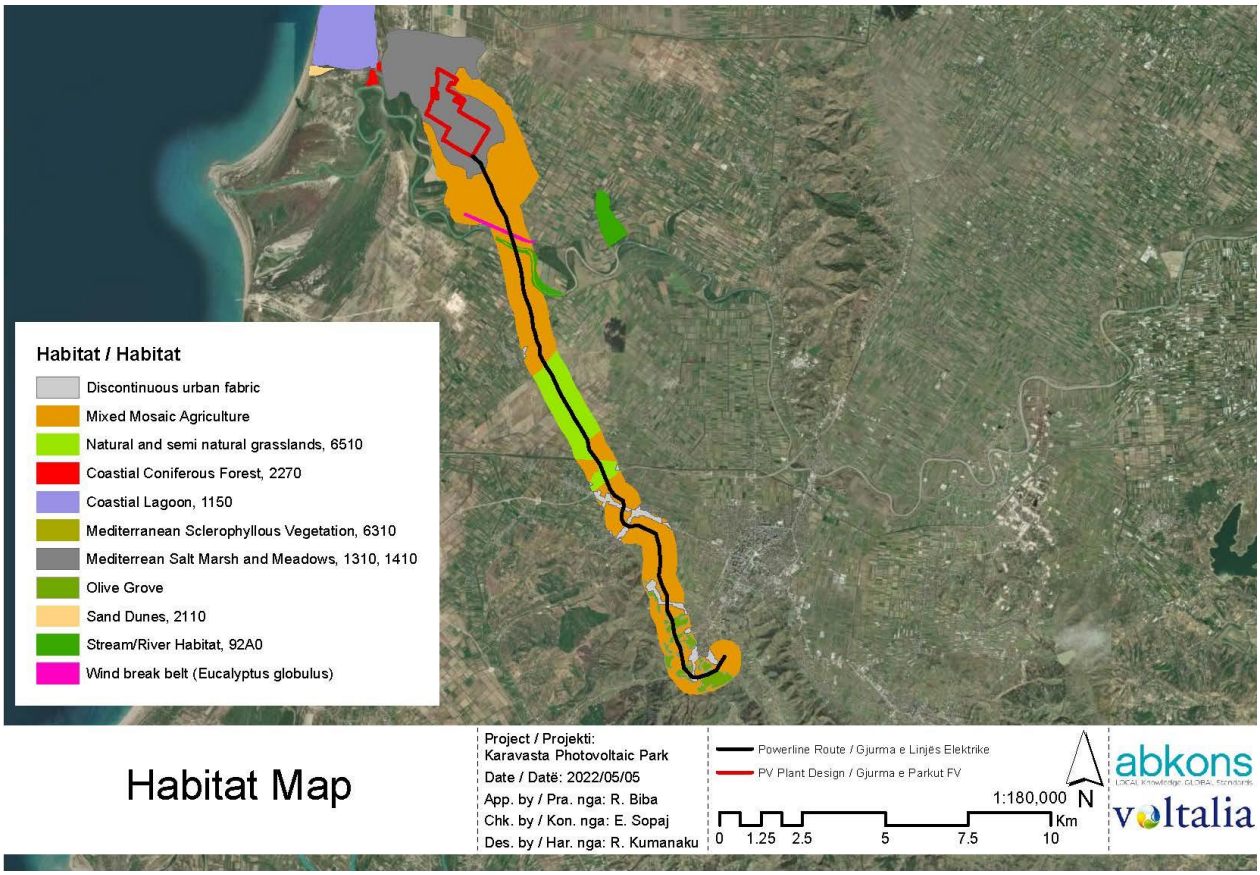


Figure 53: Habitat map- PDA and OHL AoI

Mediterranean Salt Meadow / Marsh;

Salted Mediterranean meadows (Juncetalia maritimi) (**Code 1310, 1410).**

It is included under the EUNIS code 15.15 (**Mediterranean and thermo-Atlantic salt marshes and salt meadows).** Almost all the PDA is covered by this kind of habitat. It is result of a natural rehabilitation after the abandonment of the agricultural practices.

Various Mediterranean communities of the Salicornia europaea maritime, create a variability depending of the presence of salt and water content. Under this category is included type: Salicornia and other annuals colonizing mud and sand. This habitat can be divided in 1310 and 1410, Mediterranean salt marsh and meadows, where meadows dominate. Mapping is difficult because due to the heterogeneity and the creation of a kind mosaic shape.

- 1310 - Salicornia and other colonies of highly saline clayey and sandy soils

It includes plant associations of very saline soils with very large spread in this region after sand dunes. Salt marshes are one of the most prevalent habitats in coastal area, in the low-lying alluvial plain behind sandy dunes. This habitat type is dominated in most cases by annuals of the family *Chenopodiaceae* and the *genus Salicornia*. The dominant species of these environments, *Salicornia europaea*, is the first plant to grow in an environment with such very high degree of salinity in the soil.

It is represented by perennial vegetation of marine saline muds (*schorre*) mainly composed of scrub, essentially with a Mediterranean-Atlantic distribution (*Salicornia europaea, Limonium vulgare, Suaeda* maritima and *Atriplex* communities, including *Tamarix dalmatica*).

Salt marshes are submerged in winter and dry (partly or totally) in summer. Extended halophilous vegetation has developed around these salt marshes. Salt marshes are populated by halophytes, plants that can live under saline conditions. Within this habitat type, plant cover alternates with bare ground that, in areas of high salinity, is covered with crystallized salt. Salt marshes provide many habitats for species uniquely

adapted to changes in salinity and water levels. They serve as depositories for a large amount of organic matter, which feeds a broad food chain of organisms from bacteria to mammals as it decomposes. The botanical and ecological value of this type of habitat is generally moderate.

- 1410 - Salted Mediterranean meadows (*Juncetalia maritimi*)

This habitat type is represented by various Mediterranean associations of the order *Juncetalia maritim*i and covers large areas especially in the areas around the Karavasta lagoon, Godullave and Osmani lagoon, but also in depressions inside the Mediterranean or alluvial coniferous forests. It is part of the specialized vegetation of saline soils. It is characterized by the dominance of *Juncus maritimus* and *Juncus acutus* often with a tendency to create clean populations.

It can be distinguished as Mediterranean halo-psammophile meadows (*Plantaginion crassifoliae*). The characteristic plants of *Juncetalia maritimi* are: sea rush, spiny rush, sea aster, Tamarix, long-bracted sedge), divided sedge, seaside brookweed, common spike-rush, Squirrel tail-grass, sea flax; fleaworts, centaury, mugwort, Spergularia salina, Schenkia spicata. The botanical value of this habitat encountered within the study area is low.



Figure 54: Salt meadows of *Juncetalia maritimi*



Figure 55: Salt marsh habitat

Drainage channels/reedbeds

European Habitats include 72A0 Reed beds (*Phragmito-Magnocaricetea*). The study area is characterised by dominated drainage and irrigation channels. The formation of reed beds is more widespread in these channels. High trunk helophytes, such as Common reed (*Phragmites australis*), Lesser bulrush (*Typha angustifolia*), Round-headed club-rush (*Scirpus lacustris*), Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed (*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species. Ecological value of this type of habitats is moderate to high, as it provides shelter, feeding and breeding grounds for many animal taxa.

1150 Coastal Wetlands/ Lagoons

The European Habitats include 1150 Coastal lagoons. Laguna e Ushtarit is one of important coastal lagoons as part of the entire Karavasta situated in the boundary of project area. The main vegetation type present in this lagoon is the sea grass beds dominated by eelgrass (*Zostera noltii*). Where these do occur, eelgrass is the most dominant species usually with very few other vascular species but often with abundant algae. In more shallow areas, sea grass is outcompeted by spiral tasselweed (*Ruppia cirrhosa*). The sea grass beds contain few species but reach enormous quantities of biomass, and a large number of plankton and benthos organisms' life in these communities. Fluctuating algae populations of green seaweed (*Ulva rigida*) settle on soft, muddy substrata while the gut weed (*Enteromorpha sp*.) lives on harder (sandy) substrata. Such

beds play an important role in influencing the shape and stability of the shoreline, regulating dissolved oxygen and filtering suspended matter. They can enhance the biodiversity of a lagoon by providing a physical refuge from predation and also serve as nursery and feeding habitats for a variety of organisms. The value of the habitat is generally high [they correspond to habitats with priority status, included in Annex I to Directive 92/43/EEC].

2270. Coastal Coniferous Forest

This habitat covers a limited area on the AoI, close to PDA and coastal sand dunes (NP of Divjaka Karavasta). It includes wooded dunes with Pinus halepensis and Pinus pinea L. It is only found in a small patch south-west of the surrounding area. The forest is dominated by Pinus halepensis Mill. which grows densely on sandy soils. This pine forest was cultivated 40 – 50 years ago for sandy dune stabilization and as wind break belt to protect arable land from erosion. Currently they represent habitats with priority status, included in Annex I to Directive 92/43/EEC. Areas without high biodiversity are dominated by shrubby and herbaceous species such as Rubus ulmifolius Schott., Myrtus communis L., Erica manipuliflora Salibs., and Lagurus ovata L Angelica sylvestris L., Calystegia sepium (L.) R. BR., Asparagus acutifolius L. Luzula forsteri (Sm.) DC., Vicia cracca L., Muscari comosum (L.) Miller., Ruscus aculeatus L., Smilax aspera L., Orchis morio (L.) R.M.Bateman, Rubia peregrina L., Galium aparine L. Myrtus communis L. etc.



Figure 56: Coastal Coniferous Forest of Aleppo pine

2110. Sea dunes of the Mediterranean coast

European Habitats include 2110 embryonic shifting dunes (*Cakiletea maritimae* & *Ammophiletea*). This habitat type includes the low sand dunes of the shoreline. These habitats were not found within the PDA site area itself, but can be found between the PDA and seashore within the potential area of influence (as defined in the ESIA i.e., within 2km of the PDA). These dunes are the first elevations (foredunes) of loose sandy substrate found behind the bare outwash zone of the winter surf and comprise the first evolutionary stage of the sand dune system. They are characterized by the presence of organic material and plant remains washed up by the sea and also by incessant mobility and changing of the shape, which ensure their low height.

The sandy dunes in the study area cover a narrow belt of coastline, with a variable width that ranges from 10 to 50 meters and which reaches a maximum height of 1 meter. The presence of a dune system is the result of a number of factors, which determine the morphology of a sandy coast including sufficient fluvial or marine sand deposit and the presence of a strong, prevailing wind.

The floristic composition of the sandy dunes includes typical psammophytes such as *Eryngium maritimum L., Cakile maritima Scop, Echinophora spinosa L., Euphorbia peplis L., Ammophila arenaria (L.) Link, Salsola kali L., Inula crithmoides L., Sporobolus pungens (Schreber) L., Xanthium strumarium L.,* etc. They comprise almost all vegetation on the beaches and shifting dunes.

They are often degraded due to the pressure of summer bathers. Within the study area, the natural succession of the sand dune ecosystems has been disturbed by human activities, and the “true” dunes are now found in their typical form in a few limited areas.



Figure 57: Vegetation of sand dunes

An obvious result of human impact is the extensive distribution of *Xanthium strumarium* L. (the species were introduced from America and are perfectly adapted in these areas) and many invaders from neighbouring disturbed grounds or cultivated habitats. Most common species include: *Anagallis foemina* (Mill.) Manns & Anderb, *Trifolium angustifolium* L., *Avena sterilis* L., *Bromus hordeaceus* L., *Hordeum murinum* L., *Juncus conglomeratus* L., *Lagurus ovatus* L., *Silene colorata* Pioret, *Cynosurus echinatus* L., *Erodium cicutarium* (L.) L'Hér. ex Aiton, and *Vitex agnus-castus* L. The presence of this vegetation is an important factor in curbing the movement of sand driven by the sea winds towards the land. The botanical and ecological value of this type of habitat is generally high. However, the botanical value of this habitat encountered within the study area is low.

Overhead Transmission Line (OHL) Route

In addition to the two habitats (Mediterranean Salt Meadow / Marsh and Drainage channels / reedbeds) described in the PDA section above, the following habitats were identified along the proposed OHL route:

- Stream/ River Habitat
- Sclerophyllous grazed forests
- Olive grove
- Mixed Mosaic Agricultural land

These habitats are described in more detail below; please see preceding section for description of Mediterranean Salt Meadow / Marsh and Drainage channels / reedbeds habitats.

92A0. Stream/ River Habitat (Semani River and its riparian zone)

It is classified under code 44.17 of Habitat Directive, called *Salix alba* and *Populus alba* galleries Habitat (Running Water – 92A0[46]). This habitat is the richest habitat in the study area from a botanical diversity point of view, although most of the species found are relatively frequent in stream/river habitats in Albania. It is considered a sensitive habitat and potentially a Critical Habitat (CH), especially “Kurrora e Semanit”, which is under protection status (Natural monument-NM).[47]

This reach section of Semani River (part of the project development area-PDA and to be crossed by the Transmission line) represents a typical lowland river, wide, turbid, deep, with moderate flow and muddy silt sediments. High steep banks were held with bank side herbaceous vegetation and trees. White poplar

[46] Code of European Habitats
[47] Kurora e Semanit clasified as Natural Monument is not in the Study Area.

(*Populus alba*) and White willow (*Salix. alba*) were the dominant riparian vegetation on both sides of the river forming a continuous corridor.

Further on the scattered stands of Common reed (*Phragmites australis*) and broadleaf cattail (*Typha latifolia*) were also observed. Macrophyte flora was very scarce with only P. australis, Marsh horsetail (*Equisetum palustre*) and grass species noted on the bank sides. The river itself represents an important corridor for fish migration primarily for the European eel (*Anguilla anguilla*), while marine species as the flathead grey mullet (Mugil cephalus) are commonly recorded. Further on Semani River, although polluted by oil residues and spillage from the local Oil Field and urban waste, provides important habitat for other animal species linked with running freshwater habitats, such as fish (i.e. *Barbus prespensis, Squalius platyceps, Cobitis ohridana, Alburnus scoranza, Pachychilon pictum*), amphibians, and birds. This habitat is also important for otter (*Lutra lutra*). The surrounding environment is primarily used as agriculture land. Land use activities in the surrounding area have encroached into the riparian zone which is restricted to a narrow strip along the river.



Figure 58: Crown of Semani River-Natural Monument, Stream/River Habitat (Running Water – 92A0)



Figure 59: Stream/River Habitat (Running Water – 92A0)

The riparian woodlands are largely dominated by *Populus alba L*. In these habitats there are formed communities with the associated flora, including *Salix alba L.*, *Populus alba L., Salix purpurea L.*, *Salix elaeagnos Scop*, *Alnus glutinosa L.*, *Fraxinus ornus L.*, *Cornus sanguinea L.*, *Crataegus monogyna Jacq.*, *Vitex agnus-castus L.*, *Rubus ulmifolius Schott.*, *Hedera helix L.*, *Clematis vitalba L.*, *Clematis viticella L., Symphytum bulbosum C. Schimpt*, *Aristolochia rotunda L. Ulmus minor Miller., Carpinus orientalis Miller., Calystegia sepium (L.) R. BR., Prunella vulgaris L., Circaea lutetiana L., Brachypodium sylvaticum (Hudson) P. Beauv., Dactylis glomerata L., Vinca major L., Aristolochia clematis L., Carex distans L., Carex flacca Schreber., Carex remota L., Agrostis stolonifera L., Rhinanthus minor L., Gratiola officinalis etc.* This type of habitat is of high ecological importance as it provides shelter, feeding and breeding ground for many animal taxa.

6310. Sclerophyllous grazed forests

Bushy sclerophyllous vegetation, usually evergreen in a climax stage of development, including matorral, garrigue and thermo-Mediterranean brushes. To minimise evaporation, plants have reduced leaf surface or reflect the sunlight with silvery leaves.

This habitat type represents habitats with code 6310 “Garrigues of Eastern Mediterranean”.

The main plant species are: *Paliurus spina-christi* Mill., *Phillyrea latifolia* L., *Rubus ulmifolius Schott*., *Juniperus oxycedrus* L., *Spartium junceum* L. *Fraxinus ornus* L. etc, the major part of the herbaceous plants, are dried during the summer time. Among the herbaceous plants are found: *Euphorbia characias* L., *Ruscus aculeatus* L., *Teucrium polium L*., *Cistus incanus L*., *Smilax aspera L., Dactylis glomerata* L., *Anemone hortensis* L., *Cynodon dactylon* (L.) Pers., *Briza maxima* L., *Chrysopogon gryllus* (L.) Trin., *Micromeria*

juliana (L.) Bentham., *Cynosurus echinatus* L., *Stachys officinalis* (L.) Trev., *Rubia peregrine* L., *Dorycnium hirsutum* L., *Cerinthe major* L. etc. The biodiversity value of this habitat, encountered within the study area, is low. However, this habitat is important for a number of reptiles (lizards, snakes, tortoise) and mammals (i.e., badger, polecat). This habitat is also used as feeding ground by bats.



Figure 60: Garrigues of Eastern Mediterranean

6510 Natural and semi natural grasslands

Habitat 6510, lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis). Species-rich hay meadows on lightly to moderately fertilised soils of the plain to submontane levels, belonging to the Arrhenatherion and the Brachypodio-Centaureion nemoralis alliances. These extensive grasslands are rich in flowers and are not cut before the grasses flower and then only one or two times per year.

This habitat represents a former agriculture land that is abandoned for many years (sandy salted soils) invaded mostly by grass and ruderal species such as Carrot (*Daucus guttatus*), Viscous fleabane (*Dittrichia viscose*), Clover (*Trifolium nigriscens*), Club-rush (*Scirpus holoschoenus*), Daisy (*Bellis perennis*), Elm leaf blackberry (*Rubus ulmifolius*), Bog rush (*Schoenus nigricans*), Dyer's alkanet (*Alkanna tinctoria*) and Giant reed (*Arundo donax*) (along the irrigation channel).

The banks of drainage channel with brackish waters are covered by water fringe vegetation mostly dominated by thickets of common reed (*Phragmites australis*), Rush (*Scirpus maritimus*), Bog rush (*Schoenus nigricans*), Dalmatian tamarisk (*Tamarix dalmatica*), Spiny rush (*Juncus acutus*), Sedge (*Carex distans*), Ravenna's cane *(Saccharum ravennae*).

Other species present here are: *Bellis peremis* L., *Lotus corniculatus* L., *Daucus carota* L., *Aristolochia pallida* Willd., *Borago officinalis* L., *Nasturtium officinale* R. Br., *Sinapis arvensis* L., *Carex distans* L., *Lathyrus grandiflorus* S. et S., *Medicago lupulina* L., *Centaurium tenuiflorum* (Hoffm. & Link) Fritsch., *Plantago lanceolata* L., *Cirsium arvense* L., *Avena fatua* L., *Bromus hordeaceus* L., *Poa trivialis* L., *Rumex crispus* L., *Polygonum lapathifolium* L., *Echium plantagineum* L., *Trifolium campestre* Schreber., *Sanguisorba minor* L., *Melampyrum barbatum* Waldst & Kit., *Rhinanthus mediterraneum* etc.





Figure 61: Natural and semi-natural grassland

Olive grove

There is only one or two sites on the extremity of the new transmission line, close to the sub-station that are cultivated with olive. The plantations are generally found on gently sloping low hills and form a characteristic landscape around the settlements in this area. The same traditional methods of olive cultivation have been used for years, together with the location of the terraces (formed amongst the natural vegetation), which has maintained a degree of naturalness in the terrace environment. Where terraces have been abandoned, they tend to be covered by opportunistic vegetation dominated by *Rubus ulmifolius Schott*., *Dittrichia viscosa* L. (invasive plant species), and a large number of typical Mediterranean plants, *Trifolium lappaceum L*., *Trifolium angustifolium L.*, *Brachypodium distachyom (L.) P. Beauv*., *Spartium junceum* L., *Micromeria juliana L*., *Cistus incanus* L., *Chrysopogon gryllus, Avena fatua* etc. The botanical value of this habitat encountered within the study area is low. Olive groves are important habitat for reptiles (lizards, tortoise, snakes), and feeding ground for badger and red fox, They are also used as feeding grounds for bats.



Figure 62: Olive grove

Mixed Mosaic Agricultural land

Mixed Mosaic Agricultural Areas, including recently abandoned arable land, urban and suburban construction, domestic gardens of villages and urban peripheries. Typical elements of this landscape include arable land mainly farmed with traditional crops like maize, recently abandoned agricultural lands used as pastures, fruit tree plantations, and vineyards. Most agricultural areas are situated on fairly poor soils. The most important crops cultivated in these areas are *Zea mays L*, Hassell, *Medicago sativa* L. fruit trees, vineyards, fig trees, represent horticulture, etc. Mixed mosaic arable lands provide shelter, feeding and breeding grounds for toads, lizards, snakes, small mammals (voles, moles, mice), and mesopredators (badger, jackal, red fox, and weasel). They also provide feeding grounds for bats,





Figure 63: Mixed mosaic agricultural land; **Figure 64: Wind break belt of *Eucaliptus globules***

Community of *Eucalyptus globulus* – Wind break belt (artificial plantation)

Forest build years ago in order to protect crops from strong sea winds and to strengthen the seawall; built to protect agricultural land from the floods.

This biological belt is seriously damaged by illegal cutting but still continues to be an important shelter for birds and small animals.

A composition of species similar with Stream/River Habitat and semi-natural grassland are instituted in this habitat, which originated from the abandonment of agricultural land.

4.2.2.4. Summary

In the study area exists a variability of terrestrial habitats characterized by great human influence and the unsustainable practices of land use.:

- Within the PDA area there have been observed (i) Mediterranean salt marshes (mostly on the secondary drain canals) where the water stays for a longer time (Code 1310), (ii) salt meadows in drier places and saline soils (code 1410) and (iii) drainage channels / reedbeds (code 72A0). The first is dominated by Salicornia europaea, the second by Juncus maritima and Tamarix dalmatica while the third by the aquatic plants Phragmites australis, Typha angustifolia, Scirpus lacustris etc.
- Within the area of influence (AoI) are most common (i) Sea dunes of the Mediterranean coast (code 2110), (ii) Coastal Wetlands / Lagoons (code 1150) and (iii) Coastal Coniferous Forest (code 2110). While the first two are natural habitats, the third represents artificially planted Mediterranean pine communities (afforestation).
- Within the area of transmission line, there were observed: (i) Stream / River Habitat habitat-code 92A0 (Semani River and its riparian zone). It represents the most natural and sensitive habitat, which in time has been significantly reduced, (ii) Sclerophyllous grazed forests (code 6310), located in the northern part of the power line and deeply degraded by intensive logging and over-grazing, (iii) Natural and semi natural grasslands (code 6510) representing abandoned agricultural land and turned into meadows for hay production and pastures; (iv) Olive grove, and (v) Mixed Mosaic Agricultural land, located in the southern and hilly part of the study. Of interest is the presence of a community with Eucaliptus globulus as a wind break belt (artificial plantation) in the eastern part of the power line. Eucalyptus globulus is an exotic tree species.

4.2.2.5. Protected Areas

Law No. 81/2017 "On Protected Areas" defines the different categories of the PAs (Protected Areas) in Albania, and their management recommendations. Albanian Law No. 81/2017 on PA's defines 7 categories of PA[48], each with varying degrees of protection, as follows:

- **Strict Nature Reserve (Category I)** are strict protected areas aligned with IUCN Category I protected areas. They are permanent reserves established to protect a target species or ecosystem, where only controlled research activities are allowed.
- **National Park (Category II)** are protected natural territories intended for the conservation and use in environmental, recreational, scientific and cultural purposes of natural objects and complexes that have a special ecological, cultural and aesthetic value, aligned with IUCN Category II.
- **Natural Monument (Category III)** are protected natural areas with unique, irreplaceable, ecologically, scientifically, culturally and aesthetically valuable natural objects. These objects are aligned with IUCN Category III.
- **Natural Managed Reserve (Category VI)** are PAs aiming to protect particular species or habitats and their management should reflect this priority. Many category IV PAs will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category. These objects are aligned with IUCN Category IV.
- **Protected Landscape (Category V)** are protected landscapes that include resort natural areas, recreational zones, water protection zones, coastal strips, sanitary protection zones for water bodies, and surface and groundwater formation zones. These objects are aligned with IUCN Category V.
- **Protected Area of Managed Resource (Category VI)** are PAs that conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. These objects are aligned with IUCN Category VI.
- **Municipal Natural Park (Category IV)** are Municipal nature parks that provide sustainable territory and development activities, which suit the character of the area and relate exclusively to the needs of the community.
- Protected areas of international interest (no specific protection category).

The closest protected areas to the PV Project area (within 20km from the PDA) are as follows:

- the Divjaka-Karavasta National Park located north and north-west of the PDA,
- the Nature Managed Reserve of Pishe-Poro situated in the south-western part of the PDA,
- the Landscape Protected Area of Vjose-Narta located south of the PDA,
- the Nature Monument of "Kurora e Semanit" located south-east of the PDA and
- the Nature Managed Reserve of Levan situated in the south-eastern part of the PDA.

The locations of these protected areas are presented in Figure 66.

4.2.2.5.1. Divjaka-Karavasta National Park

The project site is just outside the south-western tip of Divjaka-Karavasta National Park (Figure 66). This National Park is considered one of the most important natural areas in Albania.

Divjaka-Karavasta National Park is 22,230 ha large. It has been designated as a National Park in 2007 through the Decision of the Council of Ministers (DCM) No. 687, dated 19.10.2007. The Park represented by the following major habitats:

- Forest area (forests, rare forests, alluvial forests and shrubs, reforestation, forest and aquatic vegetation land) 5,310.00 Ha;
- Agricultural area (agricultural land, orchards, olive groves and vineyards) 9,078.42 Ha;

[48] Law No. 81/2017 "On Protected Areas"

- Aquatic area (lagoons, rivers and watersheds) 6,408.90 Ha;
- Non-productive area (sandy and bare) 1,120.71 Ha;
- Urban area of mixed farmland, orchards and woodland 312.21 Ha.

The National Park hold also 8 Natural Monuments approved by DCM No. 676, dated 22.12.2002; where 4 of them are geo-monuments, one is a hydro-monument and 3 others are bio-monuments.

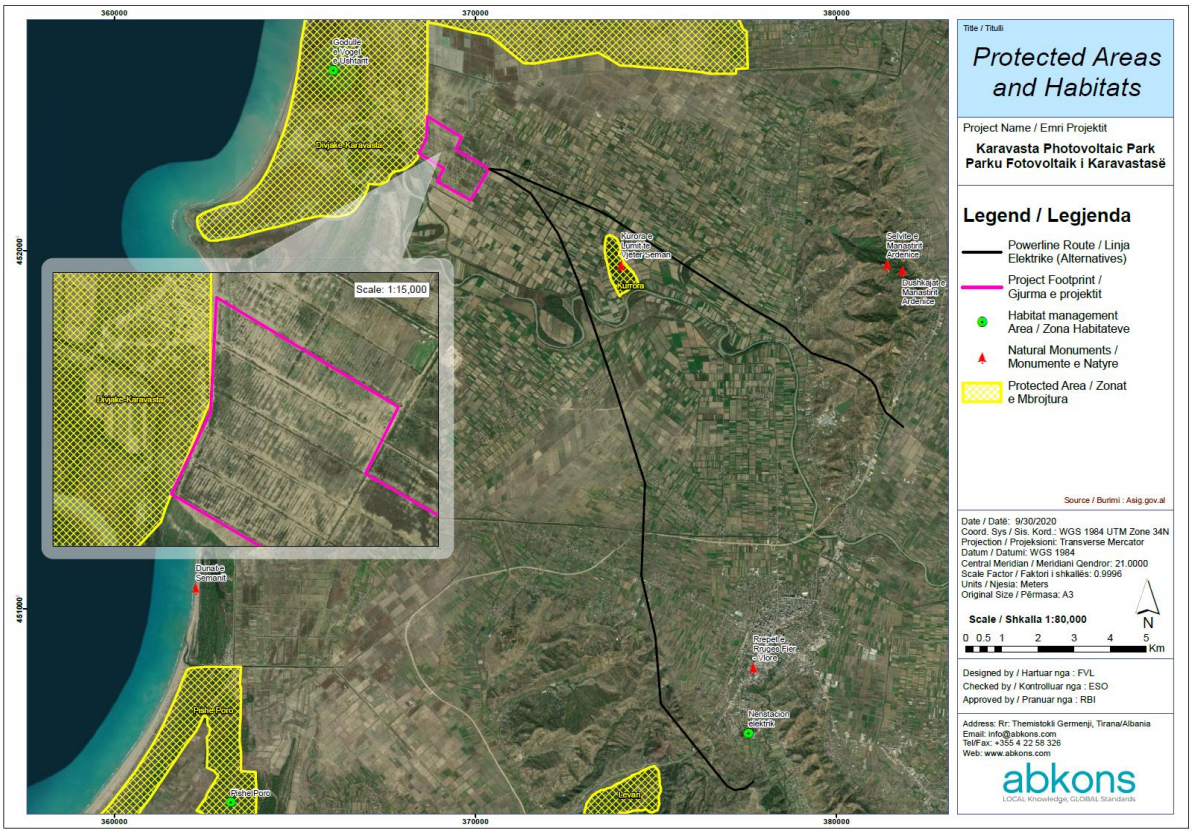


Figure 65: Proposed PDA and OHL Route in relation to surrounding Protected Areas / Priority Biodiversity Features

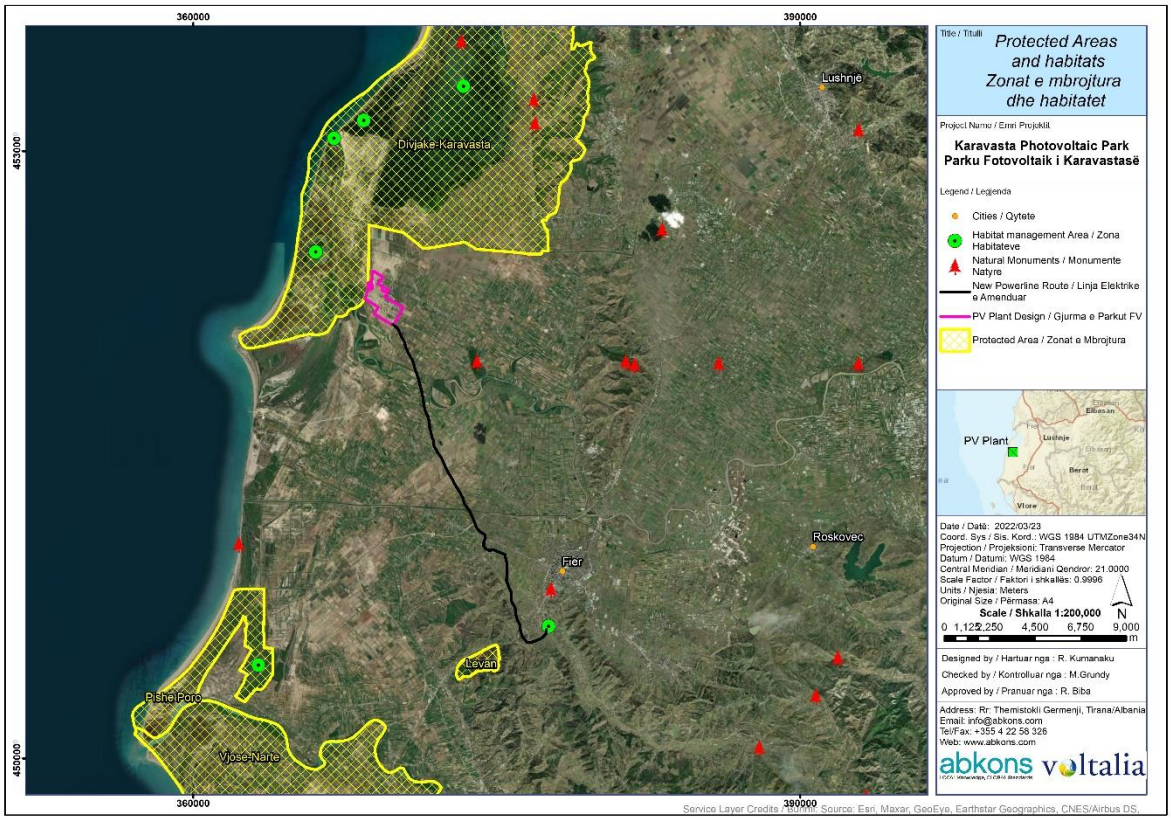


Figure 66. Protected areas and natural monuments adjacent and close to the project area

Geo-monuments:

- *Pelican Island*. It is located in Karavasta Lagoon up about 0.5 m above sea level. The island is formed by the accumulation of organic waste, and it is featured a very rich herbal and plant formation. The curly pelican is nested here.
- *Kulari Island.* It is located in Shkumbin delta, up about 0.5 m above sea level. It is formed by the accumulation of the river. It has a very rich flora, represented by herbal plants and bushes, in which a rich fauna lives in, especially sea birds where the curly pelican is also distinguished.
- *New littoral cordon of Divjaka new lagoon*. It is located in the west of Divjaka Lagoon, up about 0.5 m above sea level. It is an interesting cordon formed by accumulative activities of sea waves, in which by heightening in the north-south direction, a new lagoon in the west of the old lagoon is created.
- *Divjaka oasis dunes.* They are located in Divjaka Beach. They represent groups of dunes created by the accumulating activity of the wind on the sandy beach. They are about 600 m long, 25 m wide and 1.5 m high.

Hydro-monuments:

Godulla *of Pine* (Divjakë). It is located in the northwestern part of Divjaka forest, on the left of the old mouth of Shkumbin River. It is an interesting small lagoon formed by the accumulation of river and sea.

Bio-monuments:

- Wild Pine in Divjaka oasis: It is situated in the northern part of Divjaka forest (410 years old).
- Gorica hill in Kryekuq: It is situated a few meters on the north of the center of Kryekuq Village. It is 10-12 m high and its trunk width is about 60 cm.

Zharnec elm-trees: They are found in the cemetery of Zharnec Village. There are 5-6 elm-trees in a group of 5-6 m high and about 35 cm trunk thickness. Based on the Habitats Directive 92/43 / EEC of the Council of Europe "On the conservation of habitats and of wild fauna and flora" are identified ***14 types of habitats, 3 of which have priority status*** such as:

1) Karavasta and Osmani Lagoon
2) Coastal sand dune forests with *Pinus halepensis, P. pinea, P. pinaster*
3) Coastal dune with *Juniperus oxycedrus ssp. macrocarpa.*

Karavasta wetland complex is an important ground for several species of animals including aquatic molluscs, insects, fish, amphibians, reptiles, birds and mammals. Data deriving from monitoring reports (Ministry of Tourism and Environment, National Environmental Agency and, Museum of Natural Sciences) have shown that the area shelters more than 1,506 species (Table 25).

The aquatic habitats represent the distribution area of more than 57 aquatic molluscs the most abundant species include *Rissoa ventricosa*, *Rissoa monodonta*, *Hinia reticulata*, *Planorbis planorbis*, *Venerupis aurea*, *Tapes decussatus* etc.

Insects compose one of the most widespread group of animals. During spring and summer, the woodland supports a high diversity of Butterflies, Orthopterans, Manteopterans, Hemipterans, Homopterans, Neuropterans etc. Insects also compose the bulk of food resources for many species of amphibians and reptiles.

Table 25. Number of animal species present in Divjaka-Karavasta National Park

Taxa	No. of species
Aquatic Molluscs	57
Insects	> 1000
Fish	120

Taxa	No. of species
Amphibians	8
Reptiles	24
Birds	262
Mammals	35
Total	**> 1506 species**

Sea waters, coastal lagoons and inner waters (ditches and channels) are used by a variety of more that 120 fish species.

Within fish species the most common in terms of number of species are represented by Mugilidae (*Mugil cephalus, Liza ramada, Liza salienes* and *Chelon labrosus*) as dominant family. The resident species are numerically prevalent with the two species *Atherina boyeri* and *Aphanius fasciatus* showing the highest abundances in these types of ecosystems. Other present species are *Anguilla anguilla*, *Syngnathus* spp., *Gobius bucchichi*, *Belone belone*, *Dincentrarchus labrax*, *Sparus* aurata, etc. (Crivelli 1996, Peja *et al*. 1996b).

Amphibians (8 species) and reptiles (24 species) use this habitat for feeding, breeding and hibernating. A few species dominate the herpetological community. Those species are the European Pond Tortoise *Emys orbicularis*, Agile Frog *Rana dalmatina*, Yellow-bellied Toad *Bombina variegata* etc. Besides the typical herpetofauna includes species as Balkan Green Lizards *Lacerta trilineata*, Slow Worm *Anguis fragilis*, Aesculapian Snake *Zamenis longissimus*, Nose-horned Viper *Vipera ammodytes* and Common Tree Frog *Hyla arborea*. Some other species (Fire Salamander *Salmandra salamandra*, Warty Newt *Triturus macedonicus*) do also occur but their presence is nevertheless related with fresh water resources.

Karavasta wetland complex and especially the terrestrial habitats are essential for 35 species of Mammals. The most characteristic species of this habitat are Red Fox *Vulpes vulpes*, Common Jackal *Canis aureus*, Brown Hare *Lepus europaeus,* etc. Different species of bats (*Rhinolophus* sp., *Pipistrellus* sp. and *Myotis* sp.) are observed during summer. Mammals also include some significant species such as the Badger *Meles meles,* the Otter *Lutra lutra* etc.

Divjaka - Karavasta is mostly known for its avifauna. The number of bird species registered up today is 263 species of birds. The area is a major wintering ground for waterbirds with an average number of circa 37,000 wintering waterbirds reported during the counts of International Waterbird Census undertaken during 1993-2021 (Wetlands International).

The area is a major site for breeding birds too with circa 12,000 breeding pairs estimated in 2017 (Bino & Xeka 2017, as a contribution for the European Breeding Bird Atlas 2). Divjaka - Karavasta is also a major hub for migratory birds and particularly water birds with many of them following the migratory route of the Eastern Adriatic Flyway.

The area is also an important site for 85 bird species part of Annex 1 of the Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 "On the conservation of wild birds", as amended by Directive 2013/17/EU). Annex 1 comprises a List of particularly vulnerable species of wild birds which are the subject of special habitat conservation measures. According to Article 4.1 of the Directive "The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution".

4.2.2.5.2. Nature Managed Reserve of Pishe-Poro

The Nature Managed Reserve of Pishe-Poro is a coastal wetland site situated north of Vjosa River (Figure 66) and circa 14.5 km south-west of the PDA. Pishe-Poro is a relatively narrow transitional zone between sea and land and is characterised by a rich diversity of habitats including: salt marshes, sand dunes, coastal coniferous forest dominated by Aleppo pine (Pinus halepensis), drainage channels and abandoned agricultural lands.

Pishe-Poro represents very well-developed sand dunes (up to 6-8 m high) as well as psamophyte, hygrophyte and halophyte vegetation. The bulk of the reserve is covered by Mediterranean pine forest. A part of sand dunes is destroyed due to sand extraction for construction purposes.

The dune systems in the study area are considered to be composed of eroding mobile dunes, with a high proportion of bare mobile sand on which only a few species of plant can develop. Much of the coastline within the study area is subject to coastal erosion, with the most important effect being habitat loss. As a result, a number of sand dune plants are now believed to have become extinct in the region due to the destruction of their habitats.

As was done elsewhere in the coastal region of Albania, attempts were made to stabilise the dune system by planting maritime pines (*Pinus halepensis* and *Pinus pinea*) approximately 40 - 50 years ago, which has had a major impact on much of the dune landscape throughout the area. These forests occupy a small part of the study area, extending parallel to the dune systems.

Salt marshes, present in the more sheltered areas of coast, are important for a range of interests. In particular, they support a variety of specialist plant communities and associated animals and often have a high nature conservation interest.

The coastal plain behind the coastline consists of reclaimed coastal wetlands which now constitutes poor quality agricultural land and is criss-crossed by drainage channels. These channels are characterised by high species and vegetation richness, which is mainly based on habitat diversity in cross section and periodic disturbances, such as floods. The land between the drainage channels includes cultivated and abandoned fields which contain a large number of opportunistic ruderal species. The study area ranges in altitude from 0 m to 2 m above sea level. Most of the land in the construction corridor belongs to the salt marshes and abandoned agricultural lands and plantation pine woodland.

4.2.2.5.3. Landscape Protected Area of Vjose-Narta

“Vjose-Narta” (Figure 66) was designated as a Landscape Protected Area by the Decision of Council of Ministers No. 680, dated 22.10.2004. It is located circa 20 km south of the PDA.

Wetlands occupy circa 37% of the total area while the other main habitat types are agricultural lands occupying approximately 33% of the area and forests covering 6% of the territory. The central part of the protected area is Narta Lagoon, a shallow lagoon of 2,900 ha hectares and Skrofotina Saltpans of circa 1,200 ha, surrounded by hills to the south and east, farmland to the north and two small lagoons to the northwest.

Among the many habitats of the protected area, it is worth noting the presence of three typical habitats for the region: (i) relict sand dunes (ii) Narta lagoon and (iii) Skrofotina saltpans.

Currently, the relict sand dunes of the Vjose-Narta wetland complex constitute the last remaining old dunes of the Albanian coast.

Narta Lagoon is the second largest coastal lagoon in Albania. This particular habitat is well known for its great biodiversity values.

Skrofotina saltpans also constitute a typical habitat. Although a semi-industrial habitat, saltpans are important for their biodiversity, especially for wintering, nesting and migratory birds.

The Vjosa-Narta wetland complex is an important area for a large number of animals including insects, fish, amphibians and reptiles, mammals and especially birds. According to previous studies the wetland complex accommodates at least 749 vertebrate and invertebrate species.

The area is particularly important for birds, mammals as well as fish and reptiles. Narta shelters at least 228 bird species with several of them of conservation concern. Four species, the Common Pochard (*Aythya ferina*), the Greater Spotted Eagle (*Clanga clanga*), the Velvet Scoter (*Melanitta fusca*) and the Turtle Dove (*Streptopelia turtur*) have an unfavourable global conservation status and are registered as Vulnerable by IUCN.

Data collected during mid-winter waterbird counts of 1993-2020 show that the site shelters every year an average number of circa 19,500 waterbirds representing 66 species of waterbirds.

Table 26. Animal species present in the Vjosa-Narta wetland complex

Group Species	Endagered Nationaly	Endagered Globaly	Status of protection	No. of species
Mollusks	12	-		> 32
Insects (Lepid & Coleopt)	57	1	28	> 287
Crustaceans	9	-		> 61
Echinoderms	6	-		> 6
Fishes	16	5	1	> 102
Amphibious	9	2	5	9
Reptiles	23	5	20	26
Birds	43	4	52	> 194
Mammals	14	9	12	> 32
Total	189	26	118	> 749

Some of the waterbird species are registered here in numbers of international importance and trigger the 1% threshold of the regional population:

- Greater Flamingo (*Phoenicoptrerus roseus*) – more than 2% of the regional population
- Pied Avocet (*Recurvirostra avosetta*) – 1.5-2.5 % of the regional population.

Finally, from 228 bird species, **76 of them belong to Annex I of Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 "On the conservation of wild birds**", as amended by Directive 2013/17/EU). Annex 1 comprises a List of particularly vulnerable species of wild birds which are the subject of special habitat conservation measures. According to Article 4.1 of the Directive "The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution."

4.2.2.5.4. Nature Monument of "Kurora e Semanit" (Kurrora)

Designated as a natural monument III category of IUCN Protection in 2002[49], "Kurora e Semanit" represents an old riparian forest situated along Semani river (Figure 66).

The nature monument covers an area of about 44 ha distinguished for its high biodiversity, and is located 6 km southeast of the PDA and approximately 3 km east of the TL.

The park is considered the only indigenous musky forest and is a resource that serves fantastically for natural tourism and organized excursions.

Lying downstream of the Seman River, near Libofsha, about 1 m above sea level, the crown of trees follows the former bed of the Seman River, abandoned by it, due to the highly nomadic character in this section of the stream his. The natural park is several kilometres long and covers an area of about 44 ha. A special ecosystem has been formed in it, which is distinguished for high biodiversity.

The forest preserves all types of trees with which Myzeqeja has been covered, such as: screw, root, maple, alder, willow, ash, white poplar, juniper, laurel, black juniper and many other shrubs.

The crown of the Seman River (Adriatic, Libofsha) has scientific significance especially biological, has special ecological values. The nature monument is rich in vertebrates, most notably on amphibians, reptiles, birds and mammals. Several species of national conservation concern breed here including the Turtle Dove *Streptopelia turtur*, Common Buzzard *Buteo buteo* etc.

[49] https://www.eea.europa.eu/data-and-maps/explore-interactive-maps/european-protected-areas-1

4.2.2.5.5. Nature Managed Reserve of Levan

Levan is a Nature Managed Reserve (NMR), Category IV (IUCN), with an area of 200ha, approved by Internal Reg1, dated 27.07.1977, which consists of: Forests and Shrubs (186.6ha) and Agricultural (13.4ha). It is located in the Region of Fier. (Figure 66).

The Nature Managed Reserve [50]of "Pylli i Levanit" is located some 17 km south of the Project Development Area. It covers a surface of 200 ha and has been designated as a Protected Area since 1977. The vegetation is composed mainly by Pubescent oak Quercus pubescens mixed with elements of Mediterranean macquis.

Despite its protection status the area is heavily used by different recreational activities including restaurants, pathways for visitors etc. There is limited information on the conservation importance of the area. Nevertheless, the current level of management does not guarantee a high biodiversity value.

The nature monument covers an area of about 200 ha distinguished for its high biodiversity, and is located 18 km southeast of the PDA and approximately 2 km southwest of the TL.

4.2.3. Ecological structure and functions needed to maintain the viability

The consultation with the stakeholders has confirmed that the proposed project is adjacent to some significant biodiversity feature already identified by the project team. This includes all the protected areas described above as well as:

- Divjaka-Karavasta Ramsar site,
- The Important Bird Area of Karavasta Lagoon (AL006),
- the Important Bird Area of Narta Lagoon (AL005),
- the Key Biodiversity Area of Shkumbin-Divjake-Sean (ALB22),
- the Key Biodiversity Area of Vjose-Narte (ALB24),
- the Candidate Emerald Site of Divjake-Karavasta *and*
- the Candidate Emerald Site of Narta.
- Important Plant Area of Pylli i Divjakes.
- Important Plant Area of Vjose-Vlore

The maintenance of the hydrological regime of Karavasta lagoon, Semani and Vjosa Rivers is vital for the preservation and enhancement of the adjacent wetland sites, their functions and their biodiversity.

4.2.3.1. Divjaka-Karavasta - Ramsar Site

The site was designated in 1995. The size of the Ramsar area is circa 20,000 ha. Its boundaries coincide with the protected area of Divjaka-Karavasta National Park. The Ramsar site is adjacent to the PDA close to its western border (Figure 67).

It is an enclosed brackish lagoon and areas of forests dominated by Umbrella pine *Pinus pinea* and Aleppo pine *Pinus halepensis*, a species characteristic of the Mediterranean region. A most recent review provides the following information n the Ramsar Criteria fulfilled by the site:

The site is regularly inhabited by seven species of global conservation concern:

- Common Pochard (*Aythya ferina*) – Regular wintering bird considered as Vulnerable by IUCN. The average number for 1993-2020 is c. 325 individuals. Min 24 ind. Max 1325 ind.

[50] Declared nature managed reserves / nature park (Protected area, category V) with regulation from Interior Ministry no. 1, dated 27.07.1977

- The Greater Spotted Eagle (*Clanga clanga*) – Regular wintering bird considered as Vulnerable by IUCN. With at least 1-2 specimens in the last five years of 2015-2020.
- Long-tailed Duck (*Clangula hyemalis*) – Wintering bird considered as Vulnerable by IUCN. Observed in 2017 with 3 wintering individuals.
- Velvet Scoter (*Melanitta fusca*) – Wintering bird considered as Vulnerable by IUCN. Observed respectively in 1995 and 1996 with one specimen.
- White-headed Duck (*Oxyura leucocephala*) - Wintering bird considered as Endangered by IUCN. Observed in 1995 with 4 individuals.
- Yelkouan Shearwater (*Puffinus yelkouan*) – Resident bird in the Mediterranean considered as Vulnerable by IUCN. Regularly observed at the coast of the Ramsar Site.
- Turtle Dove (*Streptopelia turtur*) – Regularly breeding bird considered as Vulnerable by IUCN. Present in the area with c. 100-150 breeding pairs.

Divjaka-Karavasta holds more tha 1% of the regional population for five bird species:

- Dalmatian Pelican (*Pelecanus crispus*) - > 3% of the regional resident population and 1% of the global poulation
- Pygmy Cormorant (*Microcarbo pygmaeus*) - > 2% of the global population
- Greater Flamingo (*Phoenicopterus roseus*) - > 1% of the regional population
- Eurasian Wigeon (*Mareca penelope*) - > 2% of the regional population *and*
- Collared Pratincole (*Glareola pratincola*) - > 2% of the regional population.

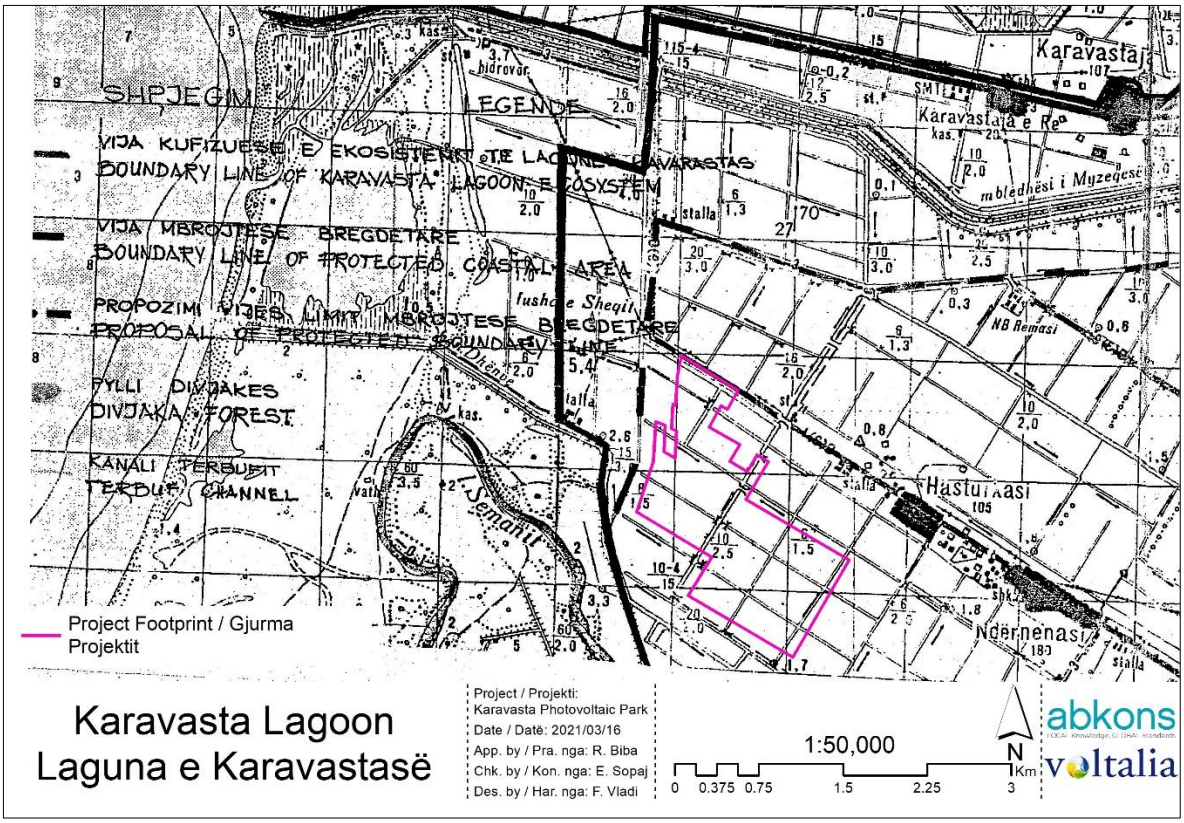


Figure 67. Original map of Divjaka-Karavasta Ramsar Site and PDA

4.2.3.2. The Important Bird and Biodiversity Area of Karavasta Lagoon (AL006) and the Key Biodiversity Area of Shkumbin-Divjake-Seman (ALB22)

The concept of Important Bird and Biodiversity Areas (IBAs) was developed by BirdLife International as a network of places or sites of international significance for the conservation of birds and other biodiversity features. BirdLife International has, to date, identified and documented more than 13,000 sites in over 200 countries and territories worldwide, as well as in the marine environment

These sites provide the BirdLife Partnership and planning or decision-making authorities of different countries with a focus for conservation action, planning, and advocacy. IBAs are large enough to safeguard a viable population of a species, group of species, or entire avian community during at least part of its life-cycle, but are small enough to be conserved in their entirety. This network may be considered the minimum essential to ensure the survival of many of these species across their ranges and throughout their life cycles. Because some places are much richer in biodiversity than others, conserving a relatively modest network of sites is a cost-effective and efficient way of ensuring the survival of a large number of species.

Key Biodiversity Areas (KBA) focus on safeguarding global biodiversity and are recognised as vital land, freshwater, and marine sites for threatened plants and animals. They are currently identified using the "Global Standard for the Identification of KBAs" set out by the IUCN in 2016. These criteria have quantitative thresholds devised over years of planning. KBAs extend the IBA concept to other taxonomic groups and are now being identified in many parts of the world, by a range of organisations. All IBAs are KBAs, but some KBAs are not IBAs (i.e., they are significant for the conservation of other taxa, but not birds). Nevertheless, the IBA network has proved a good approximation to the overall network of KBAs, as it includes the bulk of other target species and the most significant sites.

This has been more or less the case for the KBA system in Albania where the majority of IBAs have been recognized as KBA. This is rather relevant for the designated KBA in coastal area where all the IBAs were included in the network of the KBAs. Therefore, the information provided for the IBA Karavasta Lagoon (AL006) is the same as for the KBA Shkumbin-Divjake-Seman (ALB22).

The Emerald Network is an ecological network of Areas of Special Conservation Interest (ASCIs), which was established to conserve the species and habitats of the Bern Convention requiring specific protection measures. The network was launched by the Council of Europe as part of its work under the Convention on the Conservation of European Wildlife and Natural Habitats (or Bern Convention). These habitats and species are listed respectively in Resolution No. 4 (1996) and Resolution No. 6 (1998) of the Standing Committee to the Bern Convention. The identification of Emerald sites for Albania took place during 2002-2008 and in total, 25 candidate sites were selected. The Standing Committee of the Bern Convention, in its 32 meeting, in December 2012 accepted the proposal of all 25 areas for Albania (Ministria e Mjedisit 2015).

The IBA of Karavasta lagoon and the KBA of Shkumbin-Seman, covers major part of the National Park and is situated between the Shkumbini River in the North and the Canal of Myzeqe and Semani River in the South. The eastern part of the complex is surrounded by Divjaka hills while the western border is composed of the Adriatic Sea.

The PDA overlaps with the IBA and KBA (Figure 68). Circa half of the PDA surface falls within both the IBA and KBA boundaries in a habitat composed of former arable lands, today abandoned and covered by halophytic vegetation and sparsely used only for extensive grazing.

The Lagoon itself is an important shelter for more than 40 different fish species, dominated by *Mugil cephalus, Liza ramada, Liza salienes* and *Chelon labrosus*), *Atherina boyeri*, *Aphanius fasciatus*, *Anguilla anguilla*, *Syngnathus* spp., *Gobius bucchichi*, *Belone belone*, *Dincentrarchus labrax, Sparus aurata*, *Solea vulgaris*, etc. (Crivelli 1996, Peja *et al*. 1996b).

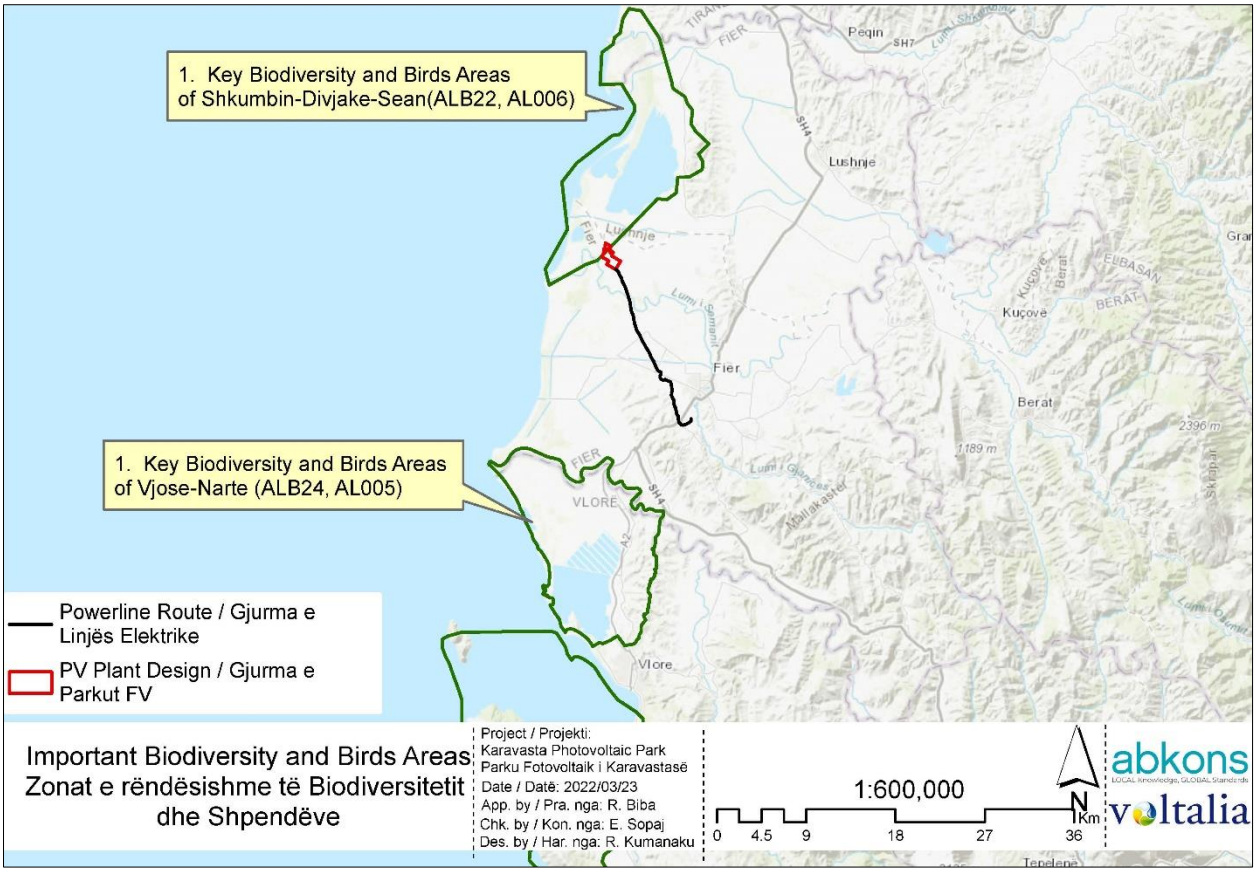


Figure 68. PDA and boundaries of (i) IBA of Karavasta lagoon (AL006) and KBA Shkumbin-Seman (ALB22), (ii) IBA of Narta lagoon (AL005and (ii) KBA Vjose-Narte (ALB24)

In the Karavasta lagoon there are present more than 40 mollusks, most widespread are the gastropods *Hydrobia acuta, Ventrosia ventrosa, Pusillina mariginata, Pirenella conica, Cyclope neritea* and the *bivalves Cerastoderma glaucum* and *Scrobicularia cottardi*. About 60 mollusk species have been reported for the coastal habitats of Vjosa delta and Narta wetlands; among them 27 are gastropods (snails), 29 bivalves (mussels) and 4 cephalopods (octopus, squids and cuttlefish). Out of these 42 species, originate from the marine habitats, 12 from freshwater and 6 from the terrestrial sites.

The bottom of the Lagoon is covered by *Zostera noltii and Ruppia cirrhosae*. These plant communities cover important surfaces in the bottoms of the Narta Lagoon. The greatest threat to the "Aquatic bed "is provided by industrial installations for salt production in the surroundings. The marshy area was transformed in salt production fields by reclamation.

Karavasta is the largest wetland complex in Albania, with the Karavasta lagoon forming the largest part of the complex. The lagoon is separated from the sea by a sandy bar (Divjaka) covered with pine forest Karavasta comprises a shallow inner lagoon, and a smaller outer lagoon. The inner lagoon has many peninsulas and small, low islands with muddy shores and some areas of bare sand. A sandy bar covered by pines separates the two lagoons. In the inner lagoon only artisanal fishery is practised, but in the outer one there are more intensive fisheries. The sandy islands offer breeding habitats for several waterbirds, notably the Dalmatian Pelican, the Common Tern, Little Tern, Redshank, Kentish Plover, Black-winged Stilt, Yellow-legged Gulls etc.

Circa 260 bird species have been registered here so far and among them about 15 Globally Endangered bird species, at least 80 species of the Annex 1 of the Birds Directive and some 5-bird species exceeding the 1% threshold of the biogeographic population.

Besides, Divjaka-Karavasta is home to up to 84 thousand wintering waterbirds, 12 thousand breeding birds and many more migrating waterbirds.

The project area covers a small part of the Important Bird and Biodiversity Area of Karavasta lagoon (AL006) and Key Biodiversity Area Shkumbin-Seman (ALB22)." Engagement and consultation with BirdLife has been conducted to understand any concerns with respect to the partial overlap with the IBA.

Nevertheless, the area is composed mostly by modified habitats with relatively limited ornithological value. Consultation with BirdLife International and local Albanian partners, confirmed that the project area does not directly impact important IBA or KBA features. The discussion gave more importance to the cumulative impacts induced by several development projects that are likely to occur in the future in the area of project interest." (For a detailed information please refer to the MoM-s attached at 0).

A Biodiversity Management Plan (BMP) and draft Biodiversity Action Plan (BAP) has been prepared including options to implement and support additional programs to enhance conservation aims in the area.

4.2.3.3. The Important Bird and Biodiversity Area of Narta lagoon (AL005) and the Key Biodiversity Area Vjose-Narte (ALB24)

Narta is one of the largest and most important coastal wetlands of Albania. The site (Figure 68) is locaed circa 20 km south of the PDA and comprises a large, shallow and brackish lake (Lake Nartes) and a number of coastal lagoons between the Vjose river delta and the city of Vlore. Large parts of the area have been converted into agricultural land or saltpans. The lake surface decreases by 30% (especially when the connection with the sea is blocked) during the summer and large mudflats are exposed which support saltmarsh. Coastal habitats include dunes, beaches and rocky shores, with *Pinus pinea* and *Pinus halepensis.* Surrounding habitats consist of olive-groves, pine plantations and scattered poplar plantations. The site includes the small Pishe Poro lagoon (former (1989) IBA AL011). Previously, the Narta lagoon IBA also included the Karaburun peninsula and Sazan island, but these are now included in site 010.

Narta shelters at least 228 bird species with several of them of conservation concern. Four species, the Common Pochard (Aythya ferina), the Greater Spotted Eagle (Clanga clanga), the Velvet Scoter (Melanitta

fusca) and the Turtle Dove (Streptopelia turtur) have an unfavourable global conservation status and are registered as Vulnerable by IUCN.

It is an important site for wintering and migratory waterbirds with 81,223 individuals counted in 1997. In average the site hosts every year circa 20,000 waterbirds. Two species are represented here with figures of regional importance:

- The Greater Flamingo (*Phoenicopterus roseus*) - 1.5-2% of the Eastern Mediterranean regional population.
- Pied Avocet (*Recurvirostra avosetta*) - 1.5-2.5 %. of the South-east Europe, Black Sea & Turkey regional population

4.2.3.4. Candidate Emerald Sites

The Emerald Network is an ecological network of Areas of Special Conservation Interest (ASCIs), which was established to conserve the species and habitats of the Bern Convention requiring specific protection measures. The network was launched by the Council of Europe as part of its work under the Convention on the Conservation of European Wildlife and Natural Habitats (or Bern Convention). These habitats and species are listed respectively in Resolution No. 4 (1996) and Resolution No. 6 (1998) of the Standing Committee to the Bern Convention.

The identification of Emerald sites for Albania took place during 2002-2008 and in total, 25 candidate sites were selected. The Standing Committee of the Bern Convention, in its 32 meeting, in December 2012 accepted the proposal of all 25 areas for Albania (Ministria e Mjedisit 2015).

The PDA is very close to the Candidate Emerald Sites of Divjaka- Karavasta (AL0000002) and circa 20 km north of Vjose - Narte. (AL0000008), refer to Figure 69 below.

Once a candidate site is officially adopted as an Emerald Network site, it is designated and managed at national level by employing measures that contribute to the main objective of the network of Emerald sites including:

- Protection from external threats and subject to an appropriate regime for achieving a satisfactory conservation status of the species and natural habitats listed in Resolutions no. 4 (1996) and no. 6 (1998) present on the site;
- Clear identification of authorities responsible for the implementation of the management measures and their monitoring;
- Identification of specific short and long-term site objectives will be drawn up for the management of Emerald sites, in compliance with the national/regional conservation objectives of the country, in order to facilitate the monitoring of their implementation and the regular assessment of their achievement;
- Involvement of national, regional and local stakeholders in the planning of the management of the sites, as well as in the implementation of the conservation and protection measures foreseen, and in the monitoring of the sites' management."

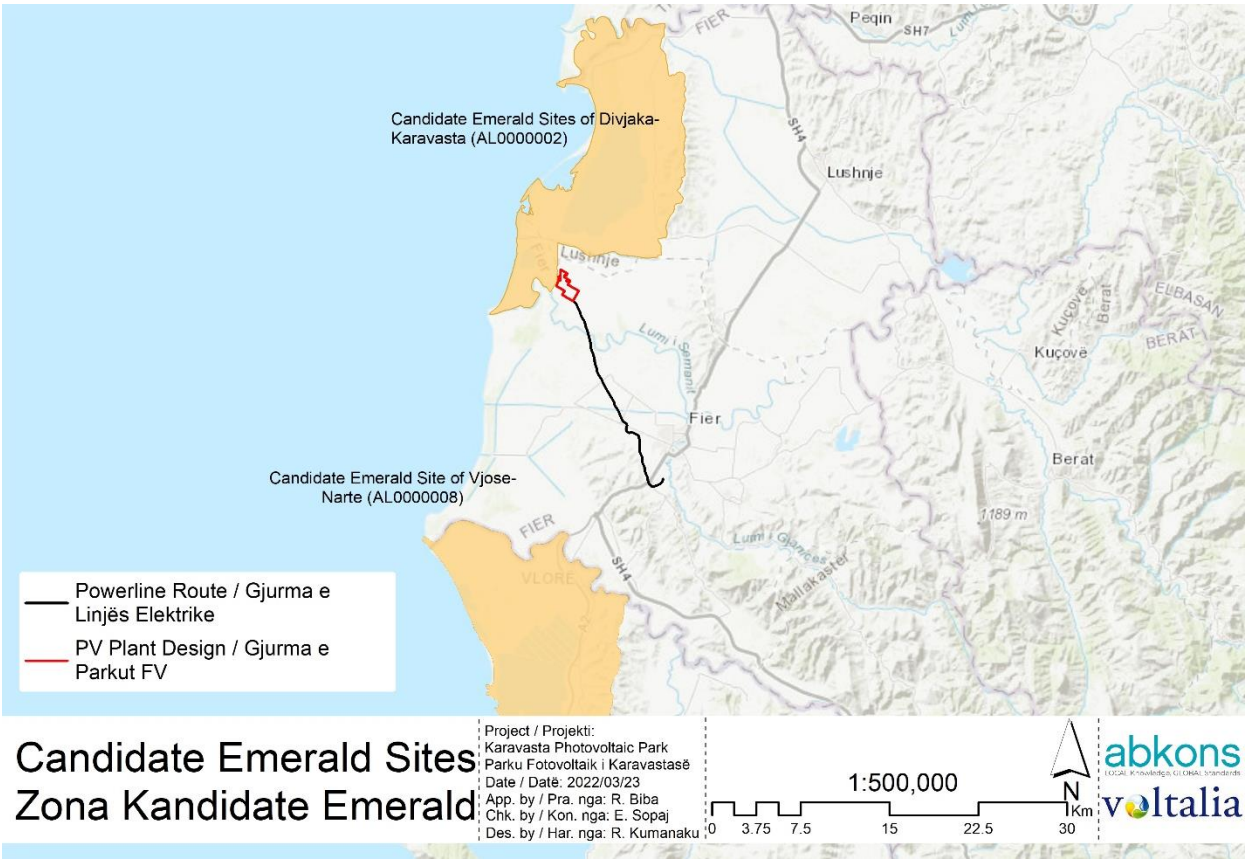


Figure 69. PDA and Candidate Emerald Sites of Divjaka-Karavasta and Vjose-Narta

4.2.3.5. Important Plant Area of Pylli i Divjakes (AL033) and Important Plant Area of Vjose-Vlore (AL035)

Important Plant Areas (IPA) is a programme set up to provide a framework for identifying and maintaining the richest sites for plant life, possibly within existing protected areas. IPAs are selected with the intention of focusing on the conservation of the important wild plant populations in these areas, and act as a subset in the broader *context* of Key Biodiversity Areas.

45 sites have been designated as IPAs in Albania. Both, the area of Divjaka and the area of Narta are part of this network corresponding respectively to Important Plant Area of Pylli i Divjakes (AL033) and Important Plant Area of Vjose-Vlore (AL035). These areas basically sit within the boundaries of the Karavasta national park and the Narte landscape area.

Information on the important plant area is nevertheless scarce and similar to those on the respective protected areas. In the case of IPA Divjaka, the information shows that the lagoon is inhabited by the monophytic community of *Ruppietum cirrhosae*, whereas in the western part the pioneer plant community of *Zostera nanae*. Meanwhile, the surroundings of the lagoon there are dominated by the associations of *Salicornietum fruticosae*, Arthrocnemetum glaucii, *Salicornietum radicantis*, *Juncetum maritimi*, *Salicornietum europaea*. The largest part of the Important Plant Area is occupied by a forest, mainly composed of *Pinus halepensis* and *Pinus pinea* trees, and mixed with other trees and bushes of *Pinus halepensis - Erica manipuliflora*, *Pistacio-Pinetum halepensis* associations. At the western edge of the pine forest a narrow strip of *Juniperus oxycedrus subsp. macrocarpa* occurred. The sea floor is covered by meadows of *Cymodocea (C. nodosae)*, the sandy belt by the pioneer community *Cakilo-Xanthietum italici* is characteristic, whereas the sand dunes are covered by the embryonic vegetation of the stable dunes.

The area host 7 endemic and threatened species at the site. Furthermore, there are 9 habitats part of the EU Habitats Directive and Bern Convention threatened habitats (5 priority).

There is no elaborated information on the features of the Important Plant Area of Vjose-Vlore (AL035). Nevertheless, the site is similar to Divjaka forest and should share more or less the same values.

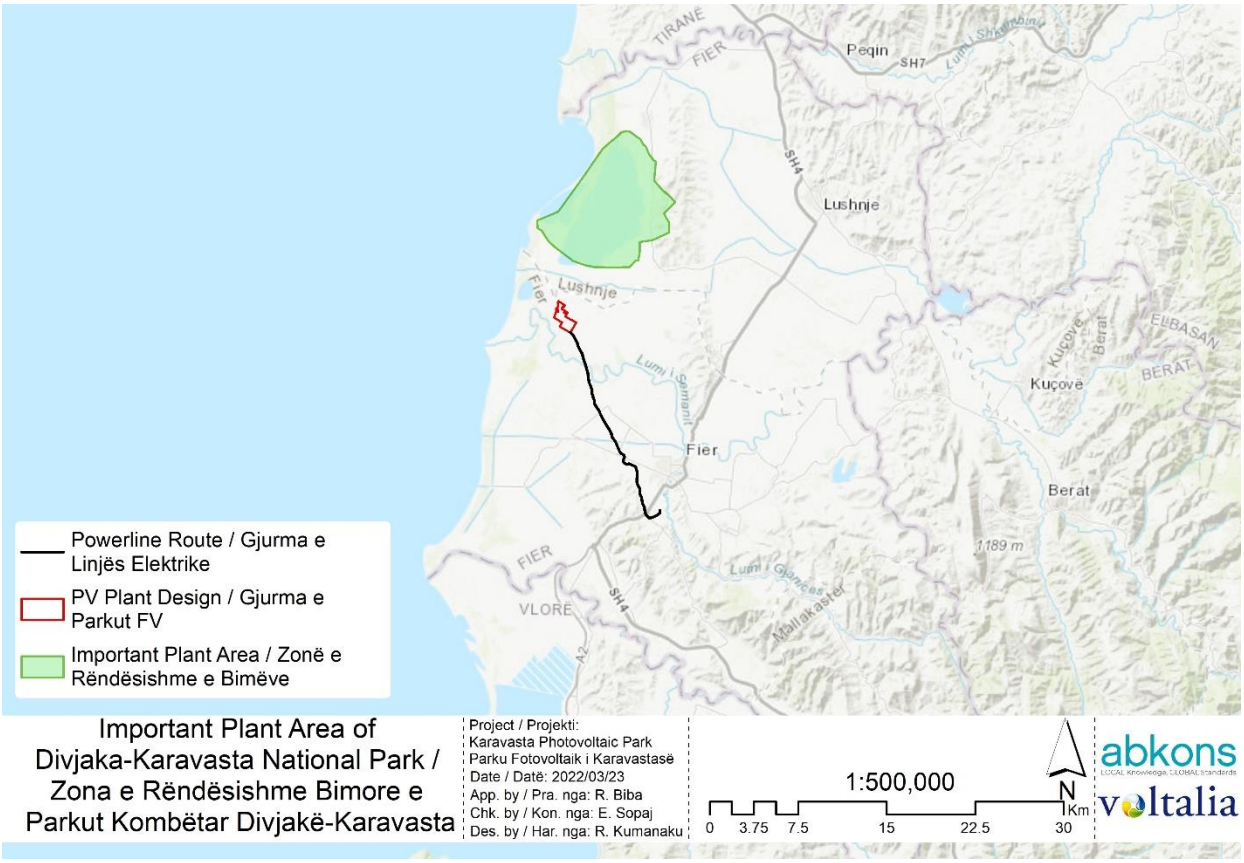


Figure 70. Important Plant Area of Divjaka Karavasta National Park and Vjose-Vlore

4.2.4. Vegetation and Flora

4.2.4.1. Introduction

This section presents the baseline for flora in the PDA and along the proposed OHL route and aims to describe (i) species richness within the broader study area and in the area that is directly or indirectly influenced by the PV project during construction and operation phases; (ii) identify the priority biodiversity features (PBFs) related with terrestrial fauna encountered in the study area and critical habitats (if triggered and appropriate), and (iii) the implications of the PBFs with respect to the PV project and TL.

This study is conducted through the following phases: (i) a pre-evaluation phase, consisting of extensive literature review of available information and best methodologies on terrestrial flora and vegetation, and (ii) on the field work survey conducted during August (PDA initial alternative OHL lines) and November 2020 (PDA and new overhead transmission line (OHL). Priority was given to the investigation of the PDA of Karavasta PV that will be directly impacted by the construction and operation of the PV project and the PBFs (species and their habitats) that might be impacted by the construction of the OHL

4.2.4.2. Survey Methodology & Data Sources

For the flora baseline assessment, a vegetation community map was developed based on preliminary field work and existing secondary data. The extent and composition of vegetation types was then verified using surveys (relèves, phytosociological sensu strictu). The evaluation and analysis of several bio-ecological indexes such as soil, climate, and aridity index were considered within a 10 km radius of the project site.

The flora survey has been focused on:

- ecological biodiversity (landscapes, ecosystems, habitats, PBFs; and,
- organismal biodiversity (families, genera, and species) - beside species and familie's variability, the variability in biological forms, chorological forms and biodiversity indexes (Shannon index etc.) was considered.

The distribution and variability of vegetation across the AoI generally follows a gradient and varies based on its distance from the seashore. Therefore, the methodology for setting survey points was undertaken according to transects from west (the seashore) to east (towards the hilly area). To determine the diversity of flora and vegetation within the PV Project site area, surveys were shifted to the left or right of the transect where any changes in species composition were observed (in phytosociology this method is called "the marshroute method").

The flora site survey was undertaken over a 5-day period in August 2020, November 2020 and May, 2021. There are surveyed 40 survey plots (10 new surveyed [lots during May, 2021), within which the inventory of vascular species was identified. The aim of the May, 2021 surveys was organized to identify the earlier flowering species on the project area and Transmission line. . deviation.

The location of the surveys undertaken are presented in Figure 71 below:

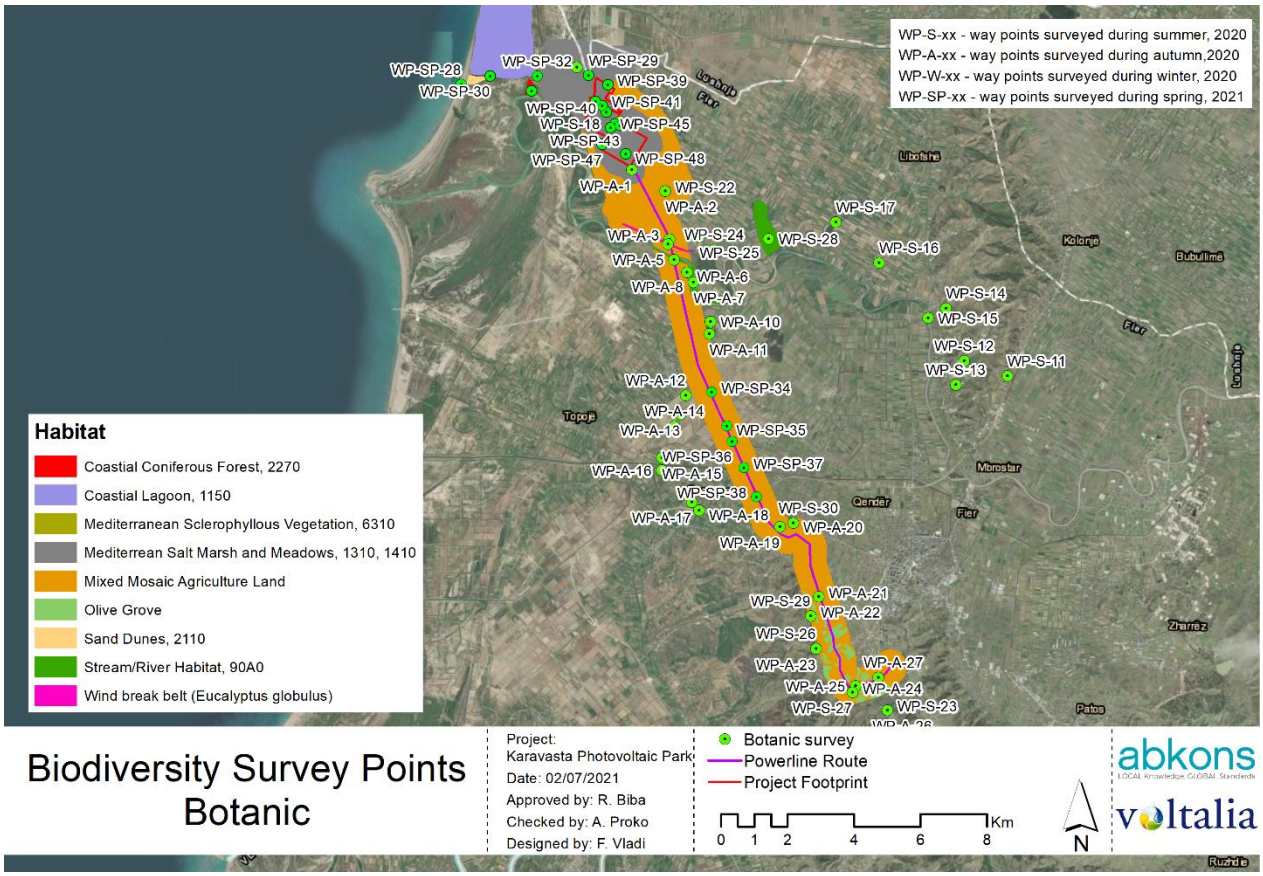


Figure 71. Botanic Biodiversity Survey Points

4.2.4.3. General Description

4.2.4.3.1. PV Project Development Area (PDA)

The PV Project footprint area or PDA is generally a heterogeneous landscape with several plant communities. The study area is part of the Myzeqe e Madhe (agricultural fields), which lie on the shores of the Adriatic Sea. The sub-Mediterranean sub-region covers a strip with coastal mountain ranges behind the very small band with Mediterranean Flora.

Salt marshes can provide many habitats for species uniquely adapted to changes in salinity and water levels, and are important storehouses of biodiversity and extremely productive habitats. The botanical and ecological value of this type of habitat is generally high; however, in this case the habitat cannot properly fulfil these functions as it is very damaged due to unsustainable practices from previous agriculture practices and present intensive grazing.

The PDA comprises mostly of salty soils that were cultivated years ago, but which are now abandoned and overgrazed.

From the botanical inventory during the field survey and secondary data, resulted a relatively high of “α diversity” (specific biodiversity) in the PDA. Flora within the PDA (including plant and surrounding area and new transmission line) numbered c.a. 352 vascular plant species, or c.a. 10% of Albania’s flora, distributed in 79 families.

The most representative families are: Poaceae (50 species), Asteraceae (30 species), Fabaceae (26 species), Lamiaceae (14 species), Brassicacea (13 species), Caryphyllaceae (11 species), Cyperace (19 species), etc.

Interesting is the variability of floristic cortege in the biological analysis (Raunkier classification), which is shown in the graph below:

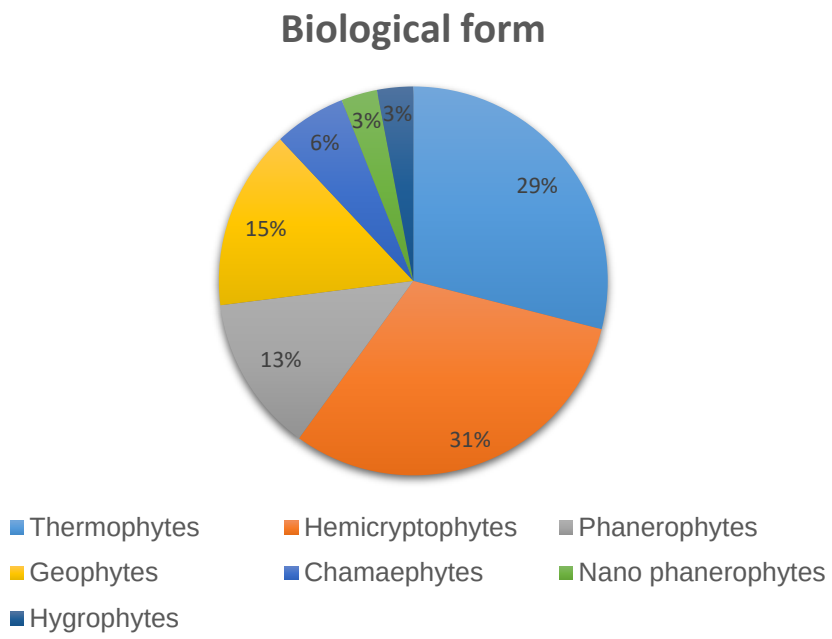


Figure 72. Biological spectrum

The low number of Phanerophytes and the high number of Hemycriptophytes indicate high level of degradation of the vegetation because unsustainable practices (agriculture and greasing) and limited ecological condition for the growth of tree species. The chorological spectrum presents a high variability of flora respecting different origins. From the chorological point of view results that almost 50% of the species have a Mediterranean character.

The chorological spectrum presents a high variability of flora respecting different origins. From the chorological point of view, almost 50% of the species have a Mediterranean character.

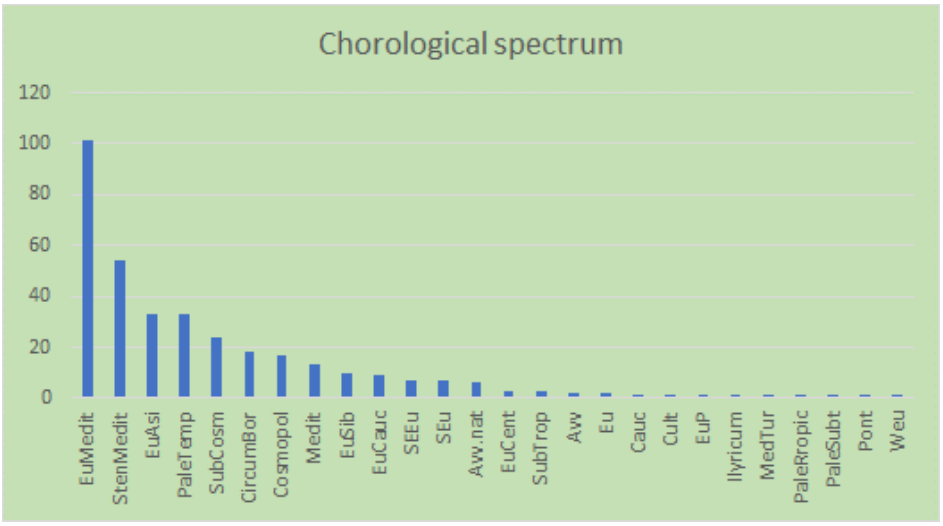


Figure 73. Chorologicum spectrum

On the project area (PDA) are identified 2 invasive species: Dittrichia viscose L., Amaranthus albus L.

Further information on the inventory and assessment of specific biodiversity can be found in 0of Flora Database and Flora Data sheet.



Figure 74: Plants in the PV Area

4.2.4.3.2. Overhead Transmission Line (OHL) Route

Overhead Transmission Line (selected alternative Fier-Hoxhare OHL 220 kV) route) start at the PDA where abandoned agriculture land with natural successions to former brackish and salt marshes are taking place, and continue through mosaic arable lands, with ditches of irrigation and drainage channels. OHL cross the Semani river and adjacent forest of riparian vegetation dominated by the White willow (*Salix alba)* and White poplar (*Populus alba)* galleries, the most sensitive habitat in the study area. Leaving behind the Semani river, the OHL continues through mosaic arable land/mixed agriculture land. In the hilly area, olive groves and vineyards, with scattered greenhouses, are the dominant characteristic of the landscape. From the hillside of Peshtani village the OHL goes downhill towards Fieri Substation, passing through degraded shrubs (degraded Mediterranean machia and garrigues).

This habitat type also occurs in scattered inland sites, in low areas behind the salt marshes and is often flooded in winter or spring, but the water table remains close to the surface all year long. Regarding salinity, this habitat forms a transitional stage between saltpans with exclusive halophytes and habitat slacking halophytic vegetation. This is because it develops on lighter soils compared to the heavy, loamy clays of the halophilous scrubs, and as such is less influenced by the underground sea water level and more influenced by the fresh groundwater of winter rains and floods.

From the botanical inventory during the field survey and secondary data, resulted a relatively high “α diversity” (specific biodiversity) on the surrounding area and new transmission line; c.a. 352 vascular plant species, or c.a. 10% of Albania’s flora, distributed in 79 families were identified.

Here as well the low number of *Phanerophytes* and high number of *Hemycriptophytes* indicate high level of degradation of the vegetation because of unsustainable practices (agriculture and grazing) and limited ecological conditions for the growth of tree species.

The chronological spectrum shows a great variability of the flora respecting various origins. From the chronological point of view, almost 50% of the species are of Mediterranean character.

Eight invasive species were identified along Overhead Transmission Line (OHL) Route: Dittrichia viscose L., Amaranthus albus L., (Olive grove and salt meadows as well as abandoned areas), Cuscuta campestris Juncher., (Agricultural land) Datura stramonium L., Erigeron canadensis (L.) Conquist., (Ruderal areas) Cercis siliquastrum L., (Mediterranean sclerophyllous shrubs), Arundo donax L. (Stream river habitats) and Eucalyptus globulus Labill. These species together with some thorny species like Rubus ulmifolius Schot., Crataegus monogyna Jacq., Ononis spinosa L., Rosa sempervirens L. etc., indicate a high level of human impact, and especially grazing impacts. The 8 identifed invasive species are described in more detail below:

- *Dittrichia viscose L*., as is mentioned before, is a flowering plant in the daisy family. Originally, the species was found mainly in dry riverbeds and abandoned fields up to a 1500 m elevation. Nowadays it is quite common in roadsides and ruderal habitats, even in urban

areas. It is considered a powerful invasive species covering almost all degraded areas of western Albania.

- *Amaranthus albus* is an annual species of flowering plant. It is native to the tropical Americas but a widespread introduced species in Albania and Europe.
- *Cuscuta campestris Juncher*. is native to central North America. It is a parasite of a wide range of herbaceous plants. and a pest of Lucerne and other legumes. It has become a widespread weed in agricultural land. It is known as 'golden dodder' in Australia.
- *Datura stramonium* likely origin was in Central America, and it has been introduced in many world regions, including Alabania. It is an aggressive invasive weed and ruderal specie, nowadays naturalised.
- *Erigeron canadensis* is an annual plant native throughout most of North America and Central America. It is also widely naturalized in Eurasia and Australia. Erigeron canadensis in the project zone is survived near ruderal areas along the ruderal roads and agriculture land.
- *Eucalyptus globulus* is a tree species originated by Australia and planted in Albania along the roads and as a break wind belt to protect the agricultural land from the strong wind. It is present in the project area crossed by the PL.
- *Cercis siliquastrum* is a small deciduous tree from Southern Europe and Western Asia which is noted for its prolific display of deep pink flowers in spring. It is also referred to as a traditional Palestinian plant for its origin. There is become common on the Mediterranean evergreen sclerophyllous shrubs and as an ornamental specie.
- *Arundo donax* grows in damp soils, either fresh or moderately saline, and is native to the Greater Middle East. It has been widely planted and naturalised in the mild temperate, subtropical and tropical regions of both hemispheres, especially in the Mediterranean, California, the western Pacific and the Caribbean. It forms dense stands on disturbed sites, sand dunes, in wetlands (especially channels and riparian habitats.



Figure 75 Species identified in the OHL project area

4.2.4.4. Protected Terrestrial Flora species within the Study Area

Based on the literature review and field investigation conducted in August, November 2020 and May 2021, a comprehensive list of flora species identified as Priority Biodiversity was compiled (see Table 27).

Based on analyses in the AoI database, none of the plant species is Globally Endangered in accordance with the IUCN Red List.

Based on the Albanian Red List, within the Area of interest there are 8 species under EN category and 7 species under VU category.

There are no species that under Annex II & IV of EU Directive EEA meet the criteria for Priority Biodiversity Features.

From Annex V plant species, the following are of community interest: *Ruscus aculeatus* L. part of Mediterranean coniferous forests and *Sclerophyllous* evergreen Mediterranean forests and shrubs.

Despite the presence of some lococally threatened plants, the CH Assessment report does not define any plant species as CH species.

Table 27: List of plant species identified as Priority Biodiversity inside the PDA and OHL

Species		IUCN Red List			Albania red list (2013)
Common name	Latin name	IUCN Status	Level	Trend	
Marram grass	Ammophila arenaria (L.) Link		Alb		EN
Egg-Shaped Goat Grass	Aegilops geniculata Roth.	LC	Globally	stable	
Aleuropus	Aeluropus litoralis (Gouan) Parl	LC	Mediterranean	stable	
Creeping Bent, Spreading	Agrostis stolonifera L.	LC	European	stable	
Water Plantain	Alisma plantago-aquatica	LC	Globally	stable	
Dyers' Alkanet,	Alkanna tinctoria L.	LC	European	unknown	
Rough Mallow	Althaea officinalis L.	LC	European	Decreasing	
Sea Ragweed	Ambrosia maritima L.	LC	Mediterranean	stable	
Wild angelica	Angelica Sylvestris L.	LC	Globally	stable	Wild angelica
Great Burdock	Arctium lappa L.	LC	European	stable	
Giant reed	Arundo donax L.	LC	Globally	unknown	
Narrow-leaved asparagus	Asparagus acutifolius L.	LC	Globally	unknown	
Summer Asphodel	Asphodelus aestivus Bot.	LC	Mediterranean	stable	
The lesser water plantain	Baldellia ranunculoides	NT	Globally	decreasing	VU
Spring Wild Oats	Avena fatua L.	LC	Globally	stable	
Flowering Rush	Butomus umbellatus L.	LC	European	stable	VU
Common Water-Starwort	Callitriche stagnalis Scop	LC	Globally	stable	
Hedge Bindweed	Calystegia sepium (L.) R. BR.	LC	Globally	unknown	
Shepherd's-purse	Capsella bursa-pastoris (L.) Medicus	LC	European	stable	
Distant sedge	Carex distans L.	LC	Globally	stable	

Species		IUCN Red List			Albania red list (2013)
Common name	Latin name	IUCN Status	Level	Trend	
Pendulous Sedge	Carex pendula Hudson	LC	Mediterranean	stable	
Remote sedge	Carex remota L.	LC	Globally	stable	
Greater Pond-Sedge	Carex riparia Cutis	LC	Mediterranean	stable	
Oriental Hornbeam	Carpinus orientalis Miller	LC	Globally	unknown	
Common Centaury	Centaurium erythraea Rafn.	LC	Globally	stable	
Judas tree	Cercis siliquastrum L.	LC	Globally	stable	
Chicory	Cichorium intybus L.	LC	European	stable	
Elk Sedge	Cladium mariscus	LC	Globally	stable	VU
Cornelian Cherry	Cornus mas L.	Lc	Globally	unknown	
Acute Swallow-Wort	Cynanchum acutum L.	LC	Globally	increasing	
Sharp-leaved grass	Crypsis aculeata (L.) Aiton	LC	Mediterranean	stable	
Sand Couch Grass	Elymus farctus (L.) P.Beauv.	LC	Globally	unknown	
Joint Pine	Ephedra distachya L.	LC	Globally	stable	EN
Marsh Horsetail	Equisetum palustris L.	LC	Globally	stable	
Branched Horsetail	Equisetum ramosissimum Desf.	LC	Globally	stable	
Great Horsetail	Equisetum telmateia Ehrh.	LC	Europe	increasing	
Ravenna cane	Erianthus ravennae (L.) Beauv.	LC	Globally	stable	
Fennel	Foeniculum vulgare Miller	LC	European	increasing	
Narrow Leaved Ash	Fraxinus angustifolia Vahl.	LC	Globally	unknown	
Goat's Rue	Galega officinalis L.	LC	European	stable	
Goosegrass	Galium aparine L.	LC	European	stable	
Water Bedstraw	Galium palustre L.	LC	Globally	unknown	
Sea-poppy	Glaucium flavum Crantz		Alb		EN
Gratiola	Gratiola officinalis L.	Lc	Globally	stable	
Squirrel tail-grass	Hordeum marinum Hudson.	LC	Globally	stable	
Squirrel tail-grass	Hordeum murinum L.	LC	Globally	stable	
Perforate St. John’s wort	Hypericum perforatum L.		Alb		EN
Woolly Grass	Imperata cylindrica L	LC	European	stable	
Yellow iris	Iris pseudacorus L.		Alb		VU

Species		IUCN Red List			Albania red list (2013)
Common name	Latin name	IUCN Status	Level	Trend	
Yellow iris	Iris pseudacorus L.	LC	Globally	stable	
Spiny rush	Juncus acutus L.	LC	Globally	unknown	
Round-fruited Rush	Juncus compressus Jacq.,	LC	Mediterranean	stable	
Hard rush	Juncus inflexus L.	LC	Mediterranean	unknown	
Coastal Rush	Juncus littoralis C. A. Meyer	NT	Mediterranean	Deacreasing	
Compact rush	Juncus conglomeratus L.	LC	Globally	stable	
Soft Rush	Juncus effusus L.	LC	Globally	stable	
Multiflowered Rush	Juncus subulatus Forssk.	LC	Globally	stable	
Prickly juniper	Juniperus oxycedrus L.	LC	Globally	stable	VU
Lentile Water	Lemna minor L.	LC	Globally	stable	
Coastal Rush	Luzula forsteri (Sm.) DC.	LC	Globally	unknown	
Gipsy-Wort	Lycopus europaeus L.	LC	Globally	stable	
Purple Loosestrife	Lythrum salicaria L.	LC	Globally	stable	
Three-Horned Stock	Matthiola tricuspidata (L.) R. Br.		Alb		EN
Sea Medick	Medicago marina L.	LC	Europe	stable	
Water Mint	Mentha aquatica L.	LC	Globally	stable	
Spiked Water Milfoil	Myriophyllum spicatum	LC	Globally	stable	
Common myrtle	Myrtus communis L.	LC	Globally	stable	
Green Winged Orchid	Orchis morio (L.) R.M.Bateman	NT	Europe	decreasing	
Sea Daffodil	Pancratium maritimum L.		Alb		EN
Water-Pepper	Persicaria hydropiper (L.) Delabre	LC	Globally	stable	
Reed Grass	Phalaris arundinacea L.	LC	Globally	unknown	
Broad-Leaved Phillyrea	Phillyrea latifolia L.	LC	Globally	stable	
Common Reed	Phragmites australis (Cav). Trin.	LC	Globally	stable	
Ribwort Plantain	Plantago lanceolata L.	LC	Globally	stable	
Greater Plantain	Plantago major L.	LC	Globally	unknown	
Smooth-Stalked Meadow-Grass	Poa pratensis L.	LC	Globally	stable	
Pale Persicaria	Polygonum lapathifolium L.	LC	Globally	unknown	
White poplar	Populus alba L		Alb		VU

Species		IUCN Red List			Albania red list (2013)
Common name	Latin name	IUCN Status	Level	Trend	
Black poplar	Populus nigra L.	DD	Globally	unknown	
Fennel Pondweed	Potamogeton pectinatus (L.)	LC	Globally	stable	
Tormentil	Potentilla erecta (L.) Raeusch.	LC	Europe	stable	
Pseudorlaya	Pseudorlaya pumila (L.) Grande	LC	Globally	stable	
Bracken	Pteridium aqualinum L. Kunth	LC	European	increasing	
Hungarian oak	Quercus frainetto Ten.	LC	Globally	stable	
Common Water Crowfoot	Ranunculus aquatilis L.	LC	Globally	stable	
Wild Radish	Raphanus raphanistrum	LC	Globally	stable	
Alatern	Rhamnus alaternus L.	LC	Globally	stable	
Iceland Yellowcress	Rorippa amphibia (L.) Besser	LC	Globally	stable	
Creeping Yellowcress	Rorippa sylvestris Besser	LC	Globally	stable	
Sorrel	Rumex hydrolapathum Hudson	LC	Globally	stable	
Arrow-Head	Sagittaria sagittifolia L.		Alb		VU
White willow	Salix alba L.	LC	Globally	stable	
Gray willow	Salix eleagnos Scop.	LC	Globally	stable	
Seaside brookweed	Samolus valerandi L.	LC	Globally	unknown	
Bog-Rush	Schoenus nigricans L.	LC	Globally	stable	
Maritime club-rush	Scirpus triqueter	LC	Globally	stable	
Thorny smilax	Smilax aspera L	LC	European	unknown	
Bittersweet	Solanum dulcamara L.	LC	European	stable	
Small-Flowered Tamarisk	Tamarix parviflora	LC	Globally	stable	
Black Bryony	Tamus communis (L.) Caddick & Wilkin	LC	European	stable	
Narrowleaf crimson clover	Trifolium angustifolium L.	LC	Globally	stable	
Burrowing Clover	Trifolium subterraneum L.	LC	Globally	stable	
Barrelier's Arrow-Grass	Triglochin bulbosa L	LC	Globally	stable	
Marsh Arrow-Grass	Triglochin maritima L	LC	Globally	stable	
Coltsfoot, Bull's Foot	Tussilago farfara	LC	European	stable	
Lesser Bulrus	Typha latifolia L.	LC	Globally	stable	
Common Elm	Ulmus minor Miller		Alb		VU
Water Speedwell	Veronica anagallis-aquatica	LC	Globally	unknown	
Large-flowered vetch	Vicia grandiflora L.	LC	Europe	stable	

All flora species are assessed against criteria and conditions of PBF and CH accordingly, following EBRD PR 6 and IFC PS 6. Priority was given to threatened species at global, European, Mediterranean and national scale. IUCN Red List and National Red List (2021) threat status of the species has been taken into consideration, along with distribution range of the species at global, regional and national scale, so as to assess the ecological importance of the study area for threatened flora species.

The research resulted in 7 plant species enlisted as Priority Biodiversity Features. All of the species are nationally threatened. 6 species are considered Endangered in Albania, only one species, the Lesser Water Plantain Baldellia ranunculoides, is considered as Critically Endangered at national level.

- Marram grass Ammophila arenaria
- Joint Pine Ephedra distachya
- Sea-poppy Glauchum flavum
- Perforate St. John's wort *Hypericum perforatum*
- Three-Horned Stock Matthiola tricuspidate
- Sea Dalfodil Pancratium maritimum
- The lesser water plantain *Baldellia ranunculoides*

These species were not found within the PDA site area itself, but can be found between the PDA and seashore within the potential area of influence (AoI) (as defined in the ESIA i.e., within 2km of the PDA).

According to the Critical Habitat Assessment report, respecting the provisions of IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources guidance notes (IFC, 2012) and the accompanying Guidance Note 6 (IFC, 2018).**There are no plant species fulfilling the criteria for Critical Habitat.**

Threatened/endemic plant species that are subject to CHA were assessed against numeric thresholds as per Criteria 1 (PS6) - ii (PR6) & (PS6) - iii (PR6) within the CHA Report, which concluded that there were no plant species as qualifying as Critical Habitat under these criteria. For more information and conclusions on this assessment please refer to CHA Report.

4.2.4.5. Key / Focus Species relevant to Project

Following EBRD PR 6 and IFC PS 6 criteria and conditions applied for Critical Habitats, none of the species of the terrestrial fauna meet the criteria for critical habitat assessment. However, a number of species are key species relevant to the project and are assessed in the following table:

Table 28: Typical protected species of plants in the PDA and along OHL Route

Scientific Name: **English Name** **Local Name**	**Conservation status: IUCN/ AlbRDB**	**Habitats and population - interaction with Karavasta PDA and OHL Route**
Ephedra distachya L. Gjunjëz bregdetare	LC/EN	Part of Sea dunes of the Mediterranean coast vegetation. Endangered species under the Albania Red List. This species potentially could be, but has not been recorded during the field surveys conducted in August and November, 2020. This needs further investigation next spring (2021).
Butomus umbellatus L. Flowering Rush Bliqën	LC/VU	Part of Canals/water environment. It is inventoried on the channels transacted by the NTL.

Scientific Name: English Name Local Name	Conservation status: IUCN/ AlbRDB	Habitats and population - interaction with Karavasta PDA and OHL Route
Cladium mariscus Elk Sedge klad si fik i egër	LC/VU	Part of Salt Marsh and meadows vegetation (1310/1420)
Juniperus oxycedrus L. Prickly juniper Dellinja e kuqe	LC/VU	Part of Coastal Coniferous Forest - dominated by *Pinus halepensis* and *P. Pinea* (2270).
Quercus robur	/VU	Part of Stream/River Habitat (Running Water – 92A0)

4.2.4.6. Summary

The PDA area has been impacted by different human activities like swamp reclamation and intensive agricultural practices. Agricultural activities have recently been reduced and the zone is abandoned due to the high salt content of the soil. These have fostered a natural succession of the salt meadow vegetation, used as shelter and nestle by wild animals (especially birds).

The OHL route passes through abandoned agriculture land with natural successions to former brackish and salt marshes taking place, and continues through mosaic arable lands, with ditches of irrigation and drainage channels. The OHL cross the Semani river and adjacent forest of riparian vegetation dominated by the White willow and White poplar galleries, which is considered the most sensitive habitat in the study area. The OHL continues through mosaic arable land/mixed agriculture land.

4.2.5. Terrestrial Fauna

4.2.5.1. Introduction

This section on terrestrial fauna (mammals, reptiles and amphibians) in the project development area (PDA) of Karavasta Photovoltaic (PV) and Overhead Transmission Line (OHL) corridors aim at describing (i) species richness within the broader study area and in the area that is directly or indirectly influenced by the PV project during construction and operation phases; (ii) identify the priority biodiversity features (PBFs) related with terrestrial fauna encountered in the study area and critical habitats (if triggered and appropriate), and (iii) the implications of the PBFs with the PV project and OHL.

4.2.5.2. Survey Methodology & Data Sources

Environmental baseline data on terrestrial fauna are collected through primary surveys, specialist studies and observations made during site visits, as well as secondary sources by literature survey, and interviews with local people (farmers) and fishermen met in the field.

Secondary information for the baseline is sourced from publicly available information including current scientific literature, non-technical literature (environmental reports, articles, and other available EIA and SEA documents), online databases and other secondary data sources.

Terrestrial fauna surveys were focused, but not limited in the following animal taxa:

- Bats (all species: roosting sites, foraging areas)
- Other mammals, such as otter, badger, polecat, jackal, dormice
- Amphibians & Reptiles, such as frogs & toads, tortoise, terrapin, pond turtle, snake etc.

Any species (bat, mammal, reptile and amphibian) present that are listed as Critically Endangered or Endangered on the IUCN Red List, nationally/regionally important including those included on the Albanian

Red List and/or subject to provisions of Albanian legislation shall be shown on a map. GPS coordinates of any such 'priority' species shall be recorded.

Satellite imagery and aerial photographs were used to select sample sites with suitable habitat for 'priority' species within the PDA and along the OHL route, such as woodland edges, watercourses (irrigation channels, ditches), abandoned buildings and bunkers. The survey visits were undertaken in suitable conditions for recording signs of species activity by avoiding strong winds and prolonged heavy rain.

Experienced ecologists (comprising an expert leader and one field assistants) familiar with methods to find, detect and able to identify species (bat, mammals, amphibians and reptiles) carried out the survey. Where noted, all signs of species activity have been plotted on a suitable scale map to show the location where recorded together with GPS coordinates to ascertain accurate locations. A description of the habitat type, suitability, and quality to support 'priority' species (priority biodiversity features) has been prepared to enable an estimate to be made of the likely carrying capacity of the habitat/population size.

The survey information has been reviewed against available published population estimates from the wider area to establish their relative nature conservation value on a geographic scale.

Further detail Scope for each of the above on the field surveys is provided below:

Bats

The survey was undertaken in August and November 2020 and May 2021. Two types of bat surveys were undertaken as follows:

Transect Surveys: Select 1 km transect routes within habitats likely to be used by bats within the PV Project area and OHL corridor. 3 survey visits at monthly intervals during August/September 2020 and May 2021 were undertaken to record further details about species commuting/foraging flight paths. A portable bat detector sound recording equipment was used to assist with species identification on transect surveys. Three 1km transects routes in 4-5 km distance from selected OHL and a 1 km transect route within the PV Project site.

Roosting Surveys: Based on transect survey findings, a search during daylight for features such as, trees with woodpecker holes, lifted bark, other cavities etc., buildings and bunkers that occur in the project area suspected for significant roosts for bats was undertaken.

Other Mammals

The survey has been undertaken between August and November 2020 and May 2021, when mammal species can be identified from signs in the field or direct observation. Two 1 km transects in each sample site within the Project site and OHL route for mammals was undertaken. Orientate some transects parallel to watercourses across Project site to search for signs of otter (*Lutra lutra*), badger (*Meles meles*), polecat (*Mustela putorius*), golden jackal (*Canis aureus*) and other riparian mammals. Map the location and route/extent of each transect on a map.

Transects were walked through 3 times in suitable weather between August and November 2020 to identify and record signs of mammal activity or presence including:

- Footprints, tracks, and pathways;
- Latrines and droppings;
- Shelters, burrows and dens; and,
- Feeding remains.

Amphibians and Reptiles

The survey was undertaken between August, November 2020 and May 2021 when amphibian and reptile species can be identified in the field through direct observation.

Two 1 km transects in each sample site within the PV Project area and along the OHL route suitable for amphibians and reptiles was undertaken. Some transects were oriented parallel to watercourses across PDA to search for presence signs and breeding frogs, toads, and pond turtles. The location and route/extent

of each transect was mapped out. Transects were walked 3 times in suitable weather between August, November 2020 and May 2021 to identify and record signs of activity or presence.

The location of the surveys undertaken are presented in Figure 76 below:

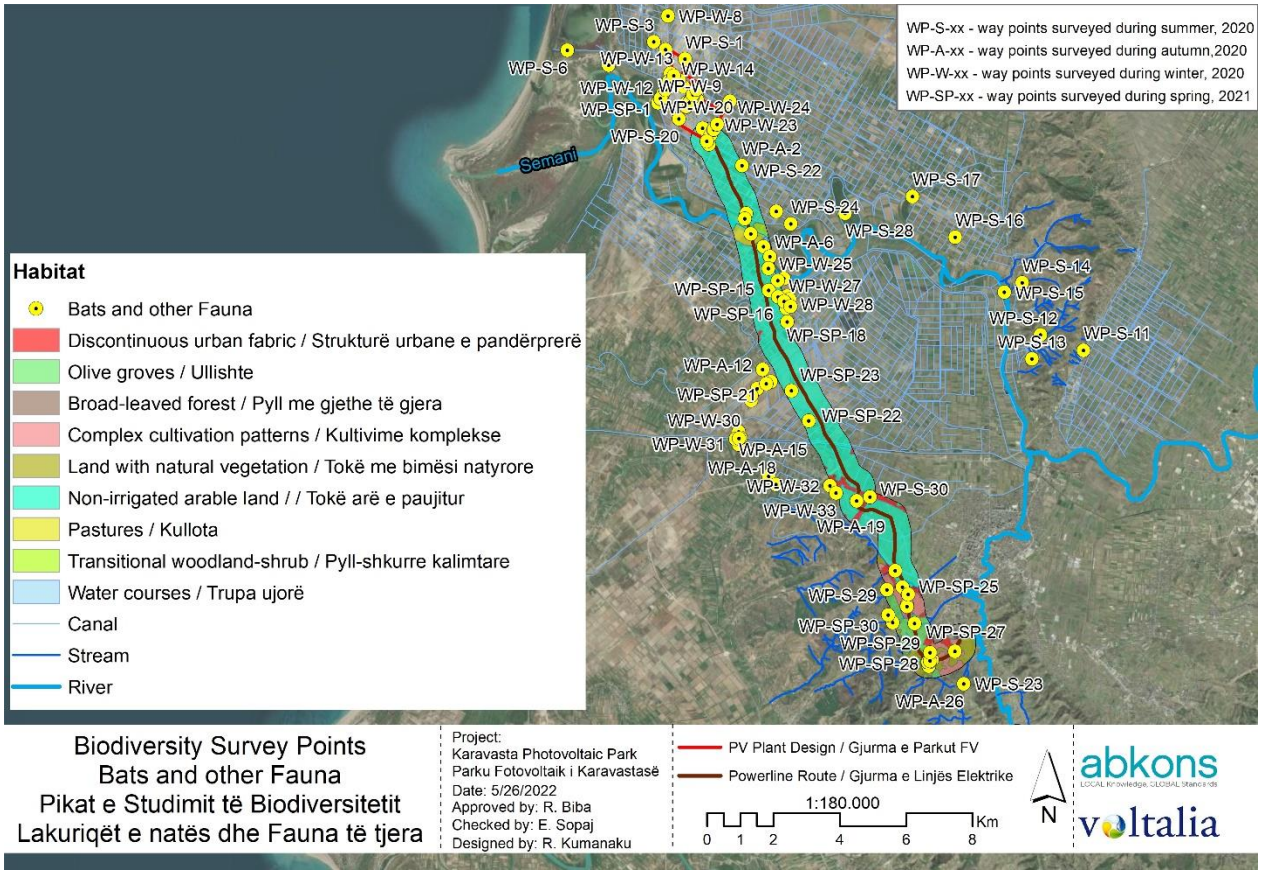


Figure 76. Bats and other Fauna survey points

4.2.5.3. General Description

4.2.5.3.1. PV Project Development Area

The PDA is situated on an abandoned agricultural land over the last 30 years, after the collapse of the communist regime, in which the natural successions towards formerly brackish and salt marshes are taking place. Irrigation channels are not operational, while the third-grade drainage channels are not maintained and secondary and primary channels draining the area towards the pumping station to “Emisari i Myzeqese”, pushing the water towards the Adriatic Sea. Proximity to the sea and the low altitude of the PDA, the operation regime of the pumping station, the seasonality in precipitation and the evaporation rate during the dry summer season make the PDA a salty marshland rather than an agriculture land. Most dominant plant species are *Salicornia europaea, Juncus maritimus, Tamarix parviflora, Phragmites australis*. Drainage channels and some temporary small rain-fed pools or ponds in depressions and along the third-grade not maintained drainage channels provide freshwater biotopes and habitats used as breeding and feeding grounds for amphibians and aquatic reptiles, and feeding grounds for otter, badger and jackal.



Figure 77. View over the PDA from the intersection of the Southern and Western borderlines (Fauna Datasheet- Picture 8456).



Figure 78. Temporary rain-fed pond inside the PDA. WP013 (heading NE) (Fauna Datasheet- Picture 453)



Figure 79. View of the PDA from WP004 (heading West): abandoned agriculture land under the natural succession processes towards salt marshes (Fauna Datasheet- Picture 8492).



Figure 80. Drainage channel inside the PDA area, recently maintained with removal of vegetation along the bank (WP007, heading South) (Fauna Datasheet- Picture 8517).

Primary drainage channels such as Emisari i Myzeqese and the one west of PDA have thick galleries of *Phragmites australis*, while the vegetation along the second-grade drainage channels is missing due to cleaning activity/works undertaken by the Drainage Board of Fieri on regular basis. However, these channels, with presence of fish and frogs attract the otter and other predators that use these network of channels as feeding grounds and corridors during their daily commuting in the study area, between Semani river and Emisari i Myzeqese. It should be noted that May 2021 field survey did not confirm the breeding of the Albanian water frog (*Pelophylax shqipericus*) inside the PDA, although it did provide with evidence of breeding for other frogs such as Pelophylax kurtmuelleri, Hyla arborea and Rana dalmatina, as well as for the European pond turtle (Emys orbicularis).



Figure 81. View over the primary drainage channel "Emisari i Myzeqese", NW of PDA area (WP001, heading West). (Fauna Datasheet- Picture 353).



Figure 82. Cleaning operations under way along the secondary drainage channel, parallel to Emisari i Myzeqese (WP005, heading West), (Fauna Datasheet- Picture 386).

The drainage channels and open terrains of salty marshes provide foraging grounds for pipistrelle bats. There are 2-3 military bunkers inside the PDA and they were checked for presence of any bats' roosting in three seasons.



Figure 83. Bunker along the western borderline of the PDA, checked for bats presence (WP001) (Fauna Datasheet- Picture 8458).



Figure 84. Bunker along the drainage channel (WP009. Heading North): bats activity (droppings) was observed inside the bunker during summer visit in PDA (August 2020) (Fauna Datasheet- Picture 8526).

Pre-construction survey [51]

During the field survey, carried out from to 30 - 31 May 2022, only in 2 habitats (segments from two drainage channels) was identified the presence of the endemic Albanian frog (P. shqipericus). (Refer to Figure 91) Their survey was conducted with the fre eye and 6 adult individuals of P. shqipericus have been caught with a simple net and then released again in their habitat. The total, around 35 individuals of P. shqipericus have been observed, but the population can be very high because the canals were covered with dense vegetations and the observation of them it was only for the individuals on surface of the water. The length of the segment of the channel (ID 1) with water and with presence of the Albanian Water Frog is 196.28 m and this habitat is fragmented. The water level in the canal was approximately 15 cm and the average temperature was 15^0C. Assessing the hot microclimate of the area, the level of land salt and the

[51] Results and Summary from Albanian Water Frog Pre-construction Survey REPORT

fragmentation of the channel with fresh water to the channal, the channal is very likely to dry out at the end of June, July and August. In this sampling point are sampled 3 adults Albanian Water Frog.

The length of the segment of the channel (ID 2) with water and with presence of the Albanian Water Frog is 95.28 m and this habitat is fragmented. The water level in the canal was approximately 15 - 20 cm and the average temperature was 17. Assessing the hot microclimate of the area, the level of land salt and the fragmentation of the channel with fresh water to the channal, the channal is very likely to dry out at the end of June, July and August. In this sampling point are sampled 3 adults Albanian Water Frog and the total no. of frogs is 18.

In the pre-construction biodiversity survey, no habitat, flora and fauna are found inside the bunker.

Overhead Transmission Line (OHL) Route

The OHL route starts at PDA where abandoned agriculture land with natural successions to former brackish and salt marshes are taking place, and continues through mosaic arable lands, with ditches of irrigation and drainage channels. OHL route crosses the Semani river and adjacent forest of riparian vegetation dominated by the White willow (*Salix alba)* and White poplar (*Populus alba)* galleries, the most sensitive habitat in the study area. Leaving behind the Semani river, OHL continues through mosaic arable land/mixed agriculture land, while in the hilly area olive groves and vineyards, with scattered greenhouses are the dominant characteristic of the landscape. From the hillside of Peshtani village the OHL goes downhill towards Fieri Substation, passing through degraded shrubs (degraded Mediterranean machia and garrigues).

Drainage channels of 1st and 2nd grade intersected by the OHL route confirmed their importance as breeding and feeding ground for frogs, including the endemic species, Albanian water frog (Pelophylax shqipericus), and the European pond turtle (Emys orbicularis). They are also used as an important feeding ground by water snakes (Natrix natrix and N. tessellata) and otters (Lutra lutra).



Figure 85. Southern border line of PDA area where the OHL Fier-Hoxhare starts (WP021, heading West) (Fauna Datasheet- Picture 522).



Figure 86. Riparian vegetation on both sides of riverbanks of Semani river (WP025, heading NW) (Fauna Datasheet- Picture 565).



Figure 87. OHL 220 kV Fier-Hoxhare alignment passing through arable land (WP028, heading North) (Fauna Datasheet- Picture 594).



Figure 88. Hoxhara drainage channel intersected by OHL; thicket of reeds (*Phragmites australis*) on both sides (WP031, heading East) (Fauna Datasheet- Picture 612).



Figure 89. OHL 220 kV heading towards Fieri Sub Station, passing through gentle hills covered with olive groves (WP036, heading North) (Fauna Datasheet- Picture 661).



Figure 90. OHL 220 kV heading towards Fieri Sub Station, passing through gentle hill slopes covered with small patch of degraded natural vegetation, shrubs, and olive groves (WP037, heading East) (Fauna Datasheet- Picture 674).

4.2.5.4. Protected Terrestrial Fauna species within the Study Area

Based on literature review and field work conducted in August, November 2020 and May 2021 a full list of terrestrial fauna was compiled (see Table 29 and Table 30) 34 species of mammals out of 86 terrestrial mammal species of Albania are hosted within the wider study area, out of which 20 species were recorded/observed during the field surveys, while the presence of other species is potential or presumed present due to habitat suitability and presence in the areas nearby. 5 species of bats out of 9 occurring in the wider study area (*Rhinolophus ferrumequinum, Myotis myotis, Pipistrellus pipistrellus, P. kuhli, P. nathusii*) are observed and/or recorded through bat detecting, of which only 2 species (*P. kuhlii and P. pipistrellus*) were recorded flying over the PDA, using this site as part of their forage grounds. Pipistrelle bats hunt over within the PDA, while *Rhinolophus ferrumequinum* and *Myotis myotis* were observed inside the military bunkers at the top of the hill, west of Fieri city. The newly selected OHL route Fier-Hoxhare is not intersected with the military bunkers, and therefore, no direct impact on this bat roosting site is anticipated.

Table 29: Mammal species occurring in the wider Karavasta PV study area and TL

Mammal Species		Habitat (Atlas, 1997)	Protection status (IUCN, 92/43/EU)	Atlas of European Mammals, 1997	Bego, et al, (2018)	Benda et al. 2019	Albania Red List (2013)
Latin Name	**Common name**						
Erinaceus roumanicus	Eastern hedgehog	Agriculture land	None	X	X		
Crocidura leucodon	Bi-coloured white-toothed shrew	Agricultural landscapes	Bern Convention (III)	X			
Crocidura suaveolens	Lesser white-toothed shrew	Wide variety of habitats. Avoide dence forests	Bern Convention (III)	X	X		
Suncus etruscus	Pygmy white-toothed shrew	Olive groves and vineyards with old dry stone, low maquis and open forests	Bern Convention (III)	X			DD
Talpa stankovici	Balkan mole	Open habitats	None	X	X		
Rhinolophus ferrumequinum	Greater horseshoe bat	Warm caves, mines, permanent pastures and deciduous woodlands	Annex II & IV	X		X	LRcd
Rhinolophus euryale	Mediterranean horseshoe bat	Caves and artificial shelters	Annex II & IV, VU	X		X	VU
Rhinolophus hipposideros	Lesser horseshoe bat	Caves, riparian vegetation	Annex II & IV, NT	X		X	LRnt
Myotis capaccinii	Long-fingered bat	Caves not far from water bodies	Annex II & IV, VU	X	X	x	LRcd
Myotis myotis	Greater mouse - eared bat	Caves and mines	Annex II & IV	X		X	
Pipistrellus kuhlii	Kuhl's pipistrelle	Urban, lowland basins	Annex IV	X		X	
Pipistrellus nathusii	Nathusius Pipistrelle	Mixed and pine forests, riparian	Annex IV	X		X	
Pipistrellus pipistrellus	Common pipistrelle	Farmland, woodland, lakes	Annex IV	X		X	
Pipistrellus pygmaeus	Soprano pipistrelle	Rooftops and houses, riparian	Annex IV			X	
Lepus europaeus	Brown hare	Open woodland, farmland, steppes	Bern Convention (III)	X			

Mammal Species		Habitat (Atlas, 1997)	Protection status (IUCN, 92/43/EU)	Atlas of European Mammals, 1997	Bego, et al, (2018)	Benda et al. 2019	Albania Red List (2013)
Latin Name	**Common name**						
Sciurus vulgaris	Red squirrel	forests	Bern Convention (III)	X		X	LRnt
Apodemus flavicollis	Yellow-necked mouse	woodlands	none	X	X		
Apodemus epimelas	Rock mouse	Rock wit crevices	none	X	X		
Apodemus sylvaticus	Wood mouse	Extremely variable	none	X	X		
Rattus norvegicus	Brown rat	River banks	none	X			
Rattus rattus	Black rat	Farmland, islands, human settlements	none	X			
Mus domesticus	Western house mouse	Commensal, wide range of habitats	none	X			
Mus macedonicus	Balkan short-tailed mouse	Wide range of habitats	none		X		
Mus musculus	Eastern house mouse	Agriculture, meadows, shrublands, buildings	none		X		
Microtus thomasi	Thomas pine vole	Grasslands and crop fields below 600 m als	none	X	X		LRnt
Glis glis	Fat dormouse	Forests of beech, oak and chestnut	Bern Convention (III)	X	X		LRlc
Muscardinius avellanarius	Common dormouse	Mixed deciduous forests	Annex IV	X	X		DD
Vulpes vulpes	Red fox	All types of forests and open landscapes	none	X			
Canis aureus	Golden jackal	Open terrains and landscapes, wetlands and marshes	Annex V	X			VU
Mustela nivalis	Weasel	Wide range of habitats	Bern Convention (III)	X			
Mustela putorius	Western polecat	Lowland habitats, sand dunes, forest fringes and river valleys	Bern Convention (III)	X			EN

Mammal Species		Habitat (Atlas, 1997)	Protection status (IUCN, 92/43/EU)	Atlas of European Mammals, 1997	Bego, et al, (2018)	Benda et al. 2019	Albania Red List (2013)
Latin Name	**Common name**						
Martes foina	Beech Marten	Mountains, farmlands, woodlots, suburban areas	Bern Convention (III)	X			LRnt
Meles meles	Badger	Deciduous and mixed woods, coniferous, hedges, scrub, agriculture, suburban areas	Bern Convention (III)	X			EN
Lutra lutra	Otter	Rivers, streams, lakes, wetlands and coasts	Annex II & IV	X			VU

The presence of hazelnut dormouse (*Muscardinus avellanarius*) is revealed by the examination of the barn owl pellets collected at Shen Kolli church (Vajkan village) during the August field survey, indicating that the hills with Mediterranean shrubs and oak woodland provide suitable habitat for this species. However, the newly selected OHL does not pass this hilly area of Vajkan, and therefore the habitat of this species will not be impacted by the PDA or OHL.

Presence of otters (*Lutra lutra*), badger (*Meles meles*) and golden jackal (*Canis aureus*) was confirmed within the PDA and adjacent drainage channels, including Semani river, while red fox is most widespread in the whole study area. Semani river, and Riparian forest, together with a network of primary and second grade drainage channels provide important habitats for otters, as they provide feeding grounds and commuting corridors for the species. Badger presence was also confirmed in the hilly areas with olive groves and patches of remaining shrubland vegetation, West and SW of Fieri city. (See pictures in the 0)

A high number of mammals, especially small mammals (rodents and insectivores), are linked with mosaic agriculture land and human settlements (synanthropic species), and therefore they are abandoned and of low conservation interest. Some of them are even considered pest animals (voles, rats and mice).

Herpetofauna (Amphibians and Reptiles) of the PDA and OHL is composed of 6 amphibians (out of 16 amphibian species recorded in Albania) and 23 reptiles (out of 43 species reported in Albania). Two frog species (*Rana dalmatina* and *Hyla arborea*) are Annex IV of EU HD, while one species (*Pelophylax shqipericus*) is an endemic species of Albania and Montenegro, estimated as Vulnerable species (VU) by the IUCN. This species distribution is limited along the coastal area of the two countries and its presence was confirmed along the, drainage channels network of the project footprint intersected by the OHL route, but not inside the PDA. The May 2021 field survey confirmed the breeding evidence of P. Shqipericus in primary and second grade drainage channels crossed by the OHL route, although in lower numbers than other sibling frog species (P. kurtmuelleri). Presence of 3 frog species (*Pelophylax kurtmuelleri, Rana dalmatina* and *Hyla arborea*) was confirmed in the PDA and along the drainage channels intersected by the OHL route.

From 23 reptile species, the presence of 11 species was confirmed during the field surveys of August and November, 2020, and May 2021. However, the presence of other species in the PV project footprint is probable provided the suitable habitats and presence of the species reported by other surveys in the wider area. 13 species meet criteria of PBFs, and the presence of 6 species inside the project footprint was confirmed (*Testudo hermanni, Emys orbicularis, Podarcis muralis, Podarcis turcicus/ionicus, Zamenis longissimus, Natrix tessellata*), while the presence of the remaining species is likely inside the project footprint. One of the species of special conservation value is the Balkan terrapin (*Mauremys rivulata*), which is assessed as vulnerable (VU) in Albania. However, the presence of the speciesalso very likely in the

stagnant waters along the drainage channels of the PDA and its proximity was not confirmed in spite of efforts made during May 2021 field survey in the area. The European Pond turtle (*Emys orbicularis*) was confirmed in few places along the drainage channels of the PDA and those intersected by the OHL route, an indication that this species is more common than terrapin (see0).

Table 30: Amphibian and reptile species occurring in the wider study area of Karavasta PV area and OHL

Amphibian and Reptile Species		Habitat (IUCN)	Protection status (IUCN Red List, 92/43/EU)	Szabolcs et.al. (2017)	Mizsei et. Al. (2017)	Albania Red List (2013)
Latin Name	**Common name**					
Amphibians						
Pelophylax shqipericus	Albanian water frog	Wetlands (inland)	VU (Native of Albania and Montenegro)	X		NE
Pelophylax kurtmuelleri	Balkan frog	Terrestrial, Freshwater (=Inland waters)	LC	X		NE
Bufo bufo	Common toad	Terrestrial, Freshwater (=Inland waters)	LC	X		LRnt
Bufotes viridis/variabilis	European green toad	Terrestrial, Freshwater (=Inland waters)	LC	X		LRnt
Rana dalmatina	Agile frog	Terrestrial, Freshwater (=Inland waters)	Annex IV, LC	X		LRlc
Hyla arborea	European tree frog	Terrestrial, Freshwater (=Inland waters)	Annex IV, LC	X		LRcd
Reptiles						
Ablepharus kitaibelli	European copper skink	Forest, Grassland, Shrubland, Artificial/Terrestrial	Annex IV, LC		X	NE
Anguis fragilis/graeca	Slow worm	Shrubland, Artificial/Terrestrial, Forest, Grassland	LC		X	NE
Dolichophis caspius	Caspian whipsnake	Shrubland, Artificial/Terrestrial, Rocky areas (eg. Inland cliffs, mountain peaks), Forest, Grassland	Annex IV, LC		X	NE
Elaphe quatuorlineata	Four-lined snake	Shrubland, Wetlands (inland), Artificial/Terrestrial, Forest	Annex II & IV, NT		X	CR
Emys orbicularis	European pond turtle	Terrestrial, Freshwater (=Inland waters)	Annex II & IV, NT		X	LRnt

Amphibian and Reptile Species		Habitat (IUCN)	Protection status (IUCN Red List, 92/43/EU)	Szabolcs et.al. (2017)	Mizsei et. Al. (2017)	Albania Red List (2013)
Latin Name	**Common name**					
Hemidactylus turcicus	Mediterranean house gecko	Artificial/Terrestrial, Shrubland, Marine Intertidal, Rocky areas, Caves and Subterranean Habitats (non-aquatic)	LC		X	LRcd
Hierophis gemonensis	Balkan whip snake	Artificial/Terrestrial, Shrubland	LC		X	NE
Lacerta trilineata	Balkan green lizard	Artificial/Terrestrial, Shrubland	Annex IV, LC		X	LRcd
Lacerta viridis	European green lizard	Shrubland, Artificial/Terrestrial, Forest, Grassland	Annex IV, LC		X	LRcd
Malpolon insignitus	Eastern Montpellier snake	Shrubland, Artificial/Terrestrial, Rocky areas (eg. Inland cliffs, mountain peaks), Forest, Grassland, Desert	LC		X	NE
Mauremys rivulata	The Balkan terrapin	Terrestrial, Freshwater (=Inland waters)	Annex II & IV, LC		X	VU
Mediodactylus kotschyi	Kotschy's gecko	Artificial/Terrestrial, Shrubland, Rocky areas (eg. Inland cliffs, mountain peaks)	Annex IV, LC		X	NE
Natrix natrix	Grass snake	Terrestrial	LC		X	NE
Natrix tessellata	Dice snake	Artificial/Aquatic & Marine, Artificial/Terrestrial, Wetlands (inland), Grassland, Marine Coastal/Supratidal, Marine Neritic	Annex IV, LC		X	NE
Platyceps najadum	Dahl's whip snake	Shrubland, Artificial/Terrestrial, Rocky areas (eg. Inland cliffs, mountain peaks), Forest, Grassland	Annex IV, LC		X	LRcd
Podarcis muralis	Common wall lizard	Shrubland, Artificial/Terrestrial, Forest, Rocky areas (eg. Inland cliffs, mountain peaks), Grassland	Annex IV, LC		X	NE

Amphibian and Reptile Species		Habitat (IUCN)	Protection status (IUCN Red List, 92/43/EU)	Szabolcs et.al. (2017)	Mizsei et. Al. (2017)	Albania Red List (2013)
Latin Name	**Common name**					
Podarcis tauricus/ionicus	Balkan wall lizard	Artificial/Terrestrial, Shrubland, Grassland	Annex IV, LC		X	LRnt
Pseudopus apodus	Giant glass lizard	Shrubland, Artificial/Terrestrial, Forest, Grassland	Annex IV, LC		X	LRnt
Telescopus fallax	European cat snake	Heathlands and shrubs, sparsely vegetated land	Annex II & IV, LC		X	LRlc
Testudo hermanni	Hermann's tortoise	Artificial/Terrestrial, Shrubland, Forest	Annex II & IV, NT		X	LRnt
Vipera ammodytes	Horned viper	Shrubland, Artificial/Terrestrial, Rocky areas (eg. Inland cliffs, mountain peaks), Forest	Annex IV, LC		X	LRnt
Zamenis longissimus	Aesculapian Rat snake	Shrubland, Artificial/Terrestrial, Forest, Rocky areas (eg. Inland cliffs, mountain peaks), Grassland	Annex IV, LC		X	EN
Zamenis situla	Leopard snake	Artificial/Terrestrial, Shrubland	Annex II & IV, LC		X	CR

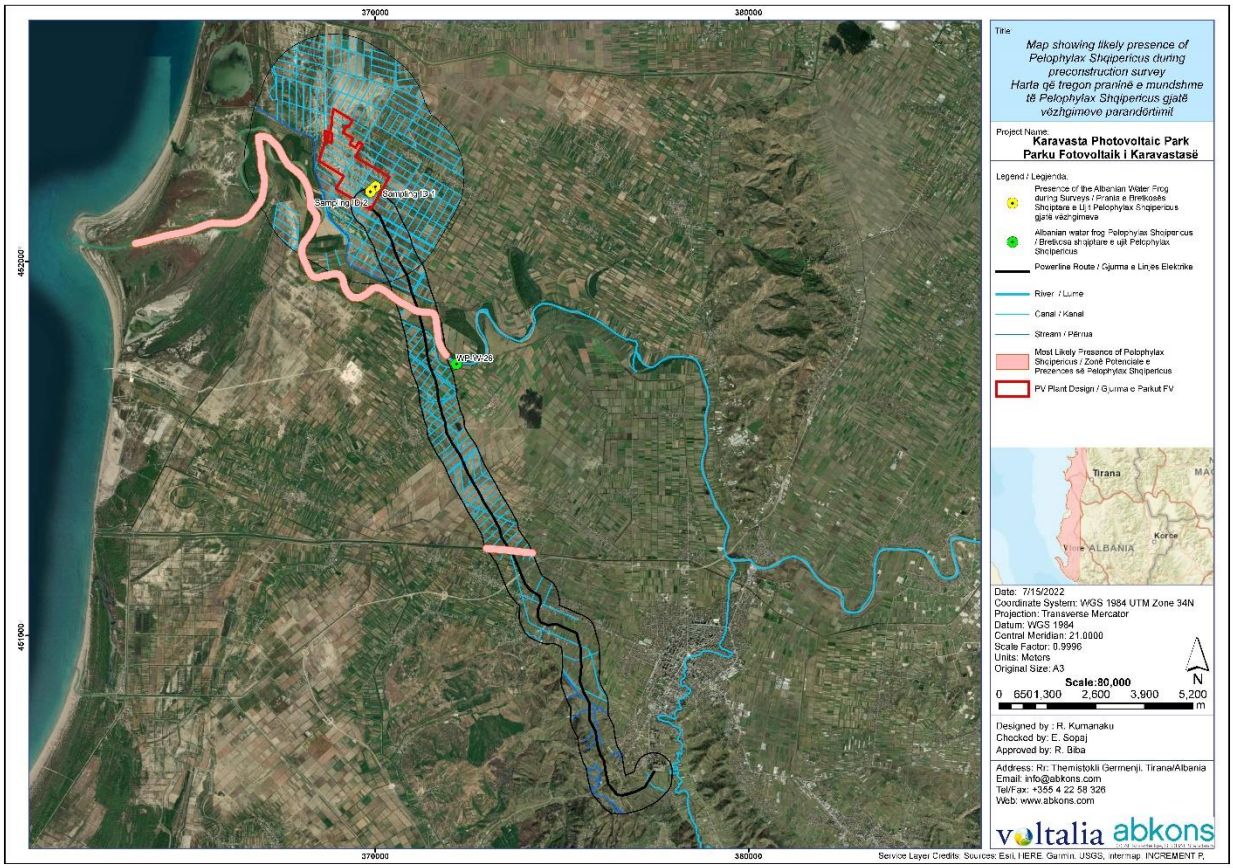


Figure 91. Habitat mapping showing presence of *Pelophylax shqipericus* (Albanian Frog) during preconstruction survey o

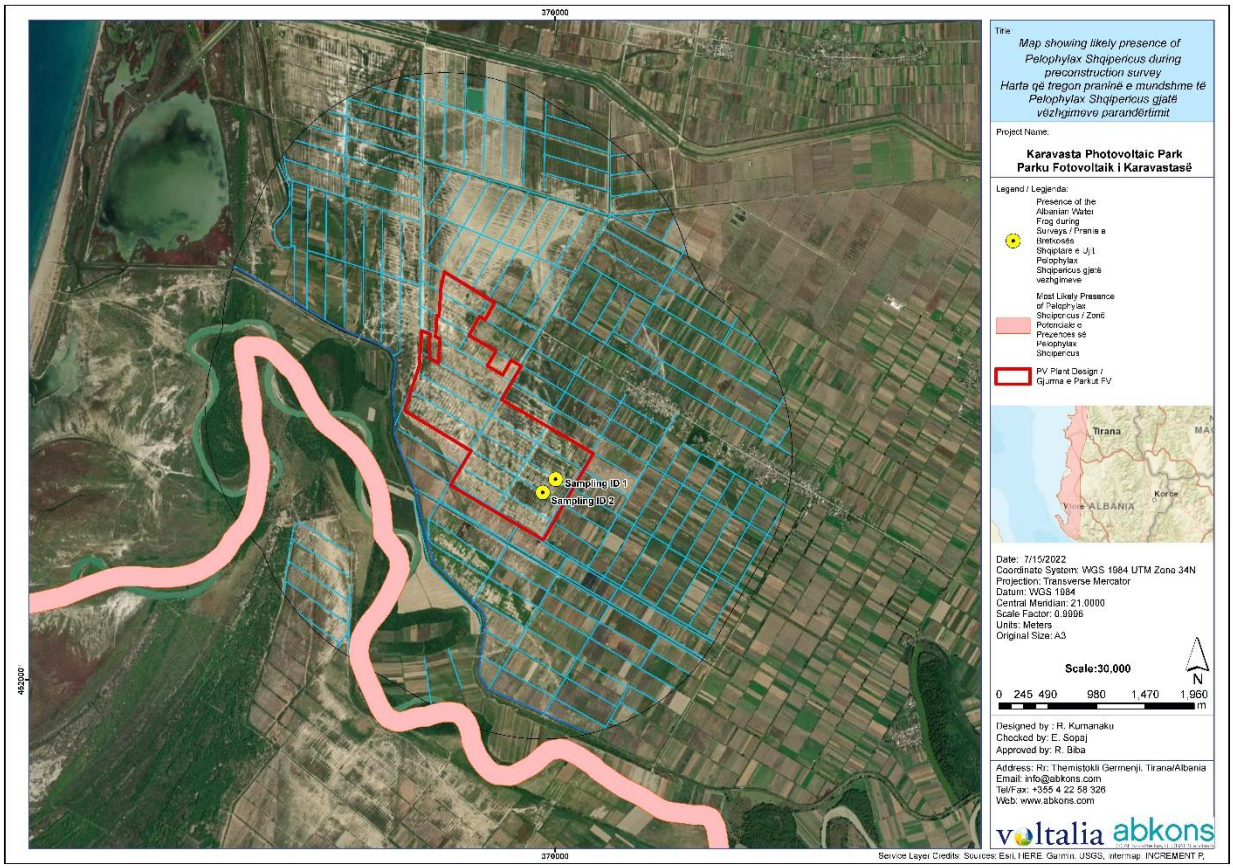


Figure 92. Habitat mapping showing presence of *Pelophylax shqipericus* (Albanian Frog) during Pre-construction field survey

All terrestrial fauna species are assessed against criteria and conditions of PBF and CH accordingly, following EBRD PR 6. Priority was given to threatened species at global, European, Mediterranean and national scale. IUCN Red List and National Red List (2013) threat status of the species has been taken into consideration, along with distribution range of the species at global, regional and national scale, so as to assess the ecological importance of the study area for threatened terrestrial fauna species. The full list of terrestrial fauna species identified as priority biodiversity features occurring in the PDA and OHL route.

Table 31: List Terrestrial fauna identified as Priority Biodiversity Features and Critical Habitats inside the study area

Mammal Species		**PBF**	**CH**	**Protection status (92/43/EU), Bern Convention**	**IUCN Red List (2020)**	**Albania Red List (2013)**
Latin Name	**Common name**					
Mammals						
Rhinolophus ferrumequinum	Greater horseshoe bat	-	+	Annex II & IV	NT	LRcd
Rhinolophus euryale	Mediterranean horseshoe bat	-	+	Annex II & IV	VU	VU
Rhinolophus hipposideros	Lesser horseshoe bat	_	+	Annex II & IV	NT	LRnt
Myotis myotis	Greater mouse-eared bat	-	+	Annex II & IV	LC	NE
Pipistrellus kuhlii	Kuhl's pipistrelle	-	+	Annex IV	LC	NE
Pipistrellus nathusii	Nathusius Pipistrelle	-	+	Annex IV	LC	NE
Pipistrellus pipistrellus	Common pipistrelle	-	+	Annex IV	LC	NE
Pipistrellus pygmaeus	Soprano pipistrelle	-	+	Annex IV	LC	NE
Muscardinius avellanarius	Common dormouse	-	+	Annex IV	LC	DD
Canis aureus	Golden jackal	-	-	Annex V	LC	VU
Mustela putorius	Western polecat	+	-	Bern Convention (III)	LC	EN
Meles meles	Badger	+	-	Bern Convention (III)	LC	EN
Lutra lutra	Otter	-	+	Annex II & IV	NT	VU
Amphibians						
Pelophylax shqipericus	Albanian water frog	-	+	Native of Albania and Montenegro	VU	NE
Rana dalmatina	Agile frog	-	+	Annex IV	LC	LRlc
Hyla arborea	European tree frog			Annex IV	LC	LRcd
Reptiles						
Elaphe quatuorlineata	Four-lined snake	-	+	Annex II & IV	NT	CR
Emys orbicularis	European pond turtle	-	+	Annex II & IV	NT	LRnt
Lacerta trilineata	Balkan green lizard	-	+	Annex IV	LC	LRcd
Lacerta viridis	European green lizard	-	+	Annex IV	LC	LRcd
Mauremys rivulata	The Balkan terrapin	-	+	Annex II & IV	LC	VU
Platyceps najadum	Dahl's whip snake	-	+	Annex IV	LC	LRcd
Podarcis tauricus/ionicus	Balkan wall lizard	-	+	Annex IV	LC	LRnt
Pseudopus apodus	Giant glass lizard	-	+	Annex IV	LC	LRnt

Mammal Species		PBF	CH	Protection status (92/43/EU), Bern Convention	IUCN Red List (2020)	Albania Red List (2013)
Latin Name	**Common name**					
Telescopus fallax	European cat snake	-	+	Annex II & IV	LC	LRlc
Testudo hermanni	Hermann's tortoise	-	+	Annex II & IV	NT	LRnt
Vipera ammodytes	Horned viper	-	+	Annex IV	LC	LRnt
Zamenis longissimus	Aesculapian Rat snake	-	+	Annex IV	LC	EN
Zamenis situla	Leopard snake	-	+	Annex II & IV	LC	CR

4.2.5.5. Key / Focus Species relevant to Project

Following EBRD PR 6 and IFC PS 6 criteria and conditions applied for Critical Habitats, in total, seven species qualify, or potentially qualify, as CH under IFC PS6 Criteria 1, 2 or 3, with some species qualifying under more than one Criterion. These species consist of one amphibian, two birds and four fish.

. During ESIA Biodiversity surveys these species are not found within the PDA, but only in the network of primary and second-grade drainage channels to be crossed by the OHL route. During the preconstruction survey Albanian water frog (*Pelophylax shqipericus*), are founded within the PDA (Refer to Figure 91).

From the survey carried out by Abkons, the Albanian water frog is found only in Seman River (see Figure 92green point), while it is most likely present in another large channel (crossing the OHL, as specified inFigure 92). Referring to the typology of primary and secondary canals located in the PV plant area, it is likely that the Albanian water frog is also present.

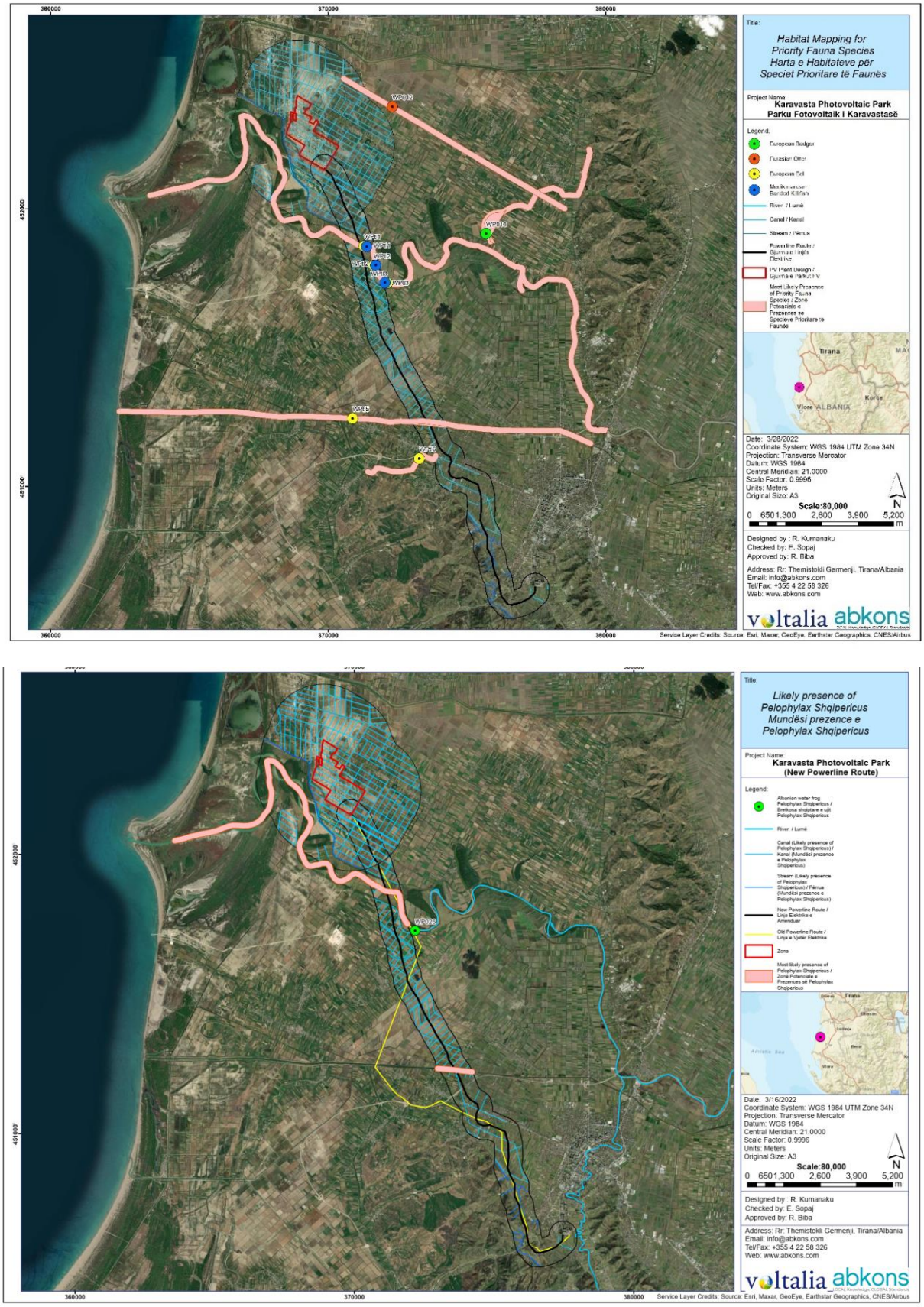


Figure 93. Habitat mapping for priority fauna species European Eel, Mediterranean Banded Killifish, Four-lined Snake, Eurasian Otter, European Badger (above) and Albanian Water Frog (below)

However, other species are key species relevant to project and are assessed in the following paragraph.

Table 32: Typical protected species of mammals in the Project area

Name: Scientific Local English	Conservation status: IUCN/AlbRDB	Habitats and population - interaction with Karavasta PDA and power transmission line
Rhinolophus euryale Lakuriqnate hundpatkua i Mesdheut Mediterranean Horse shoe bat	VU/ VU	Caves and artificial shelters. Rare species localised in several caves and tunnels in relatively small groups. EOO 15600 km2 (<20 000 km2). Red-listed as VU both at European and national scale. This species has not been recorded during the field surveys conducted in August and November, 2020, and May 2021.
Rhinolophus ferrumequinum Lakuriqnate hundpatkua i madh Greater Horse-shoe bat	NT/ LRcd	Warm caves, mines, permanent pastures and deciduous woodlands. Widespread in Albania, but destruction of several important roosting sites during the last 20 years. EOO >20 000 km2. Reduction of corridors and feeding area, increase of lighting are the reasons for being uplisted by one category, and finally assessed as NT (Bego, *personal comm.)*. The presence of the species has been confirmed in hillside near Peshtan (inside the military tunnels) along the OHL route.
Rhinolophus hipposideros Lakuriqnate hundpatkua i vogel Lesser Horse-shoe bat	NT/ NT	Caves, riparian vegetation. Widespread in Albania, but destruction of several important roosting sites during the last 20 years. EOO >20 000 km^2. Reduction of corridors and feeding area, increase of lighting are the reasons for being assessed as NT. This species has not been recorded during the field surveys conducted in August and November, 2020, and May2021.
Muscardinus avellanarius Gjumashi i lajthise Common dormouse	LC/ DD	Mixed deciduous forest. It has been recorded in few localities so far in Albania, and due to scarce data, it is assessed as DD. Habitat loss and degradation is the main threat to the species. The presence of the species has been confirmed in hillside near Vajkan however there presence was not identified along the proposed OHL route, in the pellets of barn owl (*Tyto alba*) collected at Shen Kolli church.
Lutra lutra Lunderza Otter	NT/ VU	Rivers, streams, lakes, wetlands and coasts. Due to recent research and data obtained in the field, Otter is quite widespread in all hydrographical networks of Albania. However, the population densities of the otters are low to medium and therefore the conservation status of the species is not safe due to illegal hunting and fishing, and water pollution in the lower parts of the rivers, as well as unsustainable hydropower development in almost all rivers and tributaries. Therefore, it is proposed as NT (Bego, *personal comm*.). The presence of the species in the project area has been confirmed by the field surveys conducted in August and November, 2020, and May 2021.
Canis aureus Çakalli Golden jackal	LC/ VU	Open terrains and landscapes, wetlands and marshes. The presence of the species in the project area has been confirmed by the field surveys conducted in August and November, 2020, and May 2021. It is a common species along the Adriatic coast of Albania in recent years, and the population is increasing. This is the reason that the national status of the species is proposed to be down-listed from VU to NT (Bego, *personal comm.)*

Name: Scientific Local English	Conservation status: IUCN/AlbRDB	Habitats and population - interaction with Karavasta PDA and power transmission line
Meles meles Baldosa Badger	LC/ EN	Deciduous and mixed woods, coniferous, hedges, scrub, agriculture, suburban areas. Recent data obtained from camera-traps suggest that the population of the badger in Albania as well as neighbouring countries is healthy and stable, therefore it is proposed to down-list from EN to NT (Bego, *personal comments*). The presence of the species in the project area has been confirmed by the field surveys conducted in August and November, 2020, and May 2021.
Mustela putorius Qelbësi Western polecat	LC/ EN	Lowland habitats, sand dunes, forest fringes and river valleys. The species has limited geographical range of distribution in Albania (EOO < 18.000 sqkm). This species has not been recorded during the field surveys conducted in August and November, 2020, and May 2021.

Table 33. Typical protected species of amphibians and reptiles in the Project area

Name: Scientific Local English	Conservation status: IUCN/AlbRDB	Habitats, population; interaction with Karavasta PDA and power transmission line and related facilities
Pelophylax shqipericus Bretkosa shqiptare Albanian water frog	VU/ NE	Wetlands, freshwater (inland). Recognised as new species in 1987, Pelophylax shqipericus (Hotz, Uzzell, Guenther, Tunner & Heppich, 1987) and reconfirmed by Dufresnes et., al. (2017). According to IUCN global status is VU, and the population trend decreasing. Extent of Occurrence in Albania (EOO) < 5,000 km2, fragmented distribution and continuous habitat loss. Therefore, the threat status is 'EN' B1ab (iii). is proposed to the Revised National Red List of Albania (F. Bego, pers. comment). Theresence in the project area was confirmed along the drainage channels to be crossed by the OHL route during breeding season (May 2021), but not inside the PDA.
Emys orbicularis Breshkujza me njolla European pond turtle	NT/ NT	Terrestrial, freshwater (=Inland waters). Both global and national threat category of this species is NT, and the national status of the species has been confirmed by resent studies (Szabolcs et.al. (2017). Habitat loss and degradation is the main threat to the species. The presence of the species has been confirmed in the project area in August and November, 2020, and more abundant during May 2021.
Mauremys rivulata Breshkujza qafe-vijezuar Balkan terrapin	LC/ VU	Terrestrial, freshwater (coastal and Inland waters). According to IUCN (van Dijk et.al., 2004) Mauremys rivulata is listed as LC, while in Albania it is assessed as VU, due to population declines as a result of habitat loss and degradation. This assessment is based on the current studies (Mizsei et.al, 2017), with 68 records and EOO estimation of 10 253 km^2 (< 20 000 km^2). Species presence within project area was not confirmed during May 2021 survey.

Name: Scientific Local English	Conservation status: IUCN/AlbRDB	Habitats, population; interaction with Karavasta PDA and power transmission line and related facilities
Testudo hermanni Breshka e tokes Hermann's tortoise	NT/ NT	Artificial/Terrestrial, shrubland, forest. Both global and national threat category of this species is NT, and the national status of the species has been confirmed by resent studies (Szabolcs et.al. (2017). The presence of the species has been confirmed in the project area in August, 2020 along the TL. It is killed by the local population, often dies while crossing the roads.
Elaphe quatuorlineata Bolla me kater vija Four-lined snake	NT/ CR	Shrubland, wetlands (inland), artificial/ terrestrial, forest. In Albania, according to Mizsei et.al. (2017), the species is considered widespread with 98 records and EOO 21 633 km^2 (> 20 000 km^2), based on which the species is not meeting any criteria as threatened species. However, considering the status of the species at European scale by IUCN (Isailovic et.al., 2009) NT and the population trend of the species in decline, it is proposed the national status of the species to be downlisted from CR to VU. It is killed by the local population out of fear and hostility and often dies while hunting rodents and other preys along the roads. Presence in the project area is very likely, although not observed during field surveys conducted in August and November 2020, and May 2021.
Zamenis longissimus Bolla e shtepise Aesculapian Rat snake	LC/ EN	Shrubland, artificial/terrestrial, forest, rocky areas, grassland. According to IUCN the species is assessed at European scale as LC. It is listed as EN in the National Red list (2013) of Albania. However, according to Mizsei et.al. (2017), the species is considered common and wide spread with 118 records and EOO 25 224 km^2 (> 20 000 km^2). Therefore, the threats status of the species is proposed to be down-listed (NT) (Bego F. personal comm). It feeds on rodents and shrews. It is killed by the local population out of fear and hostility and often dies while hunting rodents and other prey along the roads. The presence in the study area has been confirmed in the hillside along the OHL
Zamenis situla Gjarpri (Bolla) leopard Leopard snake	LC/ CR	Occurs in artificial/terrestrial, shrubland habitats. It has been red-listed as CR in the national Red list of Albania. However, according to Mizsei et.al. (2017), the species is recorded in 55 locations with a EOO 17 847 km^2 (< 20 000 km^2), and based on IUCN criteria, the status of the species is assessed as VU. It is killed by the local population out of fear and hostility and often dies while hunting rodents and other preys along the roads. The presence of the species in the project area has not been reported during the field surveys organised in August and November 2020 and May 2021.

4.2.5.6. Summary

- The endemic Albanian water frog (Pelophylax shqipericus) is breeding in low numbers along the primary and second grade drainage channels of the agriculture land of the study area, but not inside the PDA. It is believed that the EAAA regularly holds ≥ 10% of global population AND ≥ 10 reproductive units of the species. However, this area is not expected to be significantly impacted by the project, as the alignment of the OHL will only cause minor impacts and disturbance on the breeding and feeding grounds of this species.

- There are no important roosting sites for Bats in the PDA, however one or two bunkers show evidence of being used as roosting by a limited number of bats during night. Bats recording during night show that PDA is used as a foraging area for dozens of individuals of bats belonging to Pipistrelle species.
- PDA, Semani river and drainage channels of primary and second grade provide feeding grounds and commuting corridors for otter (*Lutra lutra*), Annex II species, and vulnerable species in the National Red list of Albania (2013).
- PDA and most of OHL corridor are part of the foraging area for European badger (*Meles meles*) and golden Jackal (*Canis aureus*), both red-listed in the National Red list of Albania (2013).
- One or two temporary ponds artificially created by sand extractions in the proximity of PDA as well as rain-fed temporary ponds and pools inside the 3rd grade drainage channels of the PDA and primary and second grade channels crossed by OHL route are breeding grounds during spring and early summer for toads and frogs.
- Drainage channels in the PDA area and those intersected by the OHL route are important and sensitive habitats for aquatic life, including frogs, toads and pond turtles as they provide freshwater breeding and feeding grounds for a number of species, including otter.
- The riverbed of Seman river, and the adjacent riparian forest with the good and well-preserved riparian vegetation dominated by *Populus alba* and *Salix alba* intersected by proposed OHL route is serving as a small refuge for species of conservation interest, such as otter, badger, jackal, frogs, toads and pond turtles..
- Hilly areas intersected by OHL, although in majority are converted into terraced olive groves and vineyards, are still hosting small patches of former natural vegetation (woodland) that provide shelter for some species of conservation interest, such as European Badger (*Meles meles*), Beech marten (*Martes foina*), Hazel Dormouse (*Muscardinus avellanarius*), Edible Dormouse (*Glis glis*), Aesculapian snake (*Zamenis longissimus*), Hermann's tortoise (*Testudo hermanni*), and Balkan wall lizard (Podarcis tauricus).
- Military bunkers in the hilly area close to Peshtan, intersected by the OHL route show evidence of being roosting sites for bats *(Rhinolophus ferrumequinum, Myotis myotis*) and tortoise (*Testudo hermanni*). In one the series of bunkers from the number of guanos found on the ground, inside of the deepest part of the bunker, it is believed that the site is commonly used by bats However, the field survey of May 2021 reconfirmed the use of the site during breeding season only by one species Rhinolophus ferrumequinum, and by only one individual. Nevertheless, the site should be regularly monitored for bats' usage of these series of bunkers, including transition period and swarming season.

4.2.6. Aquatic Ecology

4.2.6.1. Introduction

The aquatic environment section was based on preliminary literature review covering primarily and secondary sources of information on aquatic ecology, species and ecosystems, a field work survey completed in August (5th, 6th and 8th), 31st October and 9th November 2020, appendix 9. The objective of the survey was focused on investigation of the PDA and adjacent zones that will be affected by the construction and operation of the PV project, considering PBF (species and their habitats) that might be impacted by different project activities.

This section comprises an integrated assessment of the aquatic habitats and associated species diversity in the PDA and adjacent zones. It aims to assess the current state of different aquatic habitats and of biodiversity, being focused on aquatic plants, macro-invertebrates and fish composition and presence. The entire surveyed water system belongs to the brackish ecosystems are transitional waters between inland and sea and receivers of nutrients of continental origin, that are among the considerable productive water environments.

4.2.6.2. Survey Methodology & Data Sources

The study area comprised of the wider geographical region where the PDA is located considering all communication channels, both drainage and irrigation, in vicinity of Divajke-Karavasta National Park. Systematic surveys took place during field work in August, October and November in 12 different locations (Figure 94). In the course of this work, various types of surface waters were Investigated; these included drainage channels (permanent and intermittent) and Irrigation channels (in the wider area of the project zone). A total of 12 locations of the aquatic system, categorized according to (a) hydrological criteria, i.e., water bodies that are permanent one and water bodies intermittent one; (b) geographical criteria, i.e., water courses in the project and wider area considering communication with coastal area and surrounding stream/ rivers.

Literature search entailed review and documentation of information pertaining to various ecosystems, habitats (with specific attention to lagoons, drainage and irrigation channels) and species, processes connected with status and conservation challenges. It was dealing with analyses of the current status of aquatic biodiversity research and conservation approaches in the wider area of Divajke-Karavasta National Park as an integral part of communication corridors among marine and continental areas. The analyses and references consultations helped to assimilate up-to-date available information and as well as identify knowledge gaps in the understanding of current state and driving forces for habitat and aquatic biodiversity conservation in the wider area of Divajke-Karavasta National Park. Though this literature review is by no means a comprehensive examination of the wide literary resources available on this subject it does attempt to present up to date key information and generate a useful overview that can inform the next steps in this assessment.

More specifically the background assessment included a review of:

- Environmental studies, scientific literature or any other type of pre-existing biodiversity assessments available for the project area;
- National or regional plans (e.g., Strategic Environmental Assessments, National Biodiversity Strategies and Action Plans);
- Conservation programs or initiatives in the area and its surroundings (both conducted or planed one within area);
- Existing species data (e.g., IUCN Red List of Threatened Species, Global Invasive Species Database, IUCN Species Action Plans and nationally protected species lists, i.e., Albanian Red List), to identify if there are any known or potentially occurring threatened species, endemic species and/or migratory species associated within the project study area;
- Existing data, to identify any potential invasive species in the project study area site and the surrounding landscape;
- Location of any habitats of conservation significance, including World Heritage Areas; Protected Areas; Key Biodiversity Areas (Important Plant Areas).
- Other planning documents as Strategy of Territorial Development of Municipality of Divjaka for the coming 2017-2027.

The main source of information was generated via Google Scholar and following our search which considered primary and secondary resources contains different information, where in total 30 publications (out of 260 results) were assessed.

In order to complete this baseline report, the field survey was conducted as following:

- The first ecological survey in the period August 2020 (5th, 6th and 8th) that was considering 12 different locations.
- The second survey of locations carried on 31st October 2020 was based on the previous survey of August 2020 where 12 different WPs were considered. So, all these WPs were revisited and observed differences are presented in respective tables.
- The survey 9th November 2020 was focused on water crosses along the new transmission line, including 5 different locations i.e., WPtl (see).

- The third survey was carried out on 27-28 May, 2021, investigating a total of 18 WPs (12 WPs in PDA and 4 WPs along the OHL.

Sampling took place always during the day hours, using, in most cases, a large net with an extendible wooden handle and a D-shaped frame, with a minimum of eight consecutive trials applied in each site, as well as smaller dip nets. In the few cases, that the sites were wadable (relatively solid substrate, depth less than 1.5 m and limited vegetation), a seine nets were used. Due, however, to the variability of the habitats sampled and the different methods used, sampling data, though roughly comparable, had only a semi-quantitative character, especially in assessing the abundance of the fish populations.

During this survey were considered the following components: (i) Aquatic habitat assessment; (ii) Fish composition; (iii) Macrozoobenthos and (iv) Aquatic vegetation associated with surveyed habitats. To that fact the following methods were implemented:

(a) Water temperature, salinity, pH and dissolved oxygen were measured in situ with a Consort C535 multi-parameter analyzer and the appropriate probes.

(b) Seine nets: A total of 6 sampling sites (those of permanent character) were selected in the shallow part of the selected areas of the aquatic habitats during the August survey. Samples were collected using a 12 m-long beach seine (2 mm mesh size), which allowed the capture of juvenile fishes and adults of small sized species. Couple of replicates was collected during every sampling period at each sampling site by hauling 20 m reaches of shore-line at each replicate;

Live specimens, after anesthetization with quinaldine, were identified (fish nomenclature later modified according to Kottelat & Freyhof 2007), measured (standard length to nearest mm), weighted (to the nearest 0.001 g) and then returned to the water (few specimens kept for further (b') D-type of hand net;

(b'') Fyke nets used those of fishermen in communication channels, in the sampling point – wp 12;

(c) For the macrozoobenthos purposes, at each station, two replicates of soft bottoms were sampled the substrate from a standard area of 400 cm^2 (two replicates). Samples were preserved in a 4% formaldehyde solution; in the laboratory the fauna retained on a 1-mm-mesh´sieve was sorted and identified to the species level wherever possible.

(d) The assessment of submerged vegetation cover was made visually, the first recorded as the area percentage covered by submerged vegetation at each reach and the second as an ordinate categorical variable from 0 (low density of meadows) to 5 (high density of meadows). Substrate was classified according to Bain (1999) [mud (1), sand (2), gravel (3), pebble (4) and boulder (5)].

The location of the surveys undertaken are presented in Figure 94 below:

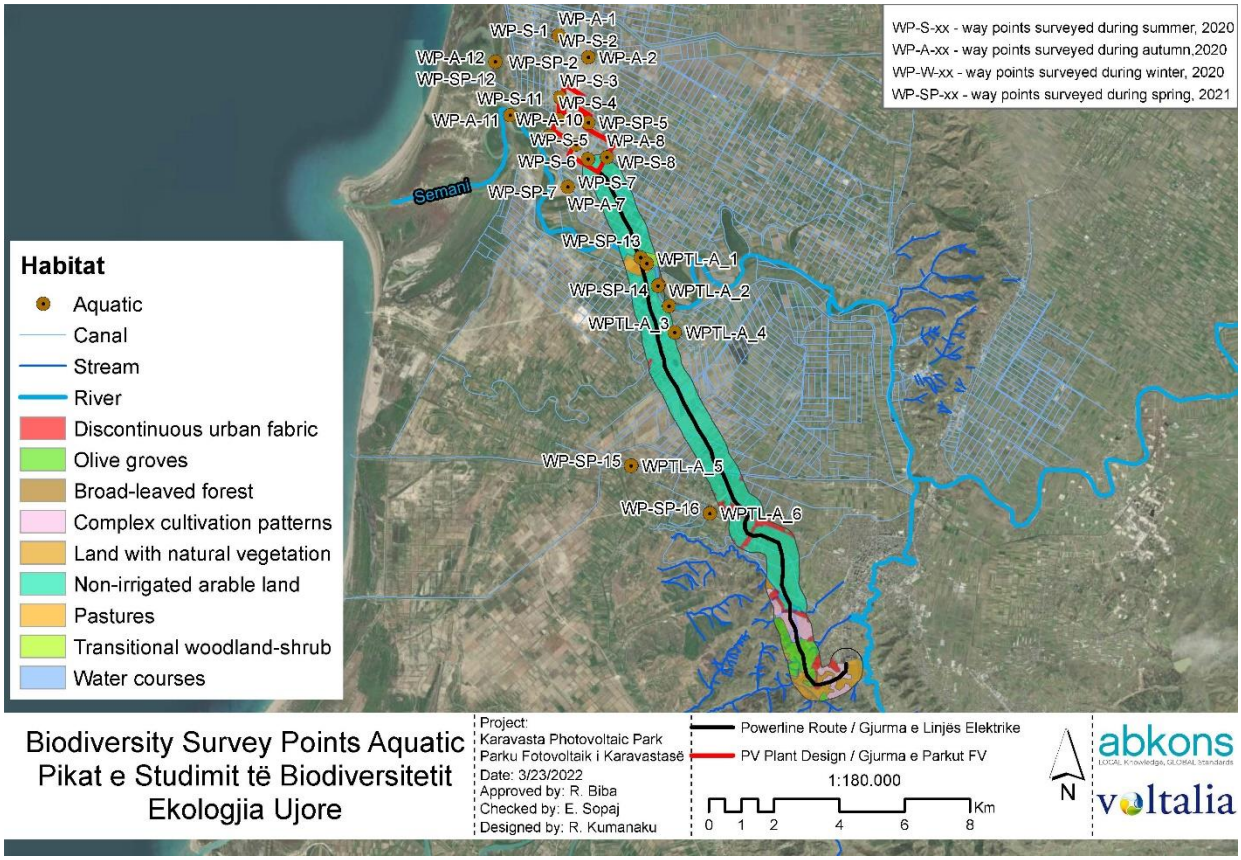


Figure 94. Aquatic ecology map/survey points

4.2.6.3. General Description

Current status of species and habitats in the project development area is directly linked with transitional water bodies, including mainly drainage channels. At the current Albanian circumstances, despite their importance, transitional waters are among the most vulnerable aquatic environments. At the global scale these water bodies are supporting considerable human pressures that usually lead to changes in their biological well-being (Vasconcelos *et al*. 2007; Courrat *et al*. 2009). From the other point the information about the differential use of shallow habitats by macro-invertebrates and fish fauna in these water ecosystems is a critical issue for the proper ecosystem management.

The species composition of the drainage channels and coastal aquatic bodies in the Karavasta project area is directly connected with Adriatic coastal water species and continental water communication system including large rivers (River Semani), irrigation channels originating with rivers and springs at the surrounding upland areas (Vjose-Levan-Fier), etc.

Fish assemblages and other species in these systems change both at temporal and spatial scales in relation to environmental parameters, such as water chemical-physical factors like temperature, dissolved oxygen and salinity or parameters related to habitat structure like depth, substrate type and submerged vegetation.

Following data collected, this survey emphasizes the importance of the transitional water bodies including drainage channels areas of the PDA to numerous fish species, including those of commercial and conservationist interest. Furthermore, the results also highlight that fish community differed according to the different habitat types identified and environmental quality.

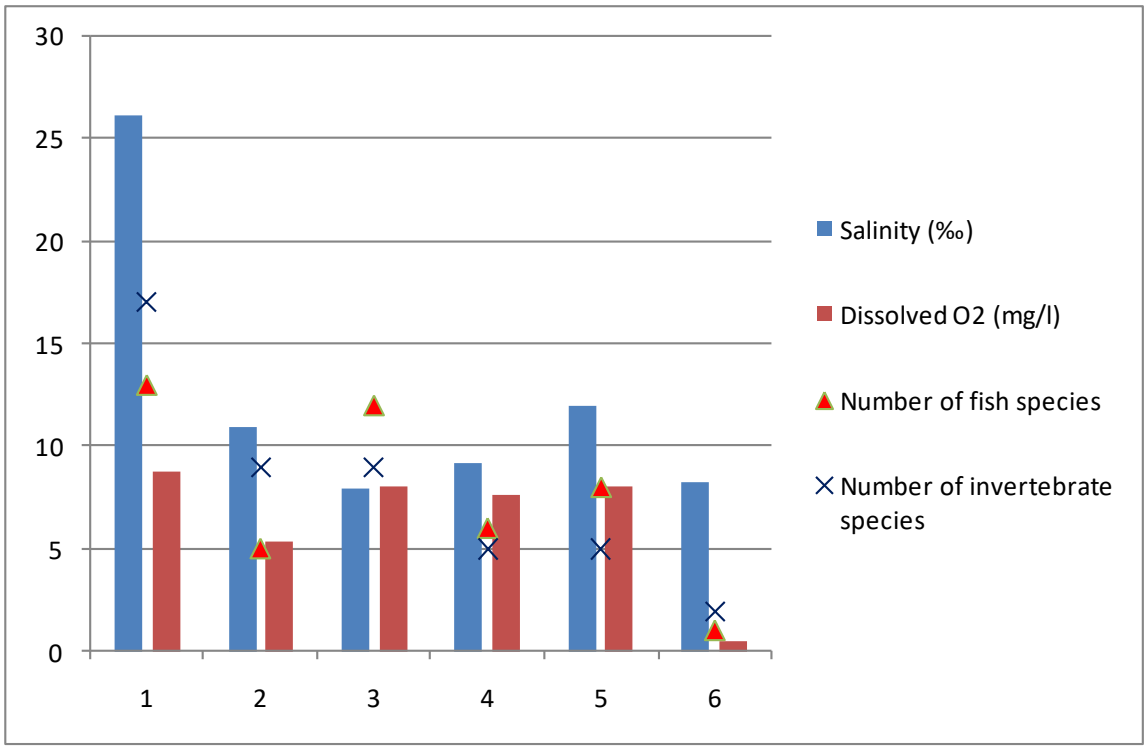


Figure 95. Relationship among number of fish and invertebrate species with dissolved oxygen and salinity in selected WPs

Following data collected, this survey emphasizes the importance of the transitional water bodies including drainage channels areas of the PDA to numerous fish species, including those of commercial and conservationist interest. Furthermore, the results also highlight that fish community differed according to the different habitat types identified and environmental quality.

These habitat-related differences were likely associated with changes in structural complexity among habitats, and suggest that maintenance and recovery of habitat heterogeneity within the transitional zone of coastal lagoons should be a priority in the management of coastal fisheries and some endangered fish species.

Table 34. Dominant aquatic species and their conservation status of identified species following National Conservation Status (Albanian Red List of 2013) and International Conservation Status (IUCN)

No	Latin name	Common name	Nat. Cons. Stat. (Alb. Red List, 2013	Int. Cons. Stat. (IUCN)
Aquatic plants				
1	*Myriophyllum heterophyllum*	Two-leaf water milfoil	-	LC
2	*Myriophyllum spicatum*	Water milfoil	-	LC
3	*Ceratophyllum demersum*	Hornwort	-	LC
4	*Typha angustifolia*	Lesser bulrush	-	LC
5	*Phragmites australis*	Common reed	-	LC
6	*Sparganium erectum*	Branched bur-reed	-	LC
7	*Berula erecta*	Lesser water-parsnip	-	LC
8	*Veronica becabunga*	Brooklime	-	-
9	*Scirpus holoschoenus*	Round-headed club-rush	-	LC

No	Latin name	Common name	Nat. Cons. Stat. (Alb. Red List, 2013	Int. Cons. Stat. (IUCN)
10	*Schoenoplechtus lacustris*	Club-rush/bulrush	-	-
11	*Mentha pulegium*	Pennyroyal	-	LC
12	*Potamogeton crispus*	Curled pondweed	-	LC
13	*Potamogeton pectinatus*	Fennel pondweed	-	LC
14	*Polygonum hydropiper*	Water-pepper	-	LC
15	*Lemna minor*	Common duckweed	-	LC

During the surveys of 2020, there has been recorded 15 aquatic plant species (both submersed and emergent), 16 macro-invertebrate species connected mostly with benthic environments, and 5 fish species (Figure 96 Figure 97, Figure 98; Figure 99 and Table 35, Table 36, Table 37) Out of them there are two species of conservation concern the Mediterranean kill-fish (*Aphanus fasciatus)* considered as Critically Endangered (CR) according to Albanian Red List of 2013 and European eel *(Anguilla anguilla)* considered as Endangered (EN) according to IUCN (See Table 36 and **Table 38**) These tables presents the typical protected aquatic species observed in PDA and OHL route, including the conservation status.

After habitat degradation, invasive species are the second leading cause of biodiversity loss, particularly in freshwater ecosystems (Vitousek et al. 1996, Mack et al.2000). Based on current dominant presence of the mosquitofish (*Gambusia holbrooki*) a cyprinodontiform fish species of the *Poeciliidae* family in the Akerni Solar Project area, it is clear that the degradation and lack of water management lead to serious situation. Besides imposing huge economic costs, invasive species cause extinction of native species, reduction of genetic diversity, and biotic homogenization through a variety of mechanisms (Rahel 2000). At the national scale it is clear that human interventions and activities have accelerated the intentional and accidental spread of species across their natural distribution barriers (Shumka *et al*., 2008. Thus, nowadays biological invasions are considered second leading threat to biodiversity loss after habitat destruction, and an important element of global change (Vitousek et al. 1996, Chapin et al.2000). The aggressive nature, high reproductive potential, fast maturation rate, flexible behavior and broad environmental tolerances have contributed to their success as invaders, and the species is considered to pose a serious threat to native fishes in many countries.

On the other hand, the current population of European eel *(Anguilla anguilla)* is very low. Following the communication with local residents in three decades ago, the eel was the most common species within area. The local status is currently facing two major impacts, the first is habitat degradation due to different human activities and second one is the lack of water management and affected hydrological connectivity.

The Flathead grey mullet (Mugil cephalus) is the major commercially exploited fish species, and beside species plasticity its status at the local scale is affected by the habitat degradation and human activities too.

4.2.6.4. Habitat Characterization

The present habitats within project area include: Drainage Channels of different rate, Irrigation channels (mostly abandoned), and while at the wider area there are persent also coastal Wetlands/ Lagoons and Salt Marshes. In the following section are given the main features of these habitats:

Drainage and Irrigation Channels

European Habitats include 72A0 Reed beds (*Phragmito-Magnocaricetea*). The study area is characterised by dominated drainage and irrigation channels. The formation of reed beds is more widespread in these channels. High trunk helophytes, such as Common reed (*Phragmites australis),* Lesser bulrush (*Typha angustifolia),* Round-headed club-rush *(Scirpus lacustris),* Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed

(*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species. In the Table 35, are given the main features of different sections of this type of habitat covered by survey of July 2020.

Coastal Wetlands/ Lagoons

The European Habitats include 1150 Coastal lagoons. Laguna e Ushtaritis one of important coastal lagoons as part of the entire Karavasta situated in the boundary of project area. The main vegetation type present in this lagoon is the sea grass beds dominated by eelgrass (*Zostera noltii)*. Where these do occur, eelgrass is the most dominant species usually with very few other vascular species but often with abundant algae. In more shallow areas, sea grass is outcompeted by spiral tasselweed (*Ruppia cirrhosa*). The sea grass beds contain few species but reach enormous quantities of biomass, and a large number of plankton and benthos organisms' life in these communities. Fluctuating algae populations of green seaweed (*Ulva rigida)* settle on soft, muddy substrata while the gut weed (*Enteromorpha* sp.) lives on harder (sandy) substrata. Such beds play an important role in influencing the shape and stability of the shoreline, regulating dissolved oxygen and filtering suspended matter. They can enhance the biodiversity of a lagoon by providing a physical refuge from predation and also serve as nursery and feeding habitats for a variety of organisms. The value of the habitat is generally high [they correspond to habitats with priority status, included in Annex I to Directive 92/43/EEC].

Table 35. Habitat characterization following considered sampling locations

Wp	Coordinates	Vegetation Cover (S-Submersed/ E-Emergent)	Sediments	Water depth (m)	Water flow pattern	Type of water flow (Permanent/ Intermittent)
1	40871144/ 19441300	E/S	Mud (1)	2.5	Glide	Permanent
2	40865174/ 19452162	E/S	Mud (1)	1.5	Glide	Permanent
3	40854005/ 19442140	E	Mud (1)	0.3	Glide	Intermittent
4	40847877/ 19441765	E	Mud (1)	0	Glide	Intermittent
5	40847180/ 19452519	-	Mud (1)	0.1-1 m	Glide	Permanent? / Intermittent
6	40841099/ 19448259	S/E	Mud (1)	1 m	Glide	Permanent
7	40829358/ 19445499	S	Mud (1)/Sand (2)	0.5-0.8	Glide	Permanent
8	40837712/ 19459550	-	-	-	-	Intermittent
9	40837119/ 19452689	E/S	Mud (1)	0.8	Glide	Permanent
10	40843249/ 19438503	E/S	Mud (1)	1.5	Glide	Intermittent
11	40848851/ 19424081	E/S	Mud (1)	3.5	Glide	Semani River Permanent
12	40863484/ 19418295	E/S	Mud (1)	0.5	Glide	Coastal lagoon Permanent



Figure 96. Dominant aquatic plants at the study area: a. Ceratophyllum demersum; b. Typha angustifolia; c. Lemna minor; d. Schoenoplechtus lacustris; e. Potamogeton crispus; f. Potamogeton pectinatus; g. Phragmites australis; h. Scirpus holoschoenus; i. Mentha pulegium

Salt Marshes

European Habitats include 1310 *Salicornia* and other annuals colonizing mud and sand, 1410 Mediterranean salt meadows (*Juncetalia maritimi*) and 1420 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*), 92D0 Saline tamarisk thickets (*Nerio-Tamaricetea*). Salt marshes are one of the most prevalent habitats in coastal area, in the low-lying alluvial plain behind sandy dunes. These are submerged in winter and dry (partly or totally) in summer. Salt marshes are populated by halophytes, plants that can live under saline conditions. Within this habitat type, plant cover alternates with bare ground that, in areas of high salinity, is covered with crystallized salt. The most common salt marsh plant is glasswort (*Salicornia europaea*), which have worldwide distribution. Salt marshes provide many habitats for species uniquely adapted to changes in salinity and water levels. They are important storehouses of biodiversity and extremely productive habitats. They serve as depositories for a large amount of organic matter, which feeds a broad food chain of organisms from bacteria to mammals as it decomposes.

4.2.6.5. Protected Species

The aquatic plants

The vegetation of the drainage channels in the project area is composed by both emergent and submersed plant species. The most dominant species of emergent type were: Lesser bulrush (*Typha angustifolia),* Common reed (*Phragmites australis*), Club-rush/bulrush (*Schoenoplechtus lacustris*) and floating plant of Common duckweed (*Lemna minor*). Out of several submesed plants the most dominat were Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*) and Curled pondweed (*Potamogeton crispus*).

The macro invertebrate species

The macrozoobenthic assemblage from the Drainage channels in the project area, located directly to the coastal zone and Karavasta lagoon i.e., one of the main wetlands of Albania, was considered on soft bottoms and human induced substrates, created from the channels digging.

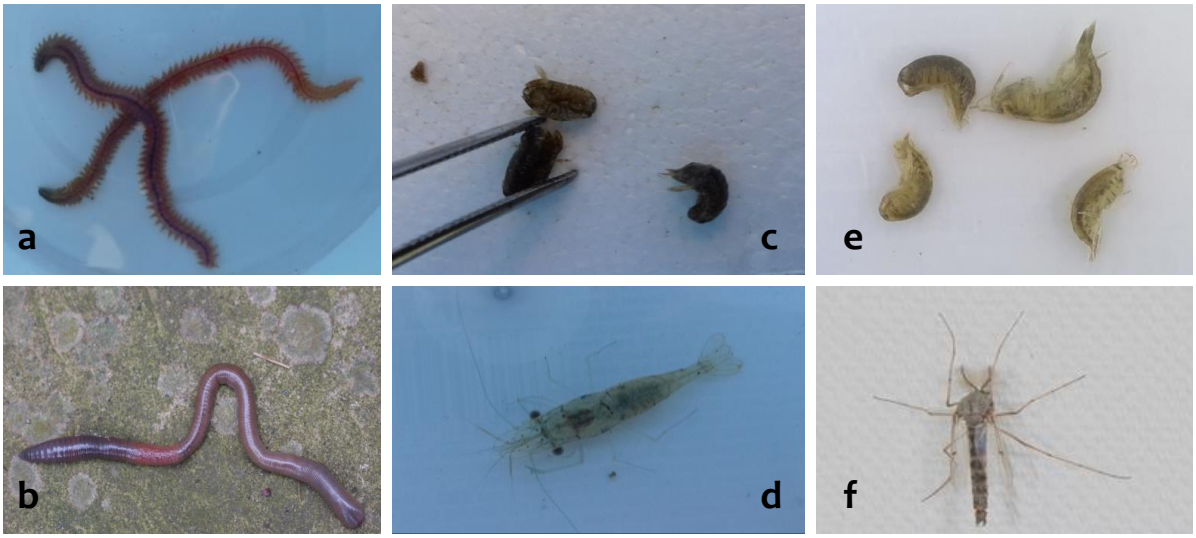


Figure 97. Some of the invertebrate species recorded in the project area: a. Phyllodocidae; b. Lumbricidae; c. Idotea baltica; d. Crangon sp.; e. Gammarus; f. Chironomus plumosus

During this survey the dominant community was that one typical 'brackish-water community', with presence of some species typical for 'outlet community' dominated by filter-feeders, and a typical 'marine community', inhabiting fine sandy bottoms (particularly in the wp 7). Among the macrozoobenthos, there are 16 taxa recorded during this survey (the maximum number was recorded in the wp7) included four bivalve, six gastropods, and the rest of the species belongs to other invertebrate groups. The widest spread species were: *Cerastoderma glaucum, Loripes lacteus, Abra segmentum, Cyclope neritea, Cerithium vulgatum, Pirinela conica Phyllodocidae, Lumbricidae, Crangon sp., Gammarus, Chironomus plumosus and Idotea baltica*.

During the site survey of 31st October 2020, a wide presence of a serpulid polychaete (*Ficopomatus enigmaticus)* has been recorded in the large drainage channels in the wider project area due to drainage works. *Ficopomatus enigmaticus* (Fauvel, 1923), originally named *Mercierella enigmatica*, is a serpulid polychaete worm that builds and inhabits white calcareous tubes that vary from 1.85 to 2 mm in mouth diameter and 20 to 40 mm in length. Colonies were firstly identified for Albania in the Seaman River Delta (40°51′25″N, 19°20′04″E) on 12 September 2011 (Shumka *et al*., 2013).

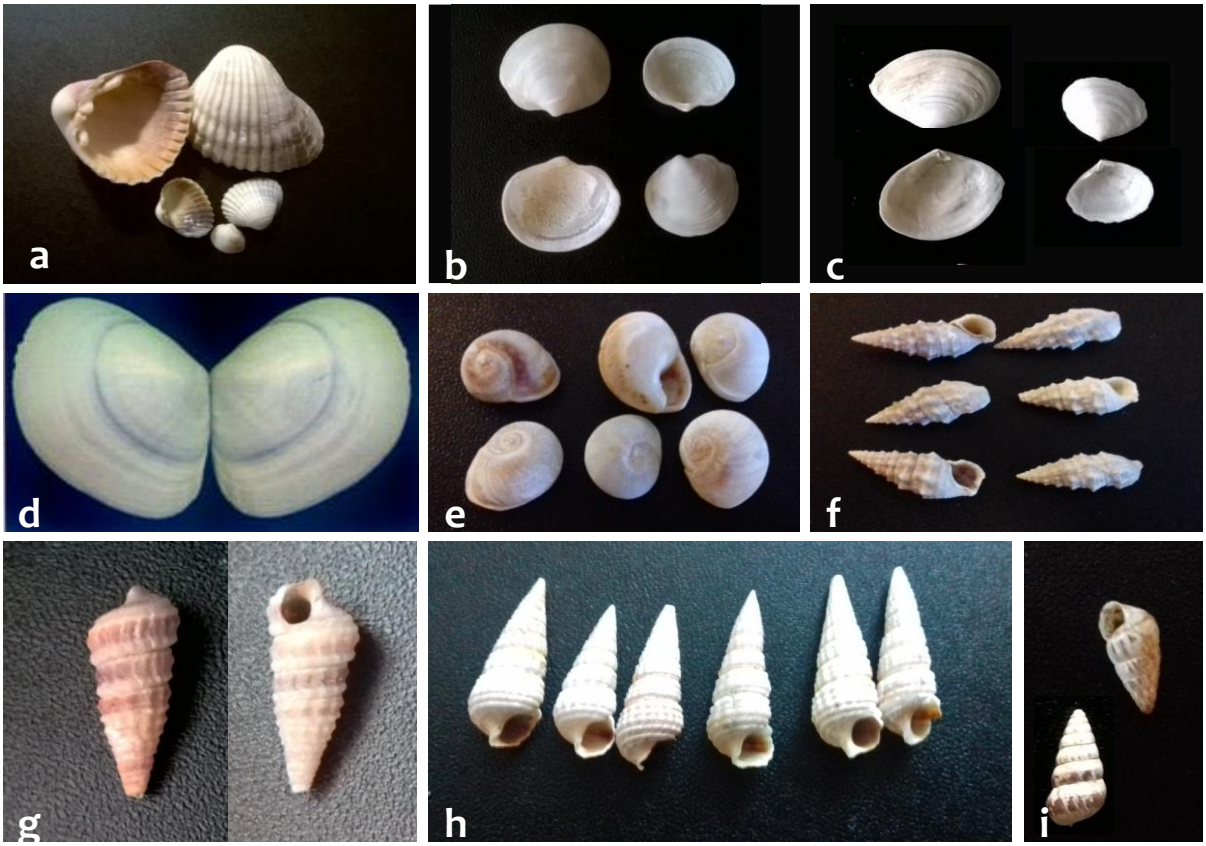


Figure 98. Some of the dominant mollusk species recorded in the project area: a. Cerastoderma glaucum; b. Loripes lacteus; c. Abra segmentum; d. Scrobicularia cottardi; e. Cyclope neritea; f. Cerithium vulgatum; g. Pirinella tricolor; h. Pirinella conica; i. Ventrosia ventrosa

It is worth to mention that in the WPtl4 and WPtl6 has been recorded the presence of freshwater mussel *Anadonta cygnae* (NT). Freshwater bivalves are a large, diverse and important group, dominating the biomass of many ecosystems. Furthermore, they are among the world's most imperiled taxonomic groups. Studies on freshwater bivalve ecology and conservation provide the basis for inter- and trans-disciplinary research and innovation, integrating knowledge into practice of freshwater protection (Lopez-Lima *et al*., 2017). Further on the freshwater bivalves provide crucial ecosystem functions and services such as water purification and nutrient cycling, thus can be used as nature-based tools for improving these ecosystem functions and services as well as representing important indicators of ecosystem health.

The blue crab *Callinectes sapidus* Rathbun, 1896 (Figure 99), a species originating from the western Atlantic, also occurs and is considered as an invasive species in the Mediterranean (Streftaris and Zenetos 2006). After the first Mediterranean record (Venice, Italy, 1949), this species has been widely recorded in different Mediterranean regions, especially in the Eastern part. Based on our survey and communication with the local fishermen of Karvasta Lagoon, the blue crab appeared to be highly distributed and of serious concerns.



Figure 99. The most invasive species within project area: *a. Ficopomatus enigmaticus; b. Callinectes sapidus*

Fish composition

Fish assemblages in these systems change both at temporal and spatial scales in relation to environmental parameters, such as water chemical-physical factors like temperature and salinity or parameters related to habitat structure like depth, substrate type and submerged vegetation coverage.

The widest spread fish species is Mosquito fish (*Gambusia holbrokii*), followed by Flathead grey mullet (Mugil cephalus) and Gobid fish Mediterranean (*Knipowitschia sp.*). The other species such as European eel (*Anguilla anguilla*) and Mediterranean Kill-fish (*Aphanius fasciatus*) were far less present.

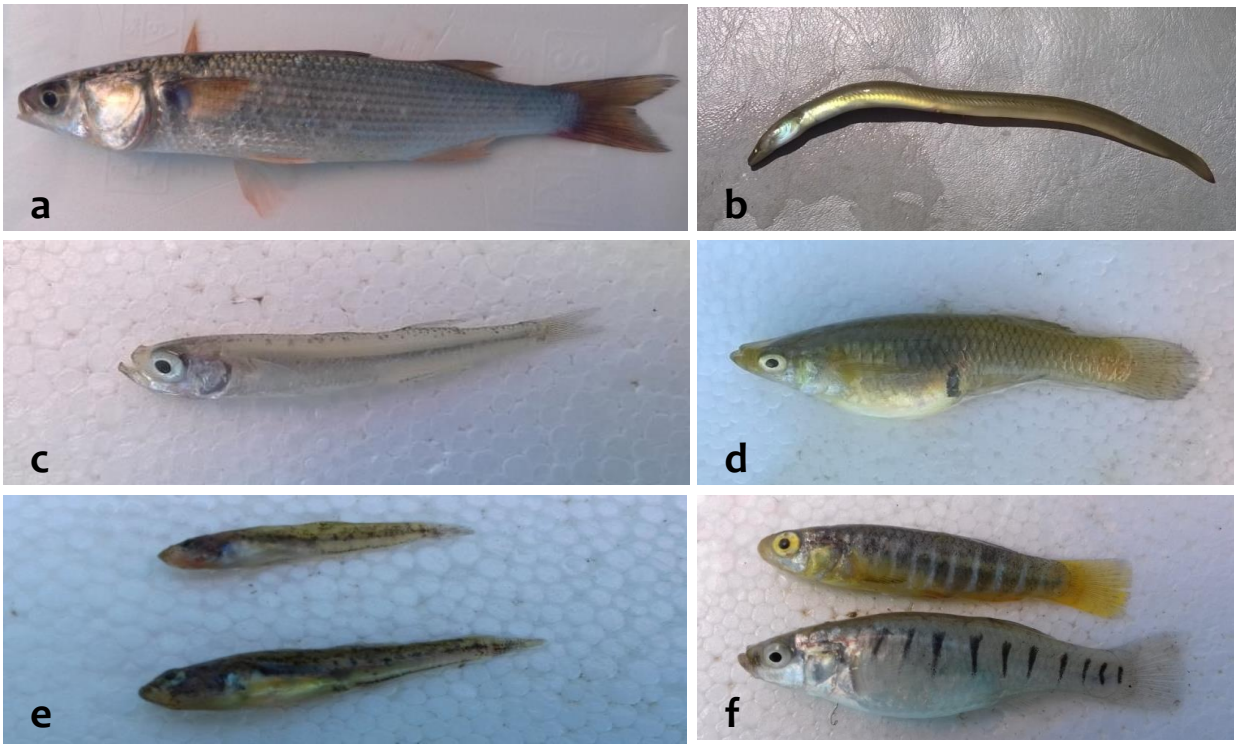


Figure 100. Present fish species within project area: a. Mugil cephalus; b. Anguilla anguilla; c. Atherina boyeri; d. Gambusia holbrokii; e. Knipowitschia sp.; f. Aphanus fasciatus

Once the fish composition of drainage and irrigation channels is analysed, it is worth to consider the connectivity with coastal lagoons which historically until 1966 was covering an area of 4180 ha. Following Peja *et al*. (1996), since then 1290 ha have been converted into a commercially operated salina. The main fish of economic use are the grey mullet (*Mugil cephalus* and *Mugil saliens*), the Sparidae dominated by *Sparus aurata* and *Boops boops*. The other species includes *Gobius buccichi*, European eel-*Anguilla anguilla*, *Aphanius fasciatus* etc.

Aquatic species of Conservation Interest (SCI)

Within this report the term "Species of Conservation Interest" covers species that are:

- Listed nationally/regionally/globally as vulnerable (VU), endangered (EN) or critically endangered (CR) by the IUCN or by the competent authority in Albania. If the Albanian species categorization does not correspond to the IUCN's classification or is being prepared but is not yet officially approved, you may use your professional judgments to include additional species to the list of Species of Conservation Interest.
- Species listed in Annexes II and IV of EU Habitat Directive 92/43.
- Geographically restricted, as defined by the IFC: For riparian, riverine, and other aquatic species, restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

Table 36. Long-list of aquatic species of conservation interest

No	Species name	Common name	Phylum	Class/Order	IUCN Category	Criteria	Albanian Red List
1	Baldellia ranunculoides	The lesser water plantain	Tracheophyta	Lilopsida/ Alismatales	NT		CR (A1c)
2	Hydrocotyle vulgaris	Common pennywort	Tracheophyta	Magnoliopsida/ Apiales	LC		VU (A2b)
3	Anodonta cygnea	The swan mussel	Mollusca	Bivalvia/ Unioniade	NT		
4	Ruditapes decussatus	Palorude clam	Mollusca	Bivalvia/ Venderidae	DD		Rare/Imp
5	Nassarius reticulatus	The dog whelks	Mollusca	Gastropoda/ Nassaridaea	DD		Rare/Imp
6	Marphysa sanguinea	Rock wormred-gilled	Annelidae	Polychaeta/ Eunicidae	DD		Rare/Imp
7	Perinereis cultrifera	Ragworm	Annelidae	Polychaeta/ Neredidae	DD		Rare/Imp
8	Upogebia pusilla	The mud shrimp	Arthropoda	Crustacea/ Upogebiidae	DD		Rare/Imp
9	Austropotamobius pallipes	White-claved crayfish	Arthropoda	Malacostraca/ Decapoda	EN	A2ce	
10	Astacus astacus	European cayfish	Arthropoda	Malacostraca/ Decapoda	VU	A2ad	

No	Species name	Common name	Phylum	Class/Order	IUCN Category	Criteria	Albanian Red List
11	Anguilla anguilla	Eorpean eel	Cordata	Actinopterygii/ Nguilliformes	CR	A2bd+4bd	
12	Barbus prespensis	Prespa barbel	Cordata	Actinopterygii/ Cypriniformes	VU	D2	
13	Alburnoides aff. prespensis	Prespa spirlin	Cordata	Actinopterygii/ Cypriniformes	VU	D2	
14	Cobitis ohridana	Ohrid loach	Cordata	Actinopterygii/ Cypriniformes	VU	D2	
15	Chondrostoma ohridanus	Ohid nasse	Cordata	Actinopterygii/ Cypriniformes	NT		
16	Alosa sp. nov. 'Skadar'	Scadar twait shad	Cordata	Actinopterygii/ Clupeiformes	VU	D2	
17	Cyprinus carpio	The common carp	Cordata	Actinopterygii/ Cypriniformes	VU	A2ce	
18	Gobio skadarensis	Scadar gudgeon	Cordata	Actinopterygii/ Cypriniformes	EN	B1ab(ii,iii)+2ab(ii,iii)	
19	Oxynoemacheilus pindus	Pindus stone loach	Cordata	Actinopterygii/ Nemacheilidae	VU	(B1ab(iii) +2ab(iii)	
20	Aphanius fasciatus	Mediterranean killifish	Cordata	Actinopterygii/ Cyprinodontidae	LC		EN

Table 37. Short- list of aquatic species of conservation interest

No	Species name	Common name	Phylum	Class/Order	IUCN Category	Criteria	Albanian Red List
1	Baldellia ranunculoides	The lesser water plantain	Tracheophyta	Lilopsida/ Alismatales	NT		CR (A1c)
2	Hydrocotyle vulgaris	Common pennywort	Tracheophyta	Magnoliopsida/ Apiales	LC		VU (A2b)
3	Anodonta cygnea	The swan mussel	Mollusca	Bivalvia/ Unioniade	NT		
4	Astacus astacus	European crayfish	Arthropoda	Malacostraca/ Decapoda	VU	A2ad	
5	Anguilla anguilla	European eel	Cordata	Actinopterygii/ Nguilliformes	CR	A2bd+4bd	
6	Cyprinus carpio	The common carp	Cordata	Actinopterygii/ Cypriniformes	VU	A2ce	

4.2.6.6. Key / Focus Species relevant to Project

This section presents the typical protected aquatic species observed in PDA and OHL route, including the conservation status.

Table 38. Typical protected aquatic species in the Project area

Name: Scientific Local English	Conservation status: IUCN/AlbRDB	Habitats and population - interaction with Karavasta PDA and power transmission line
Anadonta cygnea Midhja e kenetave The swan mussel	NT	The species has been observed in two localities of the transmitting line (OHL route) in very small numbers (Hoxhara channel and Irrigation channel of Vjose-Levan_Fier). The declines might be linked with habitat degradation, water pollution and eutrophication. Present also in some other localities in Albania. Red listed as NT in European scale.
Astacus astacus Gafora europiane European crayfish	VU	The species has been recorded during the survey of 2020 in the water courses at the OHL route. Red listed as VU in European scale.
Baldellia ranunculoides Lule delli e ujit The lesser water plantain	NT/CR	The species has limited presence in the area. The species is threatened due to land use change, recent coastal hydrological alterations, eutrophication, succession, pollution and geographic isolation. Red listed as NT in European scale and CR in national one.
Hydrocotyle vulgaris Monedha e kenetave Common pennywort	LC/VU	The species has limited presence in the area. The species is threatened due to land use change, recent coastal hydrological alterations, eutrophication, succession, pollution and geographic isolation. Red listed as NT in European scale and CR in national one. Red listed as LC in European scale and VU in national one
Anguila anguila Ngjala European eel	CR	Species present in the PDA, in drainage channels of different rate. There are clear evidences of stock decline in adjacent to the PDA. The European eel is observed inLagoon of Karavasta and Semani river. One of the major threats to European eel population in the area of concern is canals, land reclamation, sand mining, embankment, water level management and the abstraction of surface and ground water. This species has been recorded during the field surveys conducted in 2020 and 2021, however this needs further investigation during coming months. Red listed as CR in European scale.
Aphanius fasciatus Peshku celik Mediterranean Killifish	LC/EN	Aphanius fasciatus is a fish that has been recorded during sites inspection in 2020 and 2021, in brackish and salty coastal waters around the PDA. Its conservation status in the reporting period 2007-2017 was assessed as unfavourable in the national scale as a result of changes in water salinity, pollution and natural drying out of different connecting channels. Red-listed as LC at European scale and EN at national scale.

4.2.6.7. Summary

Based on the data collected, this survey emphasizes the importance of the transitional water bodies including drainage channels of the PDA to numerous aquatic species including fish, both of commercial and conservationist interest. Based on the field survey conducted in different periods of 2020, the followings are the key finding elements:

- The identified habitats related to aquatic ecosystems in the study area include: (i) **72A0** Reed beds (*Phragmito-Magnocaricetea*); (ii) **92A0** White willow (*Salix alba*) and White poplar (*Populus alba*) galleries and (iii) **1150** Coastal lagoons.
- The project area is characterized by dominated drainage and irrigation channels. The formation of reed beds is more widespread in these channels. High trunk helophytes, such

as Common reed (*Phragmites australis),* Lesser bulrush (*Typha angustifolia),* Round-headed club-rush *(Scirpus lacustris),* Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed (*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species.

- The macro-invertebrate diversity (the widest spread species were: Cerastoderma glaucum, Loripes lacteus, Abra segmentum, Cyclope neritea, Cerithium vulgatum, Pirinela conica, *Phyllodocidae, Lumbricidae, Crangon sp., Gammarus, Chironomus plumosus* and Idotea baltica) is reflecting the communication patterns of the drainage and irrigation channel habitats at the project area and thus maintaining the hydrological communication is vital for the complex ecosystems at the wider area.
- Fish assemblages and other species in these systems change both at temporal and spatial scales in relation to environmental parameters, such as water chemical-physical factors like temperature, dissolved oxygen and salinity or parameters related to habitat structure like depth, substrate type and submerged vegetation.
- During the survey of August 2020, there has been recorded 23 aquatic plant species (both submersed and emergent), 16 macro-invertebrate species connected mostly with benthic environments, and 18 fish species (including the freshwater one mainly in River Semani). Out of them there are two species of conservation concern the Mediterranean kill-fish (*Aphanus fasciatus)* considered as Critically Endangered (CR) according to Albanian Red List of 2013 and European eel *(Anguilla anguilla)* considered as Endangered (EN) according to IUCN.
- After habitat degradation, invasive species are the second leading cause of biodiversity loss, particularly in freshwater ecosystems. Based on current dominant presence of the mosquitofish (*Gambusia holbrooki*) a cyprinodontiform fish species of the *Poeciliidae* family in the Karavasta Solar Project area, it is clear that the degradation and lack of water management lead to serious situation. The aggressive nature, high reproductive potential, fast maturation rate, flexible behavior and broad environmental tolerances have contributed to their success as invaders, and the species is considered to pose a serious threat to native fishes in many countries.
- The current population of European eel *(Anguilla anguilla)* is unknown. The local status is currently facing two major impacts, the first is habitat degradation due to different human activities and second one is the lack of water management and affected hydrological connectivity.
- The Flathead grey mullet (Mugil cephalus) is the major commercially exploited fish species, and beside species plasticity its status at the local scale is affected by the habitat degradation and human activities too.
- The small coastal lagoon nearby the project location (Laguna e Ushtarit) is an important part of Karavaste-Dijvake NP, with capacity of hosting large number of birds during winter time. Numerous fish species characteristic of the lagoon ecosystem, such as flat head mullet (*Mugil cephalus),* thin-lip mullets *(Liza ramada* and *L. saliens),* gilt-head bream *(Sparus aurata),* and Mediterranean sand smelt *(Atherina hepsetus),* Mediteranean killfish (*Aphanius fasciatus*) etc., are present there.

4.2.7. Avifauna

4.2.7.1. Introduction

This section provides baseline information on bird species in the Project Development Area (PDA), Area of Project Influence (API) and Transmission Line route for the project of “Karavasta Solar Power Plant” as a contribution for the ESIA of the proposed “Karavasta Solar Power Plant”.

The information covers bird species present in the project area during August 2020 - June 2021- September 2021 including areas of national and international concern such as Divjaka - Karavasta National Park.

The report follows an approach that will serve also for the Critical Habitats' assessment. The detailed aspects of this approach are provided in the survey methodology subchapter. The other chapters provide information on the general importance of the PDA, OHL route and adjacent areas for bird species, species of conservation concern and those that surpass the 1% threshold of the regional populations and focuses on those species of conservation concern that could be impacted by the project, either during construction or operation.

4.2.7.2. Survey Methodology & Data Sources

Baseline data has been collected based on desktop research of available as well as primary data collected as part of field studies undertaken in the Project area in early August, early November 2020, mid-January, early February 2021 as well as Maj-June 2021.

Desktop research

The desktop research studies included assessment of the PDA and OHL with respect to the habitats present in the PDA and transmission route, the composition and distribution of avifauna within the Project site and adjacent areas and identification of potential animal movement pathways in relation to the Project.

The literature and online sources consulted include but are not limited to:

- Local sources including previous monitoring data on wintering and breeding birds
- The Management Plan of Divjaka-Karavasta National Park
- Globally Threatened Species (IUCN, 2020)
- BirdLife International on the assessment of certain species
- Wetlands International for the 1% threshold of regional population for waterbirds
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (The Birds Directive)
- The Red List of Flora and Fauna in Albania.

The above helped in drafting a list of species present in the Project area. The species were further evaluated through the data collected during the field surveys.

Field studies

The field surveys were conducted in August and November 2020, January, February, May and June 2021 (Table 39)

Table 39. Field visits undertaken in the project area during 2020-2021

Nr.	Dates	Purpose of the visit
1	5th, 6th and 14th of August 2020	Late breeding and early migratory birds
2	5th and 6th of November 2020	Migratory and early wintering birds
3	20th of January 2021	Wintering birds
4	4th of February 2021	Wintering birds
5	27th of May 2021	Breeding birds
6	15th and 19th of June 2021	Breeding birds

The August surveys targeted late breeding and early migratory birds in the area of project influence, in the project development area and the proposed transmission line 1 and 2. Meanwhile, the November surveys targeted late migratory and early wintering birds in the area of project influence (API), in the project

development area and the proposed transmission line. January and February 2021 surveys covered wintering bird community. Finally, the surveys of May and June 2021 were focused on both nesting and breeding birds. Considering that the 2021 spring arrivals have been delayed due to the bad weather conditions, we believe that observation undertaken in May 2021 are considered as a good option for migratory birds. In addition, the team has a good understanding of migratory birds present in the area due to historical data in both Karavasta lagoon and Narta lagoon.

In addition of the above areas, the observers have visited also the wetland site of Godulla e Ushtarit as the area is a major concentration point for birds and particularly waterbirds.

The composition and richness of different bird species was assessed through a combination of transect surveys and point counts.

Line transects suit better to open habitats such as the photovoltaics plot. Meanwhile the method of point counts is more feasible for closed habitats as dens scrubs as it might be the case for the forested areas along the route of the transmission line linking the photovoltaic plant with the transmission station in Fier.

Both methods, line transects and point counts, are based on recording birds along a predefined route within a predefined survey unit. In the case of line transects, bird recording occurs continually, whereas for point counts, it occurs at regular intervals along the route and for a given duration at each point (Sutherland et al. 2004, Bibby et al. 2000).

Line transects were undertaken to identify bird species present in current and abandoned or extensively cultivated agricultural land, temporary marshes nearby, sandy dunes and sand bars separating the lagoon or agricultural land from the sea.

Point counts were used in the area foreseen for the overhead lines covered by farmland, drain ditches, separated trees etc.

Species, occurring in the area during the site visit, were described including information on their conservation status and habitat requirements. Notes on breeding evidences, when occurring, were taken for each of the species observed in accordance with EBBA2 Breeding categories (010).

Nest site visits for colonially nesting birds such as the Collared Pratincole (Glareola pratincola) were conducted in a safe distance in order to not disturb or disrupt the breeding activity. The observer noted any kind of breeding evidences such as birds in display, alarming behaviour, egg shells, recently fledged young etc.

The survey team was composed by two observers equipped with binoculars (10 x 42), spotting scope (zoom 20-60), camera for taking pictures of birds and habitats and loud speaker for playback call in case it is necessary for the purpose of bird identification. All the data were noted in a mobile application and later uploaded in the Observation.org database.

The location of the surveys undertaken are presented in

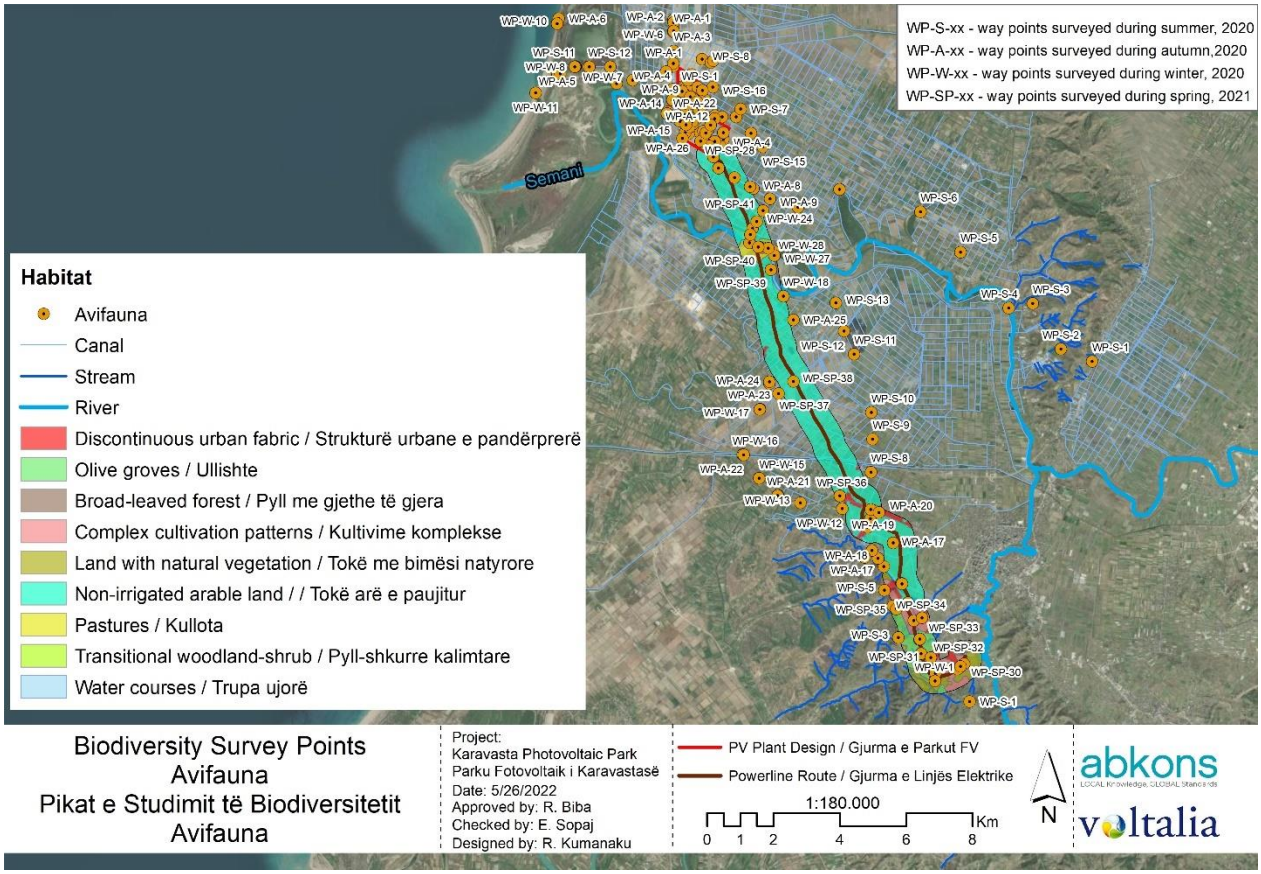


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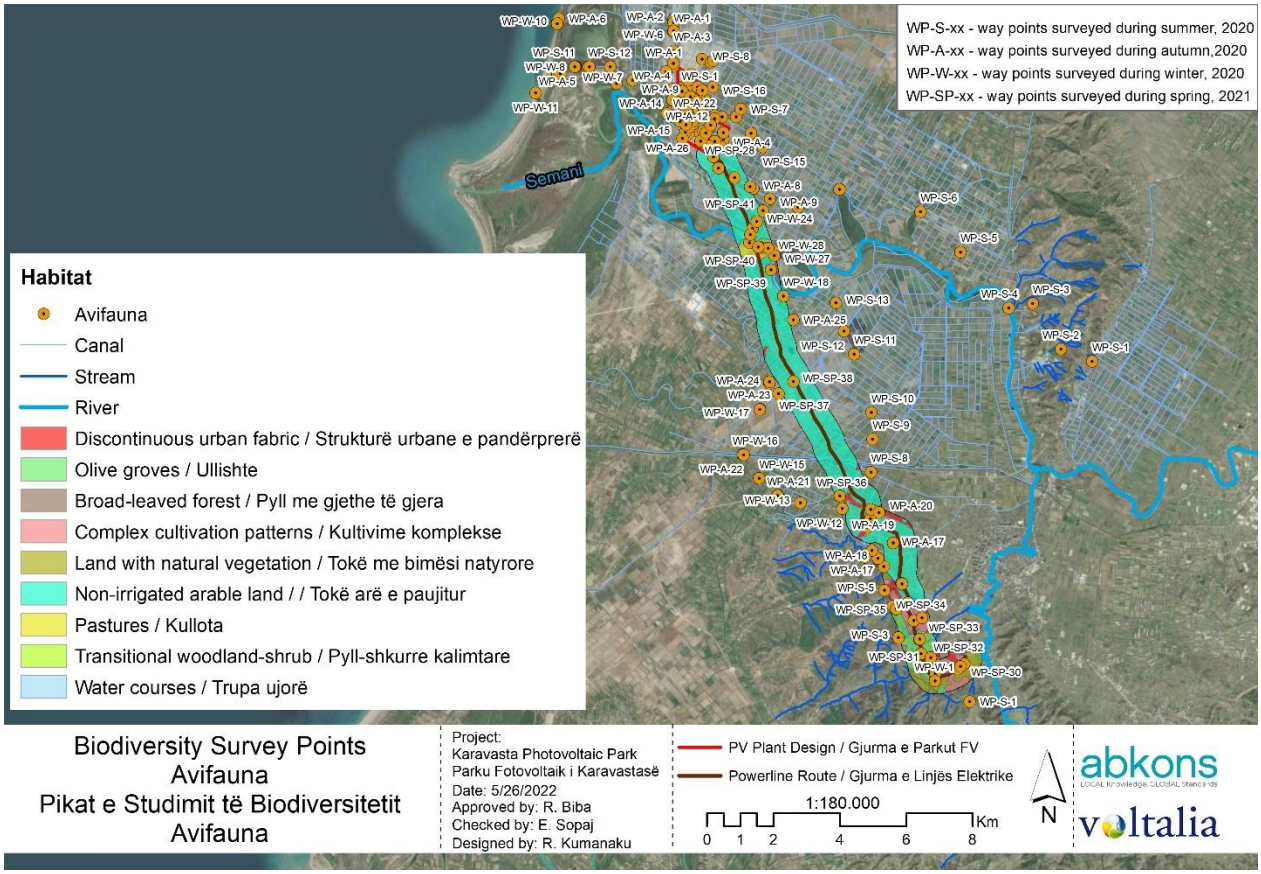


Figure 101. Avifauna Survey Points

4.2.7.3. General Description

The surveys conducted in August, November 2020 and January, February, May and June 2021, revealed the presence of 125 bird species or circa 35% of the bird species regularly observed in Albania. The area of the Transmission Line (TL) and its adjacent areas registered 86 species (Figure 102) compared with 90 species in Area of Project Influence (API) and 56 species in the Project Development Area (PDA). A detailed list of species present in the three project areas is provided in 0..

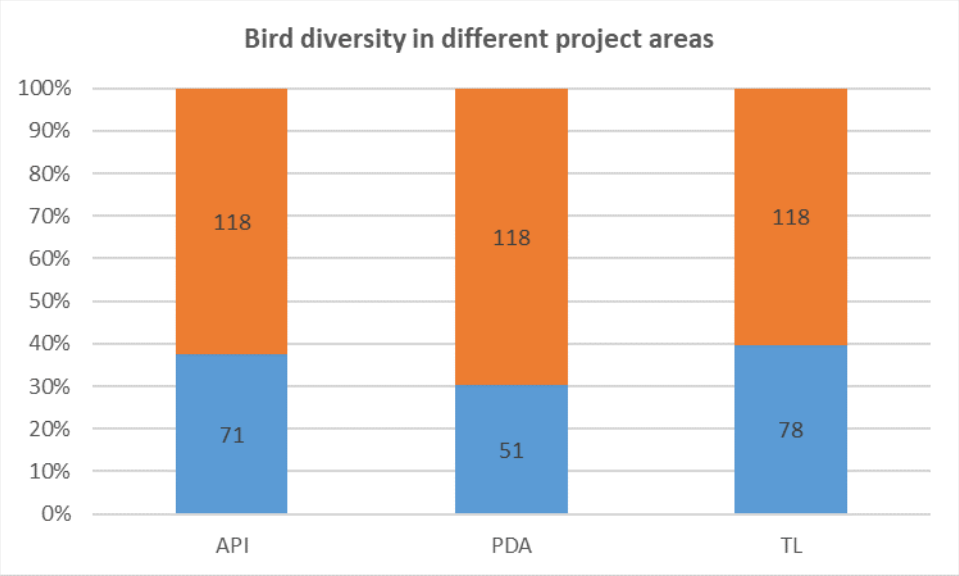


Figure 102. Relative importance of different project areas for the avifauna

PV Project Site

The project site or the project development area is composed by two major type habitats: (i) the abandoned arable land in the form of opened grounds covered by sparse halophytic vegetation such as Salicornia sp., Juncus sp. and other euryhaline species and (ii) the secondary and tertiary different drainage ditches covered by vegetation adapted to brackish waters. The drainage ditches provide an input of fresh or brackish water in an area otherwise covered by euryhaline vegetation.

The surveys conducted here in early August and Early November registered the presence of 49 bird species representing different groups of birds using the area as a breeding ground or a foraging ground.

Relative importance of the PDA for breeding birds

The surveys conducted in early August 2020, May and June 2021 identified 40 bird species present in the area (0).

19 species were considered as non-breeding despite their presence in the PDA. Some major representatives of this group are the Common Buzzard (*Buteo buteo*), Little Egret (*Egretta garzetta*), Common Kestrel (*Falco tinnunculus*), Collared Pratincole (*Glareola pratincola*), Eurasian Curlew (*Numenius arquata*), Turtle Dove (*Streptopelia turtur*) etc. For some of them, notably the Common Buzzard (*Buteo buteo*), Little Egret (*Egretta garzetta*), Common Kestrel (*Falco tinnunculus*), Eurasian Curlew (*Numenius arquata*), Turtle Dove (*Streptopelia turtur*), the habitat does not seem appropriate for nesting. For other species such as the Collared Pratincole (*Glareola pratincola*), despite the availability of the nesting habitat, the species was using the area only as a foraging ground. The individuals of the Collared Pratincole were

visiting the PDA from the adjacent grounds, circa 0.7-0.8 km north-east of the PDA, where a colony of 70-85 pairs was registered during the surveys undertaken in May and June 2021.

Four bird species from the 40 presents in the PDA, were assessed as Possible breeding species meaning that their presence was registered but there is not enough evidence to consider them either probably breeding or confirmed breeding. The Little Owl (*Athene noctua*) was spotted leaving one of the bunkers (Figure 103) inside the PDA and it is often known that such Owls use the bunkers as a potential site for nesting.



Figure 103. Bunker serving as a possible nesting site for the Little Owl

Three species from 40 being observed in the PDA were assessed as probably breeding. They are either ground nesting birds suited to open grounds (Figure 104) such as the Common Sandpiper (*Actitis hypoleucos*) or the Eurasian Stone-curlew (*Burhinus oedicnemus*) or breeding in dense shrubs or thickets as it is the case of the Lesser Grey Shrike (*Lanius minor*). The adults of those species were registered in suitable nesting habitat with some of them showing territorial and agitated behaviour as clear evidence of probable breeding.



Figure 104. Open grounds and dense thickets in PDA

14 species were assessed as confirmed breeding with the majority belonging to the passerine community. The majority of the species are ground nesting birds specialized for breeding in open grounds (Figure 104). This is the case for the Tawny Pipit (*Anthus campestris*), the Greater Shrot-toed Lark (*Calandrella brachydactyla*), Corn Bunting (*Emberiza calandra*), Crested Lark (*Galerida cristata*), European Stonechat (Saxicola rubicola), European Bee-eater (*Merops apiaster*) and the Yellow Wagtail (*Motacilla flava*). The rest of the confirmed breeding species nest in short grass (Zitting Cisticola *Cisticola juncidis*), thick

vegetation of shrubs and trees as it is the case for the Red-backed Shrike (*Lanius collurio*), Woodchat Shrike *Lanius senator* (Figure 105) and the Common Whitethroat (*Sylvia communis*) or inside the bunkers as it the case for the Red-rumped Swallow *Cecropis daurica* (Figure 106).



Figure 105. Breeding site of Woodchat Shrike (Lanius senator) in PDA



Figure 106. Nest of Red-rumped Swallow (Cecropis daurica)

It is obvious the open grounds are the main breeding habitat for birds while the drainage channels are still important for some nesting birds and all the rest that use the drainage channels and ditches as a foraging ground (Figure 107).



Figure 107. Little Egrets (Egretta garzetta) in a drainage ditch

Finally, the late breeding surveys recorded the presence of the Turtle Dove, a Globally Vulnerable species as well as the presence of 8 species of Annex 1 of Birds Directive.

Relative importance of the PDA for migratory and wintering birds

Some 29 species of birds were recorded in the Project Development Area in early November of 2020, January and February 2021 (Annex 5), a period coinciding with some migratory birds as well as early wintering birds. The majority of birds belonged to the group of passerine species such as Eurasian Skylark (*Alauda arvensis*), Meadow Pipit (*Anthus pratensis*), Water Pipit (*Anthus spinoletta*), European Goldfinch (*Carduelis carduelis*), Corn Bunting (*Emberiza calandra*), Common Chaffinch (*Fringilla coelebs*), Common Linnet (*Linaria cannabina*), Common Starling (*Sturnus vulgaris*) etc. The presence of the above birds in flocs in the open grounds of the PDA demonstrates that the area serves as a foraging ground for migrating and wintering birds.

The presence of the passerine flocks has apparently attracted also the presence of several birds of prey with some of them seen chasing on passerines. That was the case for the Eurasian Sparrowhawk (*Accipiter nisus*) and the Common Kestrel (*Falco tinnunculus*).

Again, the drainage ditches, were important for waterbirds as well as for a number of passerines.

Furthermore, the visits registered the presence of four species part of Annex 1 of the Birds Directive giving to the PDA a conservation importance for species of European conservation concern.

Finally, it is worth noting here the presence of the Globally Vulnerable species of the Greater Spotted Eagle (*Clanga clanga*). This observation (Figure 108) and some others in late November and December (Xeka *pers. info.*), confirm the previous findings (Bino 2017) that the PDA is part of a larger wintering ground for the species that includes the territory of Divjaka-Karavasta National Park and its adjacent areas.



Figure 108. PDA as wintering ground for the Greater Spotted Eagle

4.2.7.4. Area of project influence

The area of project influence was defined as the surrounding area of the project development area within a distance of 2 km from the PDA. It is a more complex site with several habitats such arable land, abandoned arable land, temporary marshes, the brackish wetland site of Godulla e Ushtarit and the riparian forest of Semani river.

Some 90-bird species were registered in this part during the survey conducted in August and November 2020, January, February, May and June 2021 (0). It is very likely that the number of bird species in this area could be higher considering the variety of habitats. Nevertheless, the collected information could be further completed through historical information collected for the Divjaka-Karavasta National Park.

Relative importance of the area of project influence for breeding birds

The August survey identified 65 bird species (Biodiversity Report) within the Area of project Influence (API). 41 were Confirmed Breeding, 7 species as Probable Breeding, 2 species as Possible Breeding and 15 species as non-Breeding.

The most important habitats for breeding birds were the abandoned arable land close to the northern boundaries of the Project Development Area, the brackish marsh (Godulla e Ushtarit) north-west of the PDA and the riparian forest at Semani River, west and south-west from the PDA.

The area of the abandoned arable land was used by a breeding colony of nesting Collared Pratincole *Glareola pratincola* (Figure 109). At the time of the survey, the colony seemed to have 70-85 breeding pairs.



Figure 109. The abandoned arable land occupied by the colony of Collared Pratincole (G. pratincola)

The riparian forest of Semani River (Figure 110) offers a potential breeding habitat for species specialized in riparian forests and the river banks. Our observations identified a few speces present in the area such as Sand Martins (*Riparia riparia*), European Bee-eater and Black-headed Gull (*Croicocephalus ridibundus*). Despite the few observations, the riparian forest could be used also by birds of prey and the Globally Vulnerable Turtle Dove (*Streptopelia turtur*).



Figure 110. Riparian forest of Semani river, west and south-west of the PDA

The drainage channel and brackish lagoon of Godulla e Ushtarit (Figure 111) were used by a variety of species, including waterbirds and non waterbirds. Several species were registered here, such as the Dalmatian Pelican *Pelecanus crispus,* Pygmy Cormorant *Microcarbo pygmaeus*, European Coot *Fulica atra*, Common Tern *Sterna hirundo,* Great White Egret *Ardea alba,* Little Bittern *Ixobrychus minutus,* Zitting Cisticola *Cisticola juncidis,* Sand Martin *Riparia riparia etc.*





Figure 111. Drainage ditch and brackish lagoon at the Area of Project Influence

This drainage ditches and the lagoon reedbed could be important for nesting birds and foraging birds such as Common Tern and Little Tern. The maintenance of this habitats is also important for small migratory birds and for other birds using is as a foraging ground.

Relative importance of the area of project influence for migratory birds

The project development area was visited in early November and mid-January, a period coinciding with late migrants and wintering species. During the November surveys, the brackish lagoon of Godula e Ushtarit (Figure 112) sheltered the majority of species represented mostly by waterbirds such as the Kingfisher (*Alccedo atthis*), Northern Pintail (*Anas acuta*), the Eurasian Teal (*Anas crecca*), Mallard (*Anas platyrhynchos*), Eurasian Wigeon (*Mareca penelope*), Great Egret (*Ardea alba*), Greater flamingo (*Phenicopterus roseus*) etc. Almost the same panorama was observed in January 2021, with the exception that in January, the observers noted a high presence of Dalmatian Pelicans (123 individuals), Slender-billed Gulls, black-headed Gulls, Flamingos etc.




Figure 112. Migratory birds in the brackish lagoon of Godulla e Ushtarit

The presence of the waterbirds demonstrates that the wetland sites within the area of project influence serve as important habitats for birds during migration and breeding and wintering period.

Overhead Transmission Line (OHL) Route

The three proposed routes for the transmission line are similar with regards to habitat characteristics as they cross through five types of habitats including (i) the abandoned arable land, (ii) the drainage ditches and channels, (iii) a mosaic of arable land, (iv) the riparian forest in Semani river and (v) the olive groves in the hilly area close to Mbrostar or Fier-Levan.

The routes of transmission Line 1 and 2 were visited in early August 2020 while the route of the transmission line 3 was visited in early November 2020, February and June 2021. The survey registered 86 bird species including breeding, migratory and early wintering birds (0). The majority of birds were part of the Passerines order. The rest belonged to birds of prey, waders, herons, owls, quails, cuckoos, woodpeckers, doves etc.

Relative importance of the transmission line routes for breeding birds

Some 63-bird species were observed in the transmission line route 1, 2 and 3. Transmission line 3, which is the proposed OHL route for the Project, registered 43 bird species, seemingly the lowest number of birds observed in the three different routes.

The surveys conducted in June 2021, show that the bird community in the transmission line 3 is composed of 1 non-breeding species, 4 possible breeding, 5 probable breeding and 33 confirmed breeding.

Among the confirmed breeders is worth mentioning the breeding evidences collected for the Common Buzzard (*Buteo buteo*) in the riparian forest of Semani near Semani i ri and the presence of the Turtle Dove (*Streptopelia turtur*) in the riparian forest of Semani river. All those species are protected by national legislation while some of them have an unfavorable national or international conservation status.

The reservoir of Peshtan and the riparian forests (Figure 113) along the transmission lines route 3, looked important for breeding birds. Despite the short time in the area, a high number of species was registered and some of the species are of conservation concern at international and national level.




Figure 113. Aquatic habitats in Poshtez and Semani River

Some large colonies of European Bee-Eaters were located close to route 3, in the sandstone hills in between the village of Radostine and Fier substatio (Figure 114).



Figure 114. Slopes inhabited by former colonies of the European Bee-eater

The other remaining habitats in route 3 of the transmission line are composed by arable land, drainage ditches and channels. They are inhabited by a variety of breeding birds such as passerines species of Warbrlers, Tits, Pipits, Shrikes, Buntings etc. Apart from those, the arable land (Figure 115) is an important breeding and foraging habitat for other species such as the Quail, Turtle Dove etc.



Figure 115. Arable land as breeding and foraging habitat for numerous bird species

Relative importance of the transmission line route for migratory and wintering birds

Some 50 species of birds were recorded in the route 3 of the transmission line in early November of 2020, January and February 2021. As it was the case for the PDA, the majority of birds belonged to the group of passerine species including the Eurasian Skylark, Meadow Pipit, Water Pipit, European Goldfinch, Common Chaffinch, Common Linnet, Common Starling etc. The presence of the above birds in flocs in the open grounds of the transmission line route demonstrates that the area serves as a foraging ground for migrating and wintering birds.

The presence of the passerine flocks has apparently attracted also the presence of several birds of prey with some of them seen chasing on passerines. That was the case for the Eurasian Sparrowhawk (*Accipiter nisus*) and the Common Kestrel (*Falco tinnunculus*).

Again, the drainage ditches, were important for waterbirds as well as for a number of passerines.

Furthermore, the visits registered the presence of five species part of Annex 1 of the Birds Directive as well as seven species of National Conservation Concern.

Finally, a roosting site of Grey Herons (*Ardea cinerea*) was registered in the riparian forest of Semani river. A few individuals of the Grey Heron were present in the area throughout the day while a number of circa 50 individuals were seen flying towards the riparian forest in the dusk and evening, providing evidences for the presence of a roosting site for the Grey Herons.

Overall, it has been concluded that the proposed OHL route will not interfere with the migratory routes for waterbirds, which make up the majority of the migratory birds using the Eastern Adriatic Flyway.

4.2.7.5. Bird species of conservation concern

Detailed information on the presence of protected species of birds is provided in Section **Error! Reference source not found.**. This information shows that the area under survey during the field work conducted in August, November 2020 and January, February, May and June 2021, shelters at least 35 species of Conservation Concern including:

- The three Globally Vulnerable species of the Common Pochard (*Aythya ferina*), the Greater Spotted Eagle (*C. clanga*) and the Turtle Dove (*S. turtur*),
    - The 19 species of national conservation concern (either Critically Endangered, Endangered or Vulnerable) *and*
    - The 26 species of Annex 1 of EU Birds Directive.

Some of the species, as demonstrated Table 40, are of conservation concern for three different categories including Global concern, National Concern and part of Annex I of Birds Directive.

Table 40. Species of Conservation Concern and their ecological characteristics (BirdLife International 2021)

No.	Species	Conservation Concern	Ecological characteristics
1	Eurasian Sparrowhawk (*Accipiter nisus*)	Endangered Nationally	This species has an extremely large range and the global population trend appears to be stable. The population size is extremely large. The global population is placed in the band 2,200,000 to 3,300,000 mature individuals (BirdLife International 2021). While the global population is suspected to be stable, the national population was considered in decline due to poaching. Therefore, the species is considered as Nationally Endangered. It mainly inhabits forest interspersed with open areas. Small birds make up the vast majority of its diet. In Albania is seen mostly in the coastal and lowland areas during winter. Sharp declines in Europe in the 1950s-1960s were driven by the use of harmful organochlorine pesticides, which causes direct mortality of adults as well as reduced breeding success. The species is still trapped in its thousands annually in Turkey, where it is used by falconers, but habitat alteration is thought to be the major contemporary. In Albania the major threat used to be poaching although other factors mentioned above might contribute to the decline.
2	Eurasian Skylark (*Alauda arvensis*)	Annex 1 Birds Directive	This species has an extremely large range and the global population size is extremely large. A very preliminary estimate of the global population size is 295,600,000-526,600,000 mature individuals (BirdLife International 2021). The Eurasian Skylark is found in most open habitats and has a strong association with farmland throughout its range. The diet is seasonal; primarily

No.	Species	Conservation Concern	Ecological characteristics
			insectivorous in summer and herbivorous in the winter. The species does not breed in coastal Albania while flocks of hundreds of individuals visit the coastal area during migration and wintering season. At the global level, the main cause of decline in this species is agricultural intensification. Recent research indicates the principal causes are changes in management of cereal-growing and grassland. The heavy use of pesticides and herbicides is thought to negatively impact this species too. High hunting pressure in some countries poses an additional threat as it was the case in Albania before 2014.
3	Common Kingfisher *Alcedo atthis*	VU in Europe Res. 6 Bern Convention	The species has a very large range. A very preliminary estimate of the global population size is 780,000-1,340,000 mature individuals. It prefers still or gently flowing water with plenty of small fish, and with reeds, rushes or shrubs on the banks for perches. Streams, small rivers, canals and ditches are favoured to open waterbodies, but it also uses lakes, ponds and flooded gravel pits. In winter it becomes more coastal, also using estuaries, harbours and rocky seashores. Egg-laying occurs from March to July. Main prey is fish but it could consume aquatic insects. The species is threatened by hard winters (northern populations) as well as chemical and biological river pollution. Canalisation of streams and clearance of emergent vegetation to improve drainage result in loss of breeding and feeding habitat and declines in fish numbers.
4	Tawny Pipit (*Anthus campestris*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is extremely large. A very preliminary estimate of the global population size is 4,550,000-8,600,000 mature individuals (BirdLife International 2021). The global population is suspected to be stable. The Tawny Pipit is found in open dry habitats, from sand dunes, sandy heaths, dry grassland and clear-felled areas to artificial habitats such as gravel pits, steppe and semi-deserts in central and eastern parts of the range. It favors areas with dwarf shrubs and low-growing trees for song posts as it is the case of the PDA. The breeding season is from mid-April to mid-August. It is monogamous and the nest is a cup of grass stems, leaves and roots, lined with finer plant material and hair and built in a scrape or a hollow on the ground or in a tuft of grass. The diet is mainly insects,

No.	Species	Conservation Concern	Ecological characteristics
			although other invertebrates and seeds are also taken, as well as rarely small vertebrates. The species is almost wholly migratory with eastern populations generally moving to the Arabian Peninsula and southern Asia, east to the north-west Indian subcontinent. The species is threatened by habitat loss as a result of afforestation of open habitats, scrub encroachment, intensification of agriculture and eutrophication of cultivated land. In addition, the use of pesticides may also be a threat through the reduction of food availability. Climate change may also have an impact on this species.
5	Great White Egret (*Ardea alba*)	Endangered Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. It is considered as endangered in Albania due to its limited number in breeding season. The European population is estimated at 20,700-34,900 pairs, which equates to 41,500-69,900 mature individuals (BirdLife International 2015). The Great White Egret inhabits all kinds of inland and coastal wetlands although it is mainly found along the coast in the winter or during droughts. In aquatic habitats its diet consists of fish, amphibians, snakes, aquatic insects and crustaceans although in drier habitats terrestrial insects, lizards, small birds and mammals are more commonly taken. The species is threatened by wetland habitat degradation and loss for example through drainage, grazing, clearing, burning, increased salinity, groundwater extraction and invasion by exotic plants
6	Grey Heron (*Ardea cinerea*)	Vulnerable Nationally	The species has an extremely large range and the global population size is very large. The global population is estimated to number c.790,000-3,700,000 individuals (Wetlands International 2015). The overall population trend is uncertain, as some populations are decreasing, while others are stable, increasing or have unknown trends. The European breeding population is thought to have undergone a short-term decline between 2000 and 2012 (BirdLife International 2015). In Albania the species has been designated as vulnerable due to the decrease of the number of breeding pairs. The Grey Heron is a generalist in its habitat use, although shallow water, relatively large prey, and four

No.	Species	Conservation Concern	Ecological characteristics
			or five months of ice-free breeding season are among the essential characteristics of its habitat. Its diet consists predominantly of fish and eels 10-25 cm long, as well as amphibians, crabs, molluscs, crustaceans, aquatic insects, snakes, small rodents and small birds. In Europe, the species was heavily persecuted in the nineteenth century due to its consumption of fish, which resulted in competition with fishermen and fish farmers. In Albania was mostly endangered by persecution and disturbance of breeding colonies.
7	Squacco Heron (*Ardeola ralloides*)	Vulnerable Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population is estimated at 370,000-780,000 (Wetlands International 2015). The European population trend is estimated to be stable (BirdLife International 2015). In Albania the species has been designated as vulnerable due to the decrease of the number of breeding pairs. In the Palearctic this species is migratory and dispersive. The species breeds from April to July in Eurasia in single- or mixed-species colonies. The Squacco Heron inhabits permanent or temporary wetlands showing a preference for fresh waters with abundant marsh vegetation, reedbeds, nearby bushes, trees and scrub. Habitats frequented include swampy plains, river valleys, deltas, lakes, ponds, canals and ditches. On migration the species may also occur on estuaries, inshore reefs or islets. It generally avoids dry habitats, and usually breeds in the lowlands. Its diet consists predominantly of larval insects although fish and amphibians up to 10 cm long, grasshoppers, beetles, butterflies, spiders, crustaceans, molluscs and exceptionally small birds may also be taken. The greatest threat to this species is the loss and deterioration of natural and man-made freshwater habitats and wet woodlands.
8	Common Pochard (*Aythya ferina*)	Vulnerable Globally	The global population is estimated to number c. 1,950,000-2,250,000 individuals (Wetlands International 2012). The overall population trend is decreasing, although some populations may be stable and others have unknown trends. It requires well-vegetated eutrophic to neutral swamps, marshes, lakes and slow-flowing rivers with

No.	Species	Conservation Concern	Ecological characteristics
			areas of open water and abundant emergent fringing vegetation. The species is omnivorous, its diet consisting of seeds, roots, rhizomes, the vegetative parts of grasses, sedges and aquatic plants as well as aquatic insects and larvae, molluscs, crustaceans, worms, amphibians and small fish. It is thought that the primary factors that have led to the decline in this species are most likely to be a combination of: (i) loss of breeding habitat in eastern Europe, and (ii) changes in water chemistry (especially from hyper-eutrophication caused by agricultural runoff).
9	Common Buzzard (*Buteo buteo*)	Vulnerable Nationally	The species has an extremely large range and the global population size is very large. The global population size is placed in the band 2,100,000-3,700,000 mature individuals. In Europe, which holds approximately 75% of the global population, the population size is estimated to be stable (BirdLife International 2015). In Albania the species has been designated as vulnerable due to persecution and a decrease of the number of breeding pairs. It inhabits a wide variety of habitats but requires at least some tree cover for nesting and roosting; ideal habitat appears to be forest edge, or mosaics of forest and open areas. Diet It is versatile depending on the prey animals available, with small mammals usually predominating, but in some areas, invertebrates making up the majority. The most important historical threat has been from persecution, including through poisoned bait traps, with pesticides and habitat loss also causing some declines.
10	Greater Short-toed Lark (*Calandrella brachydactyla*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. In Europe, the breeding population is estimated to number 9,460,000-18,100,000 mature individuals (BirdLife International 2015). In Europe, trends between 1998 and 2013 show that populations were stable (EBCC 2015). This species prefers dry areas with low and sparse vegetation cover, on level or undulating terrain, with sandy or stony soils. In the Mediterranean basin it breeds mostly in fallow lands but also on dry pastures, tobacco fields, dirt tracks and olive groves In south-east Europe it lays eggs from mid-April.

No.	Species	Conservation Concern	Ecological characteristics
			The nest is built of grasses, rootlets and similar vegetation, lined with softer material and placed in a shallow scrape on the ground, usually beside a shrub or grass tuft. It often has a small rampart of sticks or stones. Clutch size ranges from two to five eggs. It feeds mainly on invertebrates in the spring, supplementing them with seeds and the green parts of plants in the other seasons and nestlings are fed solely on invertebrates. The species is mostly migratory and departs on a broad front from mid-August through to September and October. European populations winter in Africa between 10° and 20°N. Main threats are from agricultural intensification (leading to loss of fallows, increased number of irrigation schemes, increase in surface area covered by crops, etc.) and afforestation of wastelands.
11	Kentish Plover (*Charadrius alexandrinus*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The population is therefore placed in the band 100,000-499,999 mature individuals. The overall population trend is decreasing. The European population is estimated to be decreasing by less than 25% in 15 years (three generations) (BirdLife International 2015). The species occupies its breeding grounds chiefly from March to October, dispersing from late-June immediately after the young fledge, with the southward migration peaking in September. It nests solitarily or in loose semi-colonial groups, usually in densities of 0.5 to 20 pairs per hectare, and sometimes in association with other species. Outside of the breeding season the species feeds singly or in small flocks. During all seasons the species is predominantly coastal and is usually found on sand, silt or dry mud surfaces. It also shows a preference for sparsely vegetated and sandy areas when breeding. Diet consists mainly of insects and their larvae (e.g. beetles and flies), gammarids, crabs, other crustaceans and brine shrimps, bivalve and univalve molluscs, polychaete worms, spiders and small pieces of seaweed. The nest is a shallow scrape positioned near water on bare earth or in sparse vegetation, often on slightly raised ground and partly sheltered by plants or near conspicuous objects such as grass clumps or shrubs. The species is threatened by the disturbance of coastal habitats (e.g., tourists trampling nests and

No.	Species	Conservation Concern	Ecological characteristics
			disturbing roosts on beaches). It is also threatened by the degradation and loss of wetland habitat through environmental pollution, land reclamation, declining river flows, unsustainable harvesting of benthic fauna, urbanization and a reduction in the amount of sediment being carried into coastal areas by rivers (Barter 2006).
12	Western Marsh Harrier (*Circus aeruginosus*)	Vulnerable Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population size is placed in the band 500,000 to 999,999 mature individuals. In Europe, the population size is estimated to be increasing (BirdLife International 2015) while it was considered decreasing in Albania due to persecution. The species inhabits extensive areas of dense marsh vegetation, in fresh or brackish water, generally in lowlands It is a generalist predator taking a variety of prey types, with small birds generally preferred but mammals such as voles, rabbits and rats being more important in parts of its range. The nest is a pile of reeds built in dense marsh vegetation. Major threats include wetland desiccation and drainage; persecution by shooting; pollution, especially from excessive pesticide use in and around wetlands (although widespread bans have reduced this threat somewhat), and poisoning by heavy metals, notably the consumption of lead-shot through feeding on contaminated waterbirds.
13	Hen Harrier (*Circus cyaneus*)	Endangered Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population size is placed in the band 100,000 to 499,999 mature individuals. In Europe the population size is estimated and projected to be decreasing. The current main threat is the transformation of habitat owing to intensified agriculture, disappearance of marshes and reforestation. Persecution is still severe locally as it has been the case for Albania.
14	Montagu's Harrier (*Circus pygargus*)	Endangered Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population size is placed in the band 100,000 to 499,999 mature individuals. The population is thought to be decreasing owing to over-use of pesticides and improved locust control,

No.	Species	Conservation Concern	Ecological characteristics
			agricultural intensification and destruction of nests by farm machinery and loss of small mammal and bird prey species due to changing agricultural practices. It is a migratory species, wintering in sub-Saharan Africa and southern Asia. It leaves its breeding grounds in August and September, beginning their return in March and April. In Albania is thought to be migratory with nesting still to be proved by stronger nesting evidences. It is a bird of open country, usually in lowlands. Diet is composed of small birds and mammals; voles are a particularly dominant food source locally in abundant areas. It nests in tall vegetation on the ground. It is currently in decline owing to the conversion of its habitat to agricultural land. In Albania the main threat is persecution.
15	Greater Spotted Eagle (*Clanga clanga*)	Vulnerable Globally, Critically Endangered Nationally and Annex 1 Birds Directive	This species has a small population which appears to be declining owing to extensive habitat loss and persistent persecution. It is therefore listed as globally Vulnerable. The global population size is 5,000-13,200 individuals in total, roughly equating to 3,300-8,800 mature individuals, although further validation of this estimate is needed. This species is suspected to have undergone at least a moderately rapid decline over the last three generations as a result of habitat loss and degradation throughout its breeding and wintering ranges, together with the effects of disturbance, persecution and competition with other predators. In Europe the population size is estimated to be decreasing by 50-79% in 49.8 years (three generations) and by at least 20% in 33.2 years (two generations) (BirdLife International 2015). It occurs in lowland forests near wetlands, nesting in different types of (generally tall) trees, depending on local conditions. It feeds on unretrieved quarry, small mammals, waterbirds, frogs and snakes, hunting over swamps, wet meadows and, in Europe, over extensively managed agricultural land; birds soar to c.100 m high when hunting. Evidences collected prior and through the project suggest that the PDA and AoI are a regular wintering ground for at least one individual of the Greater Spotted Eagle. Other key threats are habitat destruction and disturbance, also poaching and electrocution can be

No.	Species	Conservation Concern	Ecological characteristics
			considered important. Suitable habitat mosaics have been lost as a result of afforestation and wetland drainage. In eastern Europe, agricultural intensification and the abandonment of traditional floodplain management have reduced habitat quality. Birds are intolerant of permanent human presence in their territories. Forestry operations are a major cause of disturbance. Shooting is a threat in Russia, the Mediterranean, South-East Asia and Africa, together with deliberate and accidental poisoning across much of its range.
16	Syrian Woodpecker (*Dendrocopos syriacus*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population size is 625,000-1,460,000 mature individuals. This species has extended its range greatly. Formerly restricted to the eastern Mediterranean, it is now found throughout the Balkans, into central Europe, including Hungary and Poland. Agricultural development and other human activities have probably enabled this expansion. The European population trend is estimated to be stable (BirdLife International 2015). It occurs in open country with wooded areas. It is often found in plantations of all kinds, including olive, pecan (Carya) and avocado in the south, and vineyards in central Europe, where it is also seen in roadside trees and groups of trees, mainly near habitations, as well as forest edges, parks and gardens. It inhabits oak (Quercus) woodland and light montane forest in the southeast and breeds in coniferous forest at lower levels in Turkey. Egg-laying occurs from mid-April to May, rarely to June. The nest-hole is excavated by both sexes, but mostly by male, in a trunk or large branch of a tree, or occasionally in a utility pole or similar structure. Old nests are sometimes reused. Clutch size is three to seven eggs. It is omnivorous, feeding on various insects, snails, earthworms, fruit, berries, sap, nuts and seeds. The species is resident and dispersive; sometimes long distances are covered during dispersal. The species was formerly persecuted locally as a pest (known to cause damage in plantations and peck irrigation pipes) and sometimes large numbers were shot, however it is now generally tolerated.
17	Little Egret (*Egretta garzetta*)	Vulnerable Nationally and	The species has an extremely large range and the global population size is very large.

No.	Species	Conservation Concern	Ecological characteristics
		Annex 1 Birds Directive	The global population is estimated at 660,000-3,150,000 individuals. The overall population trend is increasing, although some populations may be stable and others have unknown trends (Wetlands International 2006). The European breeding population trend is estimated to be decreasing (BirdLife International 2015) or stable (EBCC 2015) in the short-term. It is increasing also in Albania with two large and medium colonies found after 2014 (Bino and Bego *pers. comments*) The Little Egret usually nests in colonies sometimes of thousands of pairs and often with other species. As it is the case of a mixed colony in the northern part of Divjaka-Karavasta National Park. It inhabits fresh, brackish or saline wetlands and shows a preference for shallow waters (10-15 cm deep) in open, unvegetated sites where water levels and dissolved oxygen levels fluctuate daily, tidally or seasonally, and where fish are concentrated in pools or at the water's surface. Diet It is a highly variable, taking mainly small fish under 20 g in weight and less than 10 cm long (averaging 4 cm), aquatic and terrestrial insects (e.g. beetles, dragonfly larvae, mole crickets and crickets) and crustaceans (e.g. Palaemonetes spp., amphipods, phylopods, crabs and exotic species of crayfish) as well as amphibians, molluscs (snails and bivalves), spiders, worms, reptiles and small birds. The species is threatened by wetland degradation and loss through drainage for agriculture (e.g., rice-farming and fishing), changes in current management practices (e.g., of rice-farming) and contamination from agricultural and industrial operations.
18	Eurasian Hobby (*Falco subbuteo*)	Vulnerable Nationally	The species has an extremely large range and the global population size is very large. The global population size is placed in the band 500,000-999,999 mature individuals. The population is declining locally owing to habitat loss (del Hoyo et al. 1994). In Europe the population size is estimated to be stable (BirdLife International 2015). In Albania was considered as decreasing and Vulnerable due to persecution. It occurs in open wooded areas. Flying insects form the main part of its diet, although birds are often taken in the breeding season.

No.	Species	Conservation Concern	Ecological characteristics
			Birds almost always nest in trees, using abandoned nests of other raptors or corvids (del Hoyo et al. 1994). The cutting of old growth forest patches is thought to have caused local declines in Ukraine. Some are shot, notably in Malta. A growing threat is human disturbance, which facilitates nest predation by crows and squirrels. Pesticide use has likely had only minor impacts.
19	Common Kestrel (*Falco tinnunculus*)	Vulnerable Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population size is placed in the band 4,000,000-6,500,000 mature individuals. In Europe the population size is estimated to be decreasing by less than 25% in 16.2 years (three generations) (BirdLife International 2015). In Albania the species was designated as Vulnerable due to persecution. The species tolerates a wide range of open and partially forested habitats. It feeds mainly on small mammals, particularly in northern Europe, with insects possibly more important in Africa and the Mediterranean. The locations of nests are variable, with rock ledges, buildings and abandoned corvid nests being commonly reported sites. A nest is found at the AoI and the species uses the PDA as a foraging ground. The population in much of the rest of Europe has shown a more recent steady decline, thought to be due to agricultural intensification.
20	Collared Pratincole (*Glareola pratincola*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population is estimated at 160,000-600,000 individuals (Wetlands International 2015). The overall population trend is decreasing, although some populations may be stable and others have unknown trends (Wetlands International 2015). The species breeds on flat open areas with short or patchy vegetation such as fields, steppe plains near water the margins of alkaline lakes and dried mudflats in Eurasia. Its diet consists of large insects (e.g., Orthoptera, Coleoptera, Diptera and Isoptera), spiders and molluscs.

No.	Species	Conservation Concern	Ecological characteristics
			The nest is a shallow scrape or depression on the ground on dry mudflats and sandflats. The species is threatened by the use of herbicides and insecticides, and by changes to its preferred habitats (e.g., changes in water levels, ploughing of grasslands, artificial irrigation and fertilisation, changes in traditional grazing regimes, increasing urban encroachment and human disturbance).
21	Black-winged Stilt (*Himantopus himantopus*)	Endangered Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population is estimated to number c.450,000-780,000 individuals (Wetlands International 2015). The overall population trend is unclear, some populations may be stable, increasing or have unknown trends (Wetlands International 2015). The European population is estimated to be stable (BirdLife International 2015). The Black-winged Stilt breeds in shallow freshwater and brackish wetlands with sand, mud or clay substrates and open margins, islets or spits near water level. Suitable habitats include marshes and swamps, shallow lake edges, riverbeds, flooded fields, irrigated areas, sewage ponds and fish-ponds. The species may also breed around alkaline and high-altitude (montane) lakes or in more saline environments such as river deltas, estuaries, coastal lagoons and shallow coastal pools with extensive areas of mudflats, salt meadows, saltpans, coastal marshes and swamps. Its diet is strongly seasonal but generally includes adult and larval aquatic insects (e.g., Coleoptera, Ephemeroptera, Trichoptera, Hemiptera, Odonata, Diptera, Neuroptera and Lepidoptera), molluscs, crustaceans, spiders, oligochaete and polychaete worms, tadpoles and amphibian spawn, small fish, fish eggs and occasionally seeds. The nest is a depression or shallow scrape positioned on hard ground near water on a hummock or amongst grass and sedge. Alternatively, the nest may be a more elaborate platform of vegetation constructed on a floating mass of aquatic vegetation. The species nests singly or in loose colonies, showing a preference for open areas close to foraging sites with good all-round (360 degree) visibility.
22	Olive-tree Warbler (*Hippolais olivetorum*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large.

No.	Species	Conservation Concern	Ecological characteristics
			The global population size is 23,800-55,600 mature individuals. In Europe the population size is estimated to be stable (BirdLife International 2015). This species inhabits orchards of almond (Prunus dulcis), olive (Olea) and pistachio (Pistacia vera), open oak (Quercus) woods, maquis on mountain slopes, savanna-like open woods and sparse trees on grassland, and similar. The presence of some taller trees is preferred. Breeding occurs from May to June. The nest is a well-built, deep cup of grasses, plant stems and soft twigs, often covered with cobwebs and lined with fine fibres, plant down, fur and similar soft material. It is sited in the form of a branch of a tree. Clutches are three or four eggs. It is thought to mainly feed on insects and other invertebrates, and in the summer, it also takes fruits and berries, including figs (Ficus). The species is migratory, wintering in southern Africa. The ecology of this species is not well known; however, it may be threatened by changes in habitat structure, especially from clearance and thinning of woodland and agricultural intensification in olive-groves and fruit plantations. Agricultural pesticide use may decrease insect prey numbers..
23	Little Bittern (*Ixobrychus minutus*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The population is placed in the band 600,000-1,199,999 mature individuals. The overall population trend is decreasing, although some populations have unknown trends (Wetlands International 2015). The European population is estimated to be stable (BirdLife International 2015). The species is most common in freshwater marshes with beds of bulrushes Typha spp., reeds Phragmites spp. or other dense aquatic vegetation, preferably also with deciduous bushes and trees such as willow Salix spp. or alder Alnus spp. It may also occupy the margins of lakes, pools and reservoirs, wooded and marshy banks of streams and rivers, desert oases, peat bogs, wooded swamps, wet grasslands, rice-fields, rank vegetation around sewage ponds, and in places mangroves, the margins of saline lagoons and saltmarshes. Its diet varies with region and season but it is essentially insectivorous and takes aquatic adult and larval insects such as crickets, grasshoppers, caterpillars and beetles. Other food items include

No.	Species	Conservation Concern	Ecological characteristics
			spiders, molluscs, crustaceans (e.g. shrimp and crayfish), fish, frogs, tadpoles, small reptiles and birds. Breeding site The nest is constructed from reeds and twigs and is normally placed near open poolsin thick emergent vegetation (such as beds of bulrushes Typha spp. or reeds Phragmites spp.) close to the surface of the water or up to 60 cm above it. Alternatively, nests may be placed in low bushes or trees (e.g. alder Alnus spp. or willow Salix spp.) up to 2 m above water. Preferred nesting sites are usually 5-15 m out from the shore in water 20-30 cm deep (Snow and Perrins 1998). The species usually nests singly but may nest in loose colonies in favorable habitats with neighbouring nests as close as 5 m apart (solitary nests are usually 30-100 m apart). Nests are often reused in consecutive years.
24	Red-backed Shrike (*Lanius collurio*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population size is estimated at 24,800,000-47,700,000 mature individuals. The population is estimated to be declining overall following a dramatic decline in the west and north-east of its breeding range from 1970 to 1990 at least (Harris and Franklin 2000). However, in Europe, trends between 1980 and 2013 show that the population is stable (EBCC 2015). The species breeds in temperate and Mediterranean climates. It requires sunny, warm, usually dry, and level or gently sloping terrain, with scattered bushes, shrubs or low trees providing hunting posts overlooking areas of short grass, heath or bare soil. High-quality habitats tend to feature mosaic-like grassy vegetation with alternating areas of tall and short growth and bare areas, with perches. In agricultural areas it occupies neglected overgrown patches, heaths, open downs, overgrown orchards and gardens, hedgerows, and scrub along railways or roadsides. It is also found in temporary steppe-like habitats, such as military training areas, burned forests, forest clearings and spruce (Picea) plantations. Egg-laying occurs from May to July and clutches are generally three to seven eggs. The untidy-looking nest is a loose foundation of often green plant stems, roots, grass, lichen, hair, or similar, compactly lined with grass, hair, moss, fur, reed (Phragmites) or reedmace (Typha) flowerheads, plant down and similar material, situated in dense, often thorny bush

No.	Species	Conservation Concern	Ecological characteristics
			such as hawthorn (Crataegus), blackthorn (Prunus spinosa), bramble (Rubus) or dog-rose (Rosa). It is an opportunistic feeder, feeding mostly on insects and other invertebrates as well as small mammals, birds, amphibians and reptiles. The species is migratory, wintering in eastern and southern Africa. The species is probably threatened by the loss and fragmentation of habitat resulting from afforestation and agricultural intensification, and the increased use of pesticides causing loss of food resources.
25	Lesser Grey Shrike (*Lanius minor*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population size is estimated at 1,200,000-3,260,000 mature individuals. The population is suspected to be in decline. In Europe, trends between 1999 and 2013 have shown a steep decline (EBCC 2015). This species occurs in open habitat with plenty of scattered or grouped trees and fewer bushes. It requires the presence of features offering perches, shade and accessible food (Yosef and International Shrike Working Group 2008). It uses open lowlands and hills in steppe and forest-steppe and Mediterranean zones. Suitable breeding habitats in Europe include orchards, groves, parks, woodland edges and overgrown ditches even if close to human settlement or cultivation (Tucker and Heath 1994). Tall trees are necessary for nesting. It arrives at its breeding grounds from late-April to mid-May and egg-laying occurs May to early June. The nest is built by both sexes. It is a well-made structure with a loose foundation of twigs, grass, rootlets, string, etc., often with high proportion of green plants and lined with rootlets, feathers and hair but occasionally it is unlined. Clutch size can be from three to seven eggs but usually five or six. It is a specialized insectivore, although it also feeds on spiders and very rarely vertebrates. Prey is taken from the ground and air, although the species requires few perches and often hovers. Unlike other shrikes, food hoarding is rare. The species is a long-distance migrant and spends less than four months on its breeding grounds. Agricultural intensification and an increase in monocultures have driven declines in western and central Europe.

No.	Species	Conservation Concern	Ecological characteristics
26	European Bee-eater (*Merops apiaster*)	EN Nationally	The global population size is 14,000,000-25,250,000 mature individuals. The species inhabits broad river valleys, pasture and cultivated land with shelter-belts and scattered trees; sunny hillsides, meadows, clover fields, plains, dissected steppe, shrubby riverbanks in semi-desert, and practically any open and well-timbered country, such as cork-oak woods, olive groves, tamarisks, rice fields, cereal and root crops, and Mediterranean macchia scrub. It feeds on flying insects, primarily Hymenoptera, and it hunts from perches. The species is migratory and winters almost entirely within Africa.
27	Pygmy Cormorant (*Microcarbo pygmaeus*)	Critically Endangered Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population is placed in the band 45,000-139,999 individuals. The overall population trend is increasing, although some populations have stable trends (Wetlands International 2015). The European population is estimated to be increasing (BirdLife International 2015). The species breeds in south-east Europe (east from Italy), Russia, Iran, Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan, and winters primarily in Albania, Greece, the Balkan states, Turkey, Cyprus, Iraq, Iran, Azerbaijan and also Israel, Bulgaria, Romania and Syria. The species occurs in reedbeds, transition zones between reedbeds and open waters, extensively grazed or mowed shores and wet meadows and, in winter, in coastal wetlands, along rivers, and sometimes on inland lakes. The preferred nesting habitat is willow Salix trees but, in Albania, birds breed mainly in Tamarix. The species breeds between April and July in large mixed-species colonies. Diet consists predominantly of fish up to 15 cm long. The species is threatened by the degradation of wetlands through drainage for agriculture and changes in hydrological regimes. In south-east Europe and Albania, conservation measures have ameliorated the most important threats, although concern still exists regarding habitat destruction and persecution in its wintering range. It is also susceptible to marine pollution, such as biocides and pesticides caused by agricultural run-off.

No.	Species	Conservation Concern	Ecological characteristics
28	Night Heron (*Nycticorax nycticorax*)		The global population is estimated to number c.570,000-3,730,000 individuals (Wetlands International 2015). The overall population trend is stable, although some populations may be increasing or have unknown trends (Wetlands International 2015). The species inhabits fresh, brackish or saline waters with aquatic vegetation or trees (e.g., pine, oak or mangroves) for roosting and nesting in, showing a preference for islands or predator-free areas for nesting sites. It occupies the forested margins of shallow rivers, streams, lagoons, pools, ponds, lakes, marshes and mangroves and may feed on pastures, reservoirs, canals, aquaculture ponds and rice-fields. The species nests close together in single- and mixed-species colonies. Colony sites may be reused in consecutive years or flocks may move to new sites. The species is threatened by wetland drainage and destruction and by drought in wintering areas. It is highly susceptible to pesticides such as organophosphates, carbamates and DDE (a breakdown product of DDT) which negatively affect hatching success.
29	Dalmatian Pelican (*Pelecanus crispus*)	Critically Endangered Nationally and Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population is estimated at 11,400-13,400 mature individuals. The breeding population in Albania is estimated at 85 breeding pairs. Conservation measures have resulted in a population increase in Europe, particularly at the species's largest colony (Lake Mikri Prespa in Greece), but also in other countries, including Albania, following implementation of conservation actions, and it has therefore been downlisted from Vulnerable. The potential remains for the species to undergo large declines in the future, given ongoing threats in much of the range, and the continued conservation-dependence of European colonies. As such, it is precautionary suspected that this species could undergo moderately rapid declines in the next three generations, and it is listed as Near Threatened. This species breeds in eastern Europe and east-central Asia, in Montenegro, Albania, Armenia, Greece, Romania, Bulgaria, Georgia, Russia, Azerbaijan, Turkey, Ukraine, Mongolia, Iran, Turkmenistan, Uzbekistan and Kazakhstan (Crivelli 1996, BirdLife International 2015). It occurs mainly at inland, freshwater wetlands but also at coastal lagoons, river deltas and estuaries. Breeding It breeds on small islands in freshwater

No.	Species	Conservation Concern	Ecological characteristics
			lakes or in dense aquatic vegetation such as reedbeds of Typha and Phragmites, often in hilly terrain. A few breeds in Mediterranean coastal lagoons. The species makes use of habitats surrounding its breeding sites, including nearby islands and wetlands. It feeds almost entirely on fish, especially Carp *Cyprinus carpio*, Perch *Perca fluviatilis*, Rudd *Scardinius erythrophthalmus*, Roach *Rutilus rutilus*, and Pike *Esox lucius* in freshwater wetlands, and eels, mullet, gobies and shrimps in brackish waters. Most nests are situated amongst aquatic vegetation on floating or stationary islands isolated from the mainland to avoid mammalian predators. Former declines were primarily caused by wetland drainage, shooting and persecution by fishers. Cases of illegal shooting are still reported. Other continuing threats include disturbance from tourists and fishers, wetland alteration and destruction, water pollution, collision with overhead power-lines and over-exploitation of fish stocks. Organochloride residues including DDT have been recorded in high levels in the eggs of this species and those of its prey. The breeding colonies in Mediterranean lagoons in Albania and Turkey are threatened by coastal developments and the alteration of the functioning of the lagoons.
30	Greater Flamingo (*Phoenicopterus roseus*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The overall population is estimated at 550,000-680,000 individuals (Wetlands International 2015). The overall population trend is increasing, although some populations may be stable (Wetlands International 2015). The European population is estimated to be increasing (BirdLife International 2015). The species inhabits shallow (c.1 m deep over a large area) eutrophic waterbodies such as saline lagoons, saltpans and large saline or alkaline lakes up to pH 11. It will also frequent sewage treatment pans, inland dams, estuaries and coastal waters, seldom alighting on freshwater but commonly bathing and drinking from freshwater inlets entering alkaline or saline lakes. It nests and roosts on sandbanks, mudflats, islands or boggy, open shores. Its diet consists of crustaceans (especially brine shrimp Artemia salina), molluscs, annelid worms, larval aquatic insects, small fish, adult terrestrial

No.	Species	Conservation Concern	Ecological characteristics
			insects (e.g., water beetles, ants), the seeds or stolons of marsh grasses, algae, diatoms and decaying leaves. It nests in large dense colonies on mudflats or islands of large waterbodies with a distance between neighboring nests of between 20 and 50 cm. The species suffers from low reproductive success if exposed to disturbance at breeding colonies (e.g. from tourists, low-flying aircraft and especially all-terrain vehicles), or if water-levels surrounding nest-sites lower (resulting in increased access to and therefore predation from ground predators such as foxes and feral dogs). The lowering of water levels in lakes can also lead to hyper-salinity which may affect food resources.
31	Golden Plover (*Pluvialis apricaria*)	Annex 1 Birds Directive	The species has an extremely large range. The population is placed in the band 1,300,000-1,750,000 individuals. It is a wintering species in Albania. Diet consists predominantly of insects, larval Lepidoptera, locusts, grasshoppers, earthworms, spiders, snails, crustaceans and plant material. The species has faced minor range contractions due to the cultivation and afforestation of heathlands.
32	Common Tern (*Sterna hirundo*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population is estimated to number c.1,600,000-3,600,000 individuals (Wetlands International 2015). The overall population trend is unclear. In Europe, the population is estimated to be increasing (BirdLife International 2015). The Common Tern is a strongly migratory coastal seabird. It breeds between April and June in solitary pairs or colonially in groups of up to several thousand pairs. Palearctic breeders migrate south after breeding between August and October, returning to the breeding grounds in March or April. The species breeds in a wide variety of habitats in coastal and inland areas. Along the coast, it shows a preference for nesting on flat rock surfaces on inshore islands, open shingle and sandy beaches, dunes and spits, vegetated inter-dune areas, sandy, rocky, shell-strewn or well-vegetated islands in estuaries and coastal lagoons, saltmarshes, mainland peninsulas and grassy plateaus atop coastal cliffs.

No.	Species	Conservation Concern	Ecological characteristics
			In Albania, the majority of the breeding population breeds in sandy islands situated at coastal wetlands. Its diet consists predominantly of small fish and occasionally planktonic crustaceans and insects. The nest is a shallow depression on open substrates with little or no vegetation placed near a vertical object (e.g. rock, shell, plant or artefact) to provide shelter for chicks and to facilitate nest identification. Nest sites include the edges of bare sand amongst vegetation, rocks or logs, open areas on the margins of vegetation on beaches, the edges of mats of vegetation in marshes, and grassy or rocky substrates on rocky islets. The species will also readily nest on artificial rafts. During the breeding season, the species is vulnerable to human disturbance at nesting colonies. The flooding of nest sites as a result of naturally fluctuating water levels can also result in complete breeding failure of the effected colony.
33	Little Tern (*Sternula albifrons*)	Annex 1 Birds Directive	The species has an extremely large range and the global population size is very large. The global population is estimated to number c.190,000-410,000 individuals (Wetlands International 2015). The overall population trend is decreasing, although some populations have unknown or increasing trends (Wetlands International 2015). In Europe, the population size trend is unknown (BirdLife International 2015). The Little Tern is a strongly migratory coastal seabird, which usually fishes in very shallow water only a few centimetres deep. It breeds between May and July in solitary pairs or small monospecific groups usually of 1-15 pairs (rarely over 40 pairs), occasionally amidst colonies of other terns. The species breeds on barren or sparsely vegetated beaches, islands and spits of sand, shingle, shell fragments, pebbles, rocks or coral fragments on seashores or in estuaries, saltmarshes, saltpans, offshore coral reefs, rivers, lakes and reservoirs. It may also nest on dry mudflats in grassy areas, but shows a preference for islets surrounded by saline or fresh water, where small fish can be caught without the need for extensive foraging flights. Its diet consists predominantly of small fish (e.g., *Ammodytes spp*., Sand-smelts (*Atherina spp*.), Gobies *Pomatoschistus spp*., Roach *Rutilus rutilus*, Rudd *Scardinius erythrophthalmus*, Carp *Cyprinus*

No.	Species	Conservation Concern	Ecological characteristics
			carpio and Perch *Perca fluviatilis*) and crustaceans 3-6 cm long as well as insects, annelid worms and molluscs. The nest is a bare scrape positioned on the ground in less than 15 % vegetation cover on beaches of sand, pebbles, shingle, shell fragments, coral fragments or rock above the high tide-line and often only a few metres away from shallow clear water. Alternatively, in marshy habitats (e.g., coastal saltmarshes), the species may build a nest of shells or vegetation. The species nests in small loose colonies, with neighboring nests usually placed more than 2 m apart. Habitat loss and degradation through the development of foreshore poses a significant threat to the Little Tern, with relative sea level rises predicted due to climate change also threatening beach nesting habitats. Little Terns are vulnerable to disturbance from birdwatchers, photographers and the general public, leading to nest failures.
34	European Turtle Dove (*Streptopelia turtur*)	Vulnerable Globally	This species is listed as Vulnerable. It has undergone rapid declines in much of its European range, whilst in Russia and Central Asia it is thought to have experienced further severe declines. Declines are thought to be driven by a number of factors including loss of foraging and nesting sites as well as disease and hunting along its migration routes. The global population size is 19,300,000-71,400,000 individuals. This roughly equates to 12,800,000-47,600,000 mature individuals. The population is suspected to be in decline owing to ongoing habitat destruction and unsustainable levels of exploitation. In Europe, the population size is estimated to be decreasing by 30-49% in 15.9 years (three generations) (BirdLife International 2015). The species is a widespread migrant breeder across much of central and southern Europe, Central Asia, the Middle East and North Africa, wintering mainly in the Sahel zone of Africa. The species uses a wide variety of woodland types, as well as steppe and semi-desert, frequently relying on agricultural land for feeding. It may use hedges, borders of forest, groves, spinneys, coppices, young tree plantations, scrubby wasteland, woody marshes, scrub and garigue. It tolerates humans but does not breed close to towns or villages. It generally breeds at low altitudes not exceeding 500 m in the temperate zone and up to 1,000-1,300 m in Mediterranean areas. Breeding commences in April and can last until

No.	Species	Conservation Concern	Ecological characteristics
			September. It lays one to two eggs. The nest is a small platform of twigs lined with plant material and placed in the lowest parts of trees and in shrubs and hedges. The species mainly feeds on the ground, taking seeds and fruits of weeds and cereals, but rarely also berries, fungi and invertebrates. It is strongly migratory, wintering south of the Sahara from Senegal east to Eritrea and Ethiopia (Tucker and Heath 1994), where survival is strongly linked to cereal production. Transformation of agricultural land, including destruction of hedges and areas of scrub, is thought to be an important factor in the decline of this species as well as the loss of semi-natural habitats. Changes in agricultural practices have several impacts on the species, as they can reduce both food supply and nesting habitat availability, and it is likely that the decline in food is the main limiting factor rather than decline in nest site availability. Widespread use of chemical herbicides appears to also be a very serious factor, with a consequent decline or elimination of many food plants and an increased reliance upon cultivated grain. Hunting is also significant during migration and in its wintering range, with a legal annual estimate in France computed at c. 40,000 birds. There is believed to be an annual illegal hunting take of 0.6 million individuals across 27 Mediterranean countries.
35	Northern Lapwing (*Vanellus vanellus*)	Vulnerable Nationally	This species is suspected to be decreasing at a moderately rapid rate. It is therefore classified as Near Threatened at global level. The global population is estimated to number c. 5,600,000-10,500,000 individuals (Wetlands International 2012). The overall population trend is decreasing, although some populations have unknown trends (Wetlands International 2015). In Europe, trends since 1980 show that populations have undergone a moderate decline; this is supported by recent data from Europe, suggesting the European population is decreasing by 30-49% in 27 years (three generations) (BirdLife International 2015). A strong decline is also reported for the European and western Asian population between 1988 and 2012, based on annual mid-winter counts (Nagy et al. 2014). The species shows a preference for breeding on wet natural grasslands, meadows and hay meadows with short swards and patches of bare soil at low altitudes. It will also breed on grassy moors, swampy heaths,

No.	Species	Conservation Concern	Ecological characteristics
			bogs and arable fields. The nest is a shallow scrape in short grass vegetation. During the winter the species utilises large open pastures for roosting and forages on damp grassland, irrigated land, stubble and ploughed fields, riverbanks, lake shores, fresh and saline marshes, drainage ditches, estuaries and mudflats (Africa). Its diet consists of adult and larval insects (e.g. beetles, ants, Diptera, crickets, grasshoppers, dragonflies, mayflies, cicadas and Lepidoptera), spiders, snails, earthworms and frogs. Most populations of this species are fully migratory and travel on a broad front out of Europe although some breeding populations in more temperate regions are sedentary. The species breeds from April to July in solitary pairs although pairs may also nest close together in optimal habitat. The species suffered past declines as a result of land-use intensification, wetland drainage and egg collecting. Land-use intensification remains a problem: today it is threatened by reduced breeding productivity as a result of intensifying and changing agricultural practices, especially the improvement of grasslands (e.g., by drainage, application of inorganic fertilizers and reseeding), increased growing of winter-crops and loss of field margins and semi-natural habitat. Clutch destruction may also occur during spring cultivation (using machinery) on arable fields. The species may suffer from predation and nest predation by native and introduced predators, corvids, herons, gulls, foxes.

4.2.7.6. Key / Focus Species relevant to Project

37 species (Table 41) fulfil the criteria for enlisting them as Priority Biodiversity Features (PBF).

Most importantly the Project Development Area shelters 18 PBF species while the area of the transmission Line is inhabited by 13 PBF species. Meanwhile the area of Project Influence is used by 23 PBF species.

All the species enlisted in Table 41 should be subject of specific focus aiming to assess the direct, indirect, and cumulative impacts and to ensure the avoidance and mitigation of potential impacts due to construction and operation.

Table 41. Bird species fulfilling the criteria for Priority Biodiversity Features

No.	Scientific name	Species	Global status	European status	National Status	Annex 1 Bird Dir.	Res 6 of Bern Convention	PBF	CH
1	*Accipiter nisus*	Eurasian Sparrowhawk			EN			+	
2	*Alauda arvensis*	Eurasian Skylark				I		+	
3	*Alcedo atthis*	Common Kingfisher		VU			I	+	
4	*Anthus campestris*	Tawny Pipit				I		+	
5	*Anthus pratensis*	Meadow Pipit					I	+	

No.	Scientific name	Species	Global status	European status	National Status	Annex 1 Bird Dir.	Res 6 of Bern Convention	PBF	CH
6	*Ardea alba*	Great Egret			EN	I	I	+	
7	*Ardea cinerea*	Grey Heron			VU		I	+	
8	*Ardeola ralloides*	Squacco Heron			VU	I		+	
9	*Aythya ferina*	Common Pochard	VU					+	
10	*Burhinus oedicnemus*	Eurasian Stone-curlew					I	+	
11	*Calandrella brachydactyla*	Greater Short-toed Lark				I	I	+	
12	*Charadrius alexandrinus*	Kentish Plover				I	I	+	
13	*Circus aeruginosus*	Western Marsh Harrier			VU	I	I	+	
14	*Circus cyaneus*	Hen Harrier			EN	I	I	+	
15	*Circus pygargus*	Montagu's Harrier			EN	I	I	+	
16	*Clanga clanga*	Greater Spotted Eagle	VU	EN	CR	I	I	+	
17	*Dendrocopos syriacus*	Syrian Woodpecker				I		+	
18	*Egretta garzetta*	Little Egret			VU	I	I	+	
19	*Falco naumanni*	Lesser Kestrel					I	+	
20	*Falco tinnunculus*	Common Kestrel			VU	I		+	
21	*Glareola pratincola*	Collared Pratincole			VU	I	I	+	
22	*Himantopus himantopus*	Black-winged Stilt			EN	I	I	+	
23	*Hippolais olivetorum*	Olive-tree Warbler				I	I	+	
24	*Ixobrychus minutus*	Little Bittern				I	I	+	
25	*Lanius collurio*	Red-backed Shrike				I	I	+	
26	*Lanius minor*	Lesser Grey Shrike				I	I	+	
27	*Lullula arborea*	Woodlark					I	+	
28	*Melanocorypha calandra*	Calandra Lark					I	+	
29	*Microcarbo pygmaeus*	Pygmy Cormorant				I	I		+
30	*Merops apiaster*	European Bee-eater			EN			+	
31	*Nycticorax nycticorax*	Night Heron			VU	I	I	+	
32	*Pelecanus crispus*	Dalmatian Pelican				I	I		+
33	*Phoenicopterus roseus*	Greater Flamingo				I		+	
34	*Pluvialis apricaria*	Golden Plover				I		+	
35	*Sterna hirundo*	Common Tern				I		+	
36	*Sternula albifrons*	Little Tern				I		+	
37	*Streptopelia turtur*	European Turtle Dove	VU	VU				+	

Two species trigger the Critical Habitat qualifying criteria for the wetlands of Divjaka-Karavasta National Park:

- **The Pygmy Cormorant *Microcarbo pygmeus*** breeds in Divjaka-Karavasta with ≥ 700 breeding pairs in a mixed colony with some heron species. The figure of ≥ 700 breeding pairs equates in ≥ 1400 mature individuals. Considering that the global population is estimated at 45,000-139,999, the breeding population of the colony of the Pygmy Cormorant in Divjaka-Karavasta is ≥ 1-3 % of the global population.
- **The Dalmatian Pelican *Pelecanus crispus*** breeds in Divjaka-Karavasta, in an island situated in Karavasta lagoon. In 2020, the colony registered 85 breeding pairs. This equates in 170 mature individuals. Considering that the global population is estimated at 11,400-13,400 mature individuals, the breeding population of the colony of the Dalmatian Pelican in Divjaka-Karavasta is ≥ 1.3-1.5 % of the global population.

4.2.7.7. Summary

Summary of the findings on breeding birds

The breeding season was well covered with surveys expanding in 2020 and 2021. The surveys of early August 2020 coincided with the late breeding season. Therefore, it was agreed to undertake further complementary visits in Spring-summer 2021. As stated above, such surveys took place in late May 2021 and mid-June 2021. The visits undertaken in May suggested that the 2021 breeding season was a bit delayed due to the cold spring 2021. Based on those findings, the team conducted some other fled visits in mid-June 2021.

The breeding bird surveys provided some interesting results with regard to the presence and distribution of breeding birds in the Project Development Area, Area of Project Influence and the selected route of the Transmission Line.

Breeding avifauna of the project development area

The project development area offers more or less two type of major habitats for birds: (i) open grounds with sparse vegetation and (ii) drainage channels and ditches providing an input of fresh/brackish water in an area predominantly salty.

Open grounds are used by several bird species with a number of them considered either as confirmed breeding or probable breeding. Breeding birds were represented mostly by ground nesting passerines and several species of waders with some of them considered as probable ground nesting birds.

Colonially nesting species, such as Collared Pratincoles, were not registered breeding in the area although specimen of this species was frequently observed while using the area as a foraging ground.

Meanwhile, the drainage channels and ditches could be important for nesting birds and foraging birds when filled with water and covered by aquatic vegetation. Little Egrets were seen using the drainage channels for foraging while other small birds could use then as a breeding ground.

Among the bird species present in the project area during the breeding season there were 16 of them that fulfil the criteria of Priority Biodiversity Features (see 0 and Subchapter 4.2.7.6 for more detailed information).

We could mention here the Collared Pratincole *Glareola pratincola* Vulnerable at national level and part of Annex I Bird Directive, the Globally Vulnerable Turtle Dove *Streptopelia turtur* and Brd Directive Annex 1 species such as the Short-toed Lark *Calandrella brachydactyla*, Tawny Pipit *Anthus campestris* Lesser Grey Shrike *Lanius minor* etc.

Breeding avifauna in the area of project influence

The area of project influence (API) covers, although partly, the lagoon of “Godulla e Ushtarit”, one of the few wetland bodies with fresh water entrance and therefore a major station for breeding birds closely related with reedbeds and vegetation adapted to fresh and brackish wetlands.

Besides the above, the API covers also an open ground of halophytic vegetation, arable land and riparian forest with all of those habitats estimated as important for nesting birds.

The breeding bird survey located here a colony of circa 70-85 breeding pairs of Collared Pratincoles *Glareola pratincola*, at circa 700-800m distance from the project area. This could be one of the largest colonies of the species in Albania and it should be carefully considered with regards to project activities that might affect the species.

The same open ground, located almost all around the project development area, is inhabited by a community of ground nesting species similar to the PDA meaning that the project area of influence could be used as an alternative site for breeding species actually present in the PDA. Nevertheless, the above

statement should be further considered in the ESIA report when detailing the cumulative impacts of the project. This has to consider all the development plans in the area especially those for intensive agriculture, aquaculture etc.

Breeding birds along the transmission lines

The habitats observed along the transmission line were mostly covered by arable land, orchards, urban landscape and a small part of riparian forest.

The riparian forests seem to be used by a variety of breeding species and particularly the Globally Vulnerable Turtle Dove *Streptopelia turtur*. That might lead to recommendations for particular avoidance and mitigation measures in the sections of the transmission line that cross through the riparian forests.

Apart from the riparian forest, it is expected that the impact of project activities might be minimal in other type of habitats. Nevertheless, attention should be paid to the presence of breeding colonies of European Bee-eaters located in sandstones, close to Fier substation, in between Towers 57-62 of the route 3 of the transmission line and breeding birds in the riparian forests of Semani in between Towers 8-17.

4.2.7.8. Project area and migratory birds

The project area is surrounded in the north and north-west by Divjaka-Karavasta National Park while in the south by the Nature Managed Reserve of Pishe-Poro and the Landscape Protected Are of Vjose-Narta (Figure 66).

Divjaka-Karavasta and Vjose-Narta are both Important Bird Areas due to the large number of waterbirds visiting then in breeding season, wintering season and migratory season. Although breeding birds tend to be rather sedentary, wintering and migrating birds, particularly large flying birds such as Pelicans, Flamingoes, Birds of Prey, Herons, Cormorant, Ducks, Waders, Gulls, Terns tent to use the corridor Divjaka-Karavasta-Vjosa-Narta quite frequently and in considerable numbers. This is more evident during the migratory season when large flocks of waterbirds use those wetland sites as stationary points along the Adriatic Flyway.

Migration patterns of birds differ from species to species. Nevertheless, waterbirds and other birds closely related to wetlands tend to follow the coastal wetlands, using thus the wetlands of Divjaka-Karavasta to reach those along the outlet of Semani river, Hoxhara (south of Semani River), Pishe-Poro (north of the outlet of Vjosa River) and Vjose-Narta. The above does not exclude the presence of waterbirds over the PDA and OHL as some of the waterbirds use the agricultural land for foraging. Among those, some species such as Lapwings (*Vanellus vanellus*), Golden Plovers (*Pluvialis apricaria*) and Curlews (*Numenius arquata*) tend to be more present over the PDA and the TL.

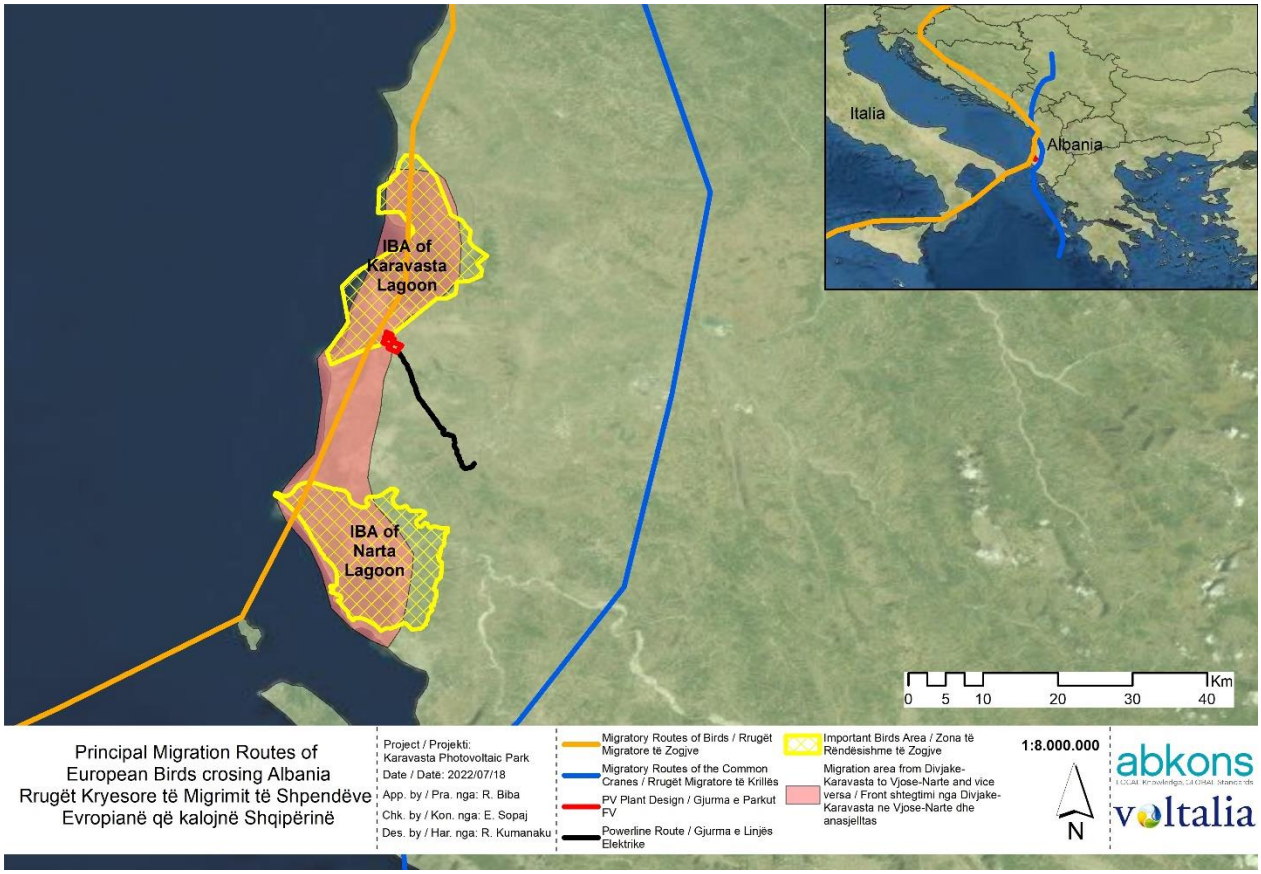


Figure 116. Principal Migratory Routes of Europian Birds crossing Albania[52]

In difference from the general movement patterns that charaterise the waterbirds, the non waterbirds species tend to migrate inlarge front above terrestrial habitats. Previous observation in the areas adjacent to the PDA and OHL and those conducted in November 2020 in the PDA, API and OHL have noticed the presence of large flocks of Wagtails (*Motacilla spp*.), Wheatears (*Oenanthe spp*.) and Larks (Alaudidae) in the open grounds, Warblers (*Phylloscopus spp*, *Sylvia spp*., *Hippolais spp*.) in bushes and shrubs and Birds of prey such as Buzzards (*Buteo spp*.), Honey Buzzards (Pernis apivorus), Short-toed Eagle (*Circaetus gallicus*) in the open air.

The winter surveys provided further information to highlight the importance of wetlands sites for waterbirds. Large flocks of Eurasian Wigeons (*Mareca penelope*), Dalmatian Pelicans (*Pelecanus crispus*), Slender-billed Gulls (*Croicocephalus genei*), Greater Flamingos (*Phoenicoptrus roseus*) etc. were observed in Godulla e Ushtarit and the southern part of Karavasta lagoon. Meanwhile the agricultural land surrounding the PDA was used by flocks of Northern Lapwings (*Vanellus vanellus*) and Golden Plovers (*Pluvialis apricaria*).

The agricultural land along the transmission line served as wintering ground for flocks of passerines composed mainly by Eurasian Skylarks (*Alauda arvensis*) and Meadow Pipits (*Anthus pratensis*). The same habitat was used by foraging birds of prey where the most common were the Common Kestrel (*Falco tinnunculus*), Common Buzzard (*Buteo buteo*) and Eurasian Sparrowhawk (*Accipiter nisus*).

[52] Ecological Animal Geography: An Authorized, Rewritten Edition Based on Tiergeographie Auf Oekologischer Grundlage/ https://www.alamy.com/ecological-animal-geography-an-authorized-rewritten-edition-based-on-tiergeographie-auf-ockologischer-grundlage-e=sc-fig-114the-three-principal-migration-routes-of-european-birds-the-west-coast-route-the-italo-spanish-route-and-the-adriatic-tunisian-route-after-lucanus-and-land-have-a-similar-relation-as-a-consequence-the-air-rises-over-the-grassland-or-shore-by-day-and-over-the-forest-or-water-by-night-such-air-currents-are-present-especially-on-seacoasts-and-in-river-val-leys-it-is-not-improbable-that-for-this-very-reason-such-stretches-are-used-as-the-migratory-routes-of-image178438823.html

4.2.7.9. Areas of Conservation Importance close to the project area and their relative importance for birds

The project area is just south of Divjaka-Karavasta National Park and circa 20 km north of the Landscape Protected Area of Vjose Narta. Both wetland areas have several national and international designations and are very important of wintering, breeding and migratory birds.

The importance of Divjaka-Karavasta for the avifauna

The project area of Karavasta Energy Park is just south of Divjaka-Karavasta National Park, designated as National Park, Ramsar Site, Important Bird and Biodiversity Area (IBA), Key Biodiversity Area (KBA) and it is a Candidate Emerald Site and a Natura 2000 Pilot site.

Divjaka-Karavasta is most known for birds. The number of bird species registred up today is 263 species of birds. The area is a major wintering ground for waterbirds with an averae number of circa 37,000 wintering waterbirds reported during the counts of International Waterbird Census undertaken during 1993-2021 (Wetlands International).

The area is a major site for breeding birds too with circa 12,000 breeding pairs estimated in 2017 (Bino & Xeka 2017, as a contribution for the European Breeding Bird Atlas 2). Divjaka-Karavasta is also a major hub for migratory birds and particularly waterbirds with many of them following the migratory route of the Eastern Adriatic Flyway.

The site is regularly inhabited by seven species of global conservation concern:

- Common Pochard (*Aythya ferina*) – Regular wintering bird considered as Vulnerable by IUCN. The average number for 1993-2020 is c. 325 individuals. Min 24 ind. Max 1325 ind.
- The Greater Spotted Eagle (*Clanga clanga*) – Regular wintering bird considered as Vulnerable by IUCN. With at least 1-2 specimens in the last five years of 2015-2020.
- Long-tailed Duck (*Clangula hyemalis*) – Wintering bird considered as Vulnerable by IUCN. Observed in 2017 with 3 wintering individuals.
- Velvet Scoter (*Melanitta fusca*) – Wintering bird considered as Vulnerable by IUCN. Observed respectively in 1995 and 1996 with one specimen.
- White-headed Duck (*Oxyura leucocephala*) - Wintering bird considered as Endangered by IUCN. Observed in 1995 with 4 individuals.
- Yelkouan Shearwater (*Puffinus yelkouan*) – Resident bird in the Mediterranean considered as Vulnerable by IUCN. Regularly observed at the coast of the Ramsar Site.
- Turtle Dove (*Streptopelia turtur*) – Regularly breeding bird considered as Vulnerable by IUCN. Present in the area with c. 100-150 breeding pairs.

Divjaka-Karavasta holds more tha 1% of the regional population for five bird species:

- Dalmatian Pelican (*Pelecanus crispus*) - > 3% of the regional resident population
- Pygmy Cormorant (*Microcarbo pygmaeus*) - > 2% of the regional population
- Greater Flamingo (*Phoenicopterus roseus*) - > 1% of the regional population
- Eurasian Wigeon (*Mareca penelope*) - > 2% of the regional population *and*
- Collared Pratincole (*Glareola pratincola*) - > 2% of the regional population

The area is also an important site for 85 bird species part of Annex 1 of the Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 “On the conservation of wild birds”, as amended by Directive 2013/17/EU). Annex 1 comprises a List of particularly vulnerable species of wild birds which are the subject of special habitat conservation measures. According to Article

4.1 of the Directive “The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.”

The importance of Vjose-Narta for the avifauna

The project area is 20 km north of Vjose-Narta Landscape Protected Area, Important Bird and Biodiversity Area (IBA), Key Biodiversity Area (KBA) and it is a Candidate Emerald Site and a Natura 2000 Pilot site.

Narta shelters at least 228 bird species with several of them of conservation concern.

Four species, the Common Pochard (*Aythya ferina*), the Greater Spotted Eagle (*Clanga clanga*), the Velvet Scoter (*Melanitta fusca*) and the Turtle Dove (*Streptopelia turtur*) have an unfavourable global conservation status and are registered as Vulnerable by IUCN.

Data collected during mid-winter waterbird counts of 1993-2020 show that the site shelters every year an average number of circa 19,500 waterbirds representing 66 species of waterbirds.

Some of the waterbird species are registered here in numbers of international importance and trigger the 1% threshold of the regional population:

- Greater Flamingo (*Phoenicoptrerus roseus*) – more than 2% of the regional population
- Pied Avocet (*Recurvirostra avosetta*) – 1.5-2.5 % of the regional population.

Finally, from 228 bird species, 76 of them belong to Annex I of Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 “On the conservation of wild birds”, as amended by Directive 2013/17/EU). 0 comprises a List of particularly vulnerable species of wild birds which are the subject of special habitat conservation measures. According to Article 4.1 of the Directive “The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.”

4.2.8. Critical Habitat Assessment

4.2.8.1. Introduction

This Critical Habitat Assessment (CHA) for the project was completed to provide a better understanding of the biodiversity features which potentially trigger IFC’s Performance Standard 6 (PS6) and EBRD’s Performance Requirement 6 (PR6) for Critical Habitat and Priority Biodiversity Features (PBFs). The analysis is based on interpretation of global and regional datasets, available literature and field data collected through baseline surveys undertaken during the preparation of this ESIA. Criteria and thresholds for Critical Habitat (CH) determination were applied separately for terrestrial and aquatic scoping areas.

An initial CHA was conducted by Abkons in 2021 in line with the provisions of EBRD PR6 and GN6 (2020), which was followed by another assessment by The Biodiversity Consultancy (TBC) in March 2022 to also meet requirements as per IFC PS6 and GN6 (2019). Lenders’ review of the initial CHA had identified some gaps in the assessment, which were also addressed in the final CHA by TBC, which is presented in 0

The CHA is a key component of full alignment with both IFC PS6 and EBRD PR6 and forms an integral part of the Project’s overall framework for managing biodiversity risk. Accordingly, Karavasta CHA (2022):

- Identifies Critical Habitat as defined by IFC PS6 and EBRD PR6;
- Identifies Priority Biodiversity Features (PBF) as defined by EBRD PR6;
- Identifies natural and modified habitats as defined by IFC PS6;
- Outlines the implications of the findings of the CHA for the Project; and
- Identifies the recommended next steps for the Project.

The initial CHA was consulted with national stakeholders including nature management authorities and national NGOs specialised in nature protection. Considering that the project area overlaps with an IBA/KBA, the ESIA Team consulted also with BirdLife International (0and its local partner the Albanian Ornithological Society.

4.2.8.2. Assessment Approach

The CH determination was based on the following steps:

1. Identification of appropriate scoping areas which contain the entire project;
2. Collection and verification of available biodiversity information from project reports, literature review, and expert opinions;
3. Identification of ecologically appropriate areas of analysis (EAAA); and
4. Completion of assessments against PS6 and PR6 criteria for species and ecosystems to identify biodiversity features that meet the relevant thresholds for CH.

4.2.8.2.1. Scoping Area

The terrestrial scoping area included the Karavasta Lagoon Key Biodiversity Area (KBA) (Figure 117). This area constitutes a common area with overlapping distribution of multiple biodiversity features, including a congregatory area supporting populations of each species during a particular period in their life-cycle that is associated with the KBA.

The aquatic scoping area (Figure 117) for this assessment comprises of the full extent of three main catchments within which most of the project infrastructure occurs; a 5 km buffer around the small portion of the transmission line which extends beyond the southernmost of the three main catchments; and the Divjaka-Karavasta National Park, where this extends north beyond the northern catchment.

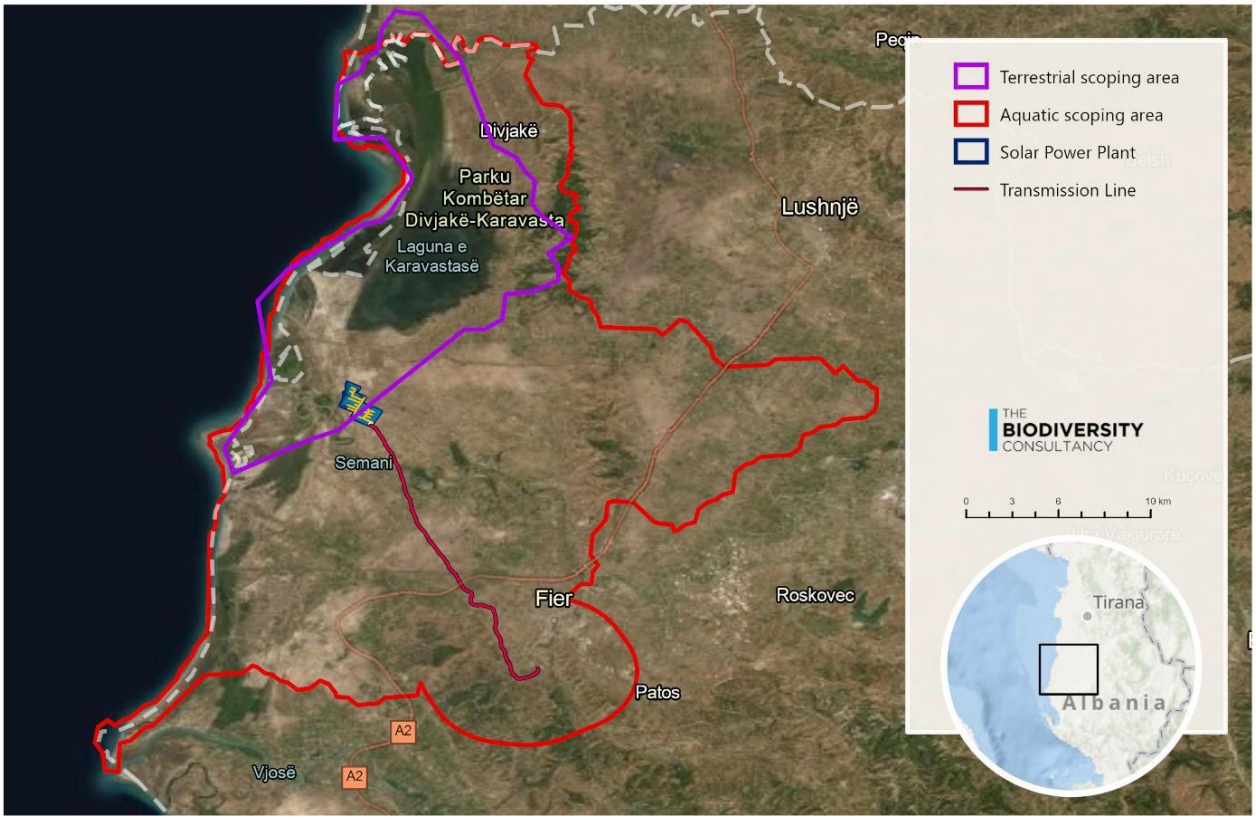


Figure 117. Karavasta CHA Terrestrial and Aquatic Scoping Areas

4.2.8.2.2. Available Biodiversity Information

A long list of species predicted to occur within each of the terrestrial and aquatic scoping areas was compiled from a spatial analysis of the IUCN Red List, global distribution data on biodiversity, Project reports and additional scientific literature (see 0 for details).

The initial version of the CHA is referred to in the final version, as were baseline surveys of biodiversity carried out as part of this ESIA, which have made a significant contribution to biodiversity knowledge for the project area and specific identification of the PBFs in line with EBRD PR6 requirements. PBF determination relied on the following resources:

- EU Habitats Directive (Annex I Habitats, Annex II and Annex IV Species)
- EU Birds Directive (Annexes 1)
- IUCN Red List of Globally Threatened Species (IUCN 2020)
- Species of European Conservation Concern
- Species of Annex 1 of the Resolution 6 of Bern Convention
- National Red List for Albania (2013)
- The Management Plan of Divjaka-Karavasta National Park
- The Management Plan of Vjose-Narta Landscape Protected Area

- Citations on Pishe-Poro Nature Managed Reserve
- Birdlife International Data Zone and information database
- Birds of the World. Cornell Laboratory of Ornithology, https://birdsoftheworld.org/bow/home
- Published information regarding specific species and habitat information (i.e., journals and studies).

4.2.8.2.3. Ecologically Appropriate Area of Analysis

The assessment of critical habitat under IFC PS6 criteria 1-3 relies on defining appropriate EAAAs, taking into account the distribution of species or ecosystems (within and sometimes extending beyond the project's area of influence) and the ecological patterns, processes, features, and functions that are necessary for maintaining them. For species that were determined likely to exceed the relevant CH threshold(s) (Criteria 1-3) within the scoping area, their key habitat associations were identified. These habitats were then used to define the EAAA for each species within each scoping area. Where the relevant CH thresholds are exceeded, the EAAA is confirmed as CH.

Where there was insufficient information available to make a definitive conclusion, a precautionary approach was taken whereby a species was assumed present in numbers to qualify the relevant scoping area as CH. Three levels of certainty are used when determining CH-status of a species in the relevant EAAA:

- **Confirmed**, when the species has been recorded in sufficient numbers to exceed the relevant threshold;
- **Likely**, when the balance of evidence suggests threshold exceedance – however, population counts or estimates are not available;
- **Possible**, when there is an indication that a threshold may be exceeded, however more evidence is required to make a determination.

4.2.8.2.4. Critical Habitat Determination

An initial screening of the species identified as present in the relevant scoping areas was completed to identify a list of candidates for assessment against IFC PS6 and EBRD PR6 criteria for CH. PBFs identified during the initial CHA were cross-checked against this biodiversity list to confirm their presence in the relevant scoping area.

Areas of "high biodiversity value" are termed CH by both the IFC and EBRD. There are five main criteria by which CH is defined (IFC / EBRD):

- Criterion 1 / Criterion ii: Areas of importance to Critically Endangered and/or Endangered species;
- Criterion 2 / Criterion iii: Areas of significant importance to endemic and/or restricted-range species;
- Criterion 3 / Criterion iv: Area supporting globally significant concentrations of migratory species and/or congregatory species;
- Criterion 4 / Criterion i: Highly threatened and/or unique ecosystems; and
- Criterion 5 / Criterion v: Areas associated with key evolutionary processes.

4.2.8.3. CHA Findings

4.2.8.3.1. CH-qualifying Biodiversity

Criteria 1-3 / Criteria ii-iv

In total, seven species qualify, or potentially qualify, as CH under IFC PS6 Criteria 1, 2 or 3, with some species qualifying under more than one Criterion. These species consist of one amphibian, two birds and four fish (Table 42). Wetland habitats within the Karavasta KBA are CH for Dalmatian Pelican and Pygmy Cormorant, as they likely support ≥1.5% of the species' global populations. However, there is no overlap between the Project area and the EAAA for these species and therefore PS6 / PR6 CH requirements are not applicable for either Dalmatian Pelican or Pygmy Cormorant. Nevertheless, the wetland and aquatic habitats that support the Albanian Water Frog and the four fish species do overlap the Project area and therefore PS6 / PR6 CH requirements apply to these species.

Criterion 4 / Criteria i: Highly threatened and/or unique ecosystems

No ecosystem or habitat identified as present in the immediate Project area meets the threshold for this criterion (0).

Determination under Criterion 4 was made by comparing the habitat descriptions from the ESIA baseline with the habitat descriptions in the IUCN Red List of Ecosystems Assessment for Europe (European Commission 2016). Consideration of this criterion outside of the area covered by the ESIA was not possible, as the only available spatial land cover layer for either scoping area does not use the same classifications as either the ESIA or European Red List Assessment.

Criterion 5 / Criteria v: Areas associated with key evolutionary processes

Review of existing information did not identify spatial features likely to be associated with key evolutionary processes, and along with the general lack of restricted range species

4.2.8.3.2. Priority Biodiversity Features

The first version of the CHA (Abkons 2021) determined seven species of plants, two species of mammals, thirty-five species of birds; and, five aquatic species (for full details see 0). None of these species have been determined as CH values.

Chapter 4.2.2.2 of this ESIA Report identifies two habitats as present in the immediate project area that are listed on Annex I of the EU Habitats Directive: '1310 Salicornia and other annuals colonizing mud and sand', and '92A0. Salix alba and Populus alba galleries'5. Small areas of the former saltmarsh habitat are naturally rehabilitating within the PV plant, following abandonment of previous agricultural cultivation. BMP include reastauration of natyral habitat throught natyral vegetation of stockpiles, reatining vegation, when is needed will planting to speed up regeneration, etc. Only plant species native to Albania will be used for restoration.. The '92A0. Salix alba and Populus alba galleries occur between pylons 10-15. As Annex I habitats, these habitats also meet EBRD's definition of 'threatened habitat' and are considered PBFs. However, neither of these habitats have been determined to be threatened by the IUCN Red List of Ecosystems Assessment for Europe and therefore do not meet the IFC / EBRD definition of CH.

A number of Legally Protected Areas (LPA) or otherwise Internationally Recognised Areas (IRA) occur within the two scoping areas as detailed in Chapter 4.2.2.5 of this ESIA Report. The only protected area that has an overlap with the project infrastructure is the Karavasta Lagoon KBA / IBA and therefore Paragraph 20 of IFC PS6 is triggered.

Table 42. CH-qualifying species

Scientific name	English name	IUCN / National status[53]	IFC PS6 Criteria[54]	CH qualification	Habitats	Critical Habitat	Justification
Amphibians							
Pelophylax shqipericus	Albanian Water Frog / Albanian Pool Frog	VU / -	1c, 2a	Confirmed	Vegetated aquatic areas, temporary and permanent water bodies, edges of lakes and slowflowing rivers	Wetland and aquatic habitats	This IUCN Vulnerable restricted-range species (estimated extent of occurrence: 10,387 km^2) occurs in Albania and southern Montenegro at elevations below 500 m asl (IUCN 2019). Almost 10% of its glob overlaps with the aquatic scoping area and the ESIA noted that drainage channels intersecting the OH were important breeding and feeding grounds for this species (Abkons 2021). Thus, it is likely that the EAAA supports ≥10% of the global population of this species, and contains a nationally-important po and therefore qualifies the aquatic EAAA as CH under Criteria 1c and 2a.
Birds							
Pelecanus crispus	Dalmatian Pelican	NT / CR	1c, 3a	Confirmed	Freshwater and brackish wetlands. Breeds on islands in freshwater lakes or in thick aquatic vegetation	Wetland and aquatic habitats	This nationally Critically Endangered (Government of Albania 2013) and globally Near Threatened con species is a trigger species for the Karavasta Lagoon KBA, where 85 breeding pairs (170 individuals) reported in 2020 (Abkons 2021). With an estimated global population of 11,400-13,400 (BirdLife Inter 2022a) this count represents ≥1.5% of the global population, and qualifies the terrestrial EAAA as CH both Criteria 1c and 3a.
Microcarbo pygmaeus	Pygmy Cormorant	LC / CR	1c, 3a	Confirmed	Reedbeds and the shorelines along rivers, freshwater lakes and coastal wetlands	Wetland and aquatic habitats	This nationally Critically Endangered (Government of Albania 2013) and globally Least Concern congr and partial migratory species is a trigger species for the Karavasta Lagoon KBA, where ≥700 breeding (1400 mature individuals) have been reported (Abkons 2021). With an estimated global population of 139,999 (BirdLife International 2022b), the terrestrial EAAA supports ≥1.5% of the global population qualifies as CH under Criteria 1c and 3a.

[53] **CR** = Critically Endangered, **EN** = Endangered, **NT** = Near Threatened, **VU** = Vulnerable, **LC** = Least Concern, **NE** = Not Evaluated

[54] IFC PS6 species **Criterion 1**: Critically Endangered and/or Endangered species, **Criterion 2**: Endemic and/or Restricted-range species, **Criterion 3**: Migratory and/or congregatory species. See 0 for further details on PS6 criteria.

Scientific name	English name	IUCN / National status[53]	IFC PS6 Criteria[54]	CH qualification	Habitats	Critical Habitat	Justification
Fish							
Barbus prespensis	Prespa barbel	LC / LR	3a	Confirmed	Freshwater and brackish lakes and streams	Wetland and aquatic habitats	This is a small size barbel (<300 mm) that spends most of its life in lakes except during reproduction (July) when it migrates into tributaries to spawn. It has a range overlap of 2.5% with the aquatic scopin and was recorded at multiple survey locations in both the SPP area and along the OHL route in May 2 Given the species' confirmed presence and level of range overlap with the aquatic EAAA, the aquatic considered likely to support >1% of the global population and therefore qualifies the EAAA as CH un criterion 3a.
Acipenser naccarii	Adriatic sturgeon	CR / EN	1a, 1c	Possible	Large freshwater rivers, after a juvenile period in nearshore marine habitats	Wetland and aquatic habitats	This globally Critically Endangered migratory species has a range overlap of 0.47% with the aquatic area. The species is restricted to the Adriatic Sea area where it occurs from the Po River, Italy, to the B Albania, but previously occurred further south along the Adriatic coast into Greece. It was last recorde Albania in 1997 in the Buna River, however due to its rarity and lack of focused surveys, it is possible l numbers are present in the aquatic EAAA – in which case the aquatic EAAA would qualify as CH und criteria 1a and 1c.
Anguilla anguilla	European Eel	CR / -	1a, 1c, 3a	Confirmed	Small streams to large rivers and lakes, in estuaries, lagoons and coastal waters	Wetland and aquatic habitats	This globally critically Endangered migratory species has a range overlap of 0.01% with the aquatic sc area, but has been recorded at multiple survey locations in both the SPP area and along the OHL rout Karavasta lagoon is important habitat at a National level for the species (Government of Albania 2019 species is therefore confirmed to qualify under Criterion 1c and may also qualify under 1a and 3a.
Alburnus scoranza	Bleak	LC / -	3a	Confirmed	Freshwater lakes and streams	Wetland and aquatic habitats	This migratory species is not mapped as present in the aquatic scoping area according to IUCN Red L however was historically present in the Vjosë river (Bogutskaya & Ahnelt 2019, record from 1894) and reported at three ESIA survey locations in both the SPP area and

Scientific name	English name	IUCN / National status[53]	IFC PS6 Criteria[54]	CH qualification	Habitats	Critical Habitat	Justification
							along the OHL route. Assuming tha species identification of the ESIA surveys is correct, the aquatic EAAA would likely contain >1% of the population, and the aquatic EAAA would qualify as CH under Criterion 3a.

4.2.8.3.3. Natural and Modified Habitats

Classification of Natural and Modified habitats within the aquatic and terrestrial scoping areas is complicated by the different habitats classification systems used by different data sources. Four broad habitat categories have been recorded as present (Figure 118):

- forest (alluvial and very wet forest, broadleaved deciduous woodland, mixed woodland and native coniferous woodland);
- shrubland (scrub);
- wetlands (rivers and streams, standing brackish and salt water, water fringe vegetation); and
- artificial areas (arable land, other urban and industrial areas).

Of these, CH-qualifying species are supported by 'wetlands' habitats, which has been to define the EAAA and represent CH (Table 42). Forests and shrublands should be considered natural habitat and artificial areas as modified habitat, as defined by the IFC.

For the aquatic scoping area, CH-qualifying species are known, or predicted to occur in all flowing or standing water bodies, including the Semani River, wetlands and lagoons, drainage channels and temporary pools which exist after rains plus adjacent riparian areas (Table 42). All wetlands and aquatic areas should therefore be considered as the aquatic EAAA and qualify as CH.

Almost all other habitats in the vicinity of the project are likely to have been degraded to some extent through human modification. This is indicated by the Corine landcover mapping available for the scoping areas (Copernicus 2018) and baseline studies. The only Natural Habitat within the project area is the area of 92A0: Salix alba and Populus alba galleries along the Semani river between pylons 10-15 (see 0 for details).

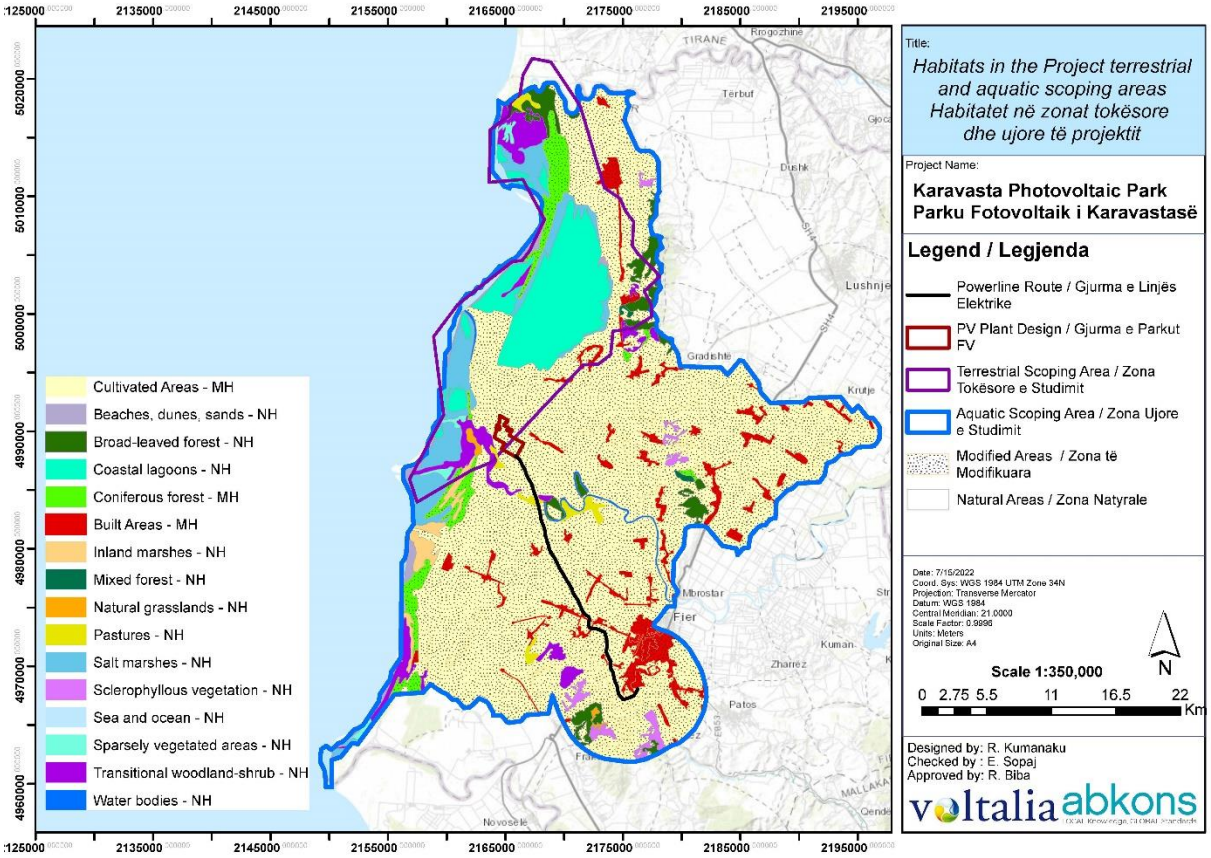


Figure 118. Habitat Types in Terrestrial and Aquatic Scoping Areas

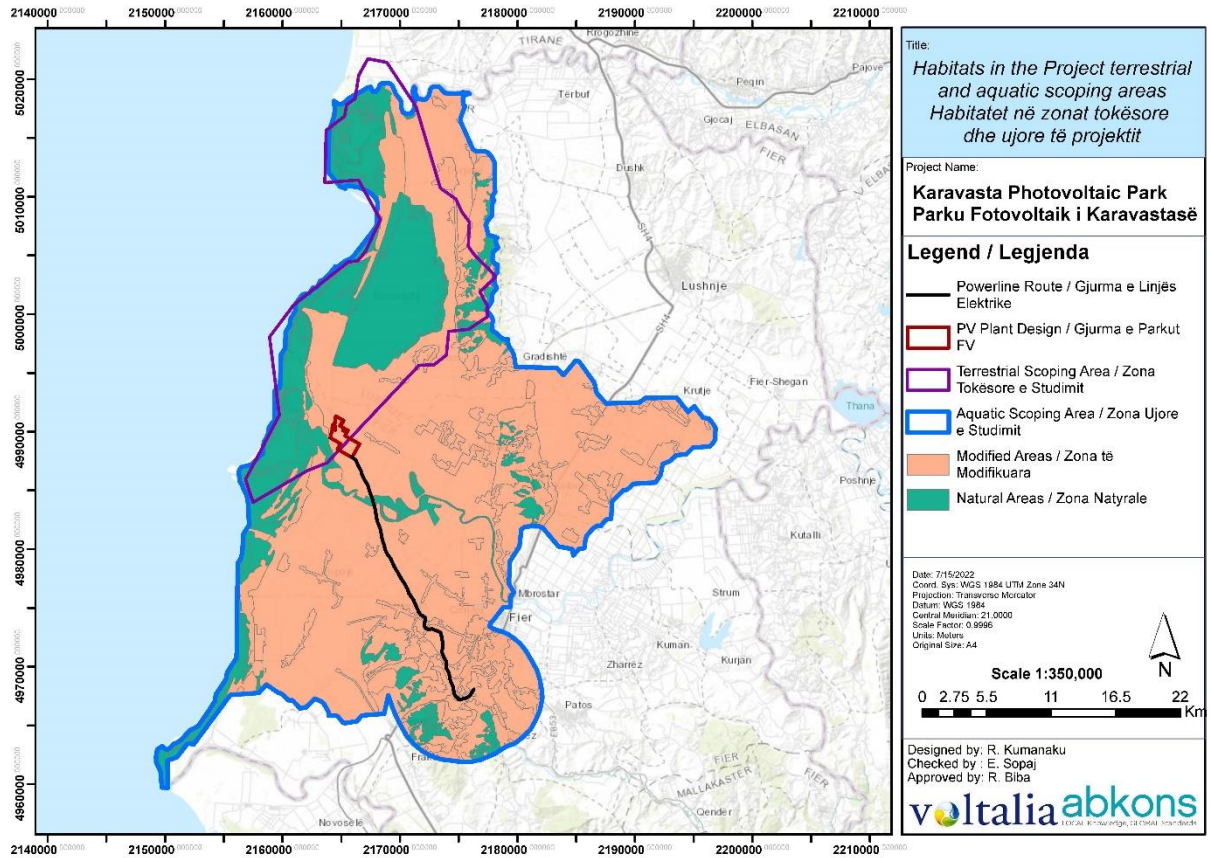


Figure 119. Natural and Modified Habitat in Terrestrial and Aquatic Scoping Areas

4.2.8.4. Implications of CHA Findings

Karavasta CHA confirms that;

- five species meet the Critical Habitat (CH) thresholds for Criteria 1-3 / Criteria ii-iv) in wetland and aquatic habitats within the PV plant and along the transmission line route: four fish species and the Albanian Water Frog.
- the remainder of the Project area meets the IFC definition of modified habitat – with the exception of a small area of Salix alba and Populus alba galleries along the Semani river between pylons 10-15 of the transmission line.
- Two habitats and 49 species are identified as PBFs, as defined by EBRD PR6
- The Project footprint overlaps with an internationally-recognised area (Karavasta KBA). The KBA also meets the EBRD definition of PBF. The wetland habitats within the Karavsta KBA are CH for two bird species, however these habitats do not overlap with the Project area and PS6 / PR6 CH requirements do not apply to either Dalmatian Pelican or Pygmy Cormorant.

The PV plant is located in an area with a mixture of critical and modified habitat and therefore PS6 paragraphs 12 and 17-19 are applicable (IFC 201). In areas of modified habitat, a project should minimize impacts to biodiversity and implement mitigation measures as appropriate. In areas of CH, projects are required to demonstrate:

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the CH was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and,
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

Where the Project could have significant, adverse and irreversible impacts to PBFs, the Project should (EBRD 2014a, paragraph 13) not implement any project-related activities unless:

- There are no technically and economically feasible alternatives;
- The overall benefits outweigh the project impacts on biodiversity;
- Stakeholders are consulted in accordance with PR 10;
- The project is permitted under applicable environmental laws, recognising the priority biodiversity features; and,
- Appropriate mitigation measures are put in place, in accordance with the mitigation hierarchy, to ensure no net loss and preferably a net gain of priority biodiversity features over the long term, to achieve measurable conservation outcomes.

As the Project is situated within an Internationally Recognized Area, it must also comply with PS6 paragraph 20 (IFC 2012), and Guidance Note 6 paragraph GN93 to GN98 (IFC 2019) by:

- Demonstrating that Project's operations within the protected area are in line with national law;
- Developing the Project in a manner which is consistent with any management plans that exist for the area;
- Consulting with protected area staff, or officials responsible for management of the area; and
- Developing, and implementing, additional programmes to 'promote and enhance the conservation aims of the area'.

In line with the requirements as per IFC PS6 and EBRD PR6 for CH-qualifying biodiversity, PBFs and Karavasta Lagoon KBA/IBA, a Biodiversity Management Plan (BMP) has been prepared to detail the mitigation and monitoring measures that will be implemented during construction and operation phases of the project to avoid and minimize impacts and restore habitat for these features on-site and verify the levels of impacts occurring.

A Draft Biodiversity Action Plan (BAP) has also been developed to quantify residual impacts on identified priority biodiversity and propose conservation actions that would support the project to meet its net gain commitment for CH, and no-net-loss commitment for PBFs, and promote conservation aims and effective management of Karavasta Lagoon KBA/IBA, also in line with recommendations by the BirdLife International.

4.2.8.5.

4.3. Socio-Economic Baseline

The socio-economic baseline used to collect data for the project consisted of primary data collection through a Sample Socio Economic Survey (SSES), Key Informant Interviews (KII) and Focus Group Discussions (FGD) and by secondary data through available data.

The field survey was conducted over a period of 4 weeks through December 2020 – January 2021 in the PDA and the OHL areas. The survey was performed by sampling the population, so a sampling strategy was implemented based on the estimated population of the PA.

The recommended size was calculated through formulas that provide an automatic calculation base on;

- Population size
- Desired confidence level, i.e., the amount of uncertainty you can tolerate in generalizing the results of the survey to the whole population (usually 95 %;)
- Margin of error, i.e., the amount of error that you can tolerate in the generalization of the results of the survey (usually 5 %;)

For the calculation was used the following formula;

$$\text{Sample size} = \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

N = population size • e = Margin of error (percentage in decimal form) • z = z-score. The z-score is the number of standard deviations a given proportion is away from the mean. For the confidence level 95% the z-score used, is as below:

Desired confidence level	z-score
95%	1.96

Regarding the population size it was not defined the exact number of populations per each village, because the information from 2011 CENSUS[55] is based on Municipality and Commune level, although secondary data from the Municipalities confirmed that population size is less than 20,000 people. This because the sample size does not change much for population larger than 20,000. Based on these assumptions, the number of questionnaires used for the survey was the following:

Population size	Confidence level	Margin of error	Sample size
20000	95%	5%	377

The dispersion of the recommended sample size will be done in order to cover all the project area was based on;

- the population/habitants for each village;
- the village area (project affection in m^2)
- Coverage of the typology of land/plots/housing of all project area per each village (including land/pastures/farms/housing/living business areas etc.)

For more details on the Dield survey methodology please consider Socio-economic survey of PV "Karavasta", in Appendix 3.

[55] Population and housing Census, 2011

4.3.1. Administration and Governance

Following the Administrative Territorial Reform of 2015, Albania is divided into 12 districts and 61 municipalities. The municipalities are responsible for the geographical, economic, social and cultural purposes inside the counties.

The 12 districts were created on 31st of July, 2000 to replace the former division into 36 districts. In 2015 new administrative divisions were introduced and the number of municipalities was reduced to 61. There are 2980 villages or communities in the entire country, formerly known as localities. The municipalities are the first level of local governance.

The municipalities are governed by an elected Mayor. The Administrative Units (AU) are formed by one or more cities, towns or villages within the municipality territory and are governed by an appointed administrator. In addition, each village is represented by a village head, which is subordinate to the Mayor. Traditionally, village heads were elected among generally elder people and solved disputes between residents and counselled the villagers on different matters, however nowadays their role is more as a villager's representative in administrative matters. The second tier consists of the districts. The district council consists of the mayors of the municipalities and the counsellors, while the Prefect is appointed by the Central Government (Council of Ministers).

The Project Area extends into the Fier county which is located in south-western Albania. The Fier County borders the Tirana County in the north, Elbasan County in the northeast, Berat County in the east, Gjirokastër County in the southeast, Vlorë County in the south and the Adriatic Sea in the west. Fier County is large 1,890 km^2. Since the 2015 local government reform, the county consists of the following 6 municipalities: Divjakë, Fier, Lushnjë, Mallakastër, Patos and Roskovec. Fier is one the most important industrial cities of Albania and is built by the Gjanica tributary of the Seman river, and is surrounded by marshland. The nearby Patos town is the centre of the oil, bitumen and chemical industries in Albania.

The project intersects the territories of the Fier and Divjakë municipality. The municipality of Fier is bordered on the north by the municipality of Divjaka, on the east by the municipalities of Patos and Roskovec, and on the south by the municipality of Vlora. It lies in the Western Lowlands, between the rivers Seman and Vjosë. The majority of the municipality lies in the lowland area while the administrative units of Cakran and Frakull in hilly territory. The center of the Municipality is the city of Fier. This municipality consists of ten administrative units and has under its administration a town and 85 villages.

The municipality of Divjaka is bordered on the north by the municipality of Rrogozhina, on the east by the municipality of Lushnja, on the south by the municipality of Fier and on the west by the Adriatic Sea. The center of the municipality is the city of Divjaka. This municipality consists of 5 administrative units and has under its administration a town and 36 villages. The municipality of Divjaka consists almost entirely of rural areas.

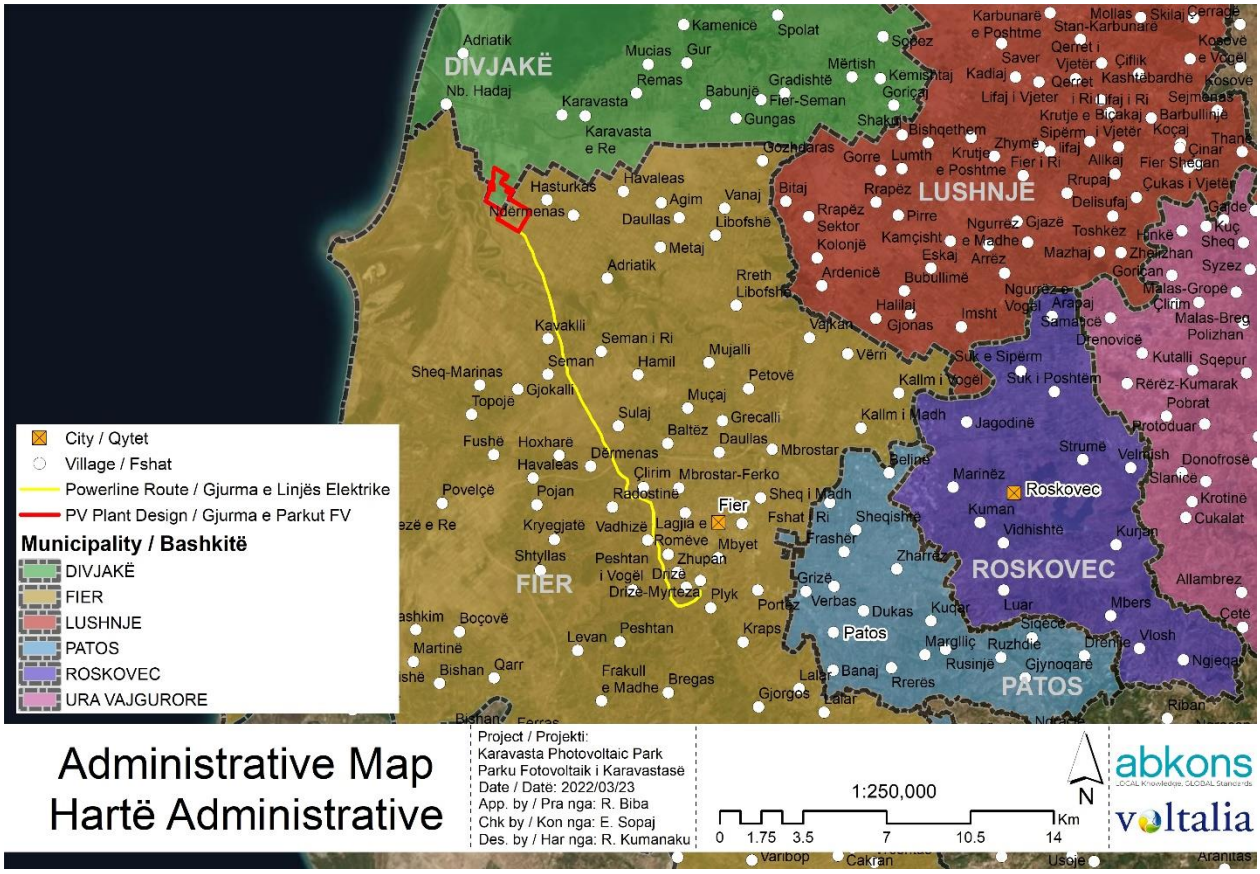


Figure 120. Administrative Map of Fier and Divjakë municipality[56]

[56] https://amvv.qeverisjavendore.gov.al/projekt-vendim/

The PV Project will be developed in territories of Libofsha and Remas AU`s while the OHL will intersect the territories of Topoje, Qendër and Dermenas AU`s. The direct project study area for the social baseline assessment includes the settlements near and within the PV plant and OHL affected area. This is considered to be the highest impacted area and will therefore be studied in greater detail. The table below shows the administrative organization and the villages whose territories are intersected by the project. It has to be highlighted that the territories of the village Karavasta e Re are affected by the PV plant area but the settlement of this village is located approximately 4 km far from the PV plant and thus it is not included in the socioeconomic survey.

Table 43. Administrative organization of area intersected by the project

No	District	Municipality	Administrative Unit	Village	Affected By/Nearby to
1	Fier	Fier	Libofshe	Ndërnenas, Hasturkas, Adriatik	PV plant and OHL
2			Topoje	Seman i Ri, Seman	OHL
3			Dërmenas	Sulaj, Dërmenas, Radostinë	OHL
4			Qendër	Zhupan, Vadizë, Drizë, Çlirim,	OHL
5			Levan	Peshtan i Vogël	OHL
6		Divjakë	Remas	Karavasta e Re	PV plant, OHL

4.3.2. Demography and Family Composition

Albania has a current resident population of 2,800,138 people according to the National Census of 2011[57]. The population of Albania started to decline from 1990, as a consequence of massive emigration mostly due to difficult economic conditions after the fall of the communist regime and the consequent crisis that followed. Compared to the previous census in 2001[58], the population decreased by 8% from the 3,069,275 resident people registered then.

Fier County has a resident population of 310,331, being the second highest in Albania, after Tirana County. The county is experiencing a rapid population growth in urban centres, despite an overall decline in population due to emigration abroad and internal migration to other Albanian cities (especially Durres and Tirana) over the past 15 years.

With regard to the municipalities according to the 2011 Census, in the territory of the Fier municipality live 120,655 inhabitants, while in the civil register there are 196,324 inhabitants. The area of the new municipality is 619.9 km^2 with a population density of 316.70 inhabitants / km^2.[59] The municipality of Divjaka has a population of 34,254 inhabitants, while the civil registry shows a population of 53,372 inhabitants. The territory of the new municipality is 309.58 km2 and with a population density of 172.40 inhabitants / km^2.[60]

The population in rural areas significantly changed after 1990. Due to a lack of investment and possibilities for employment, large numbers of people left rural areas to find work in the cities. During the interviews with Key Informants, it was reported that the population has decreased and people who move from the villages, usually do not report their actual residence. As a result, when comparing the data of the 2011 Census[61] and those actually registered in the Civil Registry[62], 38.54% less residents are registered in the Census for Fier municipality and 35.82 % less residents for Divjakë municipality. This can be considered as a probable

[57] INSTAT 2011 CENSUS http://www.instat.gov.al/.
[58] INSTAT 2001 CENSUS http://www.instat.gov.al/
[59] https://aam.org.al/bashkia-fier/
[60] https://aam.org.al/bashkia-divjake/
[61] INSTAT 2011 CENSUS http://www.instat.gov.al/
[62] https://aam.org.al/bashkia-fier/

number of those who have migrated. According to the 2011 Census the population of the administrative units intersected by the project is shown in the table below.

Table 44. Population in the area intersected by the project [63]

No.	Municipality	Administrative Unit	Village	Afected by	Residents
1	Fier	Libofshë	Ndërnënas; Hastukas, Adriatik	PV plant and OHL	6149
2		Topojë	Seman I Ri, Seman,	OHL	4246
3		Dërmenas	Dërmenas, Radostinë, Sulaj	OHL	7788
4		Qendër	Zhupan, Vadhiz, Clirim, Drizë	OHL	4207
5		Levan	Peshtan I vogël	OHL	8159
6	Divjakë	Remas	Karavasta e Re	PV plant and OHL	4449
	Total residents per gender				34998

In terms of gender, the data analysed from the socio-economic survey results that the family members are dominantly males, 54.70%. This reflects also the overall gender situation in Albania in the rural areas. The dominant age group of the family members is between 30 and 65 years old, which makes 44.67 % of the total family members.

The age group of the old retired pensioners more than 65 years old is 22.69% instead of the national average of 11.34%[64]. From the data shown in the graph below, children, aged between 0 and 18, represent 13.93% of the total family members while aged between 18 - 30 represent 18.71%.

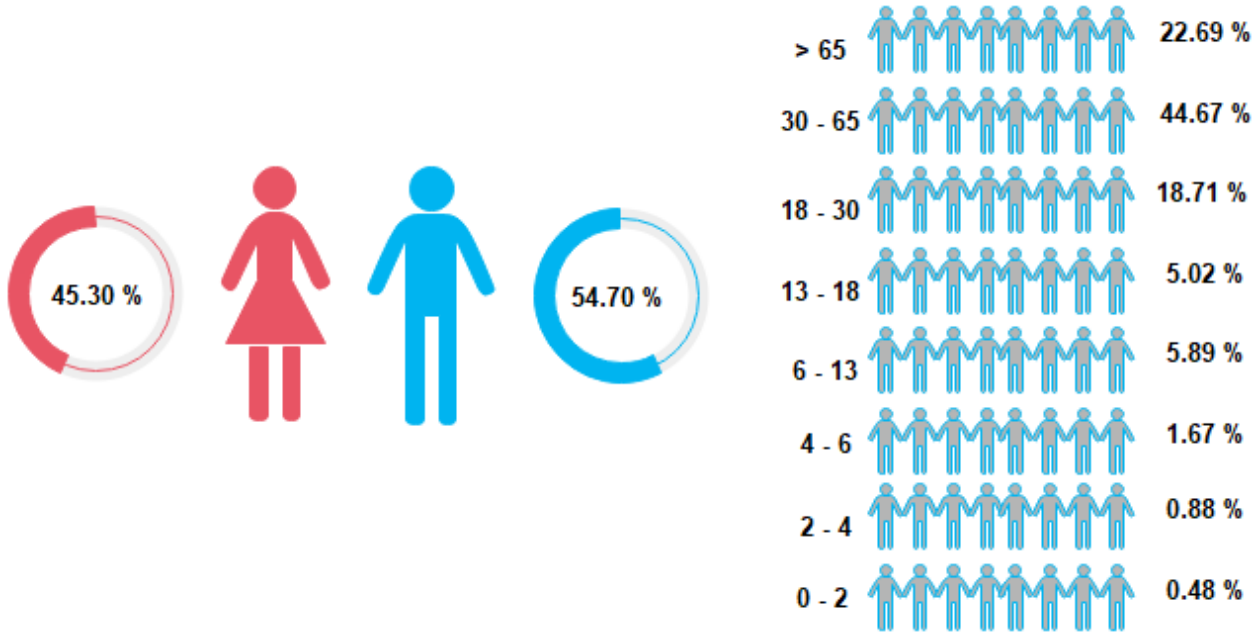


Figure 121. Gender and age group of the survey area[65]

[63] INSTAT 2011 CENSUS http://www.instat.gov.al/
[64] INSTAT http://www.instat.gov.al/
[65] Source – Socio Economic Survey

The typical family structure in Albania consists of three generations living under the same roof: the elders, their married son and their grandchildren. When such structure is established, the main income provider is considered the man who is of a working age – middle age generation.

Within the direct project area, the number of family members varies. The average number of family members in a household is 3.47 members. Most of the families are composed from 2 to 4 members with a peak of 2 members. These are typical families with two old retired members whose children live abroad. Meanwhile, there are families composed even of and/or more than 7 members (13 cases).



Figure 122. Family composition[66]

4.3.3. Language, Ethnicity and Religion

Constitutionally, Albania has been a secular country, since 1967. According to the 2011 Census[67] 58.79% of Albanians declared themselves to be Muslims, making Islam the largest religion in the country. The majority of Albanian Muslims are secular Sunnis with a significant Bektashi Shia minority. Christians represent 16.99% of the population, making Christianity the 2nd largest religion in the country. The remaining portion of the population is either atheist or belongs to other religious groups. Religion in the district where project extends reflects the Country's overall ratio of declared religion, where there is a larger affiliation towards Islam compared to Christianity. The religious affiliation of the resident population of the district intersected by the project is shown in the graph below.

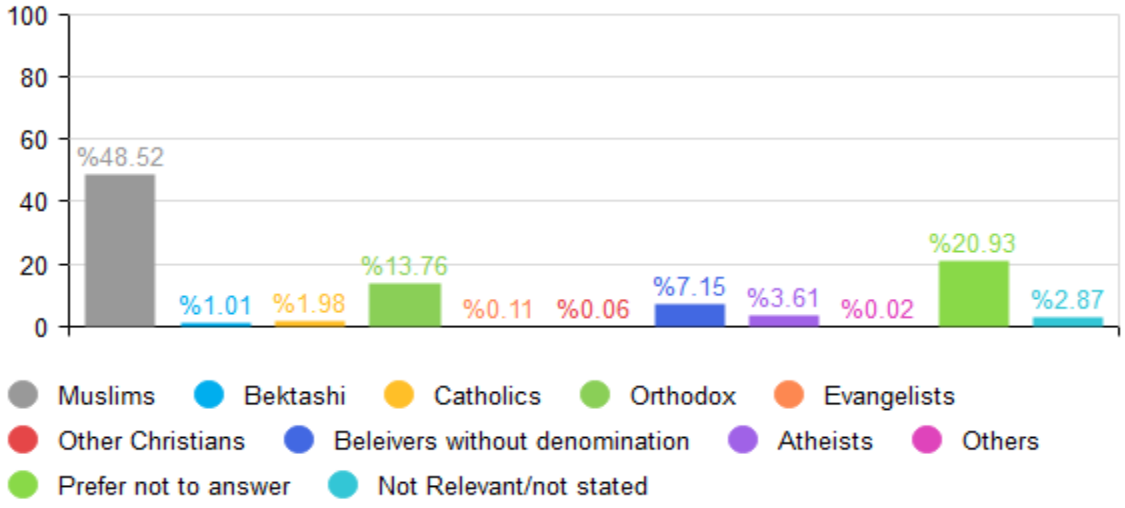


Figure 123. Religious affiliation of the resident population in the Fier District[68]

Within the project area, residents report to be religious with a majority of 43.96%. Meanwhile, 21.43% of the respondents reported to be atheists and other 34.62 either didn't answer or refuse to answer. From those who reported to be religious, 60% responded to be Orthodox, 38% Muslims and 2% of Catholic affiliation.

[66] Source – Socio Economic Survey
[67] INSTAT 2011 CENSUS http://www.instat.gov.al/
[68] INSTAT 2011 CENSUS http://www.instat.gov.al/

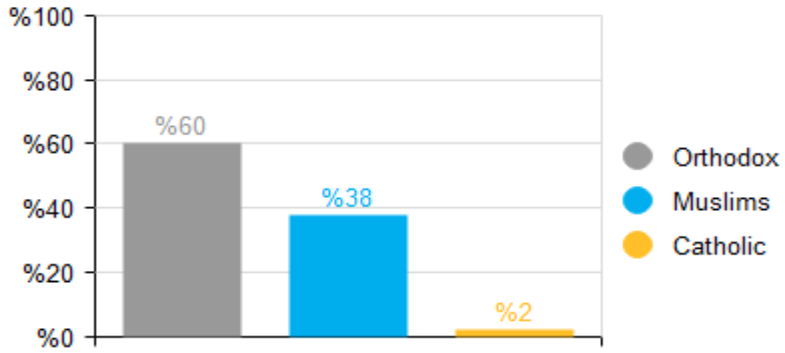


Figure 124. Religion and faith according to Survey[69]

Albania is mostly inhabited by ethnic Albanians (82.58%). The country is composed of six national minorities including Aromanians (Minority from Romania), Balkan Egyptians, Greeks, Macedonians, Montenegrins and Roma. The larger minority are Greeks, representing 0.87% of the total population, which is mainly located in the south of the country.

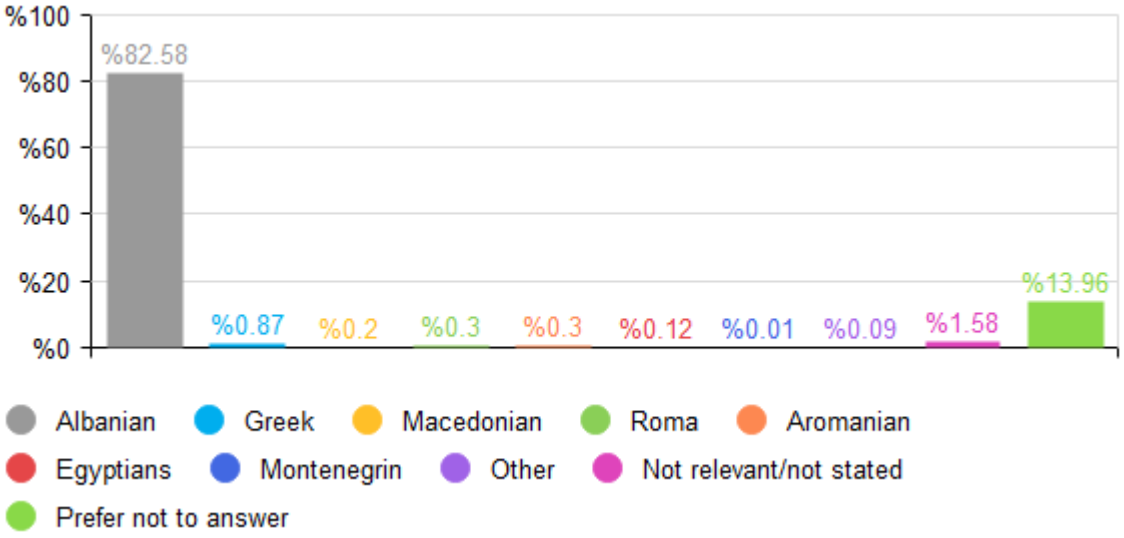


Figure 125. Ethnic Distribution in Albania[70]

All the families the interviewed, in the project area reported to be Albanian. According to the 2011 Census the ethnicity and cultural affiliation of the resident population in the district is shown in the graph below.

[69] Source – Socio Economic Survey
[70] INSTAT 2011 CENSUS http://www.instat.gov.al/

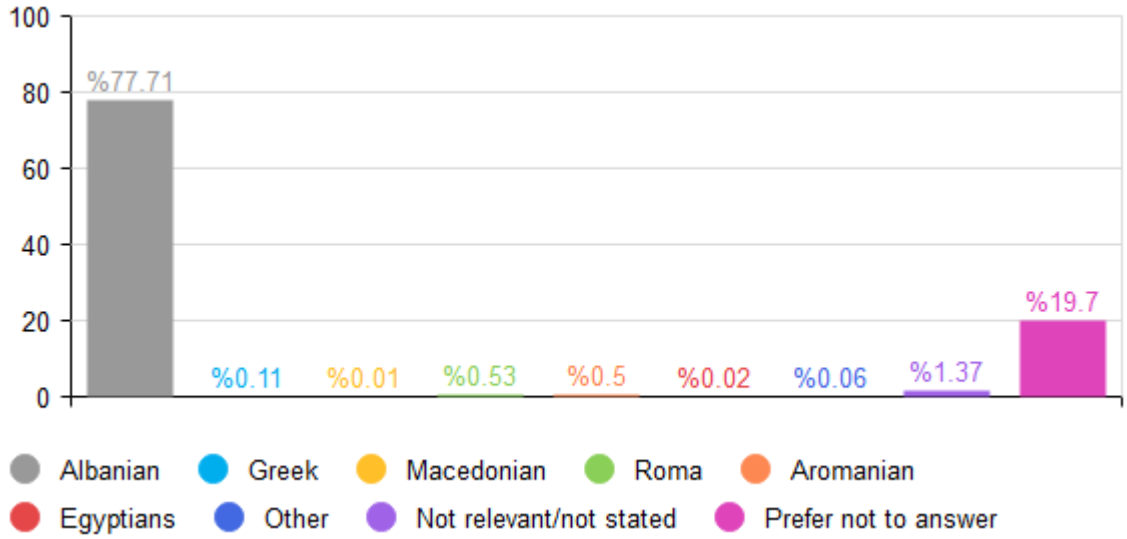


Figure 126. Ethnic Affiliation in Fier District 2011 Census INSTAT[71]

The official language of the area is Albanian and this is the case for all the families in the project area. According to the 2011 Census the resident population by mother tongue, of the district is shown in the graph below.

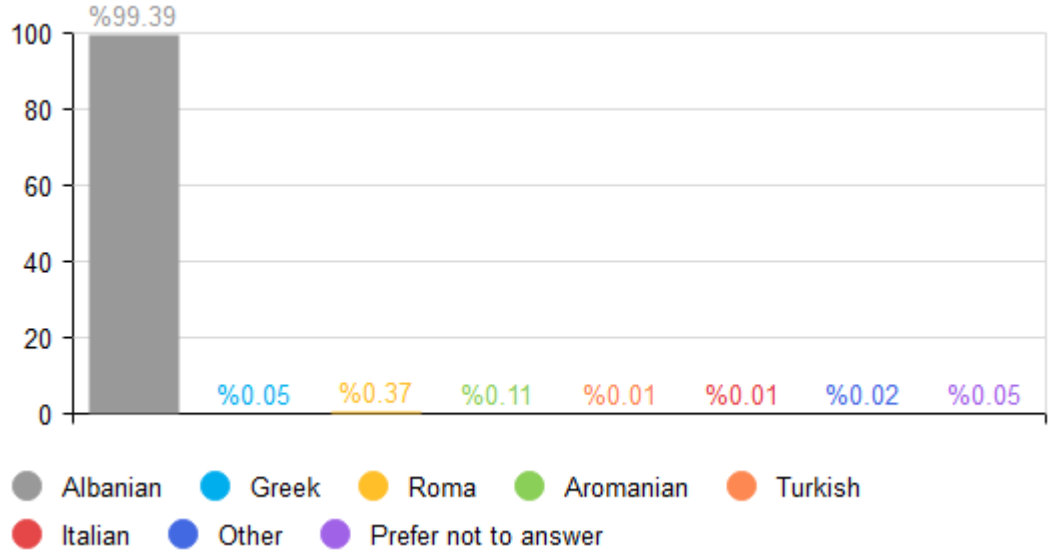


Figure 127. Resident population by native language in Fier District CENSUS 2011[72]

4.3.4. Employment, Livelihood and Economy

Albania has made remarkable economic progress during the past three decades. Due to the strong growth performance, Albania grew from one of the poorest nations in Europe to a middle-income country, with poverty declining by half during that period. However, Albania's growth model needs to shift from consumption-fuelled to investment- and export-led growth. The new model will need to help those people with less access to economic opportunities to contribute to, and benefit from, economic growth. In order to accelerate the pace of equitable growth, Albania is implementing structural reforms that will raise productivity and competitiveness in the economy, create more jobs, and improve governance and public service delivery. Enhanced regional connectivity and access to regional and global markets, coupled with export and market diversification, can also help promote faster growth[73].

[71] INSTAT 2011 CENSUS http://www.instat.gov.al/
[72] INSTAT 2011 CENSUS http://www.instat.gov.al/
[73] World Bank https://www.worldbank.org/en

The municipality of Fier includes the most important agricultural areas of the country, as well as a significant part of the industry related to oil refining. More than half of the population of the municipality live in rural areas, which shows the importance of the agricultural sector in the economic life of the municipality. The agricultural production of this area is diverse from cereals to vegetables, melons, livestock and its by-products. The municipality has a considerable coastline that stretches from the Vjosa River to the Seman River estuary at the borders of the Divjaka-Karavasta National Park. Also, an important touristic attraction is the Archaeological Park of Apollonia, along with other cultural heritage sites.

The municipality of Divjaka consists almost entirely of rural areas. The municipality is located in a completely rural and fertile area, while part of the territory of this municipality is the national park Divjaka-Karavasta, as well as the beach of Divjaka. Agriculture is the main economic activity. The main agricultural products are melons, which are sold in the domestic market and exported to many countries in Central and Eastern Europe. Divjaka has good prospects for the development of coastal tourism and ecotourism. In recent years bird watching has appeared as an important tourism attraction due to the presence of a small colony of endangered pelicans in the Karavasta lagoon. Tourism is developed mostly for day tourists and the cuisine is focused on fish products, for which the area is famous all over the country.

The economic activities of the project study area are mainly focused on farming. The data analysed for the project area shows that of the heads of family (considered as the main income provider) 46.4% are engaged in agricultural and livestock activities. Another 10% report being employed in the private sector, public sector, or self-employed and 34.6% of the respondents are retired pensioners. In addition, 7.4% of the respondents are unemployed and actively looking for a job. These respondents do not engage even in agricultural activities or do not have sufficient land.



Figure 128. Employment in the project area according to Survey[74]

Regarding the family members employment, farming is still the largest employer with 26.78%, compared to other sectors. When working as a farmer in the village, residents are mostly fulfilling their family's needs. Within the project area, most of the families report that they own private land, which is used for the family's economic needs. The most common use of land is for agriculture, farming and pasture for livestock. This refers to the entire farming and agricultural activity the residents rely on for their living.

[74] Source – Socio Economic Survey

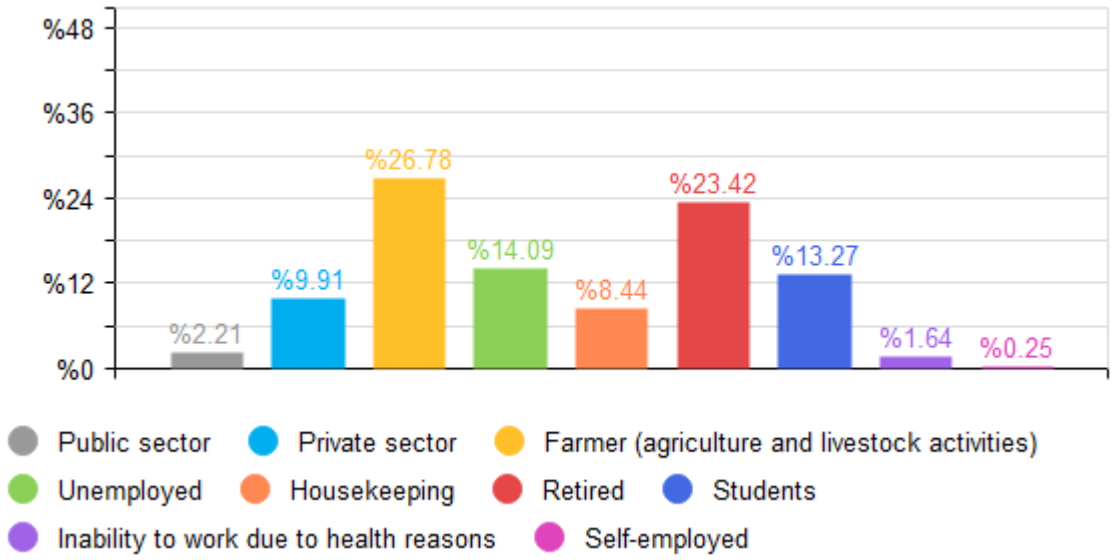


Figure 129. Employment of family members[75]

The majority of families within the area live with a total combined monthly income of 25,000 ALL (200 Euro) up to 40,000 ALL (325 Euro)[76]. More specifically, 27.7% of respondents consist of families with incomes up to 30,000 ALL (243 Euro)[77], and 27.5% of respondents consist of families whose income is up to 40,000 ALL (325 Euro). Other 15.3% of families in the area are those who live off a total combined income of 25,000 ALL (203 Euro), which is a low income even for the rural areas. Further detailed distribution is presented in the graph below.

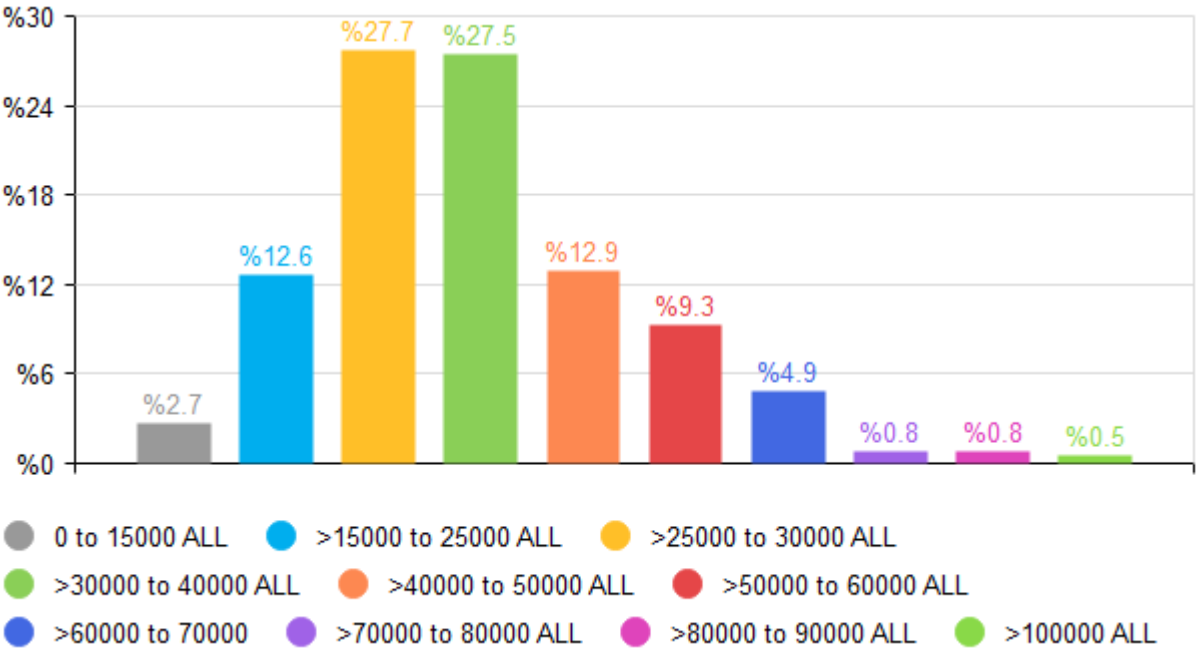


Figure 130. Combined Incomes of the Survey area[78]

As described above the incomes are provided in intervals. In this context, for the calculation of the main sources of income this report used the highest value of the intervals using the method of weighted average. The analysis shows that the respondents reported that the main sources of income are agriculture activities followed by livestock activities and pensions (all types) specifically; 30.58%, 19.37% and 24.79%. This

[75] Source – Socio Economic Survey
[76] The amount in Euro is calculated based in the current exchange rate dt.04/03/2021 which is 1.23 ALL per 1 €.
[77] The amount in Euro is calculated based in the current exchange rate dt. 04/03/2021 which is 1.23 ALL per 1 €.
[78] Source – Socio Economic Survey

reflects the fact stated above that the agriculture and livestock activities are vital for the families in the rural areas, as main source of generating incomes but also use their products to meet the family needs. With regard to employment (salary) reflects those working in public and private sector and also those engaged in seasonal working abroad, mostly in Greece. In the graph below is shown the average percentage of the main sources of income in the project area.

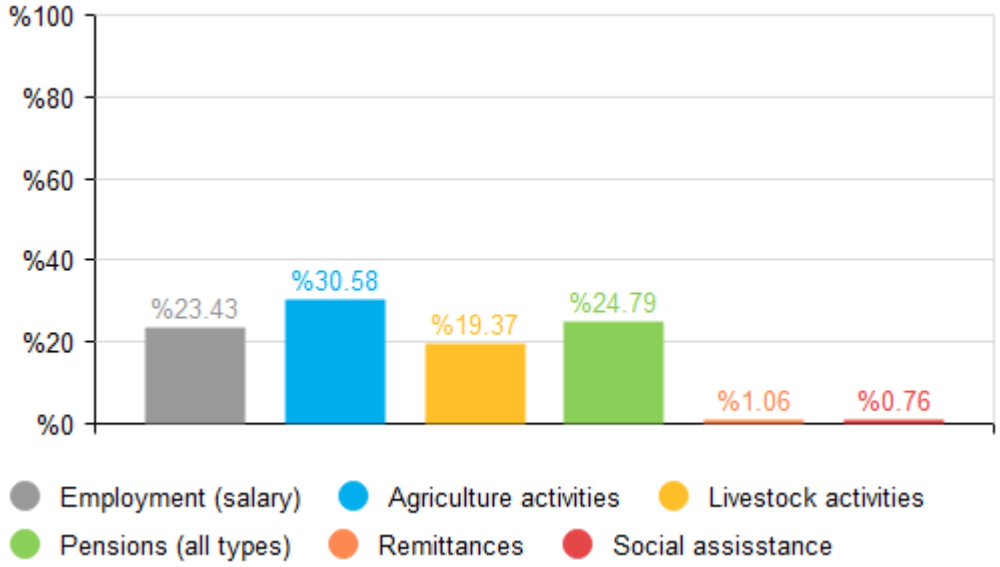


Figure 131. Main source of income according to Survey[79]

Referring to the data collected, from those who reported to be interested in agriculture cropping, 64 % of the families actually get an income from the cultivation. The amount varies from 1000 ALL (81.3 Euro) up to 1000000 ALL (8,130 Euro) per year with a mean of 124,121.03 ALL (1,009 Euro) per year or 10,343 ALL (84.09 Euro) per month. The others, only cultivate to satisfy their family needs and don't get an actual income from the farming activity. The types of crops most cultivated are vegetables, alfalfa, maize and wheat. Judging by the type of cultivation, most of the produce is used to satisfy nutritional or family needs, or those of livestock owned by the family. More than half the families own livestock, which is also related to the necessity for farming animal food. Dairy products are again used only for personal consumption at an average of 39% and other are sold informally in small markets or privately. Dairy products support the economic situation of the families.

Another important source of incomes are remittances[80] which have had a significant impact on the Albanian economy since the 1990s. According to the Bank of Albania (June 2018)[81] (remittances constitute an important item in Albania's balance of payments statistics. During 2008-2017, the ratio of remittances to GDP averaged 9.1%. This has only suffered a slight decline in the global crises period, without affecting the important contribution of this item in the country's macroeconomic framework.

Within the project area, 16.8% of the respondents reported that they receive some income from remittances. These families report to have family members abroad who support their families in their homeland. The graph below shows the amount of money that these families receive monthly.

[79] Source – Socio Economic Survey
[80] Remittances are money transfers made by people to another party. Usually is a transfer of money, often by a family member working in a foreign country to an individual in their home country.
[81] Bank of Albania https://www.bankofalbania.org/

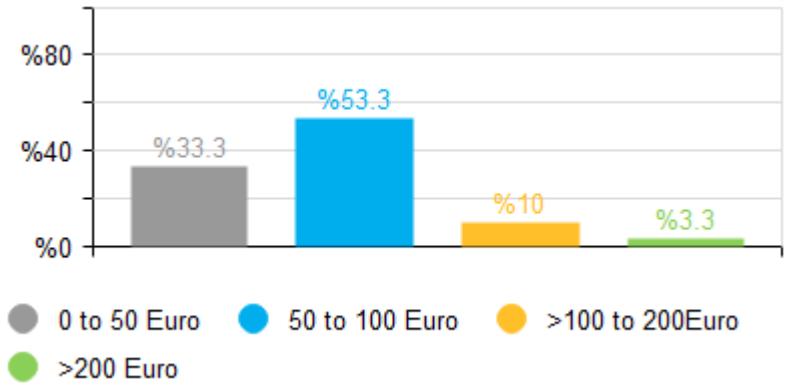


Figure 132. Remittances according to the Survey

According to the World Bank Group the level of GDP per capita in Albania for 2019 was 558,302 ALL[82]. Within the project area, the average incomes amount per capita is 11,642 ALL (94 Euro) per month, or 139,711 ALL (1135 Euro) per year. This amount is nearly five times less than the national average. However, these families do not only live on the income they get as they satisfy some of their nutritional needs in-house having personal agricultural products, they produce their own basket food products, meat and dairy.

A few families also get some profit by leasing their land instead of farming it on their own. This is a fixed income for the family and of course it helps without any additional costs. Only 11.3% families lease their land to others, profiting some income in such cases. However, the income is not very high with an average of 28,243.75 ALL (229.62 Euro) per year for those leasing the land.

Extrapolating the data with the formula "total combined monthly income/residents in the dwelling" a clearer, though not diverse view, is observed. More than half of the families (70.6%) live from 7,142 ALL (58 Euro) up to 12,307 ALL (100 Euro) per person. The distribution of families living with a specific income per capita is presented in the graph below. As the analysis go further in the expenses, this amount of money is barely sufficient to satisfy most of the needs per family.

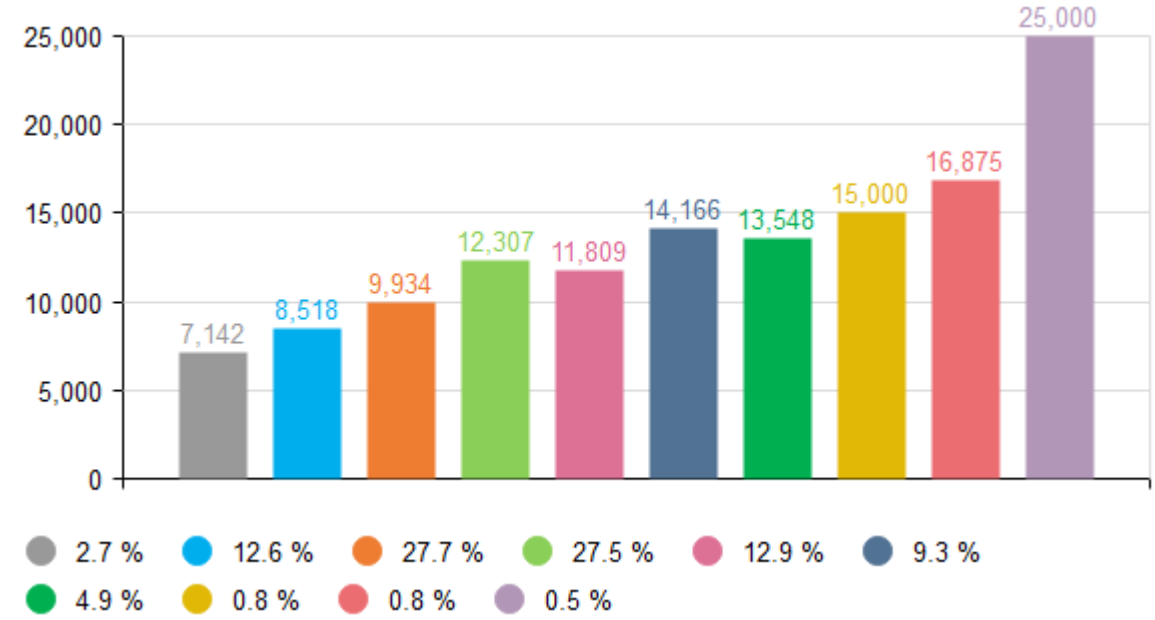


Figure 133. Average Monthly Income per capita[83]

The biggest expenses for the families are related to food with an average of 50.87% of the total budget. The average monthly amount spent for food is 11,989 ALL (97 Euro) which is the lowest income a family has.

[82] World Bank https://databank.worldbank.org/reports.aspx?source=2&country=ALB
[83] Source – Socio Economic Survey

As mentioned above there are 2.7% of the families who have an income lower than 15,000 ALL (121 Euro) that would not be able to spend anything else on other activities. Furthermore, the next most expensive category is services (water, energy, telephone, etc.) 20.70% of the total budget, which at an average expense per month goes at 4,878 ALL (39.66 Euro). Agriculture and Livestock make 15.86 %, which has a total average of expenses per month for the area, of 5,201 ALL (42 Euro). The expenses on agriculture and livestock are important in the area as the majority of the resident is either working or getting an income from farming or just living on farming. Therefore, the agricultural expenses for part of the residents are a must, and not extra expenses. As seen from this analysis, a majority of families are only able to survive, meeting only their most basic needs, and only 3.6 % of families budget is spent for entertainment.

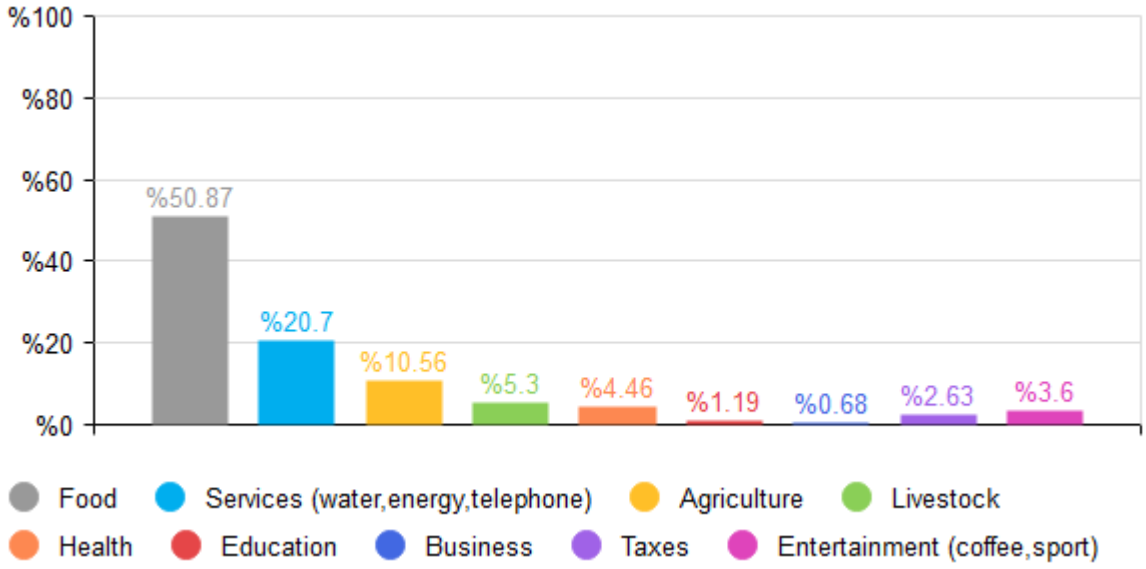


Figure 134. Percentage of expenses per each category compared with total budget[84]

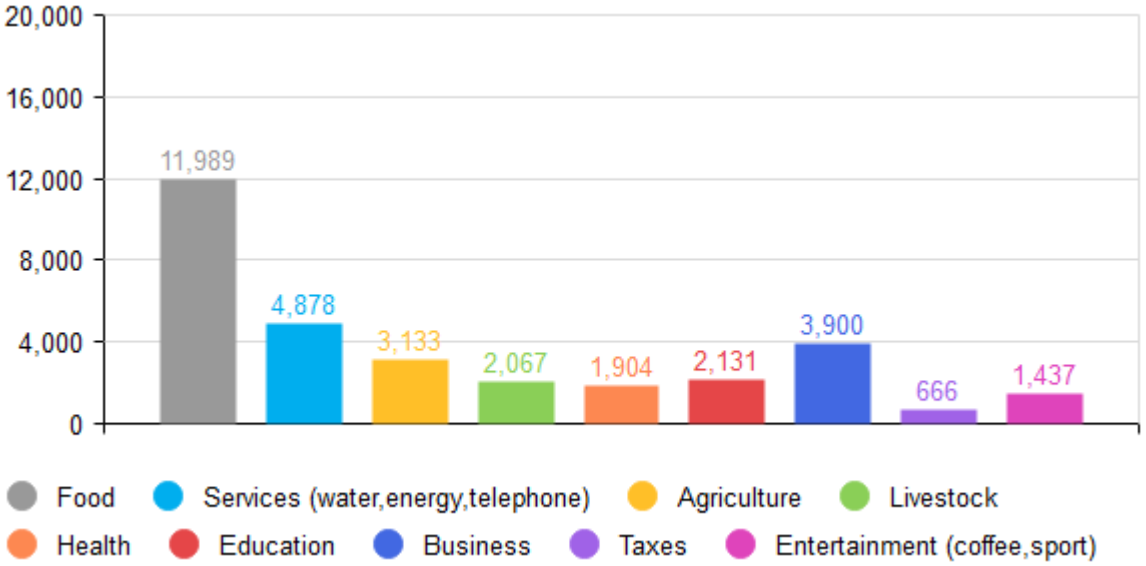


Figure 135. Average amount in ALL per each category of expenses[85]

[84] Source – Socio Economic Survey
[85] Source – Socio Economic Survey

4.3.5. Workers Organizations, Freedom of Association, Child Labour and Equal Opportunities

IFC's Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers[86].

Albania has ratified the ILO conventions Nr 87 and 98 as early as 1957, while the "Workers' Representatives Convention, 1971 (No. 135) has been ratified in 2004 and the "Collective Bargaining Convention", 1981 (No. 154) has been ratified in 2002.

Albania has ratified 55 ILO Conventions: the 8 Fundamental Conventions, the 5 Governance Conventions and 42 Technical Conventions. Albania is the 3rd European country to ratify the new ILO Convention No. 190, which is the first international treaty to recognise the right of everyone to a world of work free from violence and harassment.

Table 45 ILO Conventions Ratified in Albania

Convention	Date	Status
C029 - Forced Labour Convention, 1930 (No. 29)	25 Jun 1957	In Force
C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	03 Jun 1957	In Force
C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	03 Jun 1957	In Force
C100 - Equal Remuneration Convention, 1951 (No. 100)	03 Jun 1957	In Force
C105 - Abolition of Forced Labour Convention, 1957 (No. 105)	27 Feb 1997	In Force
C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	27 Feb 1997	In Force
C138 - Minimum Age Convention, 1973 (No. 138) Minimum age specified: 16 years	16 Feb 1998	In Force
C182 - Worst Forms of Child Labour Convention, 1999 (No. 182)	02 Aug 2001	In Force

Table 46 ILO Governance Conventions Ratified by Albania

Governance Convention	Date	Status
C081 - Labour Inspection Convention, 1947 (No. 81)	18 Aug 2004	In Force
C122 - Employment Policy Convention, 1964 (No. 122)	07 Jan 2009	In Force
C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129)Has accepted Article 5, paragraph 1(a) and (b)	11 Oct 2007	In Force
C144 - Tripartite Consultation (International Labour Standards) Convention, 1976 (No. 144)	30 Jun 1999	In Force

Although in the Labour Code there is no specific provision on the scope of collective bargaining, it is implied in the definition of collective labour contract which contain provisions governing the conditions of employment, the entering into contracts, the content and termination of individual contracts of employment, vocational training as well as the relation between the contracting parties. Furthermore, it is implied in the provision concerning the right of representative trade union to request from the employer or the employers'

[86] IFC Performance Standards on Environmental and Social Sustainability, PS2 – Labor and Working Conditions.

organization to start collective bargaining for the conclusion of a collective labour contract at enterprise/ies or branch level, in favour of one or more professional categories of employees87.

For what concerns the child labour, in 2017, Albania made a moderate advancement in efforts to eliminate the worst forms of child labour. The government passed the Regulation on Protection of Children at Work, which provides a list of hazardous occupations for children under age 18. The minimum age for work is 16 years old with restriction to light work for those from 16 to 18 years of age.

In its "Ethics Guide and Code of Conduct (CoC)"[88], Voltalia prohibits all form of child labor involving their economic exploitation and sets 16 years the minimum age access to employment at Voltalia for non-hazardous tasks and 18 years for hazardous tasks. This CoC is applied also to all partners and contractors, suppliers and their subcontractors.

In addition, Voltalia recognizes freedom of association, the right to collective bargaining and the freedom of association of its employees and those of its subcontractors and is committed to promoting social dialogue[89].

There were not reported cases of child labour in the area of the project, but were reported some cases of forced begging in the city of Fier.

In addition, the Article 18 of the Constitution of the Republic of Albania provides that we are all equal before the law. No one may be discriminated for reasons such as: gender; race; religion; ethnicity; language; political opinions; religious or philosophical beliefs; their economic, educational, or social status; or parental ethnicity.

The Law No.9970, date 24.07.2008 "Gender Equality in Society" is based on the principle of equality and non-discrimination, and other principles sanctioned by the Constitution of the Republic of Albania, by the Convention "On the Elimination of all Forms of Discrimination Against Women", and by all other international acts ratified by the Republic of Albania. The law guarantees equal opportunities among men and women to eliminate gender-based discrimination in any of its forms and assures creation of equal and appropriate working conditions, equal opportunities for information, training and qualification and equal treatment of employees during labour relations, and provides equal payment for equal value works.

In a round of engagement and meetings held with the Heads of the Administrative Units of the PA in January 2022, there was no reported activity of under aged children in agriculture activities. Usually, the children attend school till the age of 18 years (high school), and then onto university and even post university studies. For those cases of children employed in agriculture it was reported, they usually start helping their respective families at the age of 17-18 years old.

In addition to the laws and regulations of Albania, VOLTALIA will implement the IFC requirements, PS2 for Labor and Working Conditions. The company provides treatment workers fairly, safe, and healthy working conditions, will avoid the use of child or forced labor, and identify risks in their primary supply chain.

4.3.6. Land use, Land cover and Ownership

Albania has a total area of 28,748 km^2, of which 24% is agricultural land, 36% forest, 15% pastures and meadows and 25% unproductive land, including mountainous land, urban land and water bodies. Albania has one of the smallest areas of agricultural land per capita (0.22 hectares) in the region.

The relatively equitable distribution of agricultural land to rural households in the 1990s has resulted in an extreme fragmentation of landholdings. The high number of landowners complicates decision-making on developments as well as on large-scale agricultural utilization of the land. Some plots of land are of poor quality for agricultural purposes. Though land fragmentation is known to be one of the main issues Albania is facing, detailed statistical or other reliable information is missing. Also, the issue of restitution/compensation of property rights is still unresolved. The restitution of agricultural land has been

[87] Articles 161 and 163 of the Labour Code of the Republic of Albania
[88] https://www.voltalia.com/system/files-encrypted/nasdaq_kms/assets/2021/10/25/3-25-42/EN_ETHICS_GUIDE_AND_CODE_OF_CONDUCT.pdf
[89] https://www.voltalia.com/system/files-encrypted/nasdaq_kms/assets/2021/10/25/3-25-42/EN_ETHICS_GUIDE_AND_CODE_OF_CONDUCT.pdf

debated since 1993, when the original Law 7698[90] on Restitution of Property to Former Owners exempted this category. Implementation of this law continues to be incomplete.

During the 1990s many parcels were subdivided, and structures were built on land without legal authorization. These actions resulted in informal urban districts on the periphery of cities, concentrated hotel and tourist service areas on the seacoast, scattered trade and service buildings on highways, and houses on agricultural fields outside the village centres. Such unauthorized land parcels and illegal buildings now constitute a large share of all immovable properties.

The majority of the households 96.4% reported to own a land plot. The quantity of land owned in the area starts from as low as 0.5 ha (19%) up to 2ha (14.5%) or more than 2 ha (18.8%) per household (HH).

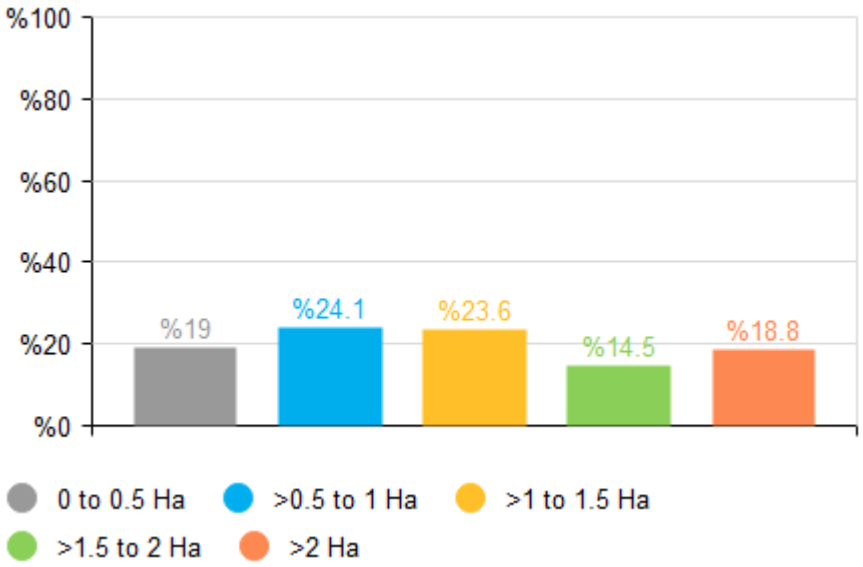


Figure 136. Land surface and accessing distance according to Survey[91]

The graphic above shows that the majority of the HH possess 1 to 1.5 ha (23.6%). This is mostly due to the Land Reform Distribution of 1991 in Albania, which distributed the land of the former communist cooperatives to all the people resident in villages. At that period more than half of the population lived in rural areas, which made the land distribution very fragmentized. Within the project area it was distributed from 0.2 ha up to 0.5 ha per capita on the average.

Almost all the families who own a land plot have private ownership to their land. In addition, 20.1% of the households rent some farming land to extend their agriculture activities. Renting the land is sometimes a way to provide additional income for the family, as it allows to have a larger farming activity. When asking for the type ownership documents the majority 97.4% responded that have the land acquisition act document so called AMTP and only 1.7% of the HH have issued the ownership certificate.

There is a substantial difference between the land acquisition act and the ownership certificate according to the Albanian law. The AMTP is a document that proves ownership of the holder and was distributed after the Land Reform in Albania in 1991, but the holder has to issue an ownership certificate to prove he/she is the right land owner. The AMTP was issued only in the name of the head of the family at the moment of issuance, but all the family members were considered as right land owners. For the land right holder to be compensated for the land or the assets, he/she needs to issue the Ownership Certificate.

[90] Law 7698 https://qbz.gov.al/
[91] Source – Socio Economic Survey

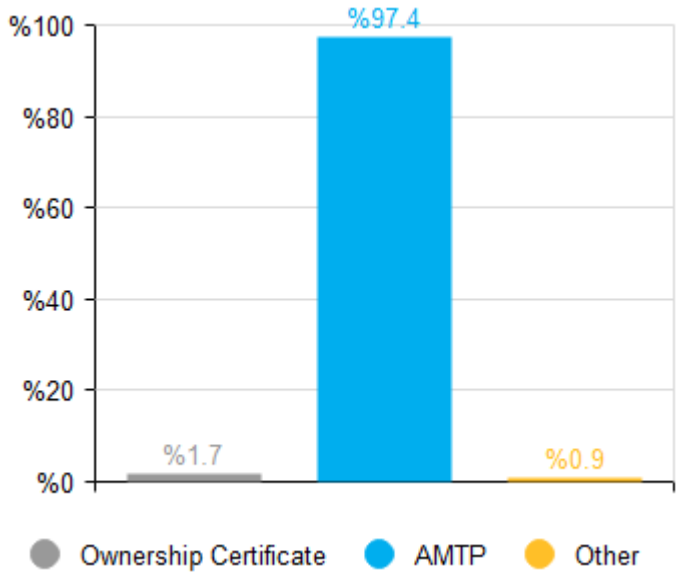


Figure 137. Land ownership documents[92]

There are a number of parcels whose ownership could not be determined during the survey. These parcels are affected by either the OHL or the temporary access roads needed for the implementation of the OHL. This is mostly due to incomplete or missing cadastrial data. Continuing engagement with the land owners in the area will identify the missing data where possible as part of the Lnas Resettlment Plan (LRP). There are 41 parcels whose owner could not be identified or had incorrect cadastral data or inheritance issues at the time, and 34 parcels whose owners are absent for immigration reasons. Additional efforts will be made to identify all right land holders of the affected parcels as part of the LRP.

4.3.6.1. Land use on OHL route

Fluvisols are planted 100% with annual crops dominated by fodder, beans and cereals. These are lands with high agronomic potential and are classified in categories II and III. They are irrigated and drained.

Salty soils are soils with low agronomic fertility and are classified in category V. They have not been cultivated for more than 30 years due to low yields of agricultural crops. In some cases, they are cultivated (not more than 10% of the surface) with fodder, only during the winter period.

4.3.7. Agriculture and Livestock Activities

The project area is characterized by a uniformly flat landscape with the absence of significant woodland or scrub cover. The land use is the broader Project area is almost completely dominated by crops, which present as a characteristic patchwork of rectangular fields. Parcels of land are also used for pasture by the farmers in the area due to the difficulty of planting crops in salty areas.

The PV plant project site itself is mostly saline due to its vicinity to the seashore and the infiltration of sea waters, and therefore is not used for growing crops. However, during the engagement in the village of Hasturkas it was reported that a small portion of the land is used for grazing but there are no specific users identified. Also, it was reported that some herders travel from other areas of Albania to the project area during the summer season. The herders met on site during the survey reported that they use the PV plant project site as a road path during spring and summer time to provide access to the agricultural parcels at the other side of the PV plant. However, the interruption of access to this path will not restrict herders from reaching the other side of the PV plant since they have other route alternatives.

[92] Source – Socio Economic Survey

The site survey identified that small portion of land in the east border of the PV plant (nearly 2- 3 Ha) is used for cultivating wheat and crops for animal grazing. The farmer met on site stated that they are informal users of this land, which is state owned and do not have any complain for ownership. Being quite exclusively cultivated with annual crops, the farmers harvest in the period of May-June, so it is preferable for the Project to allow the harvesting of these crops in June into consideration.

90.4% of the resident HH cultivate their land, and profit crops for their family needs or sometimes even for selling. However, most crops are seasonal crops and this of course, brings unstable income. Respondent's report cultivating agricultural products at a rate of 69.1 %, while the rest is cultivated with crops for livestock purpose.

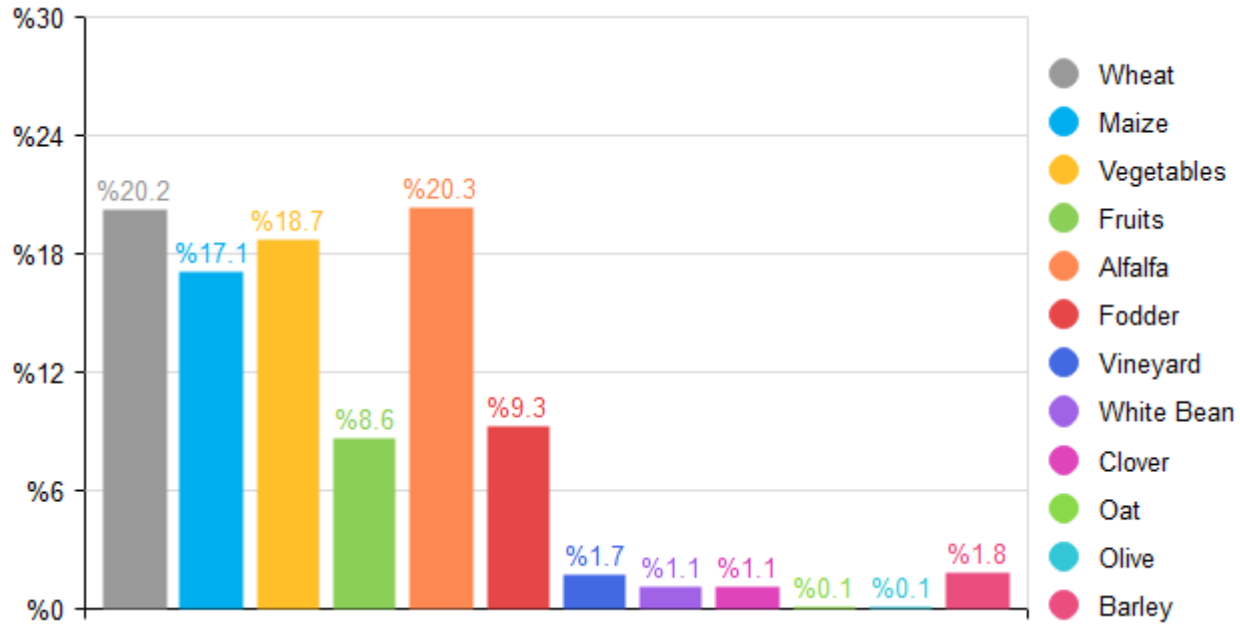


Figure 138. Main crops cultivated according to Survey[93]

As we can see by the crops cultivated, the type of cultivation is not oriented towards a specific crop, but ranges from vegetables to wheat and maize, fruit and crops for livestock. Considering the amount of land owned per each HH and cropping structure, the income from agriculture varies greatly between HH.

In terms of working equipment, tractors are used for land cultivation in 63.8% of the cases and 35.8 % cultivate their land manually. It is important for the families to have all the necessary infrastructure to farm their land. This is mainly provided by private investments or a small group of farmers working together.

As farming is one of the main activities in the area, it also presents a number of issues. 91.8 % of the respondents mention the biggest issues they face when farming. From those who responded 42.6% mentioned lack of irrigation as the main problem. This is a problem that hinders production, limits activity, and narrows the variety of crops they can farm. Other 33% mentioned lack of markets as a problem. Agriculture products instead of being sold directly to the markets are usually sold to middleman thus reducing the percentage of profit for the farmers. In addition, 10.5 % mentioned drainage as a problem. During the site visit in early February, it was noticed that some areas were flooded and damaged the crops. Irrigation and drainage are crucial to agricultural activity and if one of them is not working properly, the entire process is slowed down, if not stopped. The infrastructure is usually not present and most of the farmers do not have wells to use to irrigate the land.

[93] Source – Socio Economic Survey

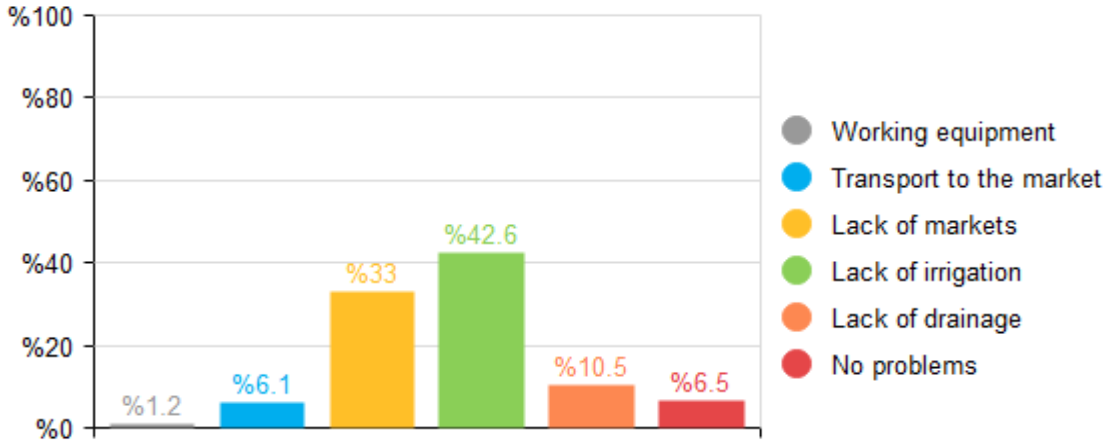


Figure 139. Agriculture problems according to Survey[94]

With regard to livestock 70.9 % of the HH reported that they own livestock. The following graph presents the distribution of the animals for the families that have responded that owns a livestock. Some of the families owns more than one of the animals shown in the graph below. The most common animal is the cow (41.5%), used for the meat, milk and other dairy products. Chickens are also owned by 41.5 % of the families to provide meat and eggs. Furthermore, goats and sheeps are also common in the area specifically 3.8% and 8.3%. Horses are also used mainly as transport animals with 1 % of the families possessing them in the area.

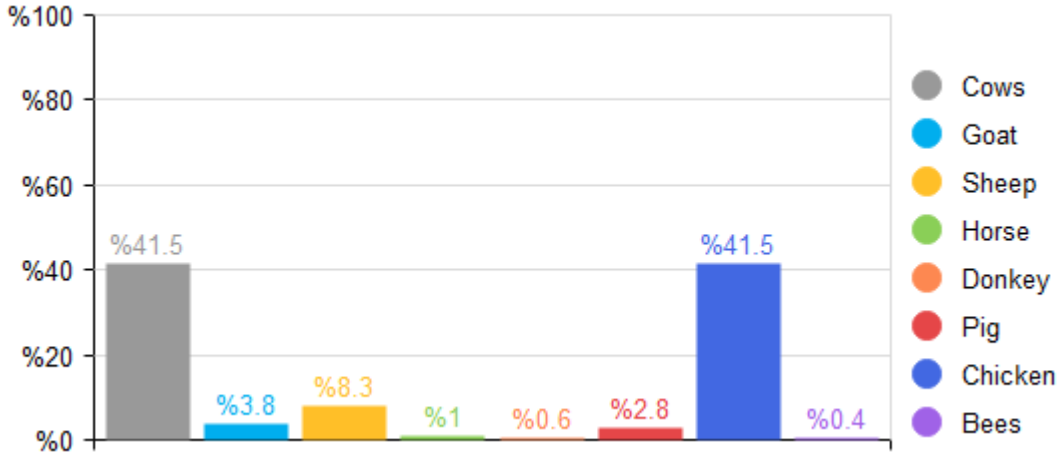


Figure 140. Type and quantity of livestock[95]

In most cases 82.8%, the food for livestock is secured from private parcels. As described above great number of parcels are being cultivated with alfalfa and fodder. Other 17.2% are securing the food for livestock from public and renting parcels.

The dairy products are used for personal consumption mostly. 39% of respondents report they use 100% of the livestock products for personal consumption only. Others use their product for both personal consumption and selling while 52% families have reported to use more than 50 % of the livestock rearing for the purpose of selling the products.

Most of the families report no problems regarding livestock. However, Illness and securing the food for livestock are the most mentioned problems in the area.

[94] Source – Socio Economic Survey
[95] Source – Socio Economic Survey

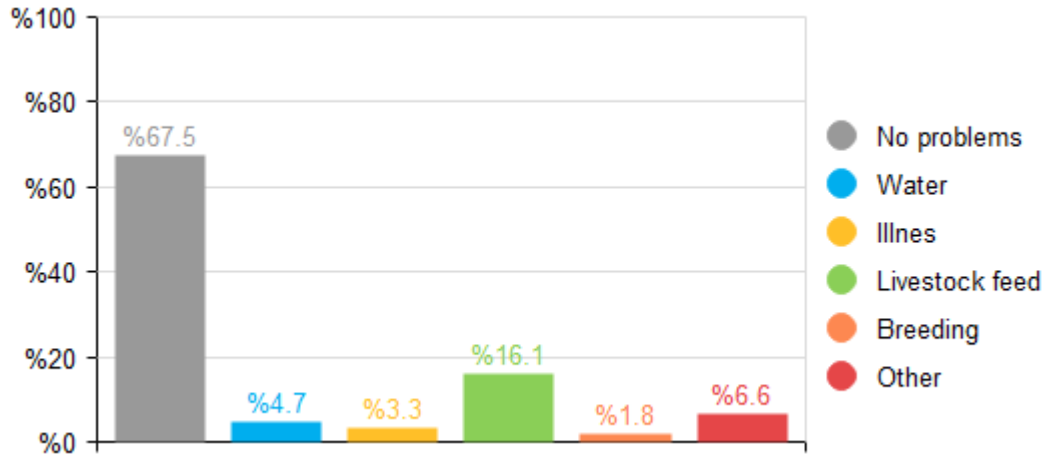


Figure 141. Livestock problems[96]

Other activities, such as hunting and fishing, are not very common in the area. Only 1 of the family have reported fishing as an activity. In the case of the few families that fish, the products are consumed by the families for sustenance. None of the families have reported this activity as a business activity. This relates to the required investment for the activities and the laws that refrain from it.

4.3.8. Village Assessment, Infrastructure and Utilities

4.3.8.1. Villages and settlements in proximity of the project area

The project extends in the municipalities of Divjakë and Fier. The PV plant is located in the territories of both AU Remas, municipality of Divjakë and AU Libofshë, municipality of Fier. While the OHL route encompasses the territories of AU Libofshë, Topojë, Dërmenas and Qendër.

The closest villages to the PV plant are Hasturkas and Ndërnenas which lie around 800 m and 1500 m respectively to the east of the project area. While, the closest inhabited houses including some warehouses are located 40-50 m distance from the main entrance road that leads to the PV plant area and 390 m far from the PV plant itself.

Along the entire route, the OHL intersects with some public infrastructures' facilities including access roads, irrigation and drainage channels where the most important road infrastructure is the National Road SH4 crossed between T31-T32. In addition, the OHL intersects with Trans Adriatic Pipeline (TAP) as shown below in Figure 142. The Decision of the National Territorial Council has declared a 'national corridor', an area with a width of 500 m (250-250 m) along the TAP route. Therefore, for the OHL route the Project shall inform TAP, and obtain the necessary permission prior to project development.

[96] Source – Socio Economic Survey

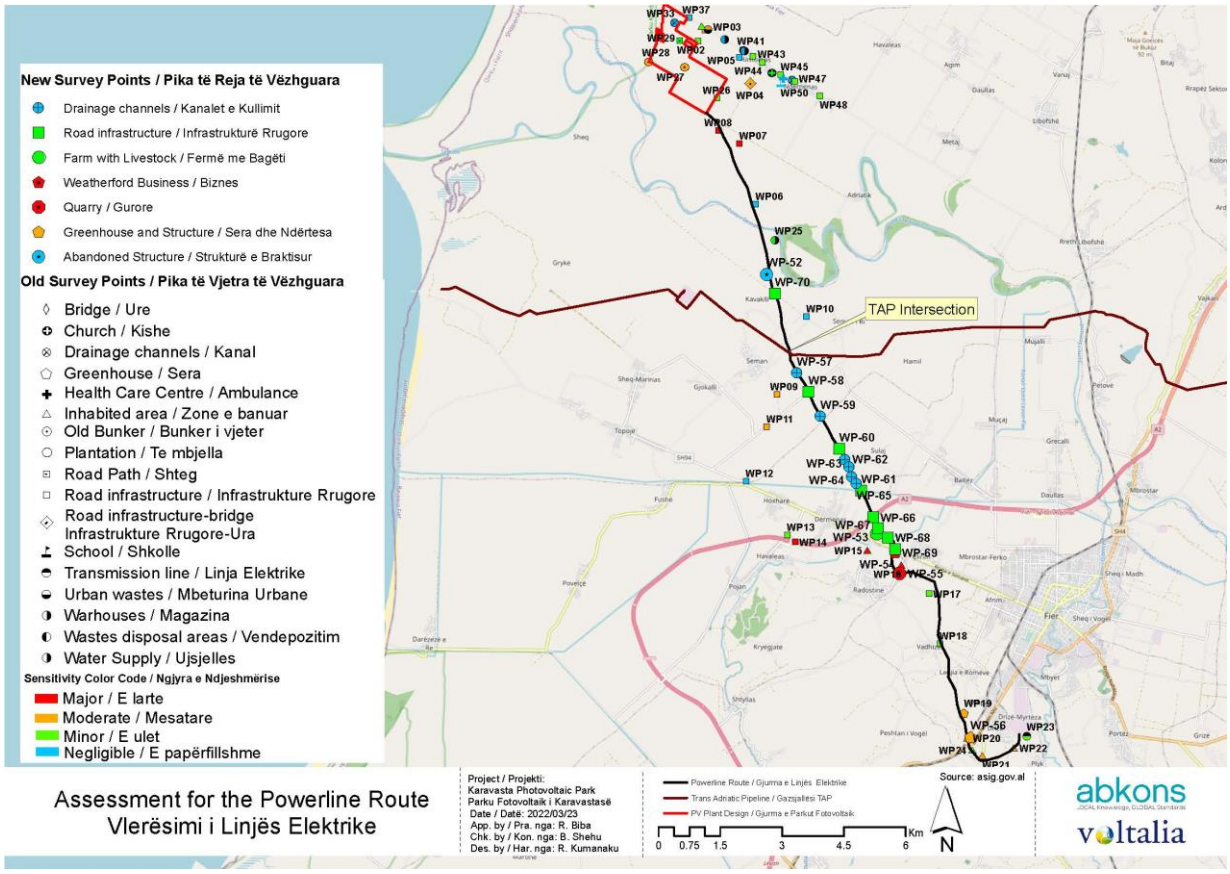


Figure 142: Infrastructure and village assessment map

4.3.8.2. Road infrastructure

After the territorial reform, the rural roads were transferred to the administration of the respective municipalities, which are responsible for the maintenance and investments. The villages within the study area are well connected to the main national road. The road infrastructure has been improved in the past few years in all the villages. Narrow rural roads, including unpaved roads, link settlements within the villages and typically the road traffic is low. During the surveys no significant noteworthy infrastructure was observed. Few of the main rural roads are equipped with adequate road signages, speed limit signs or other traffic signs. While, public lighting is provided in all the roads within the villages. Noteworthy to mention is that lighting poles along these villages and roads are mostly equipped with a small PV panel which make them energy saving.

The main entrance to the PV plant is represented by road paths in very bad conditions, sometimes difficult to access due to mud during storm periods. Road widths varies from 3-5 meters. Along the access roads to the entrance of the PV plant there is an old bridge, that is depreciated and risks to collapse. This bridge cannot afford the passage of heavy vehicles such as trucks, concrete machineries or any other heavy tonnage vehicles. As well the bridge located in the waypoint E: 370921 and N: 4522162, which can be used as an alternative to access the project site is old and represents high risks for collapsing in case of heavy vehicles and machineries passage, Appendix 4 Logbook – Village, Infrastructure and Road Assessment, Voltalia PV Solar Plant

Consultations for the temporary access roads have been conducted according to the program set out in the SEP.

Other interventions are foreseen to allow transportation of the necessary materials to the PV Plant. These interventions and upgrades are represented below:



Figure 143 Divjaka Site Entrance Bridge



Figure 144 Ndërnenas Village Bridge Upgrade

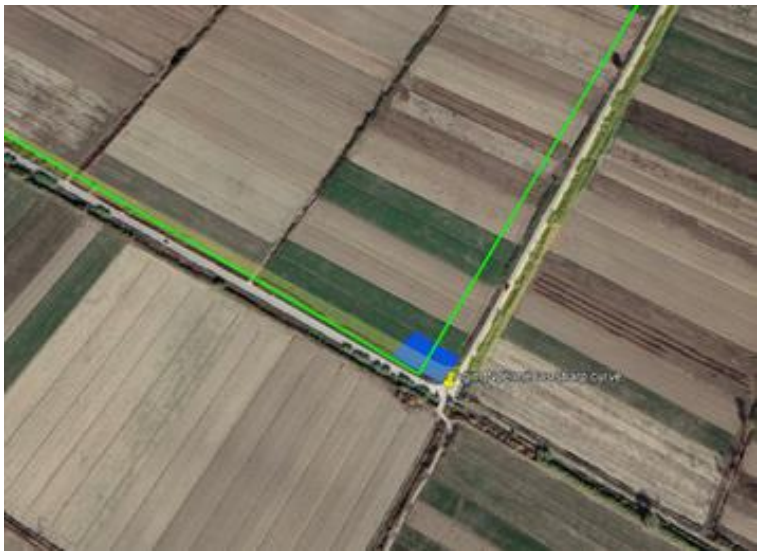


Figure 145 Agim - Ndërnenas Sharp Curve Upgrade



Figure 146 Agim Village Bridge Sharp Curve Upgrade



Figure 147 Agim Village Sharp Curve Upgrade

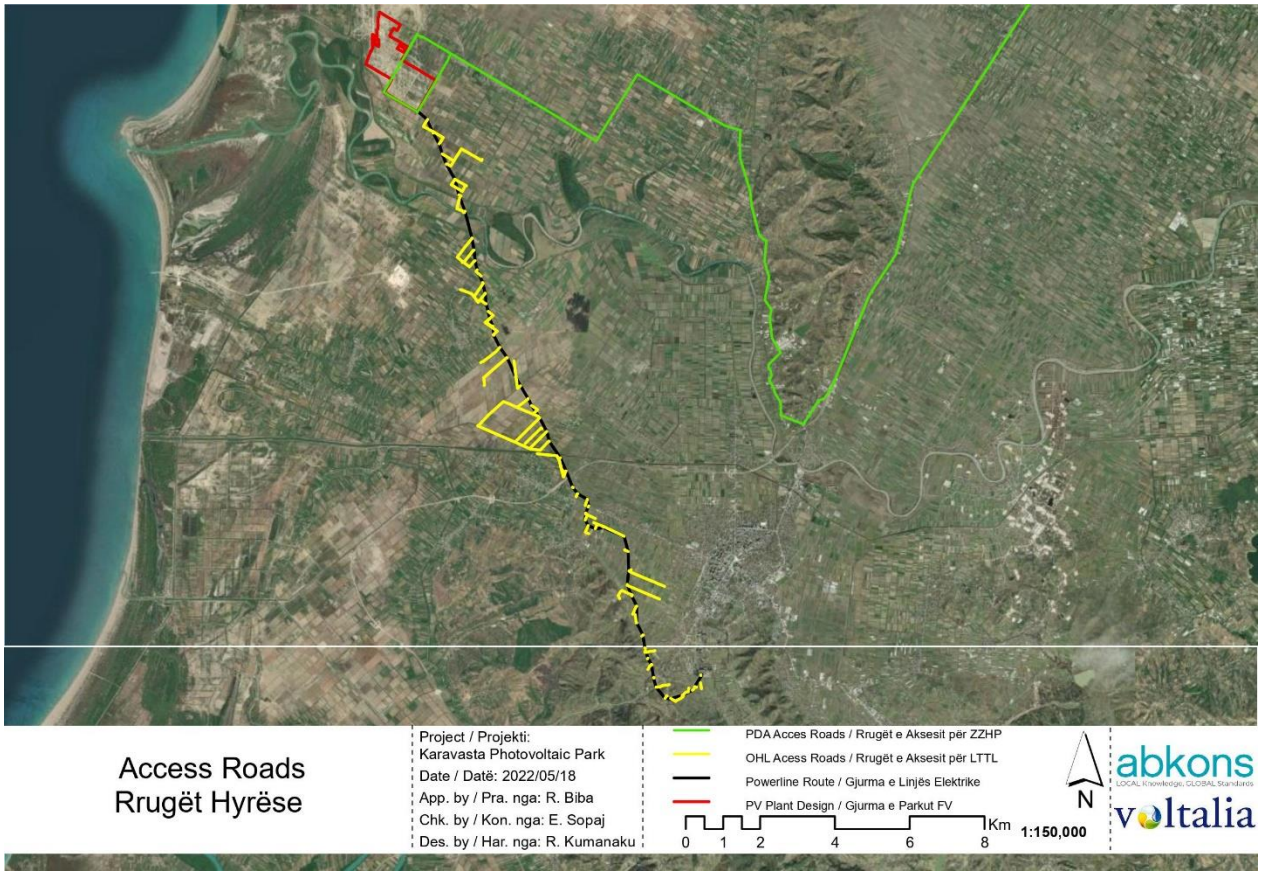


Figure 148. Access Road Map

Within the PV plant area there is a road path used by the villagers and herders during spring and summer time to provide access to the agricultural parcels at the other side of the PV plant. In addition, this path is used as a short route connecting the access road that leads to the coast. The road path is unpaved, muddy and impossible to drive by during and/or after rainy days. However, the temporal interruption of access to this path will not restrict residents from reaching the other side of the PV plant since they have other road alternatives.

Along with interventions for improving road and bridge conditions for the PV plant site, a series of temporary roads will need to be improved or built for the installation of the OHL towers and line. The majority of these roads are “agriculture roads”, access roads that allows farmers to reach the respective parcels. An evaluation of the actual conditions of these access roads and the necessary upgrades and improvements have been carried out by Voltalia in December 2021[97]

The map below shows the sensitive receptors along the main access roads used for transportation and along the temporary access roads that will be needed for the construction of the OHL.

[97] Road Survey Report for KARAVASTA SOLAR PV PLANT 140MW (THC)

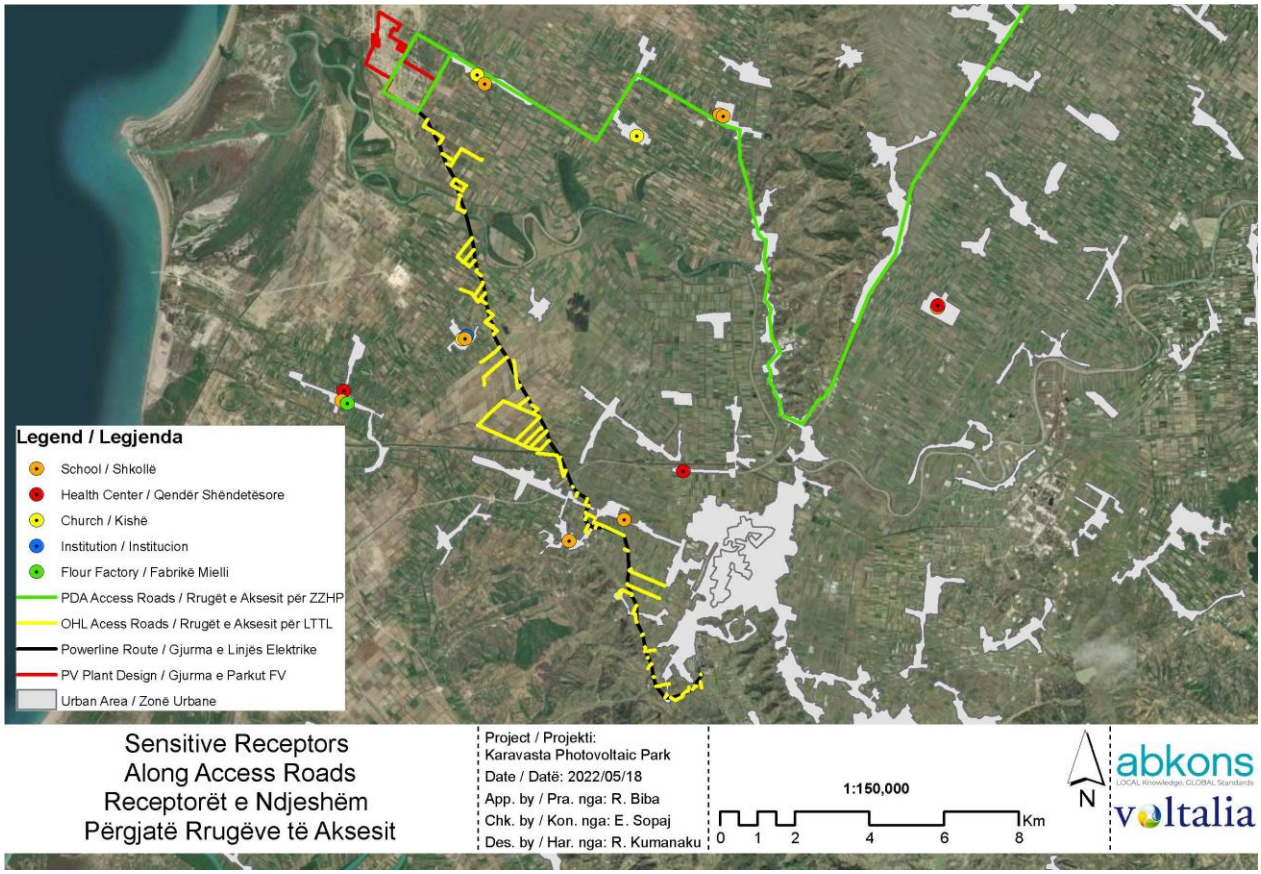


Figure 149. Sensitive receptors along the access road

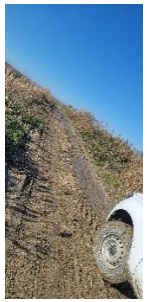
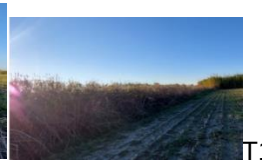
The ESIA team identified aprox. 198 residential or economic settlements within a 30 m buffer corridor along the access roads to PDA and 47 residential or economic settlements along OHL's access Roads.

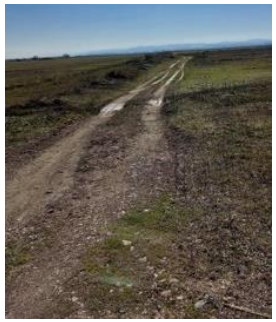
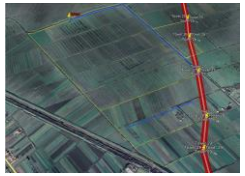
Table 47. Potential Residential settlement within 30 m buffer

Settlement	No of potential Residential settlement within 30 m buffer	
	PDA Access Road	OHL Access Road
Hastukas	58	
Ndernenas	75	
Metaj	4	
Agim	15	
Libofshë	46	
Sulaj		2
Dermenas		19
Radostice		9
Fier		17

The table below describes the actual road condition and the required upgrade or improvement.

Table 48 Temporary Access Roads for OHL Tower Installation

Segment	Picture December 2021	Description
Tower 1 to Tower 19	T2  T3:  T4:  T5:   T6:  T7:  T8:  T9:  T10:   T11:  T12:  T13:   T14:  T15:  T16:  T17:  T18:  T19: 	

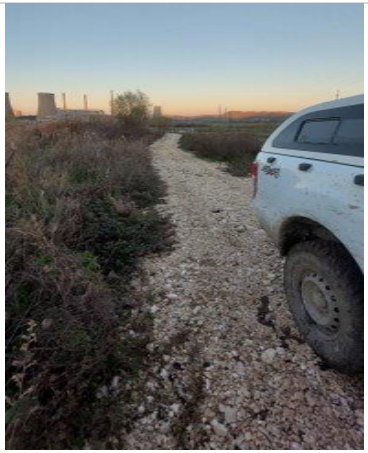
Tower 20 to Tower 25	T20:  T21:  T22:   T23, T24:   T25: 	The access roads of Tower 20 to Tower 25 are not paved or gravel. These are "agricultural" roads. The community uses them to access their lands / parcels. To access tower 22, need to cross from the asphalt road of the village, to enter the tower location, which is reached by unpaved road as we have named « agricultural" road. There are small crossing bridges over the drainage channels, Voltalia will carry out works for their improvement, when is necessary.
Tower 26 to Tower 29	T26:  T27-28-29:  	These towers will be accessed from the existing agriculture roads. The entrance to these parcels is realized through a bridge that accesses the drainage channel (as in the map).
Tower 30 to 31	T30, T31:  	Agricultural road, necessary to build the passage over the drainage canal located on the border with the tower parcel. The parcel is agricultural land, currently planted with alfalfa.

Tower 32, Tower 33	T32:  T33: 	The parcel is accessed through the existing road, damaged asphalt. T33 from the asphalt road passes to the existing unpaved road.
Tower 34, to Tower 36		T34 is accessed from the asphalt road SH94, the entrance to the parcel is done in agricultural parcels. T35 has access from the asphalt road SH94. T36 plot is accessed by gravel road, then agricultural land.
Tower 37 do Tower 39	T39 :  	T37, 38 will be accessed through the agricultural road, then the entrance to the agricultural parcel of the tower. T39 from existing gravel paved road
Tower 40 to Tower 42	T40 :  T41:  T42: 	From agricultural road to tower parcel
Tower 43, Tower 44	T43 :  T44: 	From agricultural road to agricultural land

Tower 45	T45 : 	From agricultural road need to build passing on the channels to access tower parcel
Tower 46 to Tower 48	T46 :  T47: 	From asphalt road to agricultural road

T49: 
T50: 
T51: 

T52 : 
T53: 


T54 :  T55:  T56: 

4.3.8.3. Drainage and irrigation system

The drainage and irrigation system, although present in almost all surrounding areas, is not working properly, and only a small portion of the agricultural lands in the area benefit from the well-functioning of this service. This is mostly due to lack of maintenance of the drainage system throughout the years which has not been performed timely, and the channels are continuously filled with sediment materials that create blockages and do not allow the proper functioning. At the time of the site survey the main drainage channel located in between the OHL towers 2 to 6, is inundated and all the lands in the left side of the road, including the drainage channel are flooded (see figure below). The drainage channel is full of sediments, mud and reeds which make it difficult to properly discharge the water, in particular during heavy rainfall periods. Local residents reveal that the lands in this section are continuously flooded. Flooding periods typically last from November to April or May, or in case of heavy rainfalls throughout the year.

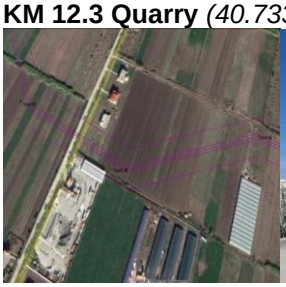


Figure 150. Inundation of lands in the project area

4.3.8.4. Other key observations for infrastructure

During the field assessment and based on the vicinity of the OHL Project no residential homes and buildingsreceptors were identified; the table below identifies potential areas that may be of concern for public health based the following informal and formal structures that were surveyed :

Location	Characteristic
KM 4.5 Structure *(40.798768, 19.474674)* 	70m from the OHL Abandoned structure that might be used during the cropping season to store farming tools Roof in poor condition Fruit trees surrounding the structure

Location	Characteristic
KM 11 Farm *(40.742466, 19.507490)* 	10m from OHL Farm with livestock (turkey and chicken)
KM 11.6 Weatherford business *(40.738560, 19.513008)*   	Structure rented by Weatherford – O&G activities Cranes & heavy machinery transitioning on a daily basis Engagement with Weatherford director Voltalia/OST reviewed specific case and considered tower 36 relocation. Tower 36 relocated and the owner agreed with the solution found.
KM 12.3 Quarry *(40.733810, 19.514369)*  	Part of storage building of the quarry is found within the wayleave corridor of the OHL Voltalia/OST reviewed this case and considered wayleave width reduction to avoid affecting storage building.
KM 17.2 Greenhouse and structure *(40.698363, 19.535510)*   	Greenhouse and a structure not detected by satellite imagery Greenhouse located nearly 80 meters from OHL and not directly affected

Location	Characteristic
Structure (E: 377312.57, N: 4506050.24) 	Storage located around 16 m from the OHL line. Concrete roof.

4.3.8.5. Housing

Almost all families are living in private dwellings. In 97.5% of the cases, they have separate private houses to live in. Other 2.5% live in apartments. The average house has four rooms: living room, two sleeping rooms and bathroom. However, houses differ in their parameters. Cooking is done within the house. They cook inside the house in 99.4 % of the cases and the other 0.6% have a detached kitchen.

Building materials consist of bricks and stones in 91.2% of the cases and concrete blocks 8.2% of the cases. Those who were built of other materials, i.e., 0.6% are adobe houses which are quite old constructions.

Most families (99.7%) are legal owners of their houses and the dwellings have been inherited from generations in the family. When asked for how many years they have been living in their house they responded from the year 1965 up to 2018. Only 0.3% are in a process of acquiring the legal ownership.

4.3.8.6. Energy supply

The energy used for cooking is mainly derived from natural liquid gas (46.4%), electricity (10.1%) or wood burning (43.2%). The most used energy for heating is derived from wood burning (84.7%). A majority of 90% of the residents heat their homes by means of wood burning stoves. Other forms of heating are electrical heaters in 1.8% and fireplaces in 4.7% of the cases.

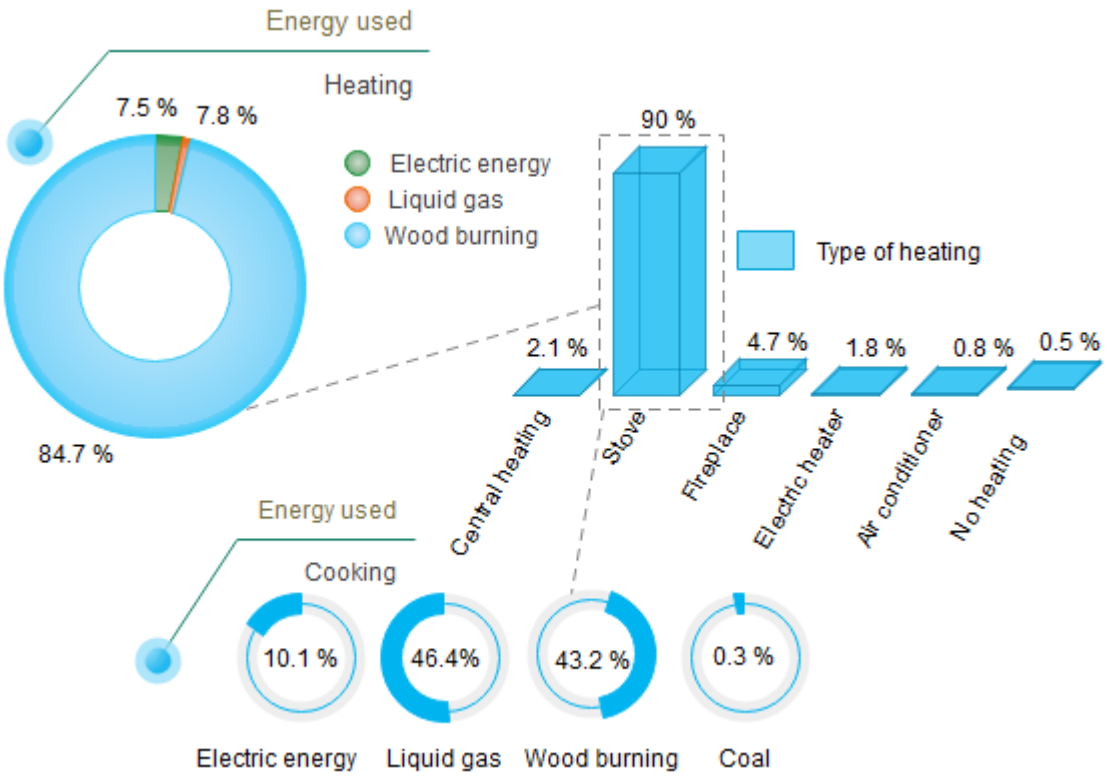


Figure 151. Energy used for heating and cooking[98]

There are a number of issues with electric power in the area. First and most importantly, is low tension in 34.2% of the cases followed by costs 28.4% which are perceived very high from the residents. Also, the electric power is not continuous, with frequent power cuts. There is a periodical lack of electric energy reported by 19.7% of residents and then unstable tension by 17.7%.

4.3.8.7. Water supply

Water supply comes in the form of a piped system in 40.5% of the households. However, the water is perceived to be of bad quality (non-drinkable) and most of the residents buy drinking water. Almost 93% of the resident families in the villages Ndërneas and Hasturkas reported that they buy the drinking water from the water tank truck (Kondi shpk) that comes in the villages every day. Some of the residents in villages also make use of groundwater wells for drinking water consumption and irrigation of their lands.

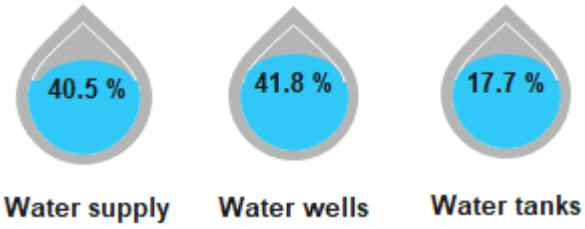


Figure 152. Water supply according to survey[99]

The residents perceive water quality to be very good (0.3%), good (7.4%), bad (26.4%) and very bad (65.9%). The drinking water quality is reported to be one of the main issues that these communities face. A number of issues are reported regarding the water supply. The first one is related to water pollution, as reported by 68.5% of the respondents. In addition to this, 23.3% of the respondents report frequent

[98] Source – Socio Economic Survey
[99] Source – Socio Economic Survey

interruption from the water supply utility and other 8.2% report low level of water in wells during summer season.

4.3.8.8. Sanitation

Most of the settlements lack of proper connection to the sewage system, and instead of that use septic tanks. The majority of the dwellings, precisely 98.1% of them, have toilets that are located inside the house. Other 1.9% have toilets outside the dwellings. This is due to the old way of constructing a house in rural areas, where they were not connected to the sewage system or there was a lack of a sewage system overall. In rural areas, this "tradition" is still used, also because it will require a big expense from some of the residents for the reconstruction. These houses have septic tanks. In total, 26.7% of the families are connected to the sewage system and it was also reported that there is no wastewater treatment in the area.

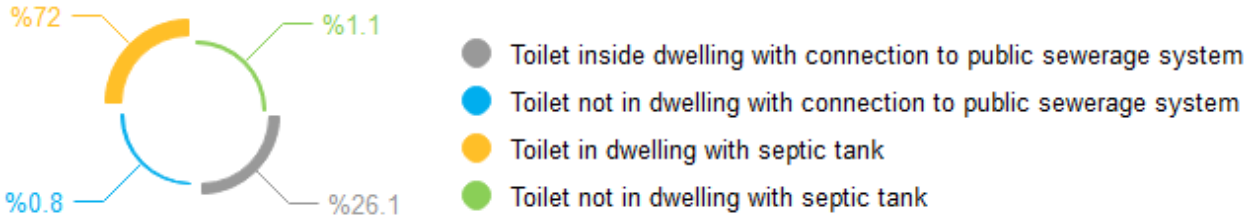


Figure 153. Sanitation and toilets[100]

As far as waste management is concerned, 90.8% of respondents report that the waste is collected by the municipality. The other 9.2% of the cases have reported that they are not thrown in specific places, which makes it very difficult to collect. Most of the residents throw either burn their wastes or throw them in illegal dumpsites or disposal areas.

4.3.8.9. Modes of transportation

Transportation is done mainly by public transport in 36%, motorcycle 27.4%, and private car 21.4% of the cases. Furthermore, a few respondents (14%) mention bicycle as a way of transport. When asking for what type of assets the household owns 79.2% of the total respondents reported that they own a movable asset as shown in the graph below. 22.9% own their private car while other 1.4% report to own a minibus or minivan, which they also use to generate some income.

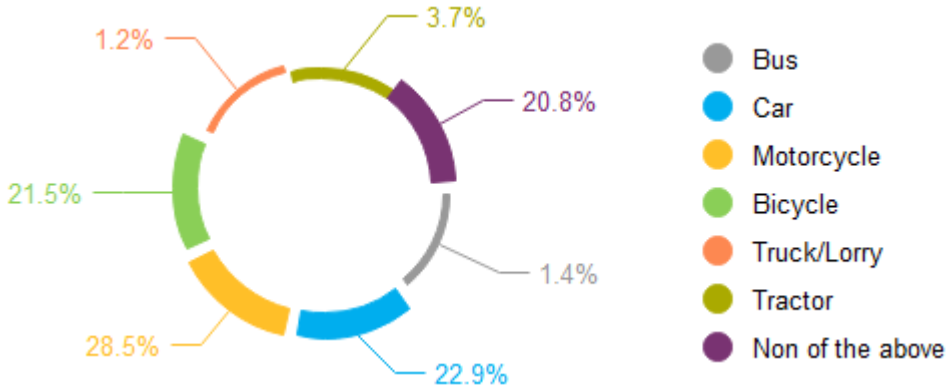


Figure 154. Type of movable assets[101]

Almost all families own mobile phones. As the land line is not covering all the area, the only secure means of communication are the mobile phones, used by 95.9% of the respondents. However, only 58.8% of the total respondents have access to the internet. 33.5% have access to internet through mobile phone and 66.5 % have internet connection in their homes.

[100] Source – Socio Economic Survey
[101] Source – Socio Economic Survey

4.3.8.10. Education

The Education System in Albania is based on primary, secondary, and tertiary levels and is mostly supported by the state. Primary education is compulsory from the first grade until the ninth, but most students continue at least until a secondary education. Students must pass the graduation exams at the end of the 9th grade and also at the end of the 12th grade in order to continue their education. The academic year is divided into two semesters. The school week begins on Monday and ends on Friday. School attendance (primary to tertiary education) of Albania is 12 years. In 2015, the overall literacy rate in Albania was 98.7%; the male literacy rate was 99.2% and the female literacy rate was 98.3%[102].

Within the study area 71.9% of the respondents' report that there is a kindergarten in their village. While 67.5% report for primary and secondary school and only 28.4% report for high school. The high schools are mostly located in bigger villages. This is something common in Albania because small villages that do not complete the number of students needed and usually take lessons in the nearest school.

The educational status of the respondent family members is showed in the graph below: 27.36% of residents have accomplished the high school level, but only 4.65% have accomplished the university.

The main educational level completed is secondary with 51.69% of the residents. This is related also with the fact that secondary level of education is mandatory in Albania.

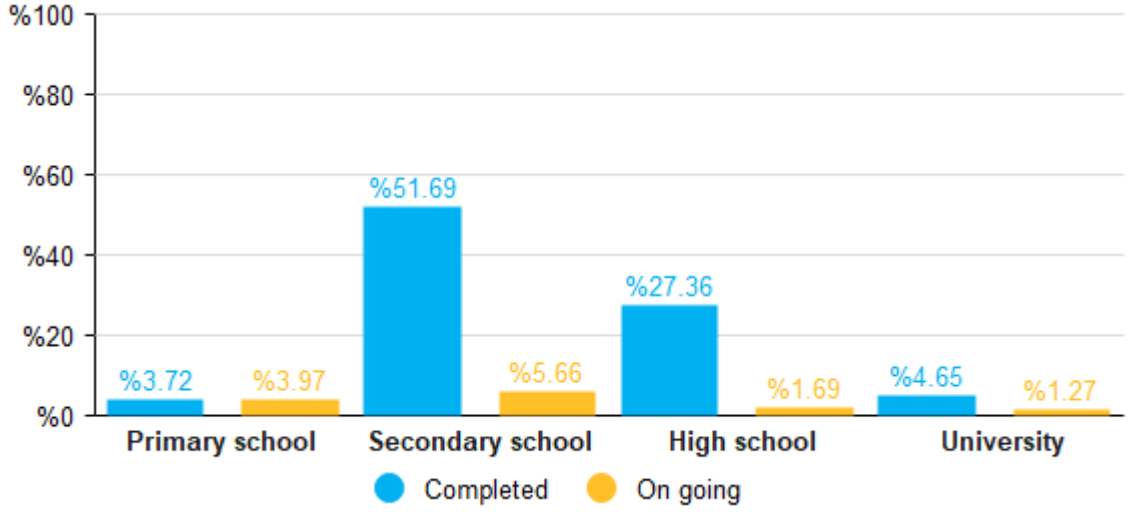
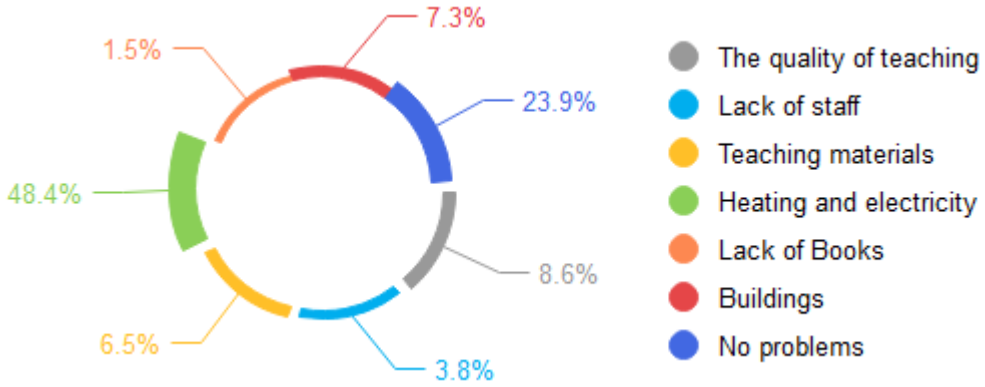


Figure 155. Educational status of the residents[103]

The residents report a number of problems with educational institutions. These include lack of heating and electricity 48.4%, state of buildings 7.3% and the quality of teaching staff 8.6% respondents citing these problems respectively. Other problems are lack of staff and teaching materials as presented in the graph below.



[102] INSTAT
[103] Source – Socio Economic Survey

Figure 156. Education problems and improvement[104]

4.3.8.11. Community health

Within the study area, 77.1% of the respondents' report that there is a Health Care Centre (HCC) in their village, which offers basic services and first aid. Others take services in the nearest HCC. However, due to a lack of staff, equipment and the state of the buildings the residents reported that for more specialised treatment they use the health centre located in Fier City. The main hospital in the area is located in Fier City.

When asked if any from the household members suffer from chronic illness, only 46.2% reported illness within the family members. Some of the families even have multiple cases. The most common disease reported is hypertension (high blood pressure). This is a typical disease for the elderly. In the area, 56.8% of the families have at least one-member suffering from hypertension (high blood pressure). However, only 6.3% of the respondents reported to have a family member with disabilities.

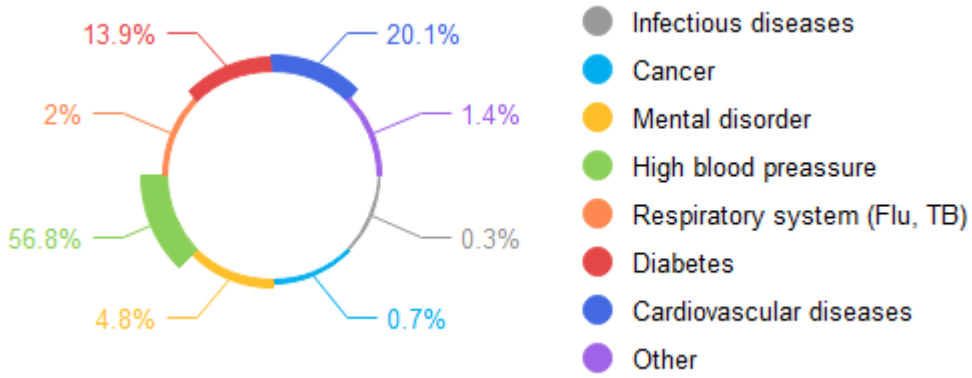
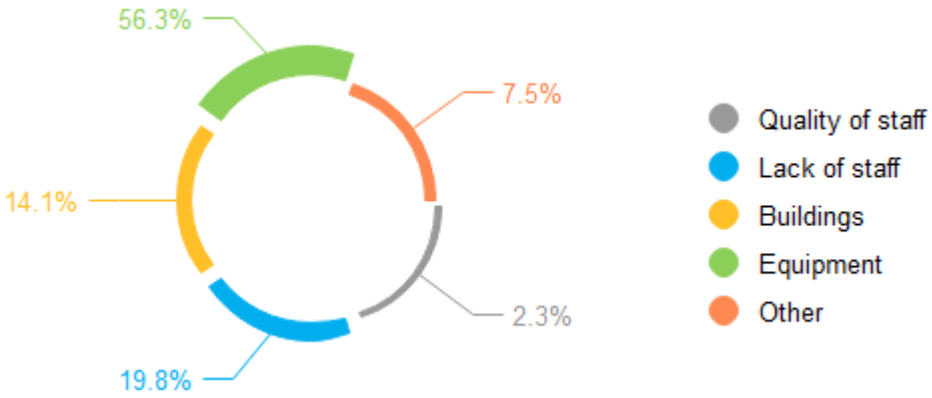


Figure 157. Type of illness of the family members[105]

Among the problems from which health services are suffering, state of the building is the most serious. The majority of the respondents 56.3% reported lack of equipment and other 19.8% lack of staff as the main problems faced with health service. Other 14.1% refer to the state of building and as the most urgent problem. It is indeed a problem in the entire country, as most of the medical staff is concentrated in the capital and bigger cities and the Ministry of Health and Social Support is conducting a campaign to proportionally spread the doctors. However, not all new doctors choose to serve in their cities and villages of origin after graduating and there's also a massive loss of medical staff due to emigration. The respondents had more than one possibility of choice regarding the issues related to the Health Care system in the area.



[104] Source – Socio Economic Survey
[105] Source – Socio Economic Survey

Figure 158. Health Care Issues according to Survey[106]

4.3.9. Gender Analysis

Gender issue are common all over in Albania, although the situation is gradually, albeit slowly, improving. For this survey, the interviewers created a scenario based on the prevailing Albanian culture of the area, where the man is considered to be the head of the family, or as is classified in the survey "the main income provider". The interviewed sample consists overwhelmingly of men. Of the interviewed sample, 90.3% of heads of families were men and only 9.7% women. Women are the main income contributor only when they are widowed or divorced. In those cases, parents or parents in law living with them are pensioners, which places them in the position of being head of the family.

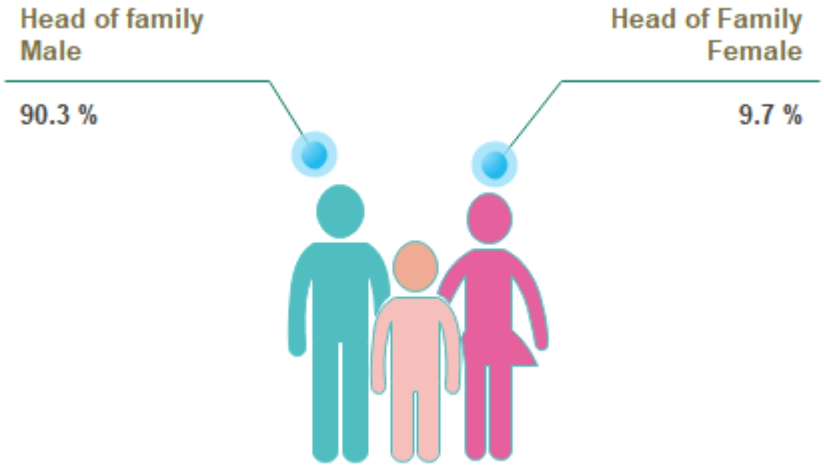


Figure 159. Head of household by gender[107]

The graph below shows the marital status of the respondents. It can be noticed that instances of divorces are low but have grown consistently in the past years, especially in big cities like Tirana, Durrës and Vlorë, while in smaller cities or remote areas they still rare.

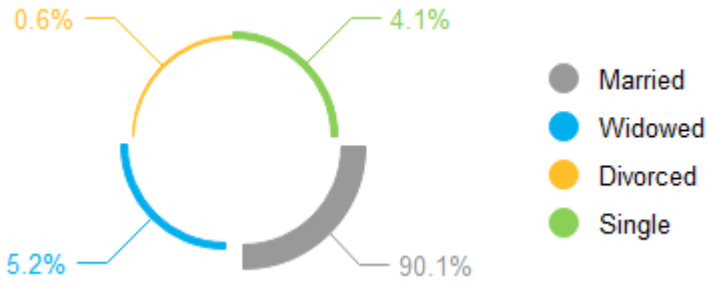


Figure 160. Marital status of the respondents[108]

Education

For what concerns the educational participation by gender in the education cycles, indicates the existence of gender differences at various education levels.

Participation in the upper secondary education is higher for men than women, namely 96.8 % and 90.1 %, whereas the ratio for higher education is rather reversed, as the participation scores higher for women 71.9 % than men 46.7 %. The ratio of men attending pre-university education is higher compared to women, whereas 60.4 % of students in higher education are women. The number of graduates from higher education

[106] Source – Socio Economic Survey
[107] Source – Socio Economic Survey
[108] Source – Socio Economic Survey

in the academic year 2019-20 amounted to 33 thousand students, of whom 65.3 % were women. Fields of study women graduate the most are business, administration, and law (28.4%); health and wellbeing (16.3 %); arts, and humanities (13.0 %)[109]. These data indicate that women attend and frequent higher education more than men, which tend to start working after completion of the secondary degree.

Employment and Economy

Due to cultural and religious reasons, women were usually considered as 'those who have to take care of the family" but this is gradually changing. At the household level, women tend to contribute more to income sources from pension and social protection funds, while their male counterparts tend to contribute more to income sources from agriculture, self-employment, and salaried employment. Women's status in Albania remains somewhat marginalised. The primary issue facing rural women is a lack of economic empowerment, resulting from traditional custom, and having limited access to employment and income-generating opportunities, a lack of skills training, and a general detachment from economic development.

According to the INSTSAT labour force survey in 2021, women are less likely to participate in the labour market. In terms of the population aged 15-64, the participation of women in the labor force has decreased in 2020, with 61.2 % from 61.6 % compared to 2019. According to the causes of inactivity, women remain out of the labour force mostly because they are busy with unpaid work at home (18.8 %), or are attending school (20.9 %)[110]. The trend of the unpaid work at home for women is sustained also in the PA, especially because women are also committed to light agricultural works and have the tendency not to declare this work as occupation.

Regarding the gender pay gap (GPG) in Albania it was attested at 6.6 % in 2021. Compared to the previous year, in 2020 there is a decrease of the gender pay gap by 3.5 percentage points. During the same year, the sector with the highest GPG, namely 24.9 %, is the Manufacturing sector, while the economic sector with the lowest GPG is construction, by -5.9 %. Viewed from the main groups and professions perspective, the GPG is the highest for Craftsmen and equipment and machinery monitoring employees, by 22.9 %. The lowest GPG is noted for the Armed Forces, by 2.5 %[111]. The gender ratio for rural pension beneficiaries is significantly high for women, with a total of 66.5 %.

In the PA women contribute mainly in agriculture activities and as housewives, but in the recent years they contribute significantly to the incomes of the family and they are employed also in private activities, usually in clothing and garment manufacturing, but also in leadership roles inside the communities, such as in the administrative units, school principal or other. Their contribution in agriculture activities is mainly based in light works.

During the interviews with key informants, it was declared that the role of women and their contribution in agriculture activities has changed through the years. Women have a more active role in the family and community, although men continue to hold some of the key leading roles inside the communities.

Land and Compensation

Despite some positive changes, land ownership still remains an issue for Albanian women. Only in very rare occasions do women own a piece of land or house, and this also due to the Law 7501 for the distribution of land in 1991 after the fall of the communist system that nominally distributed the land to the head of the families, which were considered men at the period when this Law entered into force. Only when their husband has passed away or due to inheritance law, do they become the first beneficiary and will then pass ownership onto their children, usually male. This puts them in a vulnerable position when it comes to compensation of land and assets in relation to projects being developed. The same situation is presented also in the PA, where vomen own land only in cases where their husband has passed away or due to inheritance.

[109] http://www.instat.gov.al/en/themes/demography-and-social-indicators/gender-equality/publication/2021/women-and-men-in-albania-2021/

[110] http://www.instat.gov.al/en/themes/demography-and-social-indicators/gender-equality/publication/2021/women-and-men-in-albania-2021/

[111] http://www.instat.gov.al/en/themes/demography-and-social-indicators/gender-equality/publication/2021/women-and-men-in-albania-2021/

Their income is likely to be more impacted than men due to the fact that the compensation of assets and crops deriving from the project will be given to the owners/users of the land, which are usually men.

4.3.9.1. Gender based violence and harassment

Violence against women and girls is a human right violation. It occurs in various forms, such as physical, sexual, psychological, and economical.

GBVH disproportionately affects women and girls across their lifespan and takes many forms, including sexual, physical, and psychological abuse.

In recent years Albania has improved the status of women and promoted gender equality. However, the country still faces many challenges in terms of fully displaying and utilizing the women's potential in the labour market and economy, increasing participation in decision-making and eradicating the widespread violence against women, particularly in the family realm. In addition, the country still needs to strengthen its legislative and institutional framework pertaining to gender equality and non-discrimination, improve monitoring and accountability of public offices towards women as well as ensure gender mainstreaming in public policies.

More than half of Albanian women and girls aged 15-74 years old have experienced one or more of the five different types of violence (intimate partner violence, dating violence, non-partner violence, sexual harassment and/or stalking), during their lifetime, according to an INSTAT survey conducted in 2018 in Albania, which included a total of 3443 households with 396 households interviewed in the district of Fier or 11.5% of the total households interviewed.

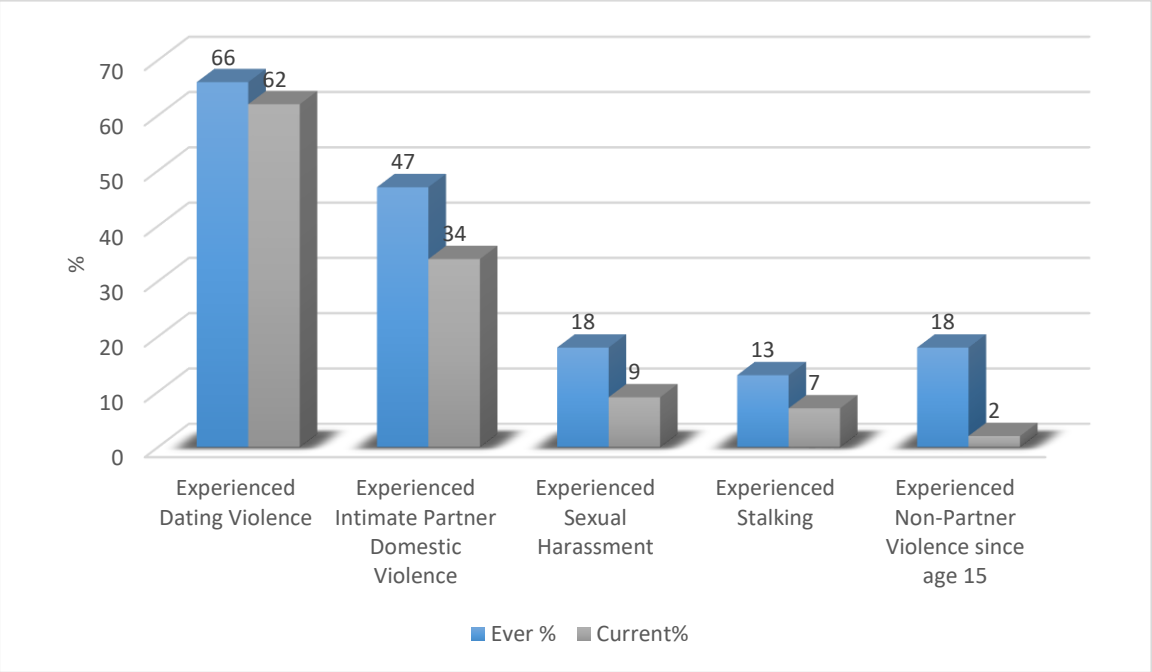


Figure 161. Experienced type of violence

Instead, the most common type of domestic violence is controlling behaviour. About 41 percent of the women have ever experienced it, and about 25 percent currently do. Some women are also restricted by their intimate partners or forbidden to meet with their friends (about 17 % ever, 11 % current) and being controlled by husbands/partners wanting to know where they are at all times (about 17 % ever, 13 % current)[112].

The second most common type of domestic violence is psychological violence. About 31 percent of the women have ever experienced it and about 20 percent currently do. The third most common type of

[112] http://www.instat.gov.al/en/statistical-literacy/violence-against-women-and-girls-in-albania/

domestic violence is physical violence. 18 % of women aged 18-74 have ever experienced it and about 7% are currently experience one or more of the 11 different types of physical violence in their marriage or intimate relationships. Also, there were 9 % of the women that in their lifetime experienced sexual violence by an intimate partner and about 4 % experience sexual violence currently[113].

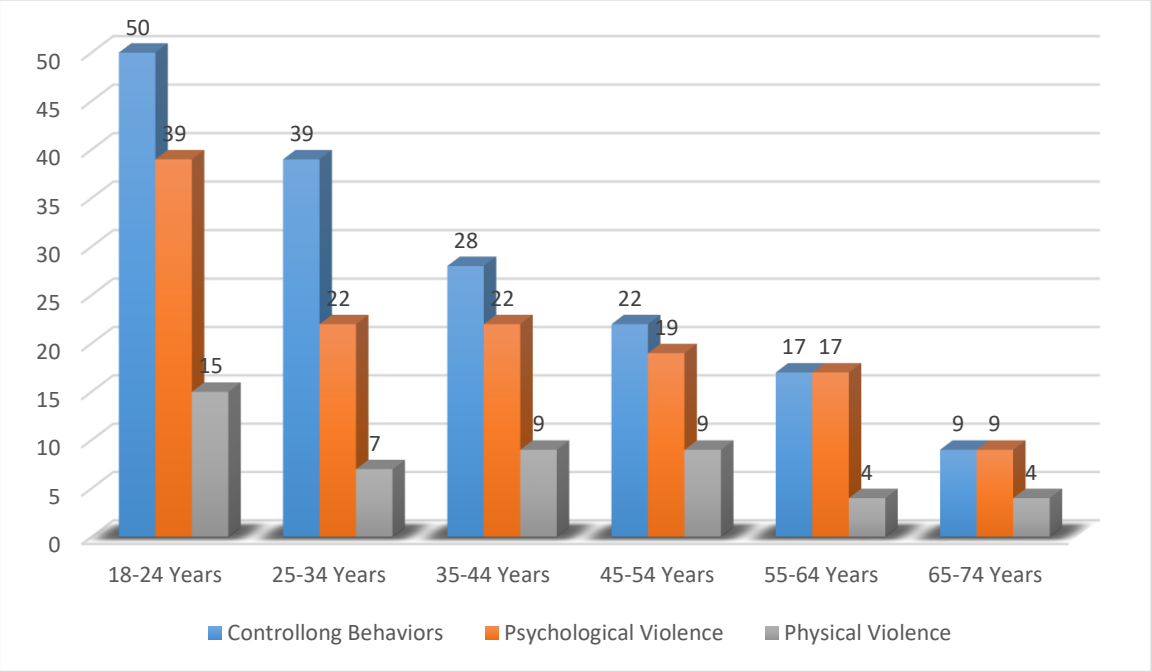


Figure 162. Type of domestic violence

Probably, in the rural areas, the above data might be even higher but due to isolation and cultural background, the data might be underreported.

4.3.10. Even if some forms of women discrimination (such as marriage without their consent) are not present anymore, much has to be achieved in order to reach gender parity. Community Security

Security and crime in the rural areas in Albania is usually much lower than that of the urban areas. This is mostly due to smaller communities and stronger relationship between community members than those of towns and bigger cities.

During the key informant interviews, there were reported in the 3 Administrative Units in the PA, 3 cases of protection orders for women due to domestic violence of their respective partners. The interviewers added that these were sporadic cases in their area and refers to all reported cases in the last 5 years.

During the same KII, the respondents declared that there were not reported cases of crime and security issues in the area. In addition, in relation also to other projects being developed or developed in the past in the same area, like the TAP project, there were not reported cases of crimes or security issues.

4.3.11. Vulnerable Groups and Individuals

Vulnerable groups include people who, by virtue of gender, ethnicity, age, physical or mental disability, economic disadvantage or social status may be more adversely affected by a project than others, and who may be limited in their ability to take advantage of a project's development benefits. The vulnerability of

[113] http://www.instat.gov.al/en/statistical-literacy/violence-against-women-and-girls-in-albania/

these groups is also based on a lack of opportunities granted, to participate in local decision-making, as well as on their economic vulnerability.

The social security system in Albania provides assistance to the most vulnerable families. However, the social security system has a more restrictive evaluation system than the one applied in this survey. As reported by the survey, 3.8% of the families receive social assistance. These are typically families with members that have certain invalidity, or families that have no means of income at all.

Furthermore, in evaluating the vulnerability in this methodology, the marital status of the women head of the family is taken into consideration. 5.49% of the women respondents are widowed. Being a widow and head of a family is certainly not easy in these villages considering the difficult living conditions and the heavy labour agricultural activity.

The graph below presents the percentage of households interviewed during the socio-economic survey which fit within the description of economically or socially disadvantaged households, which may most likely be adversely affected by the Project.

The highest number of vulnerable families are those who rely on agriculture activities and the ones where the incomes are up to 15,000 ALL. The percentage cannot be summarised since some of the families might fit in more than one category.

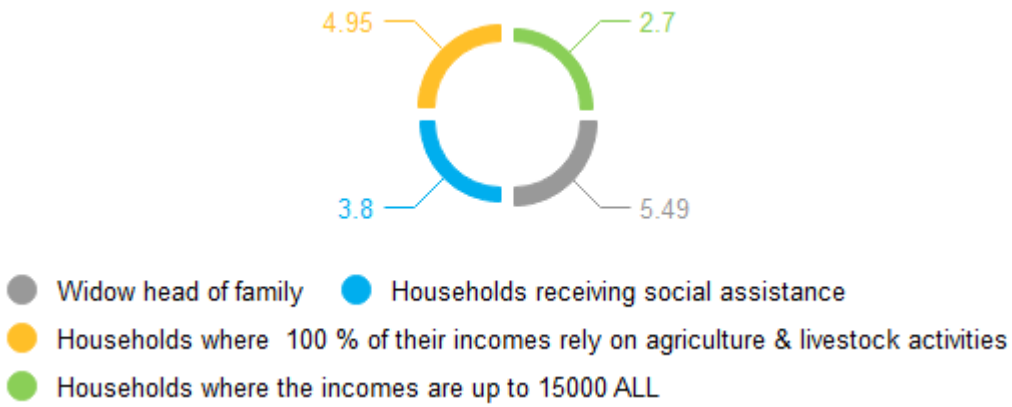


Figure 163. Vulnerability category[114]

Vulnerable people may be more adversely affected by the land acquisition process than others and who may be limited in their ability to claim or take advantage of compensation. In the context, the project especially for the land acquisition for the OHL, in evaluating the vulnerable people shall include but not limited to;

- Disabled persons, whether mentally or physically
- The elderly, particularly when live alone and/or have no networks of solidarity to support them;
- Households whose heads are female and who live with limited resources
- Households who have no or limited resources
- Widows and orphans
- Households who are affected by the Project but whose ownership rights are not registered or otherwise supported by documentation, thereby putting them at risk of not receiving compensation (this may include informal tenants and sharecroppers, and other occupiers with no legal recognition).
- Children residing in buildings along access roads or routes passing near local schools.

The screening and identification of the vulnerable people in terms of land acquisition have been defined in the Livelihood Restoration Plan (LRP).

[114] Source – Socio Economic Survey

4.3.11.1. Main Problems faced by Household and Communities

The overall estimation of the family's general situation is that most of the families in the area are living in similar conditions. 62.7% of the families report an overall perception of their status as similar to their neighbouring families. 18.4% of the families feel better or much better than their neighbours, while 18.9% of them perceive their family status worse or much worse than others' in their respective villages.

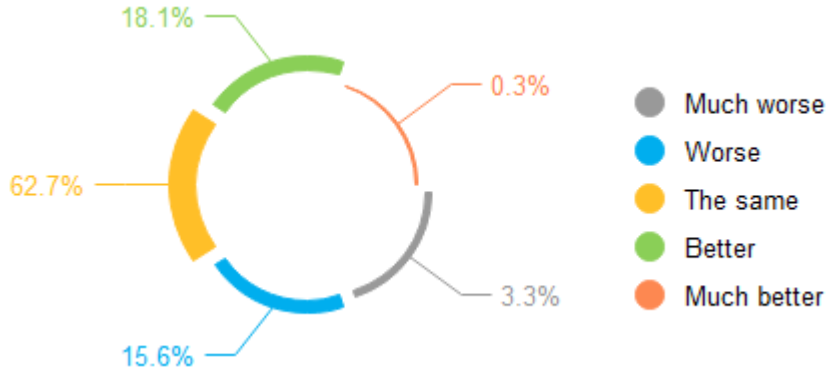


Figure 164. Living conditions[115]

The biggest issues the families residing in the area are facing, mostly relate to unemployment problems and economic issues. The percentage of the respondents reporting these problems is 35.5% and 45.9% respectively which are related to low income which leads to economic difficulties. Another problem within the resident families in the area is related to health service conditions.

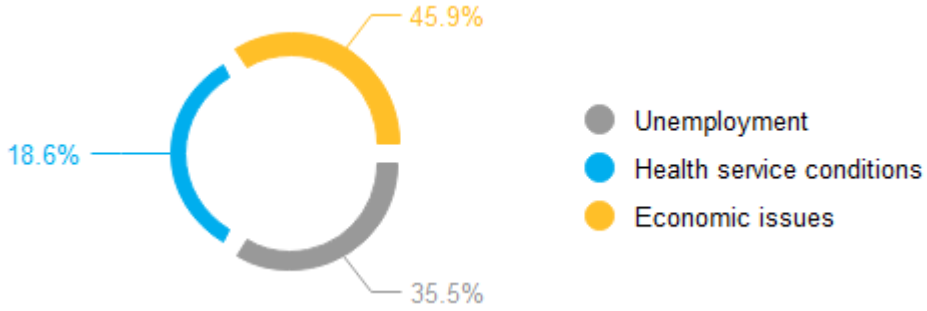


Figure 165. Main issues facing[116]

- These issues are also reflected when the respondents were asked about the greatest community challenges and/ or needs in the area. As shown in the graph below employment is one of the key issues with 17.2%. Also as mentioned in section above drinking water is reported to be one of the greatest community issues in the area which is ranked as the most urgent need 20.5%, followed by sanitation 15.8% and electricity 15.2%.

[115] Source – Socio Economic Survey
[116] Source – Socio Economic Survey

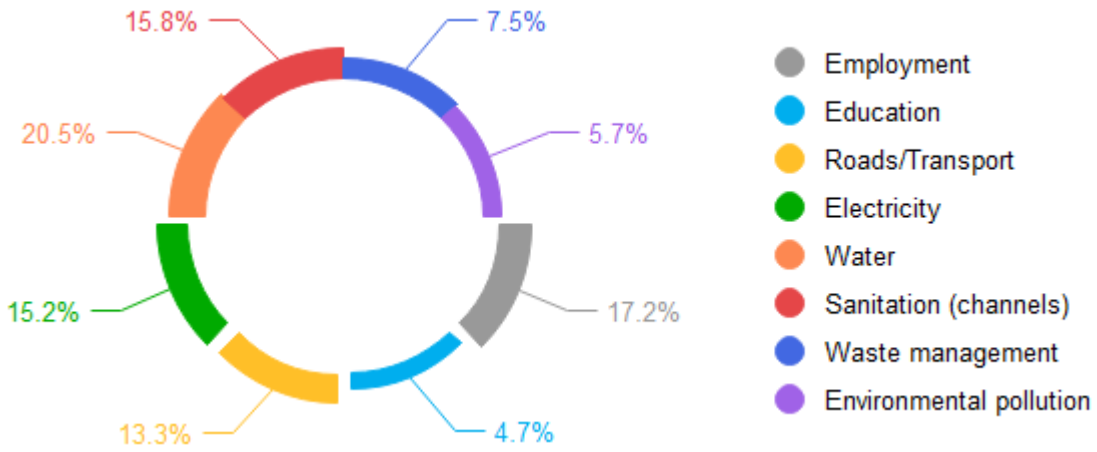


Figure 166. Greatest community challenges/needs[117]

4.3.12. Main Findings

Table 49. Summary of main findings

Main Findings	
Population and demography	The population within the study area has been declining during the last 10 years. This phenomenon is widespread throughout Albania where the inhabitants of rural areas have moved to larger cities or have migrated abroad. This can be noticed comparing the resident population registered during the 2011 Census and the civil register of the same year. Another important phenomenon is the migration of young people due to lack of employment opportunities.
Land use and natural resources including agriculture, fishing, livestock, grazing	The project area is characterized by a uniformly flat landscape with the absence of significant woodland or scrub cover. The land use is the broader Project area is almost completely dominated by crops, which present as a characteristic patchwork of rectangular fields. The area mostly planted with olives is in the hills of the village of Radostinë, Vadhiz and Zhupan that are affected by the OHL. Parcels of land are also used for pasture by the farmers in the area due to the difficulty of planting crops in salty areas. The PV plant project site itself is mostly saline. However, the farmers reported that a small portion of the land (nearly 2-3 Ha) is used for cultivating wheat and crops for animal grazing. These farmers are users of this land, which is state owned. Being quite exclusively cultivated with annual crops, the farmers harvest in the period of May-June, so it is preferable for the Project to allow the harvesting of these crops in June into consideration. Agriculture and livestock activities are the main employment sector and main source of incomes. The most cultivated plants are the annual crops especially, wheat, maize and vegetables but also alfalfa used as animal feed. In general, agricultural products are both for personal use and for sale. The products are sold to the middleman due to the lack of markets. Being a rural area, most families in the villages have livestock. The most widespread animals are cows,

[117] Source – Socio Economic Survey

Main Findings	
	goats, chickens and sheep. Residents have reported that the products are used for personal use and very few of them generate income from this activity.
Other economic activities e.g., sand quarrying, tourism, trade, services;	No business activities have been identified within the direct project area footprint. Also, from the interviews conducted with key informants, there are no tourism activities in the project area, including daily tourists. Trading activities are generally small shops, and coffee bars, located in the main villages. Only one inhabitant mentioned that sometimes the PDA is used by residents to access the beach, nevertheless, this is not confirmed during other interviews and consultations. Residents use the existing asphalted road to reach the nearest beach, which is not frequented by the non-resident population or tourists. The nearest touristic sites and frequented beaches in the area are those of Karavasta Lagoon and the beach of Darzezë, both situated nearly 7 km from the PA.
Social infrastructure and services including education, health, communication, others;	The road infrastructure is relatively good except the road that connects the villages of Ndërnenas and Hasturkas with the coast line that is in very bad conditions and difficult to drive. This is one of the main issues raised by the local community. The access roads to the PV solar plant are also in bad conditions, in particular during rainfall seasons. Road infrastructure of the area affected by the OHL is generally in good conditions. The OHL route encompasses through a large surface area of lands and residential area. Some of the tower locations, in particular after tower 31 up to the end of the OHL route, are situated close to the highway of Fier, or overpassing through residential buildings and/or greenhouses (for further details please refer to section 4.3.6.4). Drinking water coming from the water supply is reported by the local residents to be unsafe and not used for drinking purposes. In most of the villages there is primary and secondary schools, while the high schools are located in the bigger villages where the Administrative Units are located. Health centres provide basic first aid services. Most of them lack staff and equipment. The hospital is located in Fier City.
Vulnerable groups and poverty situation; gender aspects;	It is observed that women are the main income contributor only when they are widowed or divorced. Parents or parents in law living with them are pensioners which, places them in the position of being head of the family. Women take care of children and the house. 5.49% of the women respondents are widowed. A significant percentage are those who rely on agriculture and livestock activities and the ones where the incomes are up to 15000 ALL.
Public, private and governmental properties, infrastructure, industries and	There are no industrial activities in the area. All the infrastructures including the religious buildings are identified and reported with the relevant maps attached to this report.

Main Findings	
places of religious and cultural importance.	

4.4. Ecosystem Services

4.4.1. Introduction

This section presents the identification, and screening of ecosystem services associated with the construction and operational phases of the Karavasta Solar Project and summarises the results of the separate ecosystem services assessment report. This report is presented in **Error! Reference source not found.**

4.4.2. Identification of Ecosystem Services

The ecosystem services identification process included as follows:

- Desk-based review of existing information
- Meetings with the SRA team completing the LRP
- Site visits in December 2021 during the socio-economic survey
- Consultation with stakeholders during the June 2022 ESIA disclosure meetings

A total of five ecosystem services have been identified and are summarised in Table 50 to Table 51. The relationship between ecosystems, services, benefits and beneficiaries is provided in Figure 167 lists those ecosystems services that are considered as not applicable to the Karavasta Solar Project.

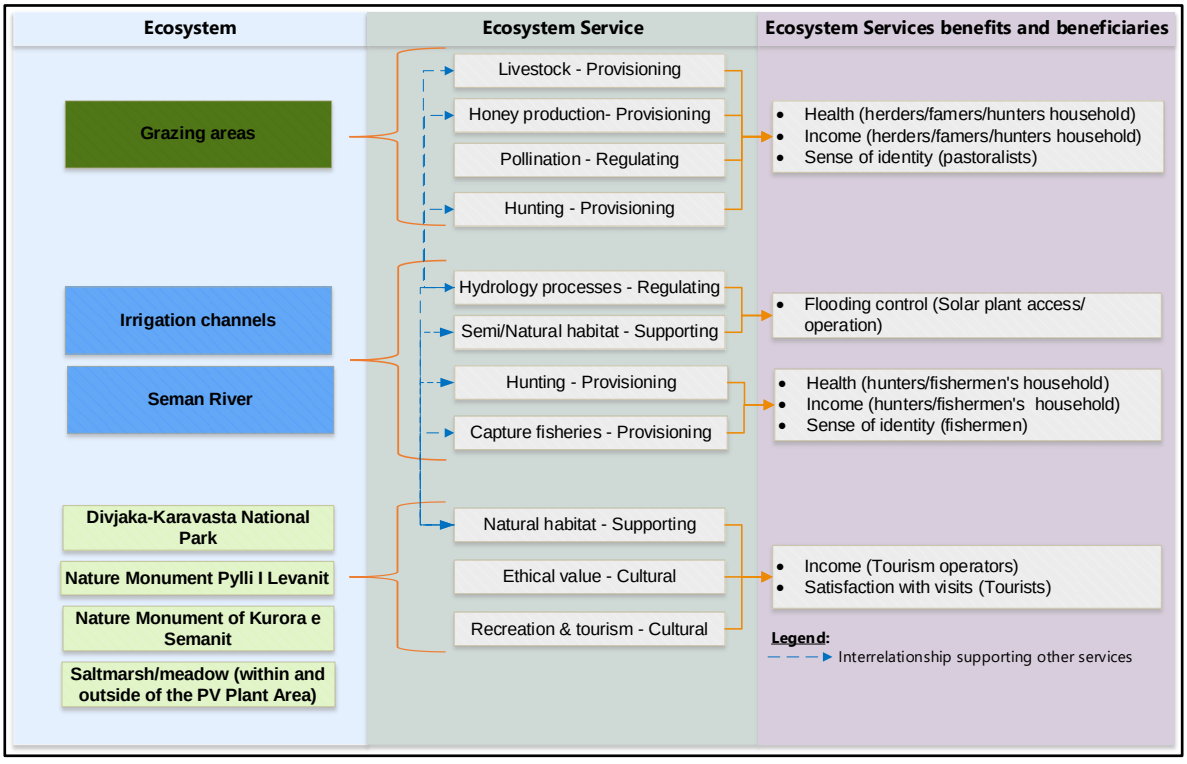


Figure 167. Ecosystems Services Relationships

Table 50. Karavasta Solar Project Provisioning Ecosystem Services

Name and Type	Summary
Livestock Type I impact – may adversely affect communities	The ESIA socio-economic survey reported that 71% of the households owned livestock, LRP household survey the number was lower; 45% of the surveyed households owned livestock. The most common livestock during the LRP household survey were chickens and cows. The ESIA socio-economic survey and the LRP household survey reported that between 50-41% of the household residents use of livestock products for subsistence purposes. Herder dwellings with livestock for non-subsistence purposes are more numerous within the Seman river area near the plant area and between OHL towers 1-10 where there is less intensive arable agriculture and better access to available grazing land. The PV Plant land is state owned with no currently enforced access restrictions and provides poor quality available grazing. In order to minimise disturbance, continued access will be assured for informal grazing to areas in the vicinity of the Plant Site. Following construction, access to the plant site for grazing of sheep will also be facilitated. This is aligned with standard practice, as grazing of sheep is normally used in PV Plant Sites to prevent grass and other plants from obstructing solar panels. The Project will engage with herders in advance to ensure grazing activities are carried out in a safe way. Access routes will be established in order to maintain passage around/through the PV Plant Area. The PV Plant land is within a larger area of similar if not better grazing potential.
Honey production, apiculture Type I impact – may adversely affect communities	In the LRP socio-economic survey and the ESIA socioeconomic survey no participants reported participating in apiculture. A total of five households were confirmed in participating in apiculture via the ecosystem services assessment site visit in December 2021 and ESIA disclosure meetings in the June 2022. All five households were located within 1km of the PV plant area and the number of beehives ranged from three to ten for four of the households and used for personal consumption. One household reported as having 120 beehives and generates income from the activity. The PV Plant Area includes saltmarsh / meadow, which are also extensively found in the surrounding area. Saltmarsh / meadow is a recognised foraging habitat for pollinators including honeybees (Ref. 6). It is assumed that vegetation cover within the PV Plant after construction phase clearing will re-establish however the impact of solar panel shade and livestock grazing will influence the extent and type of vegetation re-establishment and slow or alter revegetation.
Capture fisheries	During the ESIA socioeconomic survey, one household reported fishing as an activity for household subsistence purposes only. During the LRP household survey none of the households reported fishing activity.

Name and Type	Summary
Type I impact – may adversely affect communities	During the ecosystem services site assessment in December 2021, evidence of fishing activity was observed in many of the irrigation channels and natural water courses including the Seman river and the Ujitja / Hoxhara drainage channel outside of the PV Plant. In addition, fishing along the coastline occurs, with the PV Plant Site being used for access to the beach as well as other alternative access tracks. During the ESIA disclosure meeting engagement, in June 2022, a single fisherman was identified and engagement confirmed fishing was exclusively for subsistence purposes to support his primary vocation, farming. Irrigation channels within the PV Plant are connected to the surrounding extensive network of channels that extend over a significantly larger area. Alternative access to the beach area will be available throughout the project and access restrictions will be avoided. Voltalia have committed externally (within the LRP) to improve the existing access road to the east of the PV Plant, which will allow access to the coast and lagoon.
Hunting Type I impact – may adversely affect communities	During the ESIA stakeholder engagement and LRP household survey no households report as participating in hunting. Evidence of hunting has been observed less than 5km to the south-west of the PV Plant Area, along the OHL route between towers 7 and 9, and it is assumed that hunting will occur within the Project Area of Influence. The PV Plant Area habitat is not unique or of materially better quality than the surrounding habitat for commonly hunted waterfowl or brown hare. For waterfowl there is a far better-quality habitat outside of the Project Area of Influence with extensive wetland areas.

Table 51. Karavasta Solar Project Regulating Ecosystem Services

Name	Summary
Pollination Type I impact – may adversely affect communities	The PV Plant Area includes saltmarsh / meadow, which are also extensively found in the surrounding area. Saltmarsh /meadow is a recognised foraging habitat for pollinators including honeybees (Ref. 6). It is assumed that vegetation cover within the PV Plant after construction phase clearing will re-establish however the impact of solar panel shade and livestock grazing will influence the extent and type of vegetation re-establishment and slow or alter revegetation. There is limited information on the cultivated crop types in the vicinity of the PV Plant, the LRP socio-economic survey provides information on the OHL route. Assuming the LRP socio-economic survey is representative for the area surrounding the PV Plant, the dominance of alfalfa, a recognised agroecological crop, that supports pollinators and the limited extent of fruit trees indicate that the surrounding cultivated land would provide viable pollinator foraging habitat.

Name	Summary
Hydrology processes Type II service: Operation dependent on service provision	The PV Plant is situated within a significantly larger area with extensive, poorly maintained irrigation channels. The whole area is at risk from a number of different flood events, caused by the Seman river, drainage channel flooding, or surface flooding during intense rainfall.

Table 52. Karavasta Solar Project Cultural Ecosystem Services

Name	Summary
Ethical/ Recreational and tourism Type I impact – may adversely affect service	There is a limited amount of information on the extent of the ethical and spiritual importance of ecosystems within the Project Area of Influence and the assessment will focus on recreational and tourism aspects. The most important cultural ecosystem services within the Project Area of Influence are the three protected areas described in Section 4.3. The three protected areas have varying levels of enforcement with the Divjaka-Karavasta National Park being the largest, most mature and well established with hotels, beach facilities and Park visitor centre, 7-15 km to the north of the PV Plant. The two other protected areas within the Project Area of Influence (The Kurora e Semanit Nature Monument less than 3 km to the east of the OHL and the Pylli I Levanit Nature Managed Reserve 2 km south-west of the OHL) do attract tourist but there is no potential impacts from planned construction or operational activities as they are over 2 km from the OHL and access through/adjacent to the Protected areas to support Karavasta Solar Project construction or operation is not required.

Table 53. Karavasta Solar Project Supporting Ecosystem Services

Name	Summary
Semi and Natural Habitat Type I impact – may adversely affect service	Within the PV Plant Area saltmarsh / meadow habitat is present due to the decline in agricultural practices and maintenance of the irrigation channels. Saltmarsh / meadow is also present in the wider Project Area of Influence that supports a variety of natural and semi natural habitats including forest areas, riparian habitat, aquatic habitat and coastal habitats approximately 4km to the west of the PV Plant. The PV Plant has a very small direct interface with the Divjaka-Karavasta National Park boundary (1 km). The Divjaka-Karavasta National Park covers an area of over 22,230 Ha. This section of the Park is a mixture of

Name	Summary
	actively or abandoned cultivated land or riparian habitat. The most ecological important parts of the Park are 7-15 km from the PV Plant. The OHL tower locations avoid the Seman river riparian natural habitat and are located in cultivated land.

4.4.3. Screening of Ecosystem Services

To select ecosystem services that qualify full assessment process, a screening process was undertaken via discussions with the team working on the LRP and from the December 2021 site visits. Those ecosystem services that are considered to benefit from further assessment are listed in Table 54.

Table 54. Karavasta Solar Project construction and operation ecosystem services requiring full impact assessment

Name	Type	Justification
Livestock: Provisioning	Type I: Impacts on such services may adversely affect communities	Due to the extent of household reliance on livestock and potential restrictions to grazing within the PV Plant Area during construction and to a lesser degree during the operational phase. Noting grazing will be allowed to the extent possible and access restrictions will be mitigated by alternative access being provided.
Honey production: Provisioning Pollination: Regulating		On a precautionary basis as five households were located within 1km of the PV plant area.
Natural Habitat: Supporting		On a precautionary basis as the PV Plant is adjacent to the Divjaka-Karavasta National Park and within its hydrological catchment and within the vicinity of the Seman river.
Recreational and tourism: Cultural		On a precautionary basis and only for the Divjaka-Karavasta National Park, as PV Plant is adjacent to the Park.
Hydrology processes: Regulating	Type II: Operation dependent on service provision	Due to the dynamic flood risk in the surrounding area, and fragility of the drainage network as a result of poor maintenance. Improvements to the drainage network within the PV Plant will reduce flood risk in the operations phase.

The following ecosystem services have been screened out of the further assessment process are listed in Table 55 and include:

- Ecosystem services which the Karavasta Solar Project has very limited interaction with
- Ecosystem services for which there is an absence of potential impact mechanisms to the associated beneficiaries
- Ecosystem services for which the supply is considered to be extensive and not at risk of fragmentation within the surrounding area.

Table 55. Karavasta Solar Project construction and operation ecosystem services NOT requiring full assessment

Name	Type	Justification
Capture fisheries: Provisioning	Type I: Impacts on such services may adversely affect communities	The absence of planned construction within or directly adjacent to the Seman river. Fishing has not been observed within the PV Plant and not considered to provide suitable locations. PV Plant construction and operation will improve drainage channel function and supply of water downstream. All of the engagement activities completed to date have identified two households participating in fishing.
Hunting: Provisioning		No reports of households participating in hunting within the PV Plant Access restrictions during construction and operation of the PV Plant will be mitigated by alternative access being provided. Voltalia have committed externally (within the LRP) to improve the existing access road to the east of the PV Plant, which will allow access to the coast and lagoon.

4.4.4. Summary

Following implementation of the ecosystem's services assessment methodology, six services were selected for a more detailed assessment:

- Livestock
- Honey production and Pollination – combined assessment completed
- Hydrology processes
- Recreational and tourism
- Semi and natural habitat.

A summary of the overall impact score is provided below:

- Livestock – Minor
- Honey production and Pollination – combined assessment completed – Negligible
- Hydrology processes - Negligible
- Recreational and tourism - Negligible
- Semi and natural habitat - Minior

None of the Type I ecosystem services value or functionality are at risk from the construction or operation of the Karavasta Solar Project and associated impacts are not considered as significant. No Type 1 ecosystem services qualify as priority as per the IFC Guidance Note 6 (Ref. 3).

As described in Ecosystem Service Assessment, there is potential to create a positive impact to hydrology processes, through rehabilitation and regular maintenance of the PV Plant area drainage that is currently poorly maintained. Therefore, hydrology processes are not considered a priority service.

4.4.5. Archaeological and Cultural Heritage

Based on the published literature and the existing data within the municipality of the Divjakë, the following main areas of important archaeological findings, architectural remains, and other Cultural Heritage assets near PDA and OHL route were identified:

- Divjaka - In the hilly area of Divjaka, numerous archaeological objects dating to the Stone Age have been discovered. Based on the archaeological evidence, the area has been used as a settlement since the Stone Age, by the Illyrian tribes and during the middle Ages.
- Karavasta – A village in the municipality of Divjaka originates from the ancient Greek name, which means harbour. It is also mentioned in the Turkish document of 1431, as a very good marine moorage.
- Babunja - A village in the municipality of Divjaka, located south of the Karatoprak hills, on the right side of the old Seman River bed.
- Çermë e Sipërme - A village in the municipality of Divjaka, located on the left side of the lower reaches of the Shkumbin River, 15 km from the city. Archaeological objects and a cemetery dating to the Illyrian period have been discovered near the village, which testify to this area as a settlement since the II-IV century. It has been mentioned by this name since 1582.
- Gërmenj - A village in the municipality of Divjaka, which is bordered on the south by the village of Hallvaxhias and the village of Bregas.
- *Kulla e Pirgut* - First Category Monument - There is no information regarding its construction, use, and period. Nowadays, there are no signs of Kulla and it is turned into stables that are used for animals.
- *Kryegjata Necropolis* - First Category Monument - The necropolis has not been excavated; therefore, information is limited. It believed that it dates to the archaic period. Additionally, the Kryegjata village is mentioned in various literature as an area with high archaeological significance, because apart the necropolis, during a systematic survey in 1998, in the valley of Shtyllas there were identified; a large Hellenistic site, a large Hellenistic and Roman archaeological site, and a high concentration of lithics that date to Middle and Upper Paleolithic, and Mesolithic period. Probably, these were used as open-air sites during these periods.
- *Apollonia Archaeological Park* – Apollonia is located 12 kilometres away from the city of Fier. Apollonia was founded in the early seventh century BC in the lands of the Illyrian Taulants. It was founded the Greek colonizers coming from Corinth. The first records of their presence are documented at about 620 BC. The city was named in his honour god Apollo. Among 24 cities all over the Mediterranean world bearing this name in Antiquity, Apollonia of Illyria was more important and played a major role as a trade intermediary between the Hellenes and the Illyrians. Apollonia was at that time a large and important city, near the river Aoos (Vjosa). Apollonia retained its grandeur even in the Roman period.
- After an earthquake in the III AD century, the river Aoos changes bed and detached the city from the sea. The detachment proved fatal in an era where all commercial activity took place in connection with the sea. The town gradually lost its economic importance becoming

a simple religious centre. Archaeologists call Apollonia Pompeii of Albania, as only 10% of the territory of the former city is discovered to date.

- The large territory covered with monuments, panoramas and magnificent landscapes over the plain of Myzeqe and the Sea Adriatic, a highway in fairly good condition, the position of geographically favourable near major cities and beaches south make the Apollonia Archaeological Park a destination of privileged for cultural tourism in Albania.
- The main monuments include: Temple B, the Archaic Agora, Acropolis, the Obelisk, the Theatre, the Agonothetes or Bouleuterion, Stoa, the Temple of Diana, Prytanea, Nymphaeum, etc.

The Figure 168 shows the location of the closest cultural heritage assets in relation to the PV Project site and along the OHL route. Further research will take place during the field work to identify archaeological and/or cultural heritage objects within the area of influence of the PV Project site and the transmission line route.

There is an orthodox church close to the site, Kisha "Ungjillëzimi Hyjëlindëses" in Hasturkas. The Orthodox church is 1.2 km from the site, but is not directly impacted upon by project activities.

The MoC, with support from UNESCO is in the process of creating a community-based Inventory of ICH in Albania with a view to safeguarding and transmitting to future generations. The MoC was also consulted for any ICH within the project environs and there were no known ICH activities such as oral traditions, performing arts, social practices, rituals, festive events, or any local knowledge and skills to produce any local traditional crafts. In addition, no ICH were identified or reported during KII interviews.

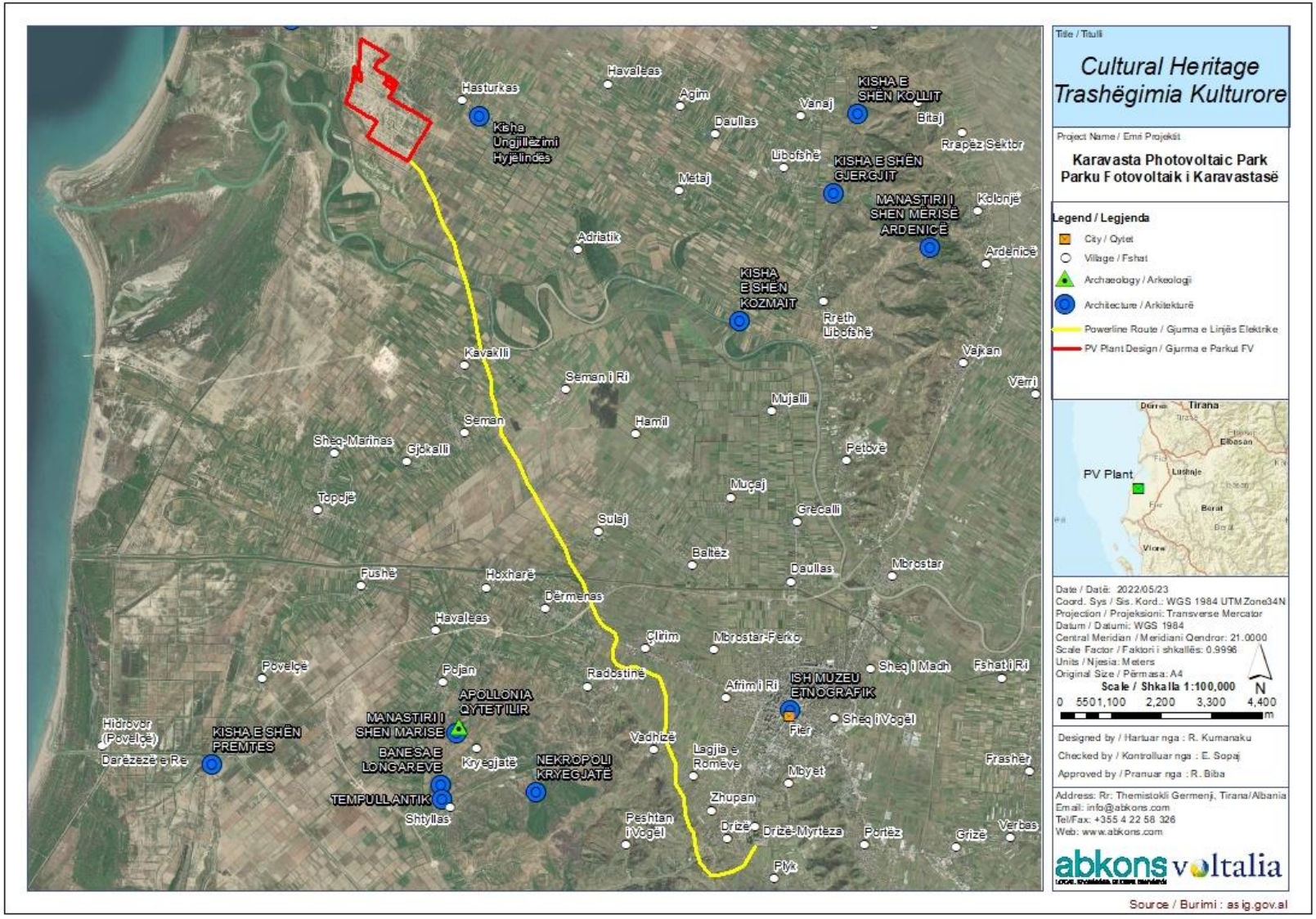


Figure 168 Cultural Heritage Map of the Project Area

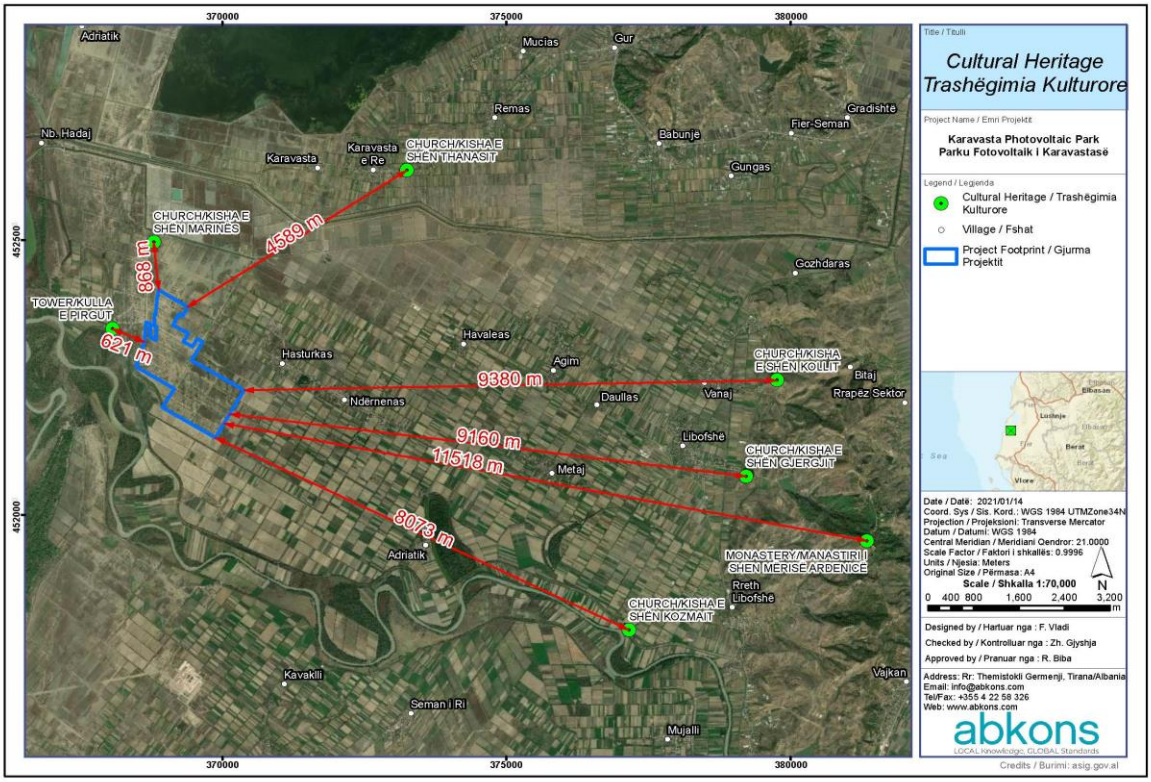


Figure 169. Map shows Cultural Heritage monuments in the region and distance to the project's area

4.5. Land Acquisition Process

According to the contractual agreement the land for the PV plant will be transferred from the Ministry of Infrastructure and Energy to Voltalia for the purpose of construction of the PV plant. The land ownership will not be transferred to Voltalia, but there is a long-term use agreement between Voltalia and the MIE. The ownership of the land will remain of the MIE.

Voltalia will support and facilitate the land acquisition process of OHL for OST. Voltalia will lead on the Voluntary Agreement Process, and the Expropriation Process will be also supported to ensure OST acquires the land for the Project. Voltalia will lead the compensation evaluation and payment on behalf of OST, but all transaction documents for land ownership transfer will be held by OST.

Based on the Compensation Framework and having due regard to national expropriation regulations and international standards and best practice, the following key steps will be followed in the Project land access and acquisition process.

- Preparation of Household Dossiers
- Preparation & Presentation of Offers
- Voluntary Agreement Process with Households
- Expropriation procedures
- Compensation Agreements
- Payment of Compensation
- Land Entry
- Land Exit & Handback.

However, the transmission line will have an impact on communities and their property, and may be necessary to implement an involuntary resettlement which could take the form of physical[118] or economical displacement.

The EBRD PR 5 (Performance Requirement 5; on Land Acquisition, Restrictions on Land Use and Resettlement) and IFC PS 5 Land Acquisition and Involuntary Resettlement defines "involuntary resettlement" as a case when affected persons or affected communities do not have the right to refuse land acquisition or restrictions on land use, other assets and natural resources, although compulsory acquisition should be used only as a last resort after a negotiated process.

According to the PR 5 the definitions are as follows:

- **Physical Displacement** includes cases when relocation is needed or when project causes loss of shelter and land, although no physical displacement has been identified as preqyured within the PDA or along the OHL.
- **Economic Displacement** includes all cases when PAP`s face loss of land; assets; restrictions on land use, assets and natural resources leading to loss of income sources or other means of livelihood. Livelihood refers to the full range of means that individuals, families and communities utilize to make a living, such as wages from employment; cash income earned through an enterprise or through sale of produce, goods, handicrafts or services; rental income from land or premises; income from a harvest or animal husbandry, share of a harvest (such as various sharecropping arrangements) or livestock production; self-produced goods or produce used for exchange or barter; self-consumed goods or produce; food, materials, fuel and goods for personal or household use or trade derived from natural or common resources; pensions and various types of government allowances.

For the purpose of the project, a Livelihood Restoration Plan (LRP) has been developed to manage the impacts on land acquisition and livelihood of the PAPs. The LRP sets out objectives, principles, eligibility criteria and mechanisms to compensate land and other assets. The plan also introduces public participation, identifies the beneficiaries of the compensation and provides the results of the consultations that accompanied its preparation. The LRP is based on a comprehensive diagnosis of the socio-economic context and social analysis within which Project Affected Persons (PAPs) operate. The LRP is focused on a culturally sensitive socio-legal and administrative environment, land management and ownership systems, matrix of rights provisions, compensation modalities and conflict resolution mechanisms.
Expropriation will be used when required if it results to be a better approach for the project to acquire the required licences and permits in time and in the same time results in increased benefits for the impacted households. In such case, the Project will ensure to provide fair and timely compensation to impacted households, in line with the IFC PS5 and EBRD PR 5.

Based on experience with the Voluntary Agreement Process to date, it is likely that almost all households will be unable to procure sufficient evidence of ownership or supporting documents required for the Voluntary Agreement, and as a result it is the intention of the Project to notify those households subject to voluntary agreement processes without sufficient ownership information that they will follow the expropriation process. This is critical in order to avoid delays in receiving permitting for project construction. However, in order not to disadvantage households subject to the voluntary agreement process, Voltalia will undertake Compensation Agreements with these households. This Agreement will undertake to provide households with the full compensation amount due for permanent land acquisition, at Project rates.

Temporary Land Access will be reached through a Declaration of Compensation for both land users and owners, and Take of Land into Temporary Use ('Temporary Expropriation') will be used when temporary expropriation of the land is required.

[118] No physical displacement expected

For both permanent land acquisition and temporary land access, an escrow account will be set up for unknown/absentee landowners to retain the compensation amounts for a period of 5 years from commencement of construction. Where owners come forward within that time period and can be verified compensation payments will be made from this account in line with the LRP.

Finally, temporary land acquisition refers to the temporary leasing of land during the construction period for a period of at least one year. The Project will lease two land parcels adjoining the PV Plant Site during the construction period. The Project will enter into a lease agreement with the owner at Project Rates.

5. Public Participation and Stakeholder Engagement

Stakeholder engagement is key to an effective project implementation. The stakeholder engagement process begins during the scoping phase and continues throughout the whole lifecycle of the Project. A "Stakeholder Engagement Plan" (SEP) has been developed as part the ESIA, and shall continue to be updated throughout the project where needed. The plan lays out a process for consultation and disclosure included the four stages as follows:

- ESIA Scoping phase;
- ESIA Study;
- ESIA Disclosure; and
- Project Execution (Construction and Operation).

Effective stakeholder engagement is a key requirement for ESIAs, and can still be crucial for fostering good relations and improving communication particularly around sensitive issues such as land acquisition. The ultimate objective is to achieve stakeholder 'buy-in' to the Project and can be a major step in the process to gaining and maintaining a 'social license to operate'.

5.1. Objectives

The stakeholder engagement process is designed to conform to both national and international standards, including the EBRD Performance Requirements and IFC Performance standards. For this Project, the key objectives for stakeholder engagement are:

- **Ensure Understanding**: An open, inclusive and transparent process of culturally appropriate engagement and communication will be undertaken to ensure that stakeholders are well informed about the proposed development. Information will be disclosed as early and as comprehensively as possible to ensure stakeholders understand the potentially significant E&S impacts of the Project;
- **Involve Stakeholders**: Stakeholders can assist in providing local knowledge to improve the understanding of the environmental and social context and better understand locally-important issues. Furthermore, they can help in developing effective mitigation measures and may have ideas on how to optimise local benefits that can be delivered through the Project;
- **Build Relationships**: Through supporting open dialogue, engagement can help to establish and maintain a social licence to operate;
- **Manage Expectations**: It is important to ensure that the proposed Project does not create or allow unrealistic expectations of Project benefits amongst local communities. The engagement process will serve as a mechanism for understanding and managing

stakeholder and community expectations, by disseminating accurate information in an accessible way.

Engagement with local communities and land users around loss of access to land and health and safety during construction will be of the most importance. It will also be necessary to inform local communities of construction works and increased traffic at peak construction times.

5.2. Stakeholder Identification

For the purposes of this Project, a stakeholder is defined as "any individual or group who is potentially affected by the Project or who has an interest in the Project and its potential impacts". The objective of stakeholder identification is therefore to establish which organizations and individuals may be directly or indirectly affected (positively and negatively) or have an interest in the Project. Stakeholder identification is an on-going process, requiring regular review and updating as the Project proceeds.

During the scoping phase was identified a list of project stakeholders. These stakeholders consist of individuals, groups, and organisations that may be affected by or may influence project development positively or negatively. The list was developed using international guidance of IFI and has considered the following groups:

- national, regional and local authorities;
- local community leaders;
- community members including vulnerable sub-groups such as women, farmers and elderly;
- national, regional and local environmental and social Nongovernment Organizations (NGOs).

The table below shows the list of stakeholders engaged during ESIA process.

Table 56: Identified Project Stakeholders

Stakeholders and Types	Interest and role in the project
National	
Ministry of Tourism and Environment (MTE)	Supervision of the ESIA procedure and approval of the ESIA report.
Ministry of Infrastructure and Energy (MEI)	The Ministry has a much broader responsibility as in addition to energy it includes transport, spatial planning and telecommunication, which is expected to facilitate coordination between sectors.
Ministry of Agriculture and Rural Development (MARD)	Ministry of Agriculture and Rural Development (MARD) is responsible for managing water resources, irrigation, drainage and flood protection. The Ministry coordinates priorities among different purposes and different users of water resources.
Ministry of Culture (MoC)	Protection and conservation of the National cultural heritage (shall be informed in chance findings during the construction activities). Provide information on cultural heritage in the project area.
National Environment Agency (NEA)	Supervision, implementation of the ESIA procedure and review and approval of the ESIA report. Supervision of the public engagement during the ESIA process.
National Territorial Planning Agency (NTPA)	National Territorial Planning Agency (NTPA) is a public institution responsible for spatial and urban planning, crucial steps in the development process for infrastructure projects, within MEI.

Stakeholders and Types	Interest and role in the project
National Agency for the Protected Areas (NAPA)	NAPA is a public body under the MTE, which is responsible for the management of protected areas.
National Agency of Natural Resources (NANR)	NANR, a subordinated agency under the MEI, has as scope of its work the development and supervision of rational use of natural resources, based on governmental policies.
National Institute of Cultural Heritage– (NICH) Ministry of Culture	Protection and conservation of the National cultural heritage; shall be informed of chance findings during the construction activities. Provide information on the cultural heritage in the project area.
Transmission System Operator (OST)	Manages the electricity transmission system in Albania.
Regional	
Regional Environmental Agency, Fier Region	Supervision and implementation of the public consultation process. Assist and publish the Public Hearing notice and the Non-Technical Summary (NTS) at its webpage (hosted at NEA website). Attend the Public Hearing process and report to NEA about the compliance of the project with public consultation procedure. This report is important for final decision making by NEA and MTE. Certification of the public consultation procedure.
Drainage Board	Drainage Board is responsible for managing the irrigation, drainage and flood protection.
Regional Agency for the Protected Areas (RAPA)	RAPA is a public body under the NAPA, which is responsible for the management of the Regional protected areas.
Prefecture of Fier Region	Reporting key concerns/opinions to the Government. Role in facilitation of the public engagement and hearing process.
Regional Council of Fier	Reporting key concerns / opinions to the Government. Role in facilitation of the public engagement and hearing process.
Mayor of Fier Municipality and Divjakë Municipality	Elected representative of the community, reporting key concerns / opinions to the Government. Role in facilitation of the public engagement and hearing process.
Technical Directories of the Fier and Divjakë Municipalities	Management of the local resources within the given competencies and technical support to the Mayor decision making. Role in facilitation of the public engagement and hearing process. - Urban planning directory (includes also environment), provide information for the land use plan in the project area. Provide information to protect the environment in the project study area. - Agriculture, forestry, irrigation and drainage directory, provide information for the agriculture land use in the project study area. Provide information for the forest's areas in the project study area. Provide information for the drainage system and plans in project study area. - Water supply enterprise provides information for the water supply systems in the project study area.
Local	

Stakeholders and Types	Interest and role in the project
Administrative Unit of Libofshë, Topoje, Dermenas, Qender.	Role in facilitation of the public engagement and hearing process
Local communities in the project area • Land right owners and users • Informal users • Stakeholders impacted by construction activities	Settlements and households likely to experience impacts pertaining to land loss, economic displacement, disturbance from construction activities.
NGOs	Interest in environmental protection and disclosure of the project impacts and mitigations strategy: PPNEA – Protection and Preservation of Natural Environment AOS- Albanian Ornithological Society ILIRIA – Protection and Social & Environmental Development Association

The following table below presents a series of questions raised by the NGOs during the consultations:

Table 57 NGOs Issues Raised

NGOs questions and concerns during consultation
PPNEA – Protection and Preservation of Natural Environment • Focus not only on this specific study for this Project, but also with the other similar Projects foreseen in the area that migh cause cumulative impact on fauna and avifauna will be major than the Project itself; • In the photovoltaic parks are usually used herbicides to not let grow the herbs under the panels. Hopefully the Project will not use or minimaze the use of herbicides to avoid soil contamination; • The photovoltaic park will be fenced, so in this way the passage of the animals will be difficult if not impossible. The area has not large size animals, like bears, but a way of passage for the animals should be foreseen in the project design. *AOS- Albanian Ornithological Society* • Concern raised for the presence in the area of the Collared Pratincole (Glareola pratincole), which colony have been observed in the summer of 2020 in the northern side of the Project Area and will require particular attention and further study from the experts. The Project should foresee an alternative nesting area for this specie if the actual area will be occupied bu the Project; • The OHL should be provided with birds' diverters in order to avoid collision of the birds in the area with the transmission line; *ILIRIA – Protection and Social & Environmental Development Association* • For the cleaning of the panels there are usually used chemical products, which will lead to soil contamination over the operation period. Also, the water necessary for the cleaning should be foreseen where it flows.

A summary of the issues raised by other stakeholders during the ESIA study consultation phase has been summarized in the table 54 in the Section 5.4.

All stakeholders have been engaged since the early stages of the project through individual meetings, distribution of leaflets informing about the project. Engagement has been undertaken during the scoping and ESIA phases and during the LRP study where all communities living along the route transmission lines have been extensively engaged and informed about the land acquisition process, but also about the impacts related to the Project. Additional meetings will be held for the LRP package disclosure as summarized in Table 55 in Section 5.4.

5.3. Information disclosure and stakeholder engagement approach with COVID-19 restrictions

Information disclosure and stakeholder engagement are cornerstones of managing the social impact of projects. Due to Covid – 19 viruses outbreak some traditional consultation approaches are ruled out. The Ministry of Health and Social Defence instrucions[119] have placed mandatory restrictions and social distancing measures to prevent the spread of the virus. According to these instruction public meetings are only allowed in certain cases even though under strict measures for enhancing protection of individuals and communities.

Considering the mandatory restriction and social distancing measures the stakeholder engagement during the scoping phase was conducted as follows;

- The engagement with national, regional and local institutions were organized in their premises.
- The engagement with local communities was conducted through individual meetings (ad hoc).
- The scoping disclosure report was conducted online.

The disclosure of the project information is conducted in line with the EBRD Stakeholder Engagement PR 10 briefing note[120], the IFC Interim Note on Safe Stakeholder Engagement during Covid-19[121], the Policy on Environmental and Social Sustainability (IFC, 2012); and Performance Standard (PS) "Assessment and management of environmental and social risks and impacts", which defines the principles and approaches to information disclosure by IFC clients and their interactions with stakeholders in the context of specific projects (IFC, 2012) that proposed the following alternative methods for disclosing information and engaging with stakeholders without gatherings.

- **Project leaflets** - targeted leaflet drops house-to-house in village with contact details and mechanisms for returning feedback
- **Email campaigns** - constant contact and mechanisms for returning feedback through company email; karavasta@voltalia.com.
- **Traditional media** - newspaper, radio, television.
- Engagement through local actors – administrators, chairmans.
- **Signage -** community notice boards, posters.
- Project Website – **www.karavastasolar.com**; to disclose all the relevant project documents and mechanisms for returning feedback.

Even though with the social distancing measures in place, the Public Hearing event is still mandatory. However, the Public Hearing will be conducted based on the following Ministry of Health and Social Defence instructions[122] for enhancing protection of individuals and communities and preventing spread of the corona virus disease (Covid-19) which includes;

[119] https://new.shendetesia.gov.al/masat-e-reja-per-te-parandaluar-perhapjen-e-covid-19/
[120] https://www.ebrd.com/sustainability-covid.html
[121] https://www.ifc.org/wps/wcm/connect/30258731-0e7d-4cb2-863c-a6fb4c6d0d95/Tip+Sheet_Interim+Advice_StakeholderEngagement_COVID19_May2020.pdf?MOD=AJPERES&CVID=n9s.b9a

[122] https://new.shendetesia.gov.al/masat-e-reja-per-te-parandaluar-perhapjen-e-covid-19/

- **Open area** venue of the meeting
- **Cleaning and disinfecting** frequently touched surfaces within the venue as much as possible.
- **Cloth face coverings** is mandatory in Albania. However, face coverings will be provided to attendees ahead of the event.
- **Temperature measurement** of the attendees.
- **Ensuring distance** by placing the seats 2 m from each other
- **Reduce number of attendees** to 10 people

Moreover, Abkons in close consultation with National and/or Regional Environment Agency, will continue to assess, based on current conditions, whether to postpone or cancel the planned engagement.

5.4. Summary of the ESIA Stakeholder Engagement Process

Stakeholder engagement related to local EIA approval have been completed and EIA permit/steatment been granted on 27.07.2021. Consultation meetings were organized during both the scoping and ESIA phases of the Project to provide stakeholders with background information about the proposed project and to give them the opportunity to raise issues and/or concerns that need to be addressed during the project.

Invitation to stakeholders were sent via invitation letters and emails that was prepared for stakeholder meetings in order to introduce the proposed Project and invitation for participation. All the letters of notification were distributed to key stakeholders' groups identified. Other forms of notifications used for consultations included putting of posters and delivering of leaflets in the affected villages and residential settlements.

Between the 21st – 25th September a total of 16 separate meetings with the participation of 53 officials have been carried out with, national, regional and local authorities. Engagement with local communities was conducted in October through ad hoc meetings with more than 30 community members in the villages of Ndërnenas and Hasturkas. While the communities living along the transmission line route were engaged in February after the confirmation of the route alignment.

The draft scoping report was available through the project website to stakeholders for comments and suggestions for a period of 30 days. After this time period an online consultation meeting was organized to discuss relevant issues related to the scoping report disclosure and preliminary findings. In total 7 participants including; 1 national level, 2 regional and local level and 4 NGO`s participated in the meeting. All the stakeholders identified in the first phase of engagement were notified through email for the publication of the scoping report and then for the online consultation after 30 days disclosure period. In addition, posters and flyers was used to inform local communities. The Scoping Report was made available on the project website and officially delivered to each of the AU`s crossed by the project.

Moreover, relevant project information is provided to local communities through the socio-economic survey. The survey also served as an information campaign where the team distributed leaflets to 364 households interviewed during the socio-economic survey.

Following the National Legislation on information disclosure, a Public Hearing event was organized according to the national legislation on EIA to provide stakeholders with the progress of the ESIA process and present the findings of the specialist studies and recommendations made. Invitation letters with attached 30 copies of non-technical summary to be made available to local community were sent to Municipality of Divjake, Fier and to the REA. The same letter with attached 10 copies of non-technical summary were sent to AU of Karavasta e Re, Libofshe, Topoje, Dermenas and Qender. Posters providing information for the public hearing and contact details were placed in the villages near the PDA and along the transmission line route. Moreover, notification was published through newspaper, radio and local and national television for 20 consecutive days.

In addition, for the stakeholders that could not be present in the public hearing event a link will be shared to make possible online participation.

The Engagement with Stakeholders was done in accordance with the requirements of EBRD, IFC and Albanian legislation and also respecting COVID-19 restrictions.The meeting was held in the village of

Ndërnenas, AU of Libofshë and saw the participation of 23 stakeholders, while 3 stakeholders were connected via web.

The public hearing report was prepared based on the obtained feedback, questions and answers from the participants, and was part of the application file. While a Stakeholder Engagement Report has been developed to describe the engagement, activities carried out during all phases of the ESIA process. This report provide detailed information of the stakeholder engagement activities including the public hearing event. The date / frequency of upcoming stakeholder engagement activities will be updated referring the date of the ESIA disclosure. This calendar is part of SEP and meeting the feeback will describe in the SER.

During the Project construction, the company shall inform stakeholders about construction activities through community boards, information on the Project website, and via tools and media announcements or local postings in the settlements and community meetings, if possible, following the Covid-19 restrictions. The company shall be in close contact with the local municipalities via the Community Liaison Officer (CLOs) who will also follow up on grievances that may occur.

Also, during Project operation, the company shall keep stakeholders informed on planned activities (e.g., maintenance or project facilities functions) and will proactively provide information on operational safety and emergency response through leaflets, information events and other means of communication.

Table 58 Main Issues during Consultations

Issues / Concerns	ESIA Output / Action
Considering that the project is close to a protected area, the monitoring and survey process should provide detailed information not only for the ESIA process but also to identify potential impacts, take mitigation measures and be considered by the company during the project lifecycle (for example bird movement and any other species of the wild life in the national park).	The ESIA studies have provided baseline information and assessment of impacts considering also the Karavasta National Park. Mitigation measures have been provided for all wildlife in the area and on biodiversity and flora and fauna aspects. Monitoring will continue also during construction and operation phases of the project.
There is a risk of collision of birds with the overhead transmission line	Bird diverters will be installed by Voltalia in order to minimize or avoid collision of birds with the OHL.
With regard of the local community the company should consider some potential investments in the area. The company will be for a long time present in the area and in this context the local community should be considered as a partner.	About 1% of the company's total investment for this project will be destined for the social responsibility and investments in the area. During construction period Voltalia will identify social investments in the communities affected and in consultation with local stakeholders, will proceed in local investments in the area.
Engagement with local communities, local authorities and with the Regional Office of the Protected Areas is required in order to consult for the assessments of impacts.	Extensive consultations were held with all stakeholders during all phases of the ESIA for the E&S baseline consideration and assessments of impacts, which have been included in the draft ESIA and reviews.
Employment possibilities for local residents should be a priority for the investor	Maximization of workforce from local areas depending also on the qualifications.

Issues / Concerns	ESIA Output / Action
PV plant and transmission line should be part of the same ESIA.	The ESIA study and report considered both the PV plant and the OHL as part of the same project and the assessment have been appropriate following this consideration
Drainage and irrigation channels in the area are very important to prevent floodings and also for the irrigation of the area and should be preserved during construction and operation	All the channels in the area have been part of assessment studies and mitigation measures have been proposed.

Additional meetings were held during the LRP studies and consultations and surveys with the PAPs were held during this phase. In addition, meetings with stakeholders affected by the OHL in order to improve the design were also held in this context.

Following LRP package disclosure, the following engagement activities will take place as part of the LRP implementation. This timeline will be refined once the OHL construction schedule will be defined.

Table 59 LRP Package Disclosure

Methodology & Stakeholder Group	Format	Frequency
Dissemination of Information & Grievance Resolution		
GLAC Disclosure to Regional and Municipal Departments and Agencies	Formal meetings	June 2022
GLAC Disclosure to PAHs	Household visits	June 2022
Engagement with PAHs having submitted a grievance to the Project if required	Ad-hoc meeting	Ad-hoc
Engagement with PAHs whose land is required for baseline geological studies on site	Ad-hoc meeting	Ad-hoc
Household Voluntary Agreements & Sign-off		
Face to Face meeting with the PAH (household head and spouse) to present Compensation Offer	Household visit	One-off starting from June 2022 to July 2022
Further visits to PAH (household head and spouse) for sign-off. Enhanced engagement for identified vulnerable PAHs	Household visits (2-4 meetings, as required)	Biweekly and weekly (one off) from May 2022 to June 2022
Land Entry & Exit		
Construction Manager and CLO engagement with PAHs to sign Land Entry Protocols	Household visit	During construction as required
Construction manager, Agronomist and CLO engagement with PAHs to sign Land Reinstatement & Exit Form	Household visit	During construction / post-construction as required
Dissemination of Information & Grievance Resolution		
Information boards in each village re: employment, training, safety issues, and construction schedule	Public notice boards	As required
Scheduled visits by Community Liaison Officers to each village	Initial meeting and visits by CLO(s) in each village	Weekly or as required
Livelihood and Vulnerable Programs		
Livelihood and Vulnerable Programs	Household visit as part of Sign-off process	As required

5.4.1. ESIA disclosure meetings

Based on the requirements of the IFC and EBRD Environmental and Social Policies on the public disclosure of the ESIA, a series of meetings were held in the project area to inform the general public about the impacts and mitigations presented in the ESIA final report.

The meetings were held in the following date and venues:

- Meeting for the villages of Ndërnenas, Hasturkas and Karavasta e Re was held in the premises of the Ndërnenas School the 22nd of June 2022 at 10:00.
- Meeting for the villages of Seman, Seman I Ri and Gjokalli was held in the premises of the Community Center in Seman villagethe 22nd of June 2022 at 14:00.
- Meeting for the villages of Zhupan, Vadhiz, Clirim and Drizë was held in the premises of the Qender Administrative Unit in the 23rd of June 2022 at 10:00.
- Meeting for the villages of Sulaj, Dërmenas and Radostinë was held in the premises of the Dërmenas Administrative Unit in the 23rd of June 2022 at 14:00.
- Meeting for the villages of Peshtan I Ri was held in the premises of the centre of the village the 24th of June 2022 at 11:00.

The meetings were conducted as per the following agenda:

- Registration of participants;
- Introduction
- Project presentation
- ESIA findings
- Discussions, questions and suggestions;

The meetings included a presentation and description of the project, engagement of stakeholders during the study and preparation phase of the EIA / ESIA and the findings of the EIA / ESIA studies. All the EIA/ ESIA findings were made public and shared with the participants. In addition to ESIA, Voltalia team also presented the Ecosystem, LRP and GLAC documents and their main principles.

No new issue or request has come from the ESIA disclosure meetings, in this situation it is not necessary to revise the ESIA report.

5.4.2. Engagement with households in the frame of LRP implementation

During June-July 2022, Voltalia social team initiated engagement with the households that are impacted by the permanent land acquisition process. As stipulated in the LRP, household visits were done to inform the households about the impacts and the planned mitigation measures. The process included an Offer Letter that detailed the impact on the land parcel and the compensation amount. The goal was to reach Voluntary Agreements that would ensure acquisition of the required lands through a Sale-Purchase Agreement.

It resulted that the households face significant challenges to prepare the required documentation to reach a Sale-Purchase Agreement due to land tenure complexities in Albania and high immigration rates. As a result, the LRP has been updated to adopt a new approach that ensures timely land acquisition process that gives way to obtainment of required permits and licences and in the same time ensures fair compensation to affected households in line with IFC and EBRD requirements.

As a result, to ensure that stakeholders are correctly informed on the process and engaged accordingly, some additional engagement activities are planned. These activities include:

1. A round of visits to households that have signed the Offer Letter to inform them about the change of approach and to align the steps to proceed to a Compensation Offer;
2. Provision of updated copies of LRP to these households and to the local authorities (Administrative Units), publishing of the updated LRP to the official project website “karavastasolar.com”

6. Environmental and Social Impact Assessment

6.1. Introduction

The proposed project may pose impacts on the environmental and social aspects during the project phases. Potential impacts may be regarded over the project footprint and area of influence. Based on the activities involved, an impact interaction matrix and methodology has been prepared for the project. The impacts of the proposed project are evaluated for the three project phases as follows:

1. Construction Phase (including pre-construction);
2. Operation Phase; and,
3. Decommissioning Phase.

6.2. Impact Assessment Methodology

Impact identification and assessment starts with scoping and continues through the remainder of the ESIA Process. Interactions with the potential for significant effects are subjected to a detailed impact assessment. The principal ESIA steps comprise the following:

- **Impact prediction**: to determine what could potentially happen to resources or receptors as a consequence of the Project and its associated activities.
- **Impact evaluation**: to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource or receptor.
- **Mitigation and enhancement**: to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.
- **Residual impact evaluation**: to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

6.2.1. Identification and Characterization of Impacts

An *'impact'* is any change to a resource or receptor caused by the presence of a project component or by a project-related activity. Impacts can be negative or positive and are described in terms of their characteristics, including the impact's type and the impact's spatial and temporal features (namely extent, duration, scale and frequency). Impact characteristics are defined in the subsections below.

Type of Impact

- *Direct*: applies to an impact which can be clearly and directly attributed to a particular environmental or social parameter (e.g., dust generation directly affects air quality).
    - Indirect: applies to impacts which may be associated with or subsequent to a particular impact on a certain environmental or social parameter (e.g., high levels of dust could entail nuisance and health effects to workers on site).
    - Induced: applies to impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project.
    - Cumulative: applies to impacts that arise as a result of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect.

Duration of impact

- Temporary: applies to impacts whose effects are limited to a period of less than 3 years, or only associated with Project pre-construction or construction phases.
- Short-term: applies to impacts whose effects are limited to a five-year period.
- Long-term: applies to impacts whose effects last longer than a period of five years, but limited to within the project lifetime.
- Permanent: applies to impacts whose effects last longer than the life of project – i.e., irreversible.

Extent of impact

- On-site: impacts that are limited to the PDA.
- Local: impacts that are limited to the PDA and adjacent properties.
- Regional: impacts that are experienced at a regional scale.
- National: impacts that are experienced at a national scale.
- Trans-boundary/International: impacts that are experienced outside of Albania.

Scale of impacts

The scale of an impact is a quantitative measure, such as the size of the area damaged / impacted or the fraction of a resource that is lost / affected, etc. It is generally described using numerical values and units rather than assigned fixed designations.

Frequency of impacts

The frequency of an impact the measure of the constancy or periodicity of an impact, described using numerical values or a qualitative description.

Likelihood

Likelihood is a measure of the degree to which the unplanned event (e.g., incidents, spills) is expected to occur. The likelihood of an unplanned event occurring is determined qualitatively, or when data is available, semi-quantitatively. Definitions of likelihood as applied in the ESIA are provided as follows:

- Unlikely: The event is unlikely but may occur at some time during normal operating conditions.
- Possible: The event is likely to occur at some time during normal operating conditions.
- Likely: The event will occur during normal operating conditions (i.e., it is essentially inevitable).

6.2.2. Evaluation of impacts

A consistent approach to the assessment of impacts will be followed to enable E&S impacts to be broadly compared across the ESIA. A set of generic criteria are used to determine significance and are applied across the various environmental and social parameters.

As far as possible, E&S impacts will be quantified. Where it is not possible to quantify impacts, a qualitative assessment will be conducted using professional judgement, experience and available knowledge, and including the consideration of stakeholder views. Where there are limitations to the data, and / or uncertainties, these will be recorded in the relevant chapters, along with any assumptions made during the assessment.

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

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

Magnitude of impact

Once impacts are characterised (see section 6.2.1 above) they are assigned a ‘magnitude’. Magnitude is typically a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

- Extent;
- Duration;
- Scale;
- Frequency.

Magnitude (from small to large) is a continuum. Evaluation along the continuum requires professional judgement and experience. Each impact is evaluated on a case-by-case basis and the rationale for each determination is noted. Magnitude designations for negative effects are: negligible, small, medium and large. The magnitude designations themselves are universally consistent, but the definition for the

designations varies by issue. In the case of a positive impact, no magnitude designation is assigned as it is considered sufficient for the purpose of the impact assessment to indicate that the Project is expected to result in a positive impact.

Some impacts will result in changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes are regarded as having no impact, and characterised as having a negligible magnitude.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is used.

The likelihood factor is also considered, together with the other impact characteristics, when assigning a magnitude designation.

For biophysical impacts, the semi-quantitative definitions for the spatial and temporal dimension of the magnitude of impacts used in this assessment are provided as follows:

- **High Magnitude Impact:** affects an entire area, system (physical), aspect, population or species (biological) and at sufficient magnitude to cause a significant measurable numerical increase in measured concentrations or levels (to be compared with legislated or international limits and standards specific to the receptors) (physical) or a decline in abundance and/ or change in distribution beyond which natural recruitment (reproduction, immigration from unaffected areas) would not return that population or species, or any population or species dependent upon it, to its former level within several generations (physical and biological). A high magnitude impact may also adversely affect the integrity of a site, habitat or ecosystem.
- **Moderate Magnitude Impact:** affects a portion of an area, system, aspect (physical), population or species (biological) and at sufficient magnitude to cause a measurable numerical increase in measured concentrations or levels (to be compared with legislated or international limits and standards specific to the receptors) (physical) and may bring about a change in abundance and/or distribution over one or more plant/animal generations, but does not threaten the integrity of that population or any population dependent on it (physical and biological). A moderate magnitude impact may also affect the ecological functioning of a site, habitat or ecosystem but without adversely affecting its overall integrity. The area affected may be local or regional.
- **Low Magnitude Impact:** affects a specific area, system, aspect (physical), group of localised individuals within a population (biological) and at sufficient magnitude to result in a small increase in measured concentrations or levels (to be compared with legislated or international limits and standards specific to the receptors) (physical) over a short time period (one plant/animal generation or less, but does not affect other trophic levels or the population itself), and localised area.
- **Negligible Magnitude Impact:** affects a very small specific area, system, aspect (physical), group of localised individuals within a population (biological) at such a rate that can be deemed to be unimportant or insignificant.

For socioeconomic impacts, the magnitude considers the perspective of those affected by taking into account the likely perceived importance of the impact, the ability of people to manage and adapt to change and the extent to which a human receptor gains or loses access to, or control over socio-economic resources resulting in a positive or negative effect on their well-being. The quantitative elements are included into the assessment through the designation and consideration of scale and extent of the impact.

Sensitivity of receiving parameter

In addition to characterising the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity of the receptor. There are a range of factors to be taken into account when defining the sensitivity of the receptor, which may be physical, biological, cultural or human. Where the receptor is physical (for example, a water body) its current quality, sensitivity to change, and importance (on a local, national and international scale) are considered. Where the receptor is biological or cultural (i.e., the marine environment or a coral reef), its importance (local, regional, national or

international) and sensitivity to the specific type of impact are considered. Where the receptor is human, the vulnerability of the individual, community or wider societal group is considered. As in the case of magnitude, the sensitivity designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The universal sensitivity of receptor is low, medium and high.

For ecological impacts, sensitivity is assigned as low, medium or high based on the conservation importance of habitats and species. For socio-economic impacts, the degree of sensitivity of a receptor is defined as the level of resilience (or capacity to cope) with sudden social and economic changes. Criteria for deciding on the value or sensitivity of biological and socioeconomic receptors are presented as follows:

- **High:** For ecological receptors, specifically protected under the Albanian legislation and/or international conventions e.g., species listed as rare, threatened or endangered e.g., IUCN. For social receptors, those affected will not be able to adapt to changes and continue to maintain pre-impact status.
- **Medium:** For ecological receptors, not protected or listed, but may be a species common globally but rare in Albania with little resilience to ecosystem changes, important to ecosystem functions, or one under threat or population decline. For social receptors, those able to adapt with some difficulty and maintain pre-impact status but only with a degree of support.
- ***Low:*** For ecological receptors, not protected or listed as common / abundant; or not critical to other ecosystem functions (e.g., key prey species to other species). For social receptors, those affected are able to adapt with relative ease and maintain pre-impact status.

Table 60. Assessment Criteria and impact Assessment Methodology for Habitats and Biological Species

Habitat Sensitivity/ Value		**Magnitude of Effect on Baseline Habitats**			
Note: Assessment Criteria for the Impacts Significance takes into account the location of the habitat, whether it is located within the project area or within the area of influence or outside both of them.		**Negligible**	**Low**	**Medium**	**High**
		Effect is within the normal range of variation.	Affects only a small area of habitat, such that there is no loss of viability/ function of the habitat.	Affects part of the habitat, but does not threaten the long-term viability/ function of the habitat.	Affects the entire habitat, or a significant portion of it, and the long-term viability/ function of the habitat is threatened.
Negligible	Habitats with negligible interest for biodiversity.	**Negligible**	**Negligible**	**Negligible**	**Negligible**
Low	Habitats with no, or only a local designation/ recognition, habitats of significance for species listed as of LC on the IUCN Red List of Threatened Species, habitats which are common and widespread within the region, or with low conservation interest based on expert opinion.	**Negligible**	**Negligible**	**Minor**	**Moderate**
Medium	Habitats with nationally designated or recognised areas (IBAs, KBAs, Emerald sites, IPAs), habitats of significant importance to globally VU, NT or DD species, priority habitat of Annex 1 of Habitats	**Negligible**	**inor**	**Moderate**	**ajor**

	Directive, habitats of significant importance for nationally restricted range species, habitats supporting nationally significant concentrations of migratory species and/or congregator species, and low value habitats used by species of medium value.				
High	Habitats within internationally designated or recognized areas; habitats of significant importance to globally CR or EN species, habitats of significant importance to endemic and/or globally restricted-range species, habitats supporting globally significant concentrations of migratory species and/or congregator species, highly threatened and/or unique ecosystems, sites of international importance (Ramsar Sites), areas associated with key evolutionary species, and low or medium value habitats used by high values species.	**Negligible**	**Moderate**	**Major**	**Critical**

Source: ERM (2017)[123]

Baseline Species Sensitivity/ Value	**Magnitude of Effect on Baseline Species**			
Note: Assessment Criteria for the Impacts Significance takes into account the location of the habitat, whether it is located within the project area or within the area of influence or outside both of them.	**Negligible**	**Low**	**Medium**	**High**
	Effect is within the normal range of variation for the population of the species.	Effect does not cause a substantial change in the population of the species or other species dependent on it.	Effect causes a substantial change in abundance and/or reduction in distribution of a population over one, or more generations, but does no threatened the long viability/ function of that population dependent on it.	Affects entire population, or a significant part of it causing a substantial decline in abundance and/or change in and recovery of the population (or another dependent on it) is not possible either at all, or within several generations due to natural recruitment (reproduction, immigration

[123] ESIA Report for 100 MW Veltoor Solar Plant, Telengana, March 2017

					from unaffected areas).
Negligible	Species with no specific value or importance attached them.	**Negligible**	**Negligible**	**Negligible**	**Negligible**
Low	Species and sub-species of LC on the IUCN Red list, or not meeting criteria for medium or high value.	**Negligible**	**Negligible**	**Minor**	**Moderate**
Medium	Species on IUCN Red List as VU, NT, or DD, species protected under national legislation, nationally restricted range species, nationally important numbers of migratory, or congregator species, species not meeting criteria for high value, and species vital to the survival of a medium value species.	**Negligible**	**Minor**	**Moderate**	**Major**
High	Species on IUCN Red List as CR, or EN. Species having a globally restricted range (i.e., plants endemic to a site, or globally breeding range for bird species), internationally important numbers of migratory, or congregator species, key evolutionary species, and species vital to the survival of a high value species.	**Negligible**	**Moderate**	**Major**	**Critical**

Source: ERM (2017)[124]

6.2.3. Mitigation Potential and Residual Impacts

A key objective of an ESIA is to identify and define socially, environmentally and technically acceptable and cost-effective measures to manage and mitigate potential impacts. Mitigation measures are developed to avoid, reduce, remedy or compensate for potential negative impacts, and to enhance potential environmental and social benefits.

The approach taken to defining mitigation measures is based on a typical hierarchy of decisions and measures, as described in Table 61. The priority is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

Once mitigation measures are declared, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above.

Table 61. Mitigation hierarchy

Avoid / reduce at source: avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
Abate on Site: add something to the design to abate the impact (e.g., pollution control equipment).
Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., traffic measures)

[124] ESIA Report for 100 MW Veltoor Solar Plant, Telengana, March 2017

Repair or Remedy: some impacts involve unavoidable damage to a resource (e.g., material storage areas) and these impacts require repair, restoration and reinstatement measures
Compensate in Kind; Compensate Through Other Means where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., financial compensation for degrading agricultural land and impacting crop yields)

Residual impact assessment

Once mitigation measures are declared, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

6.2.4. Assessing the significance of impacts

In order to assess the significance of an impact, the sensitivity of the receiving environmental or social parameter is considered in association with the magnitude of the impact, according to the matrix shown in Table 62 below.

Table 62. Impact significance matrix

Magnitude of impact	Sensitivity of receiving receptor		
	Low	Medium	High
Negligible	Negligible	Negligible	Negligible
Low	Negligible	Minor	Moderate
Medium	Minor	Moderate	Major
High	Moderate	Major	Major

While the above matrix provides a framework for the determination of significance and enables comparison across environmental and social parameters, a degree of professional judgement must be used and some parameter-specific factors considered in deciding of impact significance. The ESIA will provide additional guidance to the degrees of significance.

In the section below, it is provided additional guidance to the degrees of significance in the ESIA. Positive impacts provide resources or receptors, most often people, with positive benefits. Note that impacts can be either positive or negative.

-
- **Major significance:** an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e., ALARP[125] has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.
- **Moderate significance:** has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not

[125] ALARP, which stands for “as low as reasonably practicable” is a principle that aims to reduce residual risk while not incurring unrealistic costs or effort.

necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

- **Minor significance:** a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.
- **Negligible significance:** a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

6.2.5. Cumulative Impacts

A cumulative impact is one that arises as a result of an impact from the Project interacting with an impact from another activity to create an additional impact. How the impacts and effects are assessed is strongly influenced by the status of the other activities (e.g., already in existence, approved or proposed) and how much data is available to characterise the magnitude of their impacts.

The approach to assessing cumulative impacts is to screen potential interactions with other projects on the basis of:

- Projects that are already in existence and are operating;
- Projects that are approved but not as yet built or operating; for example, planned 110 kV line from Fier Substation to Hoxare, pomegranate farm and other solar projects in the area (full list of projects can be found in 0); and
- Projects that are a realistic proposition but are not yet built.

The cumulative impact assessment will take due regard of these existing facilities and their current impact on the local environment.

6.3. Environmental Impacts

6.3.1. Impacts on Air Quality

This section assesses the potential impacts on local air quality as a result of the Project activities. Impacts on local air quality are likely to occur during construction and preliminary phase (pre-construction), and decommissioning phase. Potential receptors in the study area consist mainly of the residential population living near the proposed site of the PV Solar plant and Overhead Transmission Line (OHL) route.

Sources of Impacts - include as follows:

- Temporary dust emissions from earthworks, clearance of vegetation, soil excavations, vehicle movement, stockpiles, unpaved surfaces, etc. nearby the Project area. This includes also construction of the electric towers and potential upgrades of access roads;
- Temporary emissions of exhaust gases into the atmosphere from vehicles involved in Project construction (i.e., emissions from excavators, bulldozers, trucks, vehicles/ cars);
- Temporary gases emissions (potential) from the use (if will be needed) of equipment such as generators during the work activities.

6.3.1.1. Potential impacts during construction phase

The main sources of air emissions during this phase will be associated with vehicle movements (transport of materials, and equipment), earthworks and potential use of generators for work activities. The principal emissions in air during construction are related to the generation of dust. Dust comprises of large airborne particles of material, which are resident in the atmosphere for short periods of time after release, as they are heavy enough to fall out of suspension in the air relatively quickly. Therefore, effects of these emissions will be localized and they do not pose long-term or wide spread changes to local air quality, but they may be a source of nuisance and complaints from communities if located close to inhabited areas and/ or

properties. This is of particular importance in the summer period close to working sites and across the sections of roads that are in poor conditions or unpaved.

It is noteworthy to highlight that the majority of the dust emissions are likely to occur during the working hours of construction activity. The precise behaviour of the dust movement, its concentration in the atmosphere, and the distance it may reach depends upon a number of factors, including wind direction and strength, rainfall, local topography and the presence of screening structures (buildings, trees etc.) that may intercept dust before it reaches sensitive locations.

The US EPA[126] reveals *"that precipitation of greater than >0.2 mm/hr will affectively attenuate dust and wind speeds of more than >5.3 m/s are typically required to lift dust from open surfaces. This will be lower for dust generated by mechanical means (i.e., during excavation and due to the movement of vehicles over unpaved surfaces), at around 3 m/s"*. Based on this statement, the US EPA concludes that:

- During the most extreme wind events and speeds, dust will typically travel a maximum of 200 m from source before falling from the air column;
- At the highest wind speeds, dust is unlikely to travel more than 500 m from source; and,
- Precipitation of >0.2 mm/h are likely to effectively weaken dust emissions.

Table 63. Dust Nuisance Assessment Matrix

Likely magnitude of impacts	Conditions
Likely high significance of impact	• Dust generating activities for >12 months; • Receptor within 200 m of dust source; • Downwind for >10 percent of the year where wind and rainfall conditions promote dust generation.
Likely medium significance of impact	• Dust generating activities for <12 months; • Receptor within 200 m of dust source; • Downwind for >10 percent of the year where wind and rainfall conditions promote dust generation.
Likely low significance of impact	• Dust generating activities for <12 months; • Receptor within 200 m of dust source; • Downwind for 2-5 percent of the year where wind and rainfall conditions promote dust generation; or, • Dust generating activities for >12 months; • Receptor within 500 m of dust source; • Downwind for 2-5 percent of the year where wind and rainfall conditions promote dust generation.
Negligible impact	• Receptor > 500 m of dust source; • Receptor 200 m – 500 m from dust source; • Downwind for <2 percent of the year where wind and rainfall conditions promote dust generation.

Referring to the baseline conditions in the average wind speed in the project area varies from 6-8 knots which if converted results from 3.1 - 4.1 m/s. For the PV solar site closest communities (houses) and receptors are located approximately 345 m in distance. The impact on the PDA Acces Road will be permanent and will be more significant during the preconstruction and construction phase, due to the number of materials and panels to be transported. The impact on OHL access roads will be temporary only

[126] https://www.miga.org/sites/default/files/archive/Documents/Vol%20II_Annex%20C_Air%20Quality_Final_Sept%202016.pdf

during construction. Please see more sensitive areas in the project zone the ones that cross with urban areas refer to the map shown Figure 148. This means that potential impacts from dust generation will be likely low to negligible impact prior to mitigation. For the OHL route these factors will slightly differ as the electric towers will be installed in different sections along the transmission line. In few sections the location of the towers will be placed in close distance to human receptors, typically varying from 1-50 m. Nevertheless, construction works for these towers will be short-term (few weeks) and will not include major excavation works. As a result, potential impacts are likely to be of minor significance.

The other potential source of air pollution is that arising from exhaust emissions associated with road traffic, vehicular movement, and operation of machinery; the principal pollutants of concern are NOx, PM_{10} and $PM_{2.5}$. Exhaust emissions from vehicles and machinery will be fairly limited in quantity and duration, with overall negligible-minor impact significance, therefore not considered to contribute considerably to baseline levels. For static sources, potential impacts caused by diesel combustion engine emissions will vary in intensity according to the distance of potential receptors (human receptors) from the source.

The potential for impacts on air quality from traffic associated with construction of the proposed project will be felt in the inhabited areas/ villages adjacent to the principal means of access for construction traffic. Dust generation due to vehicle movements and exhaust air pollutant emissions may cause temporary disturbance to the local communities during the busiest periods of construction activity. The Developer predicts that an average of 12 trips of heavy vehicles per day will be occurring on untarred and paved roads around the project areas of the PV plant and OHL route. Higher levels of traffic are anticipated to occur between April-September, which most likely will be the peak months for construction activities. As a result, potential impacts are predicted on air quality due to increased traffic and disturbance effects on local communities.

Aspect					
Site clearance and preparation works, excavation and traffic movements					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary (weeks)	Local	Daily	Possible	Medium – PV plant and OHL
Receptor					**Sensitivity**
Local residents in agricultural zone and along the Route of the OHL.					Medium - PV Plant and OHL
Overall Significance of Impact					
Moderate – PV Plant and OHL					

Management and Mitigation

The most effective way to manage and prevent dust generation and vehicular emissions and traffic is through effective control of the potential sources; specific mitigation measures and management to ensure that these sources are minimized are listed below:

- Develop a Construction Traffic Management Plan (CTMP) to incorporate all relevant mitigation measures for vehicle movement nearby and within the project areas (PV plant and OHL).
- ;
- Minimise open excavation areas;
- Minimise stockpiling of soil and earthen material through coordination of earthworks and excavation activities (excavation, grading, compacting, etc.);
- When there is visible dust being generated by vehicles and other activities, implement dust suppression techniques, such as applying water to dusty areas (e.g., site, access road, etc.) through water spraying tanks;

- Minimise vegetation clearance (when is possibile) to reduce exposure of bare soil, and revegetate cleared areas as soon as possible;
- For stockpiles left for long periods, apply grass seed or other covers;
- All construction machinery and equipment to be maintained in good working order and not left running when not in use;
- Burning of any material anywhere on construction sites is banned;
- Restrict vehicle speeds on construction sites and all access roads to minimize potential generation of dust;
- Vehicles carrying aggregate material and workings will be sheeted at all times;
- If any complaints or grievances are received from local community, investigate complaint and take action to remediate or clean up impacted receptor and take measures to reduce dust generation.

Mitigation of impacts in relation to generation of dust and vehicle / machinery emissions will be managed through the development of the ESMP/CEMP and CTMP for the construction phase which will specify appropriate measures for the management of site clearance, excavation and construction activities, such as those listed above.

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Minor – PV Plant and OHL

6.3.1.2. Potential impacts during operation phase

Operation phase of the PV Solar Plant and transmission line does not pose any risks associated with emissions on air. No excavations are required post construction phase and traffic generation is minimal, limited to daily operation of the PV Plant, occasional visits to sections of the line to undertake inspection and maintenance activities Impacts relating to dust generation and vehicle emissions are therefore not significant. Maintenance vehicles will be required to follow designed access routes. Overall impact significance for this phase is:

Negligible – PV Plant and OHL

6.3.1.3. Potential impacts during decommissioning phase

Decommissioning activities will give rise to dust generation, vehicle emissions and increased traffic for of a similar intensity and duration as during construction; as a result, impacts will be similar to those experienced during the construction phase (see section 1.3.1 above). Prior to mitigation impacts on air quality are rated to be of moderate significance. Management and mitigation measures will be similar to those during construction phase. Therefore, residual impact after management and mitigation measures is:

Minor – PV Plant and OHL

6.3.1.4. Cumulative impact

There will be no cumulative impact as a result of construction activities or during the operation and decommissioning phases associated with the PV element of the project. However, in the event that the OST 100kV line is constructed at the same time as the projects overhead line the impacts along the OHL route in terms of dust are likely to increase and/or be extended. It is recommended that the Project liaises with OST to understand the scheduling of the 100kV line and discuss a collaborative approach to minimise potential impacts and disturbance to local communities along the OHL route during construction.

Negligible – PV Plant
Minor – OHL (construction phase only)

6.3.2. Impacts on Climate Change and Adaption

The adverse impacts on climate change from project are likely to occur during construction phase. For the operation phase the project will have a moderate positive impact on climate change referring to tons of CO_2 emissions avoided per year as Solar is a clean Energy.

Project itself is situated below sea level and near a flooded area. The impacts from Global Climate change to floods as described in section 4.1.8.4can minorly influence the PDA area. Sea level change was analysed by Pirazzoli (1986) and showed that there is an increase of the Adriatic Sea level that ranges from less than 1 mm/year to over 2 mm/year, but it also indicates an increasing trend due to climate change.

All the Project area drains northwards towards Dokollarëve Drainage Canal, and ultimately to the Karavasta Pumping Station which discharges the water into the Adriatic Sea. Referring to the data collected for floods from the Seman delta[127] and sea level rise in area, project area has not been affected by floods for a period of 100 years and are not expected to have floods inside PDA area.

Receptor Sensitivity

With regards to receptor sensitivity/ value, it can be estimated that the climate in the study area is of very low sensitivity. The following were taking into account:

- The area that will be cleared for the construction of the project components is covered 86% by Fallow Land in the PDA area and 56 % Agriculture and 11% Fallow Land in the OHL Area so the total area is without too much vegetation. Residential areas and infrastructures cover a small percentage of the study area.
- For the construction of PDA and OHL the clearance of vegetation at a total area of about 310 Ha is required.
- The majority of the wider area is covered by Fallow Land, agricultural land and natural vegetation, while urban areas are limited in the area.
- The climate of the area is determined be several components, such as topography, morphology and position near the sea and so much lagoons.
- The area occupied by the project is a small percentage of the wider area.

Therefore, it was estimated that a smaller area has a greater tolerance to accommodate changes, as the climate is determined by the existing situation at a greater area.

The receptor sensitivity (in the level of the broad study area) was not estimated to be medium or high, as climate and climate change is determined by various other factors referring to a wider area and therefore climate and climate change cannot be considered of limited capacity to accommodate changes.

6.3.2.1. Potential impacts during construction phase

The following was taken into account, with regards to the impacts of the construction phase of the project on climate and climate change:

- Emissions from land use, largely agriculture, forestry and land clearing, make up some 22% of the world's greenhouse gas emissions.
- Land-based ecosystems absorb the equivalent of about 22% of global greenhouse gas emissions. This happens through natural processes that store carbon in soil and plants, in both farmed lands and managed forests as well as in natural "carbon sinks" such as forests, seagrass and wetlands[128].
- The climate impact of the actual construction processes - from material extraction to finished building or facility - is seldom taken into account. Studies show that the climate impact is significant, but more work must be done to improve knowledge and awareness. When constructing roads and building, the input of materials such as steel or cement and

[127] ICE-000-P06-V01 Karavasta 140MW - Hydrological Survey
[128] UN Climate change report: land clearing and farming contribute a third of the world's greenhouse gases, 2019

asphalt, and the management of excavated materials are the largest contributors to material-related greenhouse gas emissions[129].

The construction of the proposed PV, accompanying works (rehabilitation of existing access roads and transmission line) and rehabilitation works are not related to direct impacts on the climate of the study area. Overall, the construction works are not expected to cause significant negative impacts and changes in the climatic and bioclimatic characteristics of the study area.

During the construction phase, as a result of construction works (heavy machineries operation, vehicles and road traffic) negative impacts are related due to the release of air pollutants and dust generation (particulate matter). The primary contributors to air emissions and CO_2 would arise from mobile and/or stationary sources, such as on and off-road vehicles, diesel generation sets, use of heavy equipment, etc.

Construction activities can influence also water quality or modify flooding patterns and surface water flow over a certain period of time. The project may not avoid access road construction on wetlands/swamp. Construction activities could also cause an increase in suspended solids in wetlands and aquatic environments, which could result in siltation of feeding sites and breeding grounds of some species, particularly for fish species

However, it can be anticipated that potential negative impacts will not be significant and will be reduced to a degree, with proper mitigation measures.

Impact Magnitude

The clearance of vegetation in the area of the project is associated with negative impacts, with regards to CO_2 emissions, as well as the reduction of greenhouse gas emissions absorbed through natural processes. Taking into account the size of the area that will be cleared, the type of vegetation in area, and the limited extent to which vegetation is required to be cleared for constructing the project, the overall impact significance of the construction of the project on the climate of the area can be characterized as **negligible.**

Aspect					
Site clearance and preparation works, excavation and traffic movements					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary (weeks)	Local	Daily	Likely	Low - PV Plant Low - OHL
Receptor					**Sensitivity**
Local residents within OHL corridor. Project workers.					Low - PV Plant Medium - OHL
Overall Significance of Impact					
Negligible (climate changes) – PV Plant and OHL					

Management and Mitigation

Management and mitigation measures will be implemented during the construction phase of the project for the minimization of the impacts of the project related with dust emissions.

We recommend the use of modern, well-maintained and efficient machinery and vehicles meeting applicable emission performance standards during construction that would minimize emissions.

Good Environmental Practices will be recommended within the Construction Environmental Management Plan (CEMP). The use of best/international construction techniques and management and maintenance will help improve overall efficient use of resources and fuel.

[129] Climate impact of construction processes, A report from IVA and the Swedish Construction Federation, 2014.

Other specific mitigation measures include:

- A speed limit of 20 km/hr. will be enforced on the construction site/access road
- Regularly maintain all diesel-powered equipment and reduce idling time to avoid emissions and improve fuel efficiency
- Implement best practice procedures to control vehicle / equipment air emissions (such as turning off equipment when not in use)
- Vehicle / equipment exhausts observed to be emitting significant black smoke from their exhausts will be serviced/ replaced.

Residual Impacts

Taking into account the mitigation measures foreseen the residual impacts of the project on climate, during the construction phase can be characterized as **negligible.**

Negligible – PV Plant and OHL

6.3.2.2. Potential impact during Operation phase

The operation of the proposed project, accompanying works and rehabilitation works are not expected to have direct impact on the climate of the broad study area but will have impact on fugitive form and deforestation activities during line maintenance. The substation operation will emit through the use of ancillaries and hence the predicted impacts are minor.

So, we are expecting to have positive impact regarding reduced GHG compared to energy production from fossil hydrocarbons and negative impact from fugitive form and deforestation activities during line maintenance.

- Positive impact on climate change

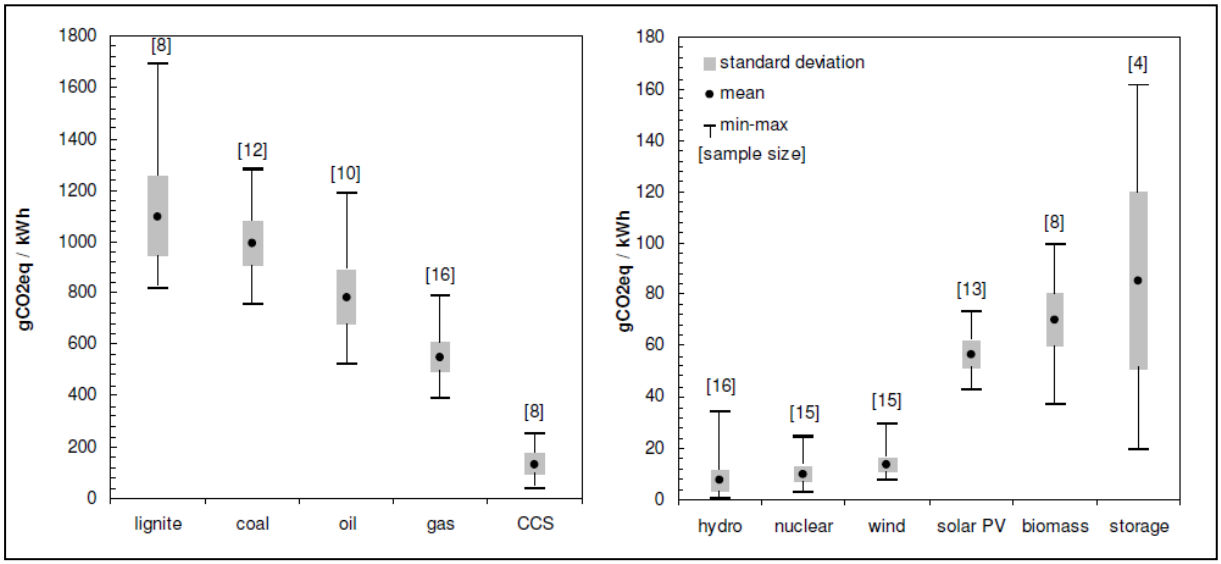
Regards to the impacts of the operation of the project with relation to climate change, this is achieved by replacing the combustion of fossil hydrocarbons for energy production.

According to the international literature, it is generally accepted that PV Projects are considered low/zero CO_2 power plants, taking into account emissions related to the construction, maintenance and demolition of substations. Among the available bibliographic data, the amount of carbon produced during the life cycle, between different power plants varies, depending on individual estimates and uses of different technologies.

The figure below presents the production (in life cycle) of an equivalent amount of CO_2 per KWh generated for the various power plants.

Table 64. Generation (in life cycle) of an equivalent amount of CO_2 per KWh generated for the various power plants130.

[130] Daniel Weisser, A guide to life-cycle greenhouse gas (GHG) emissions from electric supply technologies PESS/IAEA, Wagramer Strasse 5, 1400, Vienna, Austria



The above figure shows the very high CO_2 equivalent production values associated with conventional hydrocarbon combustion plants (400-1800 gCO_2eq / KWh). On the contrary, solar PV generation is characterized by facilities with very low CO_2 equivalent emissions (80 gCO_2eq / KWh). These estimates confirm the large contribution of solar PV generation projects to reduce climate change phenomena from fossil fuel combustion.

The project under consideration is estimated to provide the grid with a total of about 19,680- 21,680-ton CO_2/year =19.68 - 21.68 Gg CO_2/ year.

In order to estimate the avoided CO_2 emissions associated with the operation of the project the document "Methodologies for the Assessment of Project GHG Emissions and Emission Variations" (European Investment Bank, 2014) was taken into account. The coefficients presented in the table that follows, are derived from the above-mentioned document.

Table 65. Purchased Electricity: Country Grid Emissions Factors (IEA CO_2 Statistics 2009).

Country	Country Grid Factor	High Voltage Grid +2%	Medium Voltage Grid +4%	Low Voltage Grid +7%	Operating Margin
Albania	3	3	3	3	0

In the above table, five different values are presented, for national country electricity grids with all figures expressed in grams CO_2 per kilowatt hour (g CO_2 /kWh). The figures are net production data based on IEA national gross electricity and heat production statistics[131].

A preliminary estimation of avoided g CO_2/year for the operation of the project is presented in the table that follows.

Table 66. Avoided g CO_2/year for the operation of the project

Criteria	Karavasta PV	
Energy Production GWh/year	**271**	**246**
Avoided ton CO_2/year	**466,120**	**423,120**

In conclusion, the operation of the project is associated with the avoidance of production of significant amounts of CO_2 per operation year.

[131] "Methodologies for the Assessment of Project GHG Emissions and Emission Variations" (European Investment Bank, 2014)

In any case monitoring programmes and further studies can evaluate more this phenomenon. Taking the above mentioned into account, the magnitude of the impact on climate is presented in the Table that follows, with regards to the operation of the project, for the alternatives of the project.

- Negative impact on climate change (greenhouse gas emissions)

In our project part of OHL equipment of each 220-kV bay is One (1) 245 kV circuit breaker, 3-phase, SF6 type;

Single Interrupter with SF6 for 245 kilovolt systems a Gas Insulated Switchgear (GIS) will be used at the SS. GIS is a compact multi component assembly enclosed a ground metallic housing in which the primary insulating medium is compressed Sulphur hexafluoride (SF6) gas. SF6 acts as insulation between live parts and the earthed metal closure. Sulphur hexafluoride is an extremely potent greenhouse gas that is used for several purposes when transmitting electricity through the power grid. Several factors affect SF6 emissions from electric power systems, such as the type and age of the SF6-containing equipment and the handling and maintenance procedures practiced by electric utilities. Because of its long-life span and high global warming potential (GWP), even a relatively small amount of SF6 can impact the climate. The electric power industry uses roughly 80 percent of all SF6 produced worldwide. Ideally, none of this gas would be emitted into the atmosphere. In reality, significant leaks occur from aging equipment, and gas losses occur during equipment maintenance and servicing. With a GWP 22,800[132] times greater than carbon dioxide (CO_2) and an atmospheric life of 3,200[133], Release on 1 kg of this gas is equivalent to 22.8 tonnes of CO_2. (USEPA, 2017).

Table 67. Estimated Greenhouse Gases Emissions for Substation and OHL

Parameter	Energy Data Input kWh	factor MMT CO_2 eq. [134]	ton CO_2 /kWh	ton SF_6 /kWh as CO_2 equivalent
Substation				
60 MVA Transformer	48,000	0.0034	162.96	3715.488
60 MVA Transformer	48,000	0.0034	162.96	3715.488
Total	-		325.92	7430.976

When there are significant leaks occur from aging equipment, and gas losses occur during equipment maintenance and servicing, the project will have a significant contribution of the emission of GHG emissions with estimated total emissions of 7430 ton SF_6 /kWh as CO_2 equivalent at Substation.

In electric power systems, SF6 gas is used in medium voltage and high voltage switchgear for insulation (such as in gas-insulated switchgear and ring main units) and breaking (in circuit breakers and load break switches). SF_6 is used in gas-insulated switch. Estimates fugitive SF_6 emissions based on total length of transmission lines and a default fugitive emission factor. gear and substations, gas circuit breakers, and—less frequently—in high-voltage gas insulated lines. SF_6 may escape as fugitive emissions during the manufacturing, installation, use, maintenance, and disposal of this equipment. Distribution equipment that is sealed may not emit any SF_6 during use, but transmission equipment often requires periodic refilling and so has higher fugitive emissions during use. The amount of SF_6 emissions during operation and decommissioning is related to the number and type of equipment used, as well as to the maintenance and

[132] Forster, P.; Ramaswamy, V.; Artaxo, P.; Berntsen, T.; et al. (2007). "Chapter 2: Changes in Atmospheric Constituents and Radiative Forcing" (PDF). Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. pp. 129–234.
https://climatechangeconnection.org/emissions/co2-equivalents/
[133] Myhre, G.; Shindell, D.; Bréon, F.-M.; Collins, W.; et al. (2013). "Chapter 8: Anthropogenic and Natural Radiative Forcing" (PDF). Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. pp. 659–740.
[134] Referred to https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf - Table 4-108: IPCC (1997). Revised 1996 IPCC Guidelines for National Greenhouse Inventories. Houghton J.T., Meira Filho L.G., Lim B., Tréanton K., Mamaty I., Bonduki Y., Griggs D.J. Callander B.A. (Eds). Intergovernmental Panel on Climate Change (IPCC), IPCC/OECD/IEA, Paris, France.

recycling procedures. Referring to (IPCC 2006c). we have estimated Total GHG Emission from operations and maintenance activities related to the Project per Year.

Table 68. Estimated Total GHG Emission from operations and maintenance activities related to the Project per Year

Activity	Factor emission	CO_2 Emission (tCO_2e)
Transmission Lines Fugitive SF_6 Emission	1.29	49.66
Total estimated GHG for Substations (Table above)		7430.976
Total		**7,480.64**

Therefore, the climate change impact during the operational stage is considered to be minor, assuming that the maintenance shall be conducted appropriately. However, since the GHG will be emitted during the maintenance and under the as a result of uncommon condition, the rating of greenhouse gases emission during operation necessary mitigation measure is required. It is considered to be moderate positive.

Considering the positive impact that this type of energy production reduces roundly 466,120-ton CO_2 and produce 7,480.64-ton CO_2 (2% of total avoided carbon equivalent) the general impact on Climate change can be considerate minor to moderate positive one.

Table 69. Estimation of project magnitude of impacts on climate change during the operation phase

Aspect					
Green gases emission					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary (weeks)	Regional	Long	Possible	Moderate
Receptor					**Sensitivity**
Local residents in agricultural zone and along the Route of the OHL.					Low - PV Plant Low - OHL
Overall Significance of Impact					
Minor to Moderate Positive – PV Plant					
Minor to Moderate Positive – OHL					

The significance of the operation of the project on climate change can be characterized as **moderate** (**positive**), taking into account the projections referring to the territory of Albania. This does not concern only the broad study area but also Albania and the global level.

General Mitigation measures

The following measures for reduction of SF6 emissions will be considered and implmented where appropriate:

- Alternatives to SF6, with a low global warming potential;
- Reduce filling quantity and minimized leakage rate through improvements in technology and management;
- Increase recycling ratio prompted by stronger policy incentives; and
- Increased ratio of substitution of SF6.

Residual impacts

Taking into account the mitigation measures the residual impacts of the project on climate, during the operation phase can be characterized as **positive**.

Minor to Moderate Positive – PV Plant and OHL

6.3.2.3. Potential impacts during decommissioning phase

There will be no direct Climate change impact as a result of decommissioning phase activities. Treatment of PV modules and transformers are taken in consideration in the paragraph above:

Negligible – PV Plant and OHL

6.3.2.4. Potential impact from Climate Change Adoption during Operation phase

Flood and Sea Level

The Study Area "Photovoltaic Karavasta 140 MW" is located in the West of Albania (40°50'56.44''N Latitude and 19°27'12.5''E Longitude) close to Adriatic coast (about 4 km). The study area is situated between South Drainage Canal and Semani River in South-Southwest, Myzeqe Drainage Canal and Karavasta Lagoon in North, drainage canals and Adriatic coast in West and drainage canals in East. All the Project area drains northwards towards Dokollarëve Drainage Canal, and ultimately to the Karavasta Pumping Station which discharges the water into the Adriatic Sea. Currently, in the prospect of sea level rise due to climate change, the Project includes a preventive strategy against foreseeable flooding in the lower areas. There are several objectives, including protecting the population and facilitating the natural setback of the ecosystems.

However, the hydrological study and Hydrodynamic modelling[135] of the Semani River and the Myzeqe canal indicate that the Study area is not prone to flooding.

To be noted as well that the PDA is at a distance of 4 km from the erosion deposit area carried by the Seman River, so the possibility that in the project area we have large flood flows from the Seman bed and from rising sea water levels during construction time and during operation (30 years) is small.

Wetlands play an important role when facing climate change effects, in an adaptive way, helping capture greenhouse gases, and through mitigation, helping cope with sea level rise.

Karavasta lagoons have a neotectonic origin. They were created during the closing of old marine bays by sandy belts. The Karavasta lagoon is one of the youngest natural water objects in the hydrographical network of Albania. It is formed during the last centuries as results of the accumulation of solid discharge of Semani and Shkumbini Rivers. Once upon a time part of Adriatic and Ionian gulfs; have been separated with sea by Quaternary deposits (Luli N. 1964). Its creation started during Pliocene Period, some 4-5 million years ago, and its creation lasted during the Quaternary Era till our days.

[135] ICE-000-P06-V01 Karavasta 140MW - Hydrological Survey

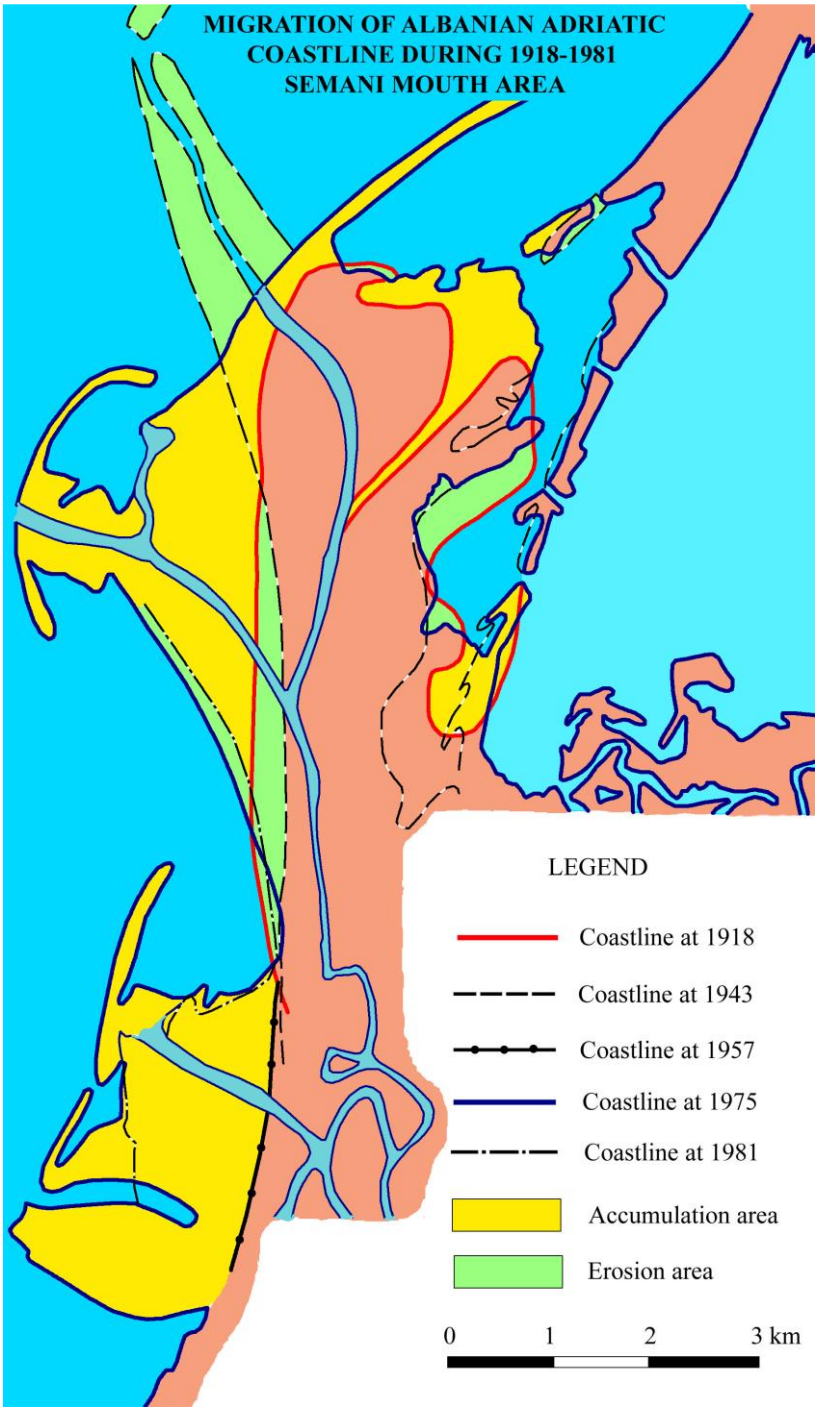


Figure 170.The general map of the evaluation of the coastline from 1918 to 1981 in the Karavasta area/ Erosion and accumulation processes

Satellite imagery above show te dynamic of the change of the coast line in the Seman and Shkumbini River mouths is also determined by variation of the impact of the suspended load discharge of this river in the Adriatic Sea are Wt=23.7206 tones/year[136]. From this about 20% of total sediment load is equivalent to Wt=4,751206 tones/year is carried bat load and the other is 80% of total sediment load equivalent to Wt=19.0106 tones/year. Is suspended sediments (Pano N. 1984).

[136] http://itc.upt.al/nfra/papers/geosciences/ICS-Frasheri-Trieste/Frasheri-Karavasta-Trieste.pdf

From the study of the longitudinal profile along the axis of the river flow to the depth of the sea of 5m, it results that the sea bed for the period 1980-2011 in a length of about 1km is filled by solid river flows with a depth of over 5 meters significantly softening and its slope.[137]

The Project is located in the stable area and has as sea flood defences sandy dunes created by accumulation area of the Seman River thus significantly reducing the risk of direct flooding from the sea and changes in sea level.

Climate change will impact temperature and irradiance and therefore will alter the output capacity of PV systems. PV systems present a negative linear relationship between the energy output and the temperature change, while the increase of solar radiation is proportional to the PV energy output.[138]

The Project will incorporate the appropriate drainage design and measures at site to protect against flooding from Semani river.

Negligible – PV Plant and OHL

6.3.2.5. Cumulative impact

There will be minor positive cumulative impact as a result of construction activities or during the operation and decommissioning phases.

Negligible – PV Plant and OHL

6.3.3. Impacts from Noise and Vibration

This section assesses the potential impacts from noise and vibration generation as a result of the Project activities. Noise and vibration emissions are likely to occur during construction and preparatory phase, operation and decommissioning phases. Potential receptors in the study area consist mainly of the residential population living near the proposed site of the PV Solar plant and Overhead Transmission Line (OHL) route. Fauna species may be also disturbed due to noise and vibration emissions.

Sources of impacts for noise and vibration emissions may include as follows:

- Noise and vibration emissions due to earthworks for the PV solar plant, OHL and any potential rehabilitation of access roads in the area nearby;
- Noise and vibration emissions from vehicle movement, transportation activities and working machineries involved in Project construction (i.e., excavators, bulldozers, trucks, roller, etc.);
- Increased traffic causes noise and vibration impacts. Project related traffic is limited to daytime, therefore impacts from light pollution are minimal;
- Erection of towers and conductors for the OHL;
- Noise emissions from the use of equipment during work activities (e.g., generators).

The Noise Level Guidelines (IFC, WHO) refer to noise originating from facilities as well as stationary noise sources, and are commonly applied as design standards for industrial and infrastructure facilities. The Albanian Government also provides similar guidelines[139] and standards to ensure industrial activities are compatible with a clean and safe environment.

Table 70. IFC Noise Level Guidelines

	IFC Standards[140]	National Standards

[137] (Pano N. 1984).

[138] Jerez, S., Tobin, I., Vautard, R. et al. The impact of climate change on photovoltaic power generation in Europe. Nat Commun 6, 10014 (2015). https://doi.org/10.1038/ncomms10014
Wild M. (2012) Solar Radiation Versus Climate Change. In: Meyers R.A. (eds) Encyclopedia of Sustainability Science and Technology. Springer, New York, NY. https://doi.org/10.1007/978-1-4419-0851-3_448

[139] Ministerial Guideline No. 8, dated 27.11.2007 “On the noise limit levels in certain environments”.

[140] https://www.ifc.org/wps/wcm/connect/4a4db1c5-ee97-43ba-99dd-8b120b22ea32/1-7%2BNoise.pdf?MOD=AJPERES&CVID=ls4XYBw

Type of Receptor	Daytime 07:00 – 22:00 1-hr LAeq (dBA)	Night-time 22:00 – 07:00 1-hr LAeq (dBA)	Critical 24-hours LAeq (dBA)	Critical 1-h LAeq (dBA)	Serious nuisance 16-h LAeq (dBA)
Residential institutional or educational	55	45	-	-	55
Industrial or commercial	70	70	70	-	-
Urban environment	-	-	-	85	-

In line with the approach of the IFC, if changes in background noise as a result of noise emissions from the plant are no greater than 3 dBA then noise impacts are not deemed to be significant.

Based on the best practice the following criteria have been used for the assessment/rating of constructional and operational noise impacts. The impact assessment methodology for residential receptors is done based on the following table:

Table 71. Impact Assessment Methodology for Residential Receptors

	Major	Moderate	Minor	Negligible	Not Significant
Construction and Decommissioning Noise	Noise level >15 dBA above criteria.	Noise level between 10 to 15 dBA above criteria.	Noise level up to 10 dBA above criteria.	Noise level up to 5 dBA above criteria.	Noise level below criteria.
Operational Noise	Noise level between >10 dBA above criteria.	Noise level between 5 to 10 dBA above criteria.	Noise level between 3 and 5 dBA above criteria and above baseline.	Noise level below criteria but above baseline < 3 dBA.	Noise level > 10 dBA below criteria and below baseline.

Note: Criteria for construction is 70 dBA; criteria for house receptors are 55 dBA (daytime); daytime is 07:00 to 22:00; night time is 22:00: 07:00.

These operational noise criteria showed in Table 71 above have been used on numerous international development projects and although they do not have a specific legal basis, they are considered as best practice with respect to significance impact rating of noise. Construction sites, however, have special characteristics compared with other major noise generators. Construction is generally undertaken in the open, is usually of a temporary duration, and varying levels of noise are produced by several different types of noise sources. Noise levels created by construction machineries and equipment can vary greatly and depend on factors such as type of equipment, the specific model, the operation being performed, duration of the activity, and the condition of the equipment. There are no standardized criteria for assessing construction noise and associated impacts, and consequently such criteria must be determined on a project specific basis. The Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, and the receptor land use. The following reviews of recognised construction noise guidelines provide guidance to develop suitable construction noise criteria. For construction, noise criteria of 70 dB LAeq, 1-hr are set to take account of the fact that it is temporary, and to acknowledge that construction work by its very nature is noisy and a lower, strictly enforced criteria, can limit development.

6.3.3.1. Potential impacts during construction phase

Noise and vibration during construction phase may arise from different work activities. Typically, this includes construction activities, the preparation of footings for the PV solar plant and OHL, installation of the necessary structures, backfilling and reinstatement, movements of vehicles, equipment and personnel, etc. Moreover, potential daily construction hours may include 07:00 – 18:00, Monday to Friday. The construction of the Project is planned to commence with Plant Site early works in Quarter 3 of 2022, and be in full operations in second half of 2023. The expected duration of the PV construction period consists of 2 months early works, and 11 months construction. The final construction schedule will be specified during the detailed design phase.

Based on the available project information and typology of the project area, there are no anticipated blasting activities that will occur; therefore, no emissions of noise and vibration will be happening from blasting.

Mechanical equipment which is planned to be involved in the construction of the proposed PV solar plant and OHL includes, but is not limited to: track loader, excavator, hydraulic hammer and breaker, roller, mobile crane, air compressor, dump trucks, generators, concrete pump, etc. The level of noise from these items during construction is likely to change based on the use of industry standard and maintenance of equipment/ machineries. For the PV solar plant site there are no anticipated impacts from noise and vibration generation. The site is located in major distance from inhabited areas, approximately 345 m from the closest house. The impact on the PDA Acces Road will be permanent and will be more significant during the preconstruction and construction phase, due to the number of materials and panels to be transported. The impact on OHL access roads will be temporary only during construction. Please see more sensitive areas in the project zone the ones that cross with urban areas refer to the map shown Figure 148.

The main sources of construction noise and vibrations will be restricted to the OHL route, in particular for the installation of towers that are located in close range with human receptors (houses). As a consequence, some intermittent noise and vibration impacts are likely to be experienced by local residents, users of roads and rights of way in the vicinity of the construction locations of the electric towers and local farm workers, for a period of a few weeks, as each tower and associated infrastructure are installed. As construction will be limited to daytime hours during weekdays, there will be no noise disturbance during night-time or at weekends. On the other side, vibration emissions will be generated during the earth compaction after backfilling of the site around towers. Most probably will be used small hand roller compactors (hand-arm vibration), therefore vibration impacts will not be experienced at these locations and there will be no associated risks for houses nearby.

Project workers will be exposed to noise from construction machinery as well as, potentially, hand-arm vibration from hand-held power tools, or whole-body vibrations from surfaces on which the worker stands or sits. Occupational Noise and Vibration will be managed through the development of a construction Occupational Health and Safety Management Plan (OHSMP), which will ensure compliance of the Project with national and international standards/ guidelines (e.g., IFC General EHS Guideline) in relation to OHS noise and vibration.

Other potential noise emissions may arise from vehicle movements in the project area. The roads to be used during construction period pass in vicinity of inhabitated areas, these increased traffic causes noise and vibration impacts. Project related traffic is limited to daytime, therefore impacts from noise and vibration are considered minimal; The impacts are characterized as short-term (6 months) since they will last until the end of the construction period and local (up to 100-300m). During the initial stage of project mobilization there will be increased level of traffic while equipment and materials are transported to the main site of the PV solar. Vehicle movement will continue during the whole duration of the project, nevertheless it is expected that the movement will vary according to the planned works; sometimes it will decrease and other times it will increase. The noise might be felt more in the inhabited areas where the vehicles will pass and OHL will be built, in particular for the electric tower's installations. However, noise and vibration emissions from vehicle movement are predicted to be less significant than other types of noise and vibration generation sources and short-term.

Aspect					
Construction activities, equipment and machinery and traffic					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary (weeks)	Local	Daily	Likely	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local residents within nearby the PV plant and OHL corridor. Project workers.					Medium - PV Plant and OHL
Overall Significance of Impact					
Moderate (noise and vibration) – PV Plant and OHL					

Management and Mitigation

Equipment maintenance, and noise/ vibration emissions and monitoring during construction will be managed through the development of a robust Construction Environmental Management Plan (CEMP) and CTMP. Themitigation measures for noise impacts will include the following:

- Development of the OHSMP for protection of workers and equipment with adequate PPE
- Development of the CTMP (see mitigation measures propose for traffic management);
- Temporary acoustic screening if required;
- Avoid simultaneous work activities that generate high levels of noise/ vibration emissions;
- Prior notification of local residents in case of important work activities that generate noise and/or vibrations;
- Restriction of construction activities to daytime hours and weekdays.

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Minor (noise and vibration) – PV plant and OHL

6.3.3.2. Potential impacts during operation phase

During the Project's operational phase there will be no work activities besides any maintenance needed for the PV solar plant and transmission line. Maintenance works are however predicted to be minor and short-term, therefore there are almost no impacts associated with noise and vibration emissions.

It can be also anticipated that no impacts will be occurring due to the Corona effect that is usually associated with overhead transmission lines and noise emissions. Corona is a typical phenomenon associated with all transmission lines as they can generate small amounts of sound energy under certain weather conditions such as fog, high humidity, rain or snow. This adverse effect becomes more noticeable at higher voltages[141] above 345 kV where under these conditions, a crackling or humming sound may be heard in the immediate vicinity of the OHL route. Since the proposed OHL of the project will be 220 kV it can be concluded that there will be no impacts or noise emissions due to Corona effect. Overall impact significance for this phase is:

Negligible (noise and vibration) – PV Plant and OHL

6.3.3.3. Potential impacts during decommissioning phase

Decommissioning activities will generate noise and vibration emissions of a similar intensity and duration as during construction phase. As a result, impacts will be similar to those experienced during the

[141] https://www.velco.com/library/document/download-migrated/Transmission%20Line%20Corona.pdf

construction phase (see section 6.3.3.1above). Management and mitigation measures are similar to those during construction phase. Therefore, residual impact after management and mitigation measures is:

Minor (noise and vibration) – PV Plant and OHL

6.3.3.4. Cumulative impact

There will be no cumulative impact as a result of construction activities or during the operation and decommissioning phases associated with the PV element of the project. However, in the event that the OST 100kV line is constructed at the same time as the projects overhead line the impacts along the OHL route in terms of noise level are likely to increase and/or be extended. It is recommended that the Project liaises with OST to understand the scheduling of the 100kV line and discuss a collaborative approach to minimise potential impacts and disturbance to local communities along the OHL route during construction.

Negligible (noise and vibration) – PV Plant and OHL

6.3.4. Impacts on Geology and Soil

The Project activities that may pose impacts on geology and soils include clearance of the vegetation cover, topsoil removal, earthworks (excavation of soil), the storage and use of fuels, maintenance of equipment and waste generation.

According to the baseline assessment and findings, soils in the project area demonstrates similar sensitiveness in terms of potential project impacts. Soils in Divjaka-Karavasta area may vary in type from grey brown to saline soils and alluvial soils, however the topography of the terrain is almost the same in the whole project area (flat terrain). There are few differences between the PV solar plant area and OHL route, where the latter is mostly represented by agricultural lands that are intensively cultivated.

In terms of potential impacts, flat terrains have high stability and thus are typically less sensitive to erosion, compaction and pollution, where any likely impact can be localized and controlled. The most likely adverse impacts on geology and soil in the project area may include:

- Degradation of soil quality due to excavation activities, improper disposal of spoil material, nutrient decline of soil quality and higher compaction, etc.;
- Degradation of soil quality due to potential contamination of soils and waters through such activities as effluent disposal (i.e., wastewaters), or through such processes as spillages and improper management of wastes;
- Soil erosion, especially in the absence of vegetation;
- Modification of hydrological regime impacting the processes such as flooding and waterlogging;
- Soil mass movement that could cause small landslides and blockages of the irrigation and drainage channels.

Typical receptors in this case are soil, agriculture land and vegetation.

6.3.4.1. Potential impacts during construction phase

The construction of the PV solar plant and OHL will include earthworks and site clearance, which will result in the removal of the vegetation and topsoil present in the project area, approximately 196.38 ha for the PV solar plant (permanent land) and transmission line (temporary land excluding electric towers). Mostly changes will occur at the PV site, on the contrary low changes in relief are expected during the construction of the OHL. Impacts to soil are most likely to occur at the PV site and locations of transmission towers installation and due to preparation works along the OHL corridor, as the soil structure may be disturbed during the clearance and excavation for the foundations and the backfilling. In addition, the construction of temporary access roads to the PV plant site and places of towers installation, assembling and erection will require earth works that may also impact on geological structures.

Typically, the excavation process and removal of the topsoil and vegetation could result in alterations to the drainage and surface run-off regime on-site, particularly during the wet season (January-April). The volume to be excavated for OHL temporary access roads is estimated at ~ 7000 m^3. Here can also be considered additional land for extension and upgrading of the existing agriculture roads These alterations may cause potential changes in siltation patterns and could further reduce the soil fertility, as well as result in increased surface erosion within the project area.

Other related impacts may include accidental events (spills, leaks and uncontrolled releases) due to the presence of hazardous materials on site, including fuel. In addition, storage and handling of hazardous and non-hazardous wastes within the site may pose risks for possible contamination of soil, especially in cases of improper waste management practices.

Based on the above-mentioned discussions, impacts on soil are considered negative and both direct and indirect. However, the changes on soil will be temporary, only during the construction phase and the scale of the impacts will be at a local level. The magnitude of the impacts and the sensitivity of receptors is different for the PV solar plant site and OHL route. The overall impacts significance prior to mitigation is showed in table below.

Aspect					
Construction activities, excavations, use and storage of fuels and chemicals, improper management of wastes					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct and indirect	Temporary (weeks)	On-site	Daily	Possible	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local soil and geology.					Medium - PV Plant and OHL
Overall Significance of Impact					
Minor – PV Plant and OHL					

Management and Mitigation

In order to address potential impacts on soil and geology a series of mitigation and management measures will be undertaken. Mitigation of impacts relating to soil contamination will be managed through the development of the Project ESMP/CESMP for the construction phase, which will include provision for good working practices in relation to maintenance of vehicles and machinery, use, storage and handling of chemicals and management of wastes. In more details, the following measures are foreseen within the management plan:

- The top layer of fertile soil should be removed (where possible) during construction works and stored. Topsoil stripping is usually done through removal of the upper layer of the soil 30-50 cm.
- The topsoil will be stored and used for the rehabilitation of affected construction areas. Topsoil stockpiles height not to exceed 2 m;
- Effective site drainage to allow for the directed flow of surface water off site;
- Oil interceptors and silt traps shall be put in place to manage and retain sediments on site;
- Preparation of guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals;
- Development of a site-specific Emergency Response Plan for soil clean-up and decontamination;
- Implementation of a training program to familiarize staff with emergency procedures and practices related to contamination events;

- Development of an Erosion and Sediment Control procedure within the CEMP to prevent impacts in surrounding of working areas, drainage and irrigation system;
- Development and implementation of a waste management plan (as part of the ESMP) to ensure that waste is disposed of correctly such that soil contamination is minimized;
- Bunding of areas where hazardous substances are stored (e.g., fuel, waste areas);
- Ensure storage areas have impermeable floor and containment, of capacity to accommodate 110% of the volume of the largest waste container;
- Rehabilitation and re-vegetation of cleared areas adjacent to the PDA which shall include the re-vegetation of bare soils before the next wet season; Land re-cultivation and restoration will be carried out after works implementation. In addition, after completion of construction all the temporary roads and embankments will be reinstated, lands will be re-cultivated and the micro relief reproduced.
- Adequate sanitary facilities to be provided for the construction workforce; It is recommended one mini-toilet for every 7 workers according to best practices[142].

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Negligible Minor – PV Plant and OHL

6.3.4.2. Potential impacts during operation phase

During the operation phase there are no anticipated impacts on soil and geology as work activities will be completed during the construction phase. Any potential impacts may be related to accidental events (spills and uncontrolled releases) during operation or any maintenance activities. Also, storage and handling of hazardous and non-hazardous wastes within the site may pose risks for possible contamination of soil, especially in cases of non-proper waste management practices. Oils / fuel spills from vehicles or machinery and the use of chemicals/paints used for maintenance work on OHL may occur, but the likely impacts are considered to be minimal.

Mitigation of impacts relating to soil contamination will be managed through the development of the Project ESMP for the operation phase, which will include provision for good working practices in relation to maintenance of vehicles and machinery, use, storage and handling of chemicals and management of wastes. In conclusion, the overall impact significance after mitigation measures and management plans is:

Negligible – PV Plant and OHL

6.3.4.3. Potential impacts during decommissioning phase

Impacts on soils and geology during the decommissioning phase are considered less than during Project construction as, although there will be some ground disturbance, the aim of decommissioning is to remove foundations, hardstanding and other Project infrastructure, rather than areas of top- and sub-soil. In the end of the decommissioning process all affected areas will be reinstated. Therefore, the impacts in this phase are predicted:

Negligible – PV Plant and OHL

6.3.4.4. Cumulative impacts

There will be no cumulative impact as a result of construction activities or during the operation and decommissioning phases associated with the PV element of the project. However, in the event that the OST 100kV line is constructed at the same time as the projects overhead line the impacts along the OHL route in terms of soil pollution and geology are likely to increase and/or be extended. It is recommended

[142] https://www.hse.gov.uk/pubns/cis59.pdf

that the Project liaises with OST to understand the scheduling of the 100kV line and discuss a collaborative approach to minimise potential impacts and disturbance to local communities along the OHL route during construction.

Negligible – PV Plant and OHL

6.3.5. Impacts on Water Resources

Water resources will include both groundwater and surface water. The key potential impacts on surface and groundwater resources may include as follows:

- Earthworks in the project area may increase the erosion, especially during rainfall events, which may increase the suspended sediment concentrations and pollute water resources;
- Disruption of the irrigation and drainage patterns/ network scheme due to earthworks for the PV plant and OHL;
- Degradation of surface water and groundwater quality as a result of accidental leaks/spills or siltation due to earthworks;
- Sewage will generate from the construction workforce (toilets and washing facilities) and during the operation phase of the PV plant;
- Liquid effluents will also arise from washing of equipment (i.e., PV solar panels); and
- Inappropriate storage and management of wastes, material storage that may lead to water quality impacts from run-off entering, and improper drainage channels inside the PV plant site.
- The site facilities will ensure availability of water for staff use (washing hand, toilets etc) with water tanks to be filled with rotation trucks. Drinking water will be supplied from local companies each week.
- For sanitary and construction water Voltalia will take it with tanks from local suppliers.
- For construction use each subcontractor will provide their own water

Quantity of water volume required for mobilization phase and construction phase of the OHL and PV site::

- Drinking water 352 000 liters
- Sanitary water 7 040 000 liters
- For construction needs 1 200 000 liters.

6.3.5.1. Potential impacts during construction phase

Modification of irrigation and drainage patterns

Construction activities could affect natural irrigation and drainage patterns in the project footprint area, in particular within the PDA. Excavation works for the foundations opening, hard structures, levelling and reshaping of slopes and deepening of drainage channels in the project sites could modify, deteriorate, damage and/or cause blockages in the irrigation and drainage system. It should be noted that all existing drainage channels will remain and no additional drainage channels are proposed within the PDA. Any works on the existing drainage channels is only required due to the lack of historic maintenance of the channels and the only works proposed of the channels is to ensure that they function as originally designed; such works is envisaged to include the deepening and restoration of the slopes. The rehabilitation of drainage channels may increase sediment loading; no changes in overall performance of the drainage is foreseen during the construction phase, and once rehabilitation of the channels is complete the overall performance of the drainage system should improve and be more closely aligned to its original design. This improved performance may lead to increase flows within the channels which may improve overall water quality. All these processes could lead to adverse impacts such as increased erosion, sediment transport, and sediment deposition impacts.

No reductions to the connectivity of irrigation and drainage channels within or nearby the project footprint areas are envisaged as all channels will remain and their overall functioning improved.

The majority of potential impacts on irrigation and drainage network scheme is anticipated within the PDA due to the presence of the extensive existing irrigation / drainage channels in the area, large construction work surface area and larger presence of water flows. For the OHL route impacts on irrigation and drainage scheme are deemed to be lower due to the proposed locations of the tower pylons which will typically be located a fair distance from the channels. Based on the baseline survey two challenging sections along the OHL route were identified, namely: (i) section from tower 3 to tower 7 which is regularly inundated due to flooding issues from the main drainage channel in the area, and (ii) section from tower 10 to tower 15 which are not closely related to the irrigation and drainage patterns, but to the presence of Seman river that causes flooding in the riparian areas nearby.

Based on the above discussions the impact significance prior to mitigation is rated as follows:

Aspect					
Construction activities, excavations, alterations in the irrigation and drainage patterns/ network					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local	Daily	Unlikely	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Irrigation and drainage patterns/ network, lands nearby					Medium - PV Plant and OHL
Overall Significance of Impact					
Moderate – PV Plant and OHL					

Management and Mitigation

The following mitigation measures are recommended to be implemented for the preservation and functionality of the irrigation and drainage network scheme:

- The irrigation and drainage pattern/network scheme around the PV plant site and areas of work for the OHL towers shall not be altered, but kept disciplined and functional to the maximum extent possible with the natural/ existing water flowing, channel depth and slope inclination to prevent blockages and/or flooding in surrounding lands;
- Develop an Irrigation and Drainage Preservation Procedure within the CEMP; This procedure should clearly define mitigation and management measures for temporal diversion of the channels when necessary or when construction works are being implemented in a particular section;
- Develop an Erosion and Sediment Control Procedure within the CEMP to define measures that prevent and/or reduce impacts and control the risk of erosion and sedimentation impacts on existing water bodies in the project area. This measure could include potential silt fencing in specific working locations, changes or improvements in the project design, erosion protection interventions, reshaping of slopes, hydro-seeding or planting of vegetation, etc.;

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Minor – PV Plant and OHL

Increased sediment content of surface waters and deterioration of water quality

Temporary contamination of surface waters with run-off from construction sites may take place during the construction phase. Site clearance and construction activities for the PV plant and OHL, including the removal of soil (and topsoil) could result in the acceleration of erosion, increased surface water run-off and sediment load in surface water bodies (drainage and irrigation channels). As a consequence, this may lead to the increase of soil particles in surface water bodies and notable (visual) deterioration of the water quality caused by higher turbidity.

Moreover, there will be heavy machineries, construction materials and other equipment on-site that will be used for the opening of the access roads, site preparation as well as foundations for the PV solar plant and OHL towers. If these machineries and equipment are not maintained in a good state of repair, hydrocarbon-related leaks from construction plant and equipment could be part of the surface water run-off leading to water pans thus adversely affecting surface water quality. The potential release of these contaminants and extra sediment loads in surface water bodies (including drainage/ irrigation channels) can also lead to an impact on the aquatic ecology.

Besides the above-mentioned sources of impact, there may be additional sources of pollution such as accidental spillages of fuel/hydrocarbon and hazardous materials, lubricants, cement and wet concrete; as well as potential pollution from inadequate or unsafe storage of wastes, handling and disposal of sanitary wastewater and domestic water from the contractors during the work activities.

Nevertheless, there are differences to the extent of impacts, magnitude and sensitivity of the areas between the PV solar plant and OHL route. Higher impacts are predicted for the PV solar plant due to the large surface area it covers. Instead, for the OHL route the requirements for vegetation clearance and work site surface area are much more limited and rated to the minimum of impacts in terms of increases in run-off flow and sediment load. Overall, the impacts for both project components are predicted to be short-term duration and localized. The impact assessment matrix is rated in more details below:

Aspect					
Construction activities, excavations, alterations in the hydrological pattern/ scheme, wastes and wastewaters					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct and indirect	Temporary (weeks)	Local	Daily	Likely	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local surface waters (irrigation and drainage network)					Medium - PV Plant and OHL
Overall Significance of Impact					
Moderate – PV Plant and OHL					

Management and Mitigation

The following mitigation measures are recommended to be implemented for the protection of surface water bodies:

- The hydrological pattern and scheme around the PV plant site and areas of work for the OHL towers shall not be altered and kept disciplined to the maximum extent possible with the natural/ existing water flowing, channel depth and slope inclination;
- Develop an Erosion and Sediment Control Procedure within the CEMP to define measures that prevent and/or reduce impacts due to erosion and sediment creation;
- Flow of the drainage channels as passing through the PV plant site shall be maintained and adapted as per above scenario;

- Special attention needs to be taken during the access roads rehabilitation for the PV plant and OHL towers in order to maintain proper drainage and standard slope inclination as the soil cannot wash out in the water body. In addition, it may also be needed proper compaction and filling with construction material (e.g., crushed stone) of the access road structure;
- Adequate arrangement for storm water management during construction period shall be made to avoid sediment run-off from the construction site;
- Storm water flow must be directed to the existing drainage channels with appropriate mitigation measures such as use of silt traps/ fences to avoid sedimentation and/or blockages of the channels or contamination of the receiving water body.

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Minor – PV Plant and OHL

Potential groundwater contamination

As mentioned above, vegetation clearance, earthworks and soil compaction may increase the intensity and volume of surface water run-off as a result of a decrease in water infiltration recharging the groundwater. Improper handling and disposal of sewage, wastewaters and other solid wastes can eventually contaminate the groundwater resources in the area. The hydrogeology of the project area could potentially be affected if any leaked hydrocarbons permeate into the sub-surface and through cracks in the bedrock geology come into contact with the groundwater. Groundwater contamination during the construction phase may occur from unplanned events such as leaks and spills of oil, lubricants, fuel from heavy equipment, improper handling of wastes and sewage.

Mitigation measures such as storage of oil, lubricants, fuel at concreted laydown areas are foreseen to be implemented to minimize contamination in the event of a spill. Proper sanitary facilities are anticipated to be provided on-site. While there is a potential for short-term direct impacts to groundwater quality from construction, proper handling of fuel, waste and liquid effluents, the impact to groundwater from spills and leaks is assessed to be low.

Aspect					
Construction activities, excavations, alterations in the hydrological pattern/ scheme, wastes and wastewaters					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct and indirect	Short-term	On-site	Daily	Possible	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Groundwater resources.					Medium - PV Plant and OHL
Overall Significance of Impact					
Minor – PV Plant and OHL					

Management and Mitigation

The following mitigation measures are recommended to be implemented for the protection of groundwater resources:

- Fuel, oil and used oil storage areas shall be contained in bunds of 110 percent capacity of the stored material;
- Refuelling shall be carried out in designated areas using strict protocols;

- Spill containment and clean up kits will be available on-site and clean-up from any spill shall be appropriately contained and disposed of at a bound landfill site;
- Project staff shall not be permitted to utilize any water sources (stream, river, or other water bodies) for the purposes of bathing, washing of clothing;
- Construction vehicles/ machineries and equipment shall be serviced regularly at off-site location;
- Ensure that all construction plant and equipment is maintained in a good state of repair with minimal leaks;
- Oil leakage or spillage shall be contained and cleaned up immediately. Waste oil or hydrocarbons shall be collected and stored for recycling or disposal;
- Adequate sanitary facilities, i.e., toilets and waste bins shall be provided for the construction workforce;
- Workers shall be trained in the use of designated areas/bins for waste disposal and encouraged to use toilets;
- Licensed companies shall be contracted for management and disposal of wastes, wastewaters and sludge from the septic tank.

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Negligible – PV Plant and OHL

6.3.5.2. Potential impacts during operation phase

One of the key activities during the operation phase is the regular cleaning of PV modules to prevent dust build-up which could affect their performance. This has the potential to consume significant quantities of water. In order to reduce the water demand of the project it is planned that the PV modules will be cleaned monthly using dry cleaning techniques, with wet cleaning (using water) only planned on a quarterly basis, otherwise there will be a degradation in plant performance. For wet cleaning it is estimated that on average around 1 litre of water per PV module is required, which equates to around 300 m^3 of water per wet clean, and up to a total of 1,200 m^3 per year. The whole process is not expected to use any additives which might alter the water quality. Nevertheless, in case of usage, it must be biodegradable with low environmental impact and contain no volatile organic compounds (VOCs), phosphate and be chlorine free. This would be the maximum water quantity required for the wet cleaning process of Karavasta solar plant, however this does not mean that will be done 4 wet cleaning per year. Based on Voltalia's previous experience with a similar solar plant in France, the PV modules did not require any additional wet cleaning process besides dry cleaning with rainwater. Most probably for Karavasta solar plant will be a similar situation, an assumption of 2 wet cleaning processes on average per year would surely be a more accurate estimation.

The water for cleaning, and potable use, will be sourced from local permitted resources / suppliers. No abstraction of groundwater or surface water resources, such as drainage/irrigation channels will be undertaken by the project. This will include agreements with local water supply companies (e.g., Kondi shpk) and/or local fire stations. Water will be supplied through water trucks at the moment when the wet cleaning process will be needed (preliminary assumption 2-4 times per year). The Developer and the Consultant discarded the initial option of creating a groundwater well or sourcing from a close surface water resource, as the need for water supply is considered limited and water treatment would have been necessary. From a permitting point of view, it also makes things easier and the developer will be looking forward to signing an agreement either with a private company or with the municipality (fire department) to supply water via water trucks. This new solution means that there will be no impacts on water resources (surface water and groundwater) during the operation phase. Therefore, the evaluation of the impact significance will result as follows:

Aspect

Groundwater and surface water bodies					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term	Local	Daily	Likely	Low - PV Plant
Receptor					**Sensitivity**
Groundwater and surface water resources					Low - PV Plant
Overall Significance of Impact					
Negligible – PV Plant					

Management and Mitigation

The following mitigation measures are recommended to minimize water consumption and enhance water reuse:

- Periodical training is needed to be provided to workers for best utilization of water during operation;
- Potential provision of rainwater harvesting and use during the wet cleaning process of PV modules;
- Recycle/reuse of water to the extent possible.

PV Modules Cleaning Systems and Methodology

The water required during operational phase of the project will be mainly for washing the solar modules. From discutions with project team it is understood that approx. 1 L of water will be required per month for cleaning of one module. To reduce the water demand of the project it is planned that the PV modules will be cleaned monthly using dry cleaning techniques, with wet cleaning (using water) only on a quarterly basis.Other proposed measures include installation and use of rainwater harvesting and steam cleaning equipment and prohibiting extraction of groundwater or surface water for both construction and operation activities of the project.

Below is a summary of the cleaning techniques that are used for large scale solar projects.

- Manual cleaning

Manual cleaning consists of using a nonconductive brush, sponge, or other mild agitating method, and is performed by brushing and rinsing the modules with brooms and water. Quality of cleaning varies depending on the workers professionalism and motivation and on the equipment they use. When the module is wet it is hard to tell whether it was properly brushed and if all the dirt was removed. Stains or a heavy dirt coating may be only partially removed with remains left on the glass after the module dries. This method can be performed with a dry or wet brush cleaning, depending on the type of dirt.



Figure 171. Manual cleaning

- *Robotic cleaning*

Robotic cleaning is performed by a machine with an automatic or semi-automatic system mechanism of rotating brushes, combined with a blower, angled in such a way as to push dust down and away from the modules that assists in manual cleaning. Automatic cleaning allows absolute control over module brushing and complete removal of dirt takes place systematically. This process will be handled by an operator and this method can be performed with a dry or wet brush cleaning, depending on the type of dirt.



Figure 172. Robotic cleaning

- *Mechanical cleaning*

Mechanical cleaning consists of a synthetic fibre roller that, by means of a rotary system, rotates continuously on the module surface. The system is arm mounted on an all-wheel-drive vehicle, designed specifically to clean free field solar power plants, and can clean entire module rows in one pass. This method can be performed with a dry or wet brush cleaning, depending on the type of dirt.



Figure 173. Mechanical cleaning

It is considered that the project will use robotic and manual cleaning as the space between strings does not allow mechanical cleaning.

In conclusion, in the case of wet cleaning, the amount of water needed is insignificant. There would be no need of water if Voltalia manages to successfully implement dry cleaning of the modules. If wet cleaning will be necessary, water runoff / discharge from the panels is likely to get evaporate or absorbed into the arid ground below the panels, and no drainage canal is required. Proper equipment (steam equipment) is recommended to rationalize use of water tank trucks & storage tanks on site. 'Voltalia will install and use rainwater harvesting and steam cleaning equipment.. Extraction of groundwater or surface water for both construction and operation activities of the project is prohibited.

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Negligible – PV Plant

6.3.5.3. Potential impacts during decommissioning phase

Impacts on water resources during the decommissioning phase are considered to be less significant than those during Project construction. As a result, the significance of impacts is rated:

Minor – PV Plant and OHL

6.3.5.4. Cumulative Impact

No cumulative impacts are foreseen in relation to water resources.

Negligible – PV Plant and OHL

6.3.6. Impacts from Wastes

During its life cycle, mainly during the construction phase, the proposed PV solar plant and OHL will include numerous work activities such as site clearance, removal of vegetation, excavation works, setting up of labour and staff working facilities (base camp), installation of modules/panels and temporary structures that will generate different types and amounts of wastes (solid and liquid wastes). The largest quantities of wastes are expected to be non-hazardous, however there may be certain hazardous wastes that may be generated in small quantities. Typically, the following types of wastes will be generated due to the development of the project:

- Excavated soil material (spoil/surplus material) due to earthworks and construction activities;
- Municipal and domestic solid waste from workforce;
- Sanitary waste and sewage from workforce;
- Waste oil from generator and other construction machinery;
- Packaging waste such as gunny bags, plastics, paper/cardboard, etc.;
- Empty paint containers, metal scrap, paints, varnishes, adhesives, anti-corrosive substances, etc.;
- Construction debris.

In regard of the managmant of broken solar panels, Voltalia confirms that until the end of work, the broken solar panels will be stored on site in containers. Up to now no acceptable recycling company has been identified, but Voltalia is continuing efforts to identify a recyling company.

Receptors

Potential receptors will be local communities and houses within and/or nearby the project area. Improper management of solid and liquid waste may lead to air, water, soil pollution and odour nuisances in and around the project site.

Potential Waste Streams Generation

The potential waste streams that may be generated during the project development phases (i.e., construction, operation and decommissioning) have been evaluated on the basis of Voltalia's previous similar projects and the ESIA team's experience. Reference has also been made to Albanian legislation, namely the DCM No. 99, dated 18.02.2005 "On the approval of the Albanian Waste Catalogue" amended, European Waste Catalogue[143] and international guidelines[144] for PV solar plants and transmission lines.

Table 72. Potential Waste Streams and Classification Codes for the proposed project

[143] https://www.sustainabilityexchange.ac.uk/the_european_waste_catalogue_ewc
[144] https://www.gov.uk/how-to-classify-different-types-of-waste

List of wastes		Construction Phase	Operation Phase	Decommissioning Phase	Quantity in the Construction phase	Quantity in the O&M phase	Potential quantity for a 140 MW PV Project
Type of wastes	Code of wastes				(ton / MW)	(ton / MW)	(ton)
Non - hazardous wastes							
Paper and cardboard packaging	15 01 01	Yes			4.52		632.8
Plastic packaging	15 01 02	Yes			0.03	0.004	4.76
Wooden packaging	15 01 03	Yes			0.18		25.2
Metallic packaging	15 01 04	Yes			0	0.029	4.06
Mixed packaging	15 01 06	Yes			0		0
Waste glass packaging	15 01 07	Yes			0		0
Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	15 02 02				0		0
Absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02	15 02 03	Yes			0		0
Discarded equipment other than those mentioned in 16 02 09 to 16 02 13	16 02 14	Yes			0.23	0.023	35.42
Wastes not otherwise specified	16 07 99	Yes					
Concrete	17 01 01	Yes		Yes	1.45		203
Wood	17 02 01	Yes			1.97		275.8
Plastic	17 02 03	Yes			0.2		28
Iron and steel	17 04 05	Yes		Yes	0.72		100.8
Mixed metals	17 04 07	Yes		Yes	0		0

List of wastes		Construction Phase	Operation Phase	Decommissioning Phase	Quantity in the Construction phase	Quantity in the O&M phase	Potential quantity for a 140 MW PV Project
Type of wastes	Code of wastes				(ton / MW)	(ton / MW)	(ton)
Cables other than those mentioned in 17 04 10	17 04 11	Yes	Yes	Yes	0.06		8.4
Soil and stones other than those mentioned in 17 05 03 (Surplus natural material)	17 05 04	Yes			1.4	0.004	196.56
Mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	17 09 04	Yes		Yes	0		0
Scalps, syringes, sharp instruments (except 18 01 03)	18 01 01	Yes					
Waste, collection, and disposal of which requires special treatment to prevent infections	18 01 03	Yes					
Medications other than those mentioned in 18 01 08	18 01 09	Yes					
Paper and cardboard	20 01 01	Yes					
Glass	20 01 02	Yes					
Biodegradable kitchen and canteen waste (organic wastes, i.e., food wastes)	20 01 08	Yes					
Cloths	20 01 10	Yes					
Paint, inks, adhesives, and resins other than those mentioned in 20 01 27	20 01 28	Yes					
Discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	20 01 36	Yes	Yes	Yes			
Wood other than that mentioned in 20 01 37	20 01 38	Yes					
Plastics	20 01 39	Yes		Yes			
Metals	20 01 40	Yes		Yes	0	0.089	12.46
Other fractions not otherwise specified	20 01 99	Yes					
Biodegradable waste	20 02 01	Yes			0.26	0	36.4
Mixed urban waste	20 03 01	Yes	Yes	Yes			
Septic tank sludge	20 03 04	Yes	Yes			1.174	164.36
Hazards Wastes (*)							
Packaging containing residues of or	15 01 10*	Yes					

List of wastes		Construction Phase	Operation Phase	Decommissioning Phase	Quantity in the Construction phase	Quantity in the O&M phase	Potential quantity for a 140 MW PV Project
Type of wastes	Code of wastes				(ton / MW)	(ton / MW)	(ton)
contaminated by dangerous substances							
Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	15 02 02*	Yes					
Oil filters, diesel	16 01 07*	Yes					
Wastes containing oil	16 07 08*	Yes					
Wastes containing other dangerous substances	16 07 09*	Yes					
Soil and stones containing dangerous substances	17 05 03*	Yes					
Solvents	20 01 13*	Yes					
Paint, inks, adhesives and resins containing dangerous substances	20 01 27*	Yes					
Electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components	20 01 35*			Yes			

6.3.6.1. Potential impacts during construction phase

Waste streams generated during construction of the Project are likely to consist of the following:

- Excavated soils (spoil/surplus natural material);
- General urban wastes during construction phase;
- Hazardous wastes; and,
- Sanitation, wastewater and sludge.

During this phase, the main source of waste will be the construction activities themselves, waste from equipment and material packaging, and waste generated by the workforce. Some quantities of waste will be generated from earth and concrete works, electro-mechanical works, PV modules installations, tower and cable installations, etc. However, as a large element of the PV solar plant and OHL construction comprise the assembly of prefabricated structures, therefore the amount of construction waste will not be large.

Maintenance of construction machinery and vehicles will not be conducted within the construction areas, therefore the creation of associated wastes (used tyres, batteries, oils, etc. from vehicles) is not expected.

Fuel storage facilities will probably not be necessary on-site and therefore would not be provided within any construction areas or contractor's compound. Where fuels are taken to site, this would be restricted to the minimum amount required for the PV plant and OHL works and equipment on site. Dedicated fuel tanker vehicles/ trucks will be used for this purpose.

Vegetation along the proposed location for the PV solar plant is almost inexistent, thus vegetation clearance will not produce any significant quantities of these organic/biodegradable wastes. The OHL route encompasses a large area and it can be anticipated that the vegetation clearance will generate small amounts of organic wastes. These wastes will normally be composed of scrub and small trees unacceptable for timber processing. They will be retained and redistributed or composted on the site which would allow production of nutrient capital and facilitate natural regeneration.

Excavated soils

The largest amount of waste that is expected to result during the construction phase will be excavated soils (spoil/ surplus material) from the earthworks and construction activities needed for the installation of the PV solar modules and OHL towers foundations. Potential impacts may result in case of improper management of these wastes (natural excavated soils) by the Contractor. This includes depositing of excess/surplus material in areas not approved by government institutions/authorities (such as Fier and Divjaka Municipalities) and in non-compliance with the existing national legislation. The deposition of these soils directly in areas covered with vegetation would have direct adverse impacts in the biodiversity (flora and fauna) of the areas. Moreover, the deposition of excess/surplus material in the vicinity of water bodies/water resources (such as drainage and irrigation channels) would represent a permanent risk of contamination of these waters and damage to water ecology due to the increased organic matter and turbidity in water, in particular during rainfall periods. However, as the site is predominately flat the extent of soil waste from site grading will be minimal, with the main source of excavated material that will require management will be that excavated during works of canals to make them deeper. It is anticipated that all excavated material will remain on site, being used backfilling trenches or for use for layering on internal routes and pathways, with any excess material used for internal landscaping.

Other impacts may arise as a result of poor management of hazardous wastes or materials and/or accidental spills of fuel, lubricating oils, etc., in natural excavated soil. In case of contact of a hazardous substance with natural soil it should be handled and managed as a hazardous waste. Nevertheless, taking into account the baseline conditions of the PV plant location, as well as the hydrological/ hydrogeological studies, the project footprint area will most probably require backfilling to increase the level of the site and reinforce the stability and foundations of the plant area. In this context, the PV site area will mostly need levelling works instead of major excavation works. On the other side, the OHL will generate small quantities of excavated soils for the installation of towers. Instead of depositing these natural soil quantities in disposal areas, they could be preserved in a temporary disposal close to the PV solar plant and (partially) reused in the backfilling process and/or reused for the rehabilitation process in the end of construction works. This approach minimizes the risks from surplus/spoil material and fits properly with the purpose and objectives of a good waste management practice as required by the national legislation and international best practices.

General urban wastes

General urban waste may include a variety of non-hazardous materials, including wood, paper, cardboard, plastics, etc. Urban wastes may also include packaging materials such as plastics, paper and cardboard from the use of equipment, tools and machineries to be used within the scope of the Project. In addition, general urban wastes, similar to household wastes, will be generated by workforce activity during construction work in the project areas, including food residues (organic wastes), paper, bottles and cans and other packaging materials. These residues/wastes shall be collected on-site and further handled, deposited and/or recycled.

Several impacts may arise as a result of improper urban waste management. Primarily, there may be soil and surface water contamination in the event of illegal dumping of waste inside and/or outside the project area. These potential impacts besides contamination of environmental elements, also pose a hazard to the generation of unpleasant odours (such as organic wastes). Moreover, improper waste management would result in an unsafe environment for the workforce and the local community in the area, which as a result

may pose risks for human health-related issues. Another important aspect would be the indirect impact of additional costs that will be needed by the relevant authorities (i.e., municipalities) for handling, cleaning, collecting and transporting these wastes from the illegal dumping areas to the approved disposal/ landfill sites.

Hazardous wastes

Hazardous wastes can be generated during the construction activities for the PV solar plant and OHL. This may result due to the presence of different substances / materials on-site such as paints, solvents, fuel, oil, additives, etc., which may have to be used during the various work activities. Among the types of hazardous waste that might be generated are: excess concrete quantities (with additives), various paints, solvents and contaminated containers (e.g., used containers of paints, solvents and additives). In comparison with urban/municipal wastes, hazardous wastes pose higher environmental and human-related health risks, in particular if handled, collected and/or deposited improperly. The effects of hazardous waste are immediate and can cause massive contamination, especially if they get in contact with agricultural lands or even worse in contact with water bodies, which due to free flow may have a direct impact on biodiversity (flora and fauna) and indirect pollution of other habitats in the downstream (water bodies or ground surface).

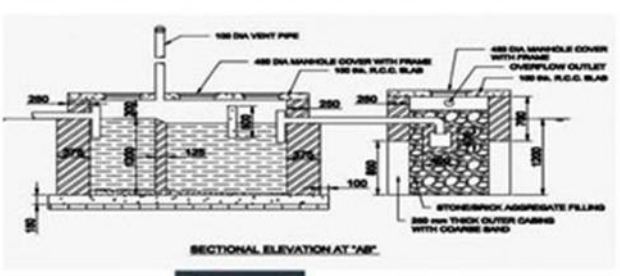
Nevertheless, the proposed project will generate limited amounts of hazardous wastes during construction.

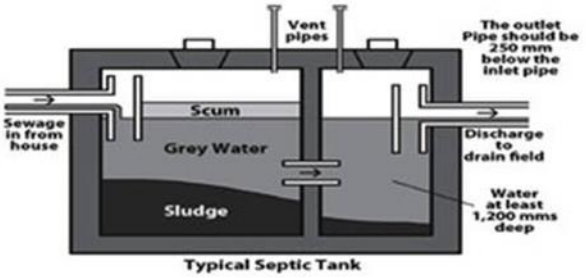
Sanitation and wastewaters

Urban wastewaters will be generated during the construction process as a result of workforce activity on-site. Urban wastewater generation can have significant impacts on the environment if no precautionary measures are taken to manage, collect and treat them accordingly. Direct discharge into the environment would lead to direct impacts on agricultural lands, contamination of groundwater resources and contamination of surface waters (irrigation canals and drainage channels).

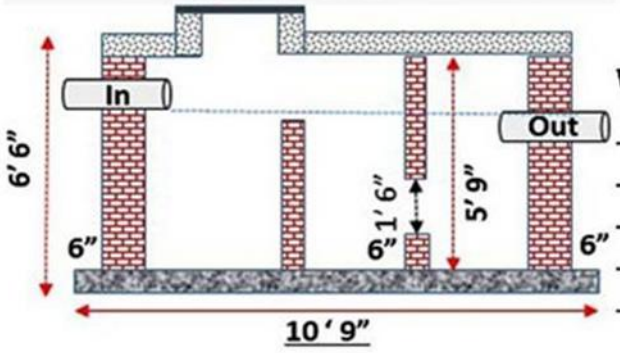
The project considers that the management of sanitary wastewaters will be done through the construction of a septic tank within the PDA and placement of portable mini-toilets in various working site areas during construction activities. The capacity of the septic tank will be calculated and specified by the Contractor prior to the commencement of works. The septic tank will be regularly monitored by the site management team. This will include checking of the wastewater level, periodic emptying, cleaning, collection (usually on weekly basis) and transferring of wastewaters by a private company that offers these types of services. A similar monitoring will also be performed for portable mini-toilets. The Contractor should undertake adequate measures to put in place the appropriate number of chemical/mini-toilet facilities and perform adequate management. According to the BSI standard[145] (BS6465-1-2006), it is recommended that one mini-toilet should be available to seven persons working on-site during 40-hour week.

[145] https://www.hse.gov.uk/construction/healthrisks/welfare/toilets-and-washing.htm





Typical Septic Tank



Volume (m^3)	Dimensions (meters)			
	Length of the first compartment	Length of the second compartment	Width	depth
2.0	2.4	0.9	0.9	1.0
2.5	2.6	1.0	1.0	1.0
3.0	2.2	1.1	1.1	1.1
5.0	2.4	1.2	1.2	1.2
10.0	3.0	1.5	1.5	1.5

Figure 174. Typical sketch of a septic tank

Estimated useful volume of the septic tank – the estimated useful volume, or total volume required for the septic tank, is calculated from the equation below:

$V_e = ((1000 + N * (C * T * K * L_f)) * (1/1000)$

- V_e: estimated useful volume of the septic tank, in m^3;
- N: number of people / contribution units;
- C: sewage contribution, in litre / person. day or in Litre / unit. day;
- T: sewage retention period, in days;
- K: rate of accumulation of digested sludge, or time of accumulation of fresh sludge, in days;
- L_f: contribution of fresh sludge, in Litre / person. day or in Litre / unit. day;
- 1/1000: conversion of a litre unit to m^3.

Impact significance

As mentioned above, generation of various types of waste (solid and liquid) during the construction phase can result in potential impacts. Inadequate management and disposal of these wastes may result in infiltrations, soil contamination and contamination of water resources in the area, which may lead to direct and indirect impacts on biodiversity and also to the health of the local community. Poor general housekeeping at construction sites and base camp can result in visual impacts to local communities during the construction phase, especially if uncontained solid wastes such as paper, cardboard and plastic packaging is blown off the site. Poor management of waste foods at base camps can attract vermin and may cause impacts to the health of workers. In addition, the scale of the potential impacts prior to mitigation and impact significance of waste-related risks during the construction phase of the project can be summarized as follows.

Aspect					
Earth and concrete works, electro-mechanical works, PV modules installations, tower and cable installations of the OHL					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local	Daily	Likely	Medium - PV Plant and OHL

Receptor	Sensitivity
Local communities (visual and health), workforce (health), groundwater and surface water resources, soils.	Medium - PV Plant and OHL
Overall Significance of Impact	
Moderate – PV Plant and OHL	

Management and Mitigation

The contractor will develop a Waste Management Plan (WMP) in compliance with Albanian legislation, IFI Requirements and GIIP (Good international industry practice) that will include arrangements for the disposal of hazardous and non-hazardous waste through licensed waste disposal subcontractors/ companies. The plan will also include measures to ensure:

- The construction contractor must ensure that the base camp offices have adequate waste handling and disposal facilities. Arrangements for collection of non-hazardous and hazardous wastes must include provisions of waste bins equipment on-site. It is recommended that waste bins are segregated according to the stream of waste e.g., organic wastes, hazardous wastes, paper/cardboard wastes, plastic wastes and metallic wastes. Their disposal and recycling must be made in close collaboration with the local government authorities (i.e., municipalities) and licensed waste recycling companies. Provision of chemical/ mini toilets for workers at the base camp must be in the ratio of 1:7[146], maximum 1:10 (toilet to workers) respectively in order to maintain hygienic and clean surroundings; The septic tank shall be built according to the standard construction and isolation standards to avoid any accidental leakage and/or discharge of wastewaters. Monitoring of wastewater in the septic tank must be performed periodically by the Contractor, namely by E&S and H&S experts.
- Segregation, reuse and, where feasible, recycling of wastes by registered operator; construction contractor must follow the 3R policy to manage the solid wastes;
- Waste storage/collection areas shall be fenced, laid at the bottom with an impermeable cover and equipped with relevant signage (e.g., urban waste collection area); any waste fuels/oils or chemicals that may need to be temporarily stored on site will be contained within solid impermeable bunding with 110% capacity of storage containers, to avoid contamination of soils, surface and groundwater in the event of spillage / leakage.
- Nearby municipalities may also be contracted for regular disposal of the base camp waste;
- Avoidance of refuelling on site to prevent oil spills. If this is not possible procedures will be developed to avoid accidental spillage, like the provision of drip trays and bunding for stores of fuel and waste chemicals/ substances;
- Responsible storage and disposal of liquid effluents such as sewage from temporary accommodation;
- Good general housekeeping;
- Covering of solid waste containers to prevent windblown litter across and outside site;
- Composting of organic wastes;
- Appropriate handling and storage of hazardous and non-hazardous waste for licensed collection for responsible disposal by registered operator; In each case, the entity/company that will transport or transfer the waste shall be equipped with a license of type III.2.B, as an obligation under Article 57 of Law no. 10463, dated 22.09.2011 “On Integrated Waste Management” as amended;

[146] https://www.hse.gov.uk/construction/healthrisks/welfare/toilets-and-washing.htm

- Generated waste quantities - must be recorded in a separate/dedicated register according to the type of waste and the quantities generated. During the waste transfer process, a waste transfer format (Waste Transfer Format) shall be filled out to determine the respective quantities according to the type of waste leaving the site and the name of the company/entity that will handle these wastes. These data shall be regularly kept by the Contractor during the construction activity, and presented/reported to the government authorities if required;
- Conduct continuous training and education awareness of all employees of the project in regard to waste management practices in order to avoid, reduce the risks of waste generation and potential impact during the construction phase.

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Minor – PV Plant and OHL

6.3.6.2. Potential impacts during operation phase

During its operation, the PV solar plant and OHL will create minimal quantities of waste that will result from the activities of working staff and in case of any maintenance and control activities of the installations. Common types of waste that will be created in the operational phase of the project may include electrical waste (consumables, spare parts and obsolete equipment) and broken/ damaged solar panels, as well as packaging waste and waste paint from coating towers. These items will be removed outside of the project area. Nevertheless, it can be anticipated that there will not be any substantial generation of solid wastes; mostly these wastes will be of domestic types and wastes deriving from any maintenance activity. Wastewaters will continue to be handled and managed through the septic tank that will be installed during construction phase within the PDA.

A proper ESMS and waste management system shall be established during the operational stage. This system will be in compliance with the national legal waste management requirements and will consider possibilities for re-use of wastes. Another option includes the possibility that waste elements such as any electric waste, broken PV panels/modules, packaging waste, etc., are offered as recyclable waste streams to the authorized/ licensed waste management companies. Considering the limited distribution of impact (within the site), long duration of activities and low magnitude and intensity, the significance of impacts from wastes prior to mitigation is assessed as negligible-minor.

Minor – PV Plant and OHL

Management and Mitigation

The developer will prepare and maintain a Waste Management Plan (WMP) in compliance with Albanian legislation that will include arrangements for the disposal of hazardous and non-hazardous waste through licensed waste disposal subcontractors/ companies. The plan will also include measures to ensure:

- Food/organic waste and recyclables such as. paper, plastic, scrap metal waste, etc. must be properly segregated and stored in designated waste bins/containers and periodically deposited in approved disposal areas or either sold to licensed recycling companies.
- Ensure electrical waste (consumables, spare parts and obsolete equipment) and broken solar panels are properly packed and sent back to manufacturer and/or reused in other forms and locations;
- Generated waste quantities - must be recorded in a separate/dedicated register according to the type of waste and the quantities generated. During the waste transfer process, a waste transfer format (Waste Transfer Format) shall be filled out to determine the respective quantities according to the type of waste leaving the site and the name of the company/entity that will handle these wastes. These data shall be regularly kept by the Developer during the operation activity, and presented/reported to the government authorities if required;

- Conduct continuous training and education awareness of all employees of the project in regard to waste management practices in order to avoid, reduce the risks of waste generation and potential impact during the operation phase.

Recycling practices of the PV modules – This type of "electronic equipment" is intended to have a useful lifespan of approximately 25-30 years. Voltalia confirmed that until the end of works broken solar panels will be stored on site in containers. The beginning of the implementation of large PV parks in Europe, and also in the rest of the world, started around 2007, and therefore limited experience or industrial recycling practices have been developed at a large scale until very recently. Nevertheless, there is always a fraction of supplied PV modules that are damaged or need to be replaced, becoming waste, and therefore require recycling. Voltalia also has extensive experience in O&M sites and PV modules waste management, since these early times.

In most European countries there is a monetary contribution from the manufacturer to a system that deals with these "electronic waste", which define the methodologies and targets for them. targets – that since 2019 is the recycling of 65% of the average of the produced WEEE. In the meantime, some experimental electronic waste treatment companies have been created, but the numbers concerning the recycling of the more complex and dangerous part of the panels: glass and photovoltaic elements are very low. On the other hand, the frame in aluminium, plastics and cables can be recycled without problems. Silicon-based photovoltaic panels require normal treatment of flat glass and no specific removal of the semiconductor layer. Photovoltaic panels not based on silicon require special technology to remove semiconductors and isolate toxic heavy metals.

A European entity called the "European Recycling Platform" is responsible for the management of the discarded/damaged PV panels, sending them for recycling units that separate the aluminium frame, metal conductors, plastics and the glass and photovoltaic elements. The first ones are completely recycled. The destination of the major part of plastics and the glass and photovoltaic elements is a controlled specific landfill indicated by European Recycling Centre (ERC).

As an example, in Portugal, from 2017 to 2020 were collected and sent for treatment 7.5 ton of photovoltaic panels. As each panel weighs approximately 20 kg, about 375 PV panels were processed.

In conclusion, waste during normal operations will be minimal and will largely consist of municipal waste (e.g., food; packaging) and over time potentially defunct panels, cabling and control equipment etc. Waste management arrangements for the construction phase should be continued (proper control of collection, storage and final disposal via licensed contractors).

Residual Impact

Following implementation of mitigation measures described above, the residual impact is considered to be:

Negligible – PV Plant and OHL

6.3.6.3. Potential impacts during decommissioning phase

Impacts from waste generation during the decommissioning phase are considered to be less significant than those during Project construction. This phase will include the dismantling and removal of all project structures and facilities. As a consequence, potential amounts of wastes may be generated during this process. The most common types of waste that will be created in the decommissioning phase of the project may include domestic wastes, packaging wastes, electrical waste and solar panels. Solar panels/modules will be removed and transferred to another location such as the European Recycling Centre (ERC) or either sent to the manufacturer for recycling. At the end of the phase, all these wastes and items will be removed outside of the project area. As a result of the aforementioned discussions, the significance of impacts is rated:

Minor – PV Plant and OHL

6.3.6.4. Cumulative Impact

No cumulative impacts are foreseen in relation to waste generation.

Negligible – PV Plant and OHL

6.4. Biological Impacts

6.4.1. Impacts on Habitats

To evaluate the potential impacts on habitats, the Consultant has taken into consideration the proposed project footprint area, including the PV solar plant area and OHL route. Moreover, an Area of Influence of 2 km radius was considered for the PV solar plant and 0.5 km for the OHL route. Referring to the in-depth baseline studies, the proposed project and associated infrastructures facilities encompass a diverse ecosystem and habitats. Species which meet the thresholds for Criteria 1-3 / Criteria ii-iv: wetland habitats within the Karavasta KBA are CH for Dalmatian Pelican and Pygmy Cormorant; and wetland and aquatic habitats within the PV plant and along the transmission line route are CH for four fish species and Albanian Water Frog. The remainder of the Project area meets the IFC definition of modified habitat – with the exception of a small area of Salix alba and Populus alba galleries along the Semani river between pylons 10-15 of the transmission line. Two habitats and 49 species are identified as PBFs, as defined by EBRD PR6; and, the Project footprint overlaps with an internationally-recognised area (Karavasta KBA). The KBA also meets the EBRD definition of PBF.

The PV plant area is represented by abandoned agricultural lands, salt meadows, marshes and reeds, typical for drainage and irrigation channels in the area. The potential area of influence around the PV solar plant is represented by more significant habitats, including wetlands, lagoons, sand dunes and coastal coniferous forest in the north-western part which are typically populated by Mediterranean association species. Along the OHL route, including the buffer area, encompasses abandoned, agricultural lands and semi-natural lands used for hay production, as well as pasture lands. The habitats are represented by salty marshes and meadows, reeds in drainage and irrigation channels, coniferous forest in surroundings or riparian habitat of the river Seman, olive trees parcels and with the majority comprising of mixed mosaic agricultural lands.

There are a few habitats that are of special interest in terms of protected status which lie within and/or adjacent the defined AoI, but not classified as priority or critical habitats by the EU Habitats Directive (Annex I). Based on the baseline surveys there are no classified habitats within the project footprint that have a protected status of less or more than 5% of the global extent of an ecosystem type with IUCN status of CR or EN. Key habitats identified during the site surveys that are listed in the EU Habitats Directive, Annex I are as follows:

- 92A0 Salix alba and Populus alba galleries – located along the OHL where it crosses the Seman River (the area between towers 10-15, preliminary design of the OHL route);
- 1310 Salicornia and other annuals colonizing mud and sand – located within the PV plant area and AoI;
- 1150 Coastal Lagoons – located outside of the AoI of the PV solar plant, approximately 2.2 km from the boundaries of the PV site.

The first two habitats, 92A0Salix alba and Populus alba galleries, and 1310 Salicornia and other annuals colonizing mud and sand, are not classified as priority type habitats, are listed on Annex I of the EU Habitats Directive. 'Small areas of the former saltmarsh habitat are naturally rehabilitating within the PV plant, following abandonment of agricultural cultivation.

Encouraging further regeneration of these areas are discussed in the BMP /draft BAP.. The ‘92A0. Salix alba and Populus alba galleries occur between pylons 10-15. As Annex I habitats, these habitats also meet EBRD’s definition of ‘threatened habitat’ and are considered PBFs. However, neither of these habitats have been determined to be threatened by the IUCN Red List of Ecosystems Assessment for Europe and therefore do not meet the IFC / EBRD definition of CH.

The 92A0 Salix alba and Populus alba galleries are riparian forests of the Mediterranean basin dominated by *Salix alba, Salix fragilis* or their relatives. Mediterranean and Central Eurasian multi-layered riverine forests with *Populus alba*., *Ulmus minor., Salix alba., Alnus spp., Tamarix parviflora, lianas*. The 1150 Coastal Lagoons are classified as a priority habitat, but it is located outside of the project area and AoI. This habitat is named as 'The Ushtari Lagoon' and is a small lagoon represented by brackish waters. The vegetation of this habitat is composed of Sea sowthistle *(Scirpus maritimus)*, Common reed *(Phragmites australis)*, Bog-rush *(Schoenus nigricans)*, Dalmatian tamarisk *(Tamarix dalmatica)*, Spiny rush *(Juncus acutus)*, Ravenna cane *(Saccharum ravennae)*. The widest spread species of macro-invertebrates are: *Cerastoderma glaucum, Loripes lacteus, Abra segmentum, Cyclope neritea, Cerithium vulgatum, Pirinela conica, Phyllodocidae, Lumbricidae, Crangon sp., Gammarus, Chironomus plumosus,* and *Idotea baltica*. The main fish of economic use in this habitat are: European eel *(Anguilla anguilla)*, the grey mullets *(Mugil cephalus and Liza ramada)*, the Sparidae dominated by *Sparus aurata* and *Boops boops*. The other species includes *Gobius buccichi* and *Aphanius fasciatus*, etc.

Habitats within project footprint is of importance for seven plant species considered as Endangered and one plant species, namely the Lesser Water Plantain *Baldellia ranunculoides*, is Critically Endangered (Albanian Red List of Fauna and Flora). The Lesser Water Plantain has limited presence in the area and it has not been observed during field visit.

The PV solar plant area also overlaps with the Important Bird and Biodiversity Area of Karavasta lagoon (AL006) and Key Biodiversity Area Shkumbin-Seman (ALB22).. Circa half of the proposed PV site falls within both the IBA and KBA boundaries in a habitat composed of former arable lands, today abandoned and covered by halophytic vegetation and sparsely used only for grazing.

The project area provides for the following ecosystem services in terms of wildlife and biodiversity with both of them belonging to the category of non-extractive ecosystem services:

- Hosting habitats available for wildlife including aquatic, adjacent and migratory life
- Supporting and regulating services on biodiversity (see 7.3.1.3).

Impacts and mitigation measures for habitats and their wildlife are elaborated in 6.4.1and6.4.2.

6.4.1.1. Potential impacts during construction phase

The key impacts on habitats during construction are mainly limited to the project footprint, including the PV solar plant and OHL route. The estimated project area surface for the PV plant is 196 ha, which will be affected by various construction works and activities during this phase. The area of influence or buffer area is created with the only scope of avoiding any associated risks due to the project development and increase the attention of workers, staff and contractors during work activities. The project goal during the ESIA phase was to avoid to the highest extent possible direct interaction with any protected area and/or high priority habitat. As mentioned above, the PV plant area includes mainly habitats with no or very low interest in terms of biodiversity diversity and ecological protected status. Two habitats and 49 species are identified as PBFs, as defined by EBRD PR6; and, the Project footprint overlaps with an internationally-recognised area (Karavasta KBA). The KBA also meets the EBRD definition of PBF.

The PV plant is located in an area with a mixture of Critical and Modified Habitat and therefore PS6 paragraphs 12 and 17-19 are applicable (IFC 2012).

This habitat is also located adjacent to the PV site, which in a sense avoids high fragmentation or loss of the habitat. The important bird area also overlaps with the PV site area; however, birds are mobile and no important bird features or nesting have been identified within the footprint. The other habitat represented by coastal lagoons is located outside of the PV project area and AoI, therefore does not represent any risks. Earthworks and vehicle/machinery movements may create temporary disturbance (noise and air emissions) to the biodiversity of these habitats, but no significant fragmentation of habitats is expected.

It is not expected to have impact on critical habitat of coastal lagoon “Godulla e Ushtarit” because this area is in a distance of 2.2 km from PDA area.

Based on the baseline studies, the OHL route does not encompass any high priority or critical habitat type and due to the typology of construction works to be conducted there are no anticipated risks. The construction of each OHL tower pylons will necessitate the removal of soil and surface vegetation from comparatively small areas of land for laying tower foundations. The locations that need higher attention and better construction management are those located close to River Seman and/or close to drainage channels of the areas. The section of the OHL route from tower 10 to tower 15 encompasses Seman River and its riparian areas which are represented by the *Salix alba* and *Populus alba* galleries habitat. However, the construction works will be minimal in this area and easily managed through various mitigation measures and/or rerouting to avoid double/triple crossings of the river.

The improper disposal of excavation material is a potential factor that may impact on habitats during construction activities in case of improper management of solid wastes. The relatively small amounts of excavation and waste material that will be generated by the Project during construction activities, in relation to the expanse of largely uniform habitat along the majority of the project footprint means that related impacts are not significant.

Based on the aforementioned discussions, the significance of impacts on habitats for the PV solar plant and OHL route is rated as below.

Aspect					
Earthworks, vehicle movement, PV modules installations, tower and cable installations for the OHL					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary	Local	Daily	Likely	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local habitats, biodiversity species, habitats listed in Annex I of the EU Habitat Directive					Medium - PV Plant and OHL
Overall Significance of Impact					
Moderate – PV Plant and OHL					

Management and Mitigation

Mitigation of impacts in relation to habitats will be managed through the development of the ESMP and BMP, which will specify appropriate measures for the management of site clearance and excavation activities, training of staff for the preservation of biodiversity values, and soil and waste management both along the PV solar plant and OHL, as well as for associated infrastructure, such as base camp and any small length access/entrance roads, etc.

In areas of Modified Habitat, the project should minimize impacts to biodiversity and implement mitigation measures as appropriate. In areas of Critical Habitat, projects are required to demonstrate:

- No other viable alternatives within the region exist for development of the project on Modified or Natural Habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the Critical Habitat was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and,
- .

Where the Project could have significant, adverse and irreversible impacts to PBFs, the Project should (EBRD 2014a, paragraph 13) not implement any project-related activities unless:

- There are no technically and economically feasible alternatives;
- The overall benefits outweigh the project impacts on biodiversity;
- Stakeholders are consulted in accordance with PR 10;
- The project is permitted under applicable environmental laws, recognising the priority biodiversity features; and,
- Appropriate mitigation measures are put in place, in accordance with the mitigation hierarchy, to ensure no net loss and preferably a net gain of priority biodiversity features over the long term, to achieve measurable conservation outcomes.

As the Project is situated near with an Internationally Recognised Area, it must also comply with PS6 paragraph 20 (IFC 2012), and Guidance Note 6 paragraph GN93 to GN98 (IFC 2019) by:

- Demonstrating that Project's operations within the protected area are in line with national law;
- Developing the Project in a manner which is consistent with any management plans that exist for the area;
- Consulting with protected area staff, or officials responsible for management of the area; and
- Developing, and implementing, additional programmes to 'promote and enhance the conservation aims of the area'.

- Establishment of working strip to restrict area (If any) of impacts to within OHL working corridor;
- ;
- Road construction works will be confined to the road working strip where practically possible;
- Road construction/ upgrading will follow existing tracks and trails where possible;
- Permanent infrastructure to be sited on unused land of no particular ecological value;
- No construction materials will be taken from the surrounding environment unless approved by the responsible authority;
- Avoidance of forested areas and any other valuable environmental resource identified during route refinement;
- Restoration of sites to their original condition where possible upon completion of construction; and
- Retain original vegetation where possible for reinstatement.
- Establish a pre- post construction biodiversity baseline from which all mitigation, restoration, and loss / degradation can be measuredVoltalia need to develop a Biodiversity Management Plan (BMP) that details the mitigation and monitoring measures that will be implemented during construction and operation phases of the Project to avoid and minimise impacts to CH-qualifying features and PBFs, and restore habitat for these features on-site and verify the levels of impacts occurring; and,
- An ecologist/biologist or environmental expert will be required to supervise the habitat clearance works and provide advice to the workforce when required.
- Avoid disturbance or works within the drainage and irrigation channels within the PDA, and where works are required to safeguard the project as part of drainage scheme, ensure works are undertaken sensitively and rehabilitation the channels to ensure no net loss in habitat.
- Environmentally sensitive areas and critical habitats in surroundings of the project areas will be clearly marked and mapped as 'No-Go Areas' (e.g., "Godulla e Ushtarit" lagoon) and access by staff and contractors will be strictly forbidden, until the relocation of habitat out of PDA is completed.

- Limit site clearance activities to only those areas where this is required and avoid where possible the removal of vegetation or disturbance of habitats.
- The loss of the habitat “1310 Salicornia and other annuals colonizing mud and sand” that will be affected by the PV plant, and which is listed in Annex I of the EU Habitat Directive has to be compensated in the adjacent area of influence next to the PV site. This could include planting of native vegetation in these adjacent areas.
    -
    - Relocate the nests out of working area in order to allow construction activity;
- Vegetation clearance within the project footprint will be undertaken by the Voltalia EPC Contractor in a progressive manner, working from the center towards the edge of the construction site. This should enable fauna to move away from the area of works, disperse into surrounding habitats and should prevent the possibility of fauna being isolated in fragmented areas of habitat.
- Routine checks will be undertaken to ensure vegetation clearance is confined to defined areas of disturbance and periodic checks will also be undertaken supervising engineers.
- The Biodiversity Expert will be on site during vegetation clearing and to assist the workforce where required.
- If working sites are open in the period 1st March – 31st July (bird breeding season) pre-vegetation clearance surveys will be undertaken by qualified ornithologists. Should nests of species of conservation concern (species listed in Bern Convention, EU Birds Directive or Albanian national law) be located in the working strip, the strip shall be optimized so that no works are carried out within a 15 m buffer of the nest site until chicks have fledged from the nest or it is abandoned.
- Any construction work within drainage channels will be prohibited. Signage will be erected to communicate awareness.
- Burning of waste or vegetation on-site will be prohibited.
- All employees, contractors and staff working on site will undergo induction training covering the key procedures and protocols relevant to an individual’s area of work that are included within this BMP.
- Driver induction should include awareness of fauna on site and the sensitivities thereof.
- Any topsoil cleared will be conserved in designated stockpiles. Stockpile locations should be selected to avoid vegetated areas and be at least 20 metres from any water body.
- All open excavations should be routinely checked each morning to see whether any animals have become trapped in the excavations.
- Should any protected fauna species be identified during construction activities the areas where these species are observed will be demarcated and warning signs for workers/drivers will be erected
- A gap of at least 5-10 cm should be retained at the base of fences on site to allow for small animals to move freely across the site.
- No trees shall be cut/trimmed during the nesting/maternity period for birds and bats (between April and July).
- Avoid the accumulation of stagnant water and organic waste within the construction site and on the roads, that could attract wildlife, especially amphibians. This is especially important of the potential occurrence of the Red listed Albanian Water Frog.
- No wastewater shall be directly discharged to the environment. Chemical toilets shall be provided to workers and regularly emptied and cleaned under a safe protocol.
- Project construction will not be undertaken at dusk, dawn and at night to avoid disturbance to nocturnal and crepuscular fauna (i.e., protected status fauna species, bats, etc.) from increased noise and vibration.
- Poaching, hunting and fishing will be strictly forbidden. This will be communicated in both the induction and training of on-site workers.
- The speed limit of 30 km/hr should be adhered to on-site. Adequate signage and awareness through induction should enforce this.
- Fishing and the collection of aquatic natural resources within or in the vicinity of the project will be prohibited to minimize impacts to aquatic habitats and species.
- Signage will be erected for general awareness.
- This rule will be included in site induction and worker training.

- Implement measures to prevent the transport of excess sediment to the downstream environment due to erosion where required on a site-by-site basis. This will include the erection of silt barriers within the riparian areas and wetlands, or the use of any other appropriate methods such as hay bales, spoil berms, geotextile and dewatering and bypass methods.
- Refueling of vehicles and machinery will be restricted to designated refueling locations, which will be located at least 50 meters from any waterbody.
- Aquatic Natural Habitat that is impacted by temporary construction activities (temporary roads, wetland and river crossings, structures) will be fully reinstated to pre-construction conditions on completion of construction works.
- On PDA and OHL route sections through open land habitats (meadows etc..) important for breeding birds, birds will be discouraged from these areas by installing plastic bands (e.g warning tape) or flags that flutter in the wind, before bird breeding season starts i.e. before March 1st.
- In sensitive habitat areas (as outlined in **Error! Reference source not found.**), measures to discourage nesting activity should be employed like flags or use of tape. Where this does discourage breeding, vegetation removal can occur (following a pre-vegetation removal check) at any time of the year unless wider disturbance is identified as a key issue;
- Translocate important flora species to other suitable areas;
- Micro-siting of the route to be done, where possible, for best position available for biodiversity (Particularly important where areas of European Priority Habitats and designated sites are affected);
- Habitat compensation measures should be considered where required to replace permanently lost and damaged habitats. This may include new habitat creation, restoration of damaged habitats and habitat enhancement; and
- Ecological awareness training should be provided to all personnel.
- Establish a Forest Fire Risk Prevention Plan if necessary;
- Avoid where possible works during winter months when mudflat habitat is likely to be flooded and where impacts will be greater. (Seman river).

Residual Impact

Following implementation of mitigation and management measures, the residual impact will be:

Minor – PV Plant and OHL

6.4.1.2. Potential impacts during operation phase

During the operation phase both the PV facility and associated transmission line can be considered as passive in nature, and there will be no construction works or any other heavy work activities, therefore no impacts are anticipated. The PV solar plant and OHL will only require periodic maintenance which will mostly be associated with minor interventions and repairs of the PV modules or electric cables and associated facilities. Once the PDA and transmission line has been constructed, the only impacts relate to operations and maintenance activities, which principally relates to vegetation and erosion/sedimentation controls to manage wetland habitat under the solar panels.

Management and Mitigation

Potential damage to local habitats will be managed by ensuring that only designated access tracks will be used for maintenance of the traffic and the appropriate handling and use of paints and chemicals.

Mitigation of impacts in relation to habitats will be managed through the development of the ESMP and BMP which will specify appropriate measures for the management of maintenance activities, training of staff for the preservation of biodiversity values, and soil and waste management both along the PV solar plant and OHL, as well as for associated infrastructure, such as small length access / entrance roads, etc.

As a result, impacts on habitats during this phase are considered to be negligible.

Negligible – PV Plant and OHL

6.4.1.3. Potential impacts during decommissioning phase

During this phase the project facilities and structures will be removed. The affected project footprint will be restored and rehabilitated. The areas will be relieved from the project facilities, restored to their natural state and no other development will be performed. The impacts during this phase are rated:

Negligible to Minor – PV Plant and OHL

6.4.1.4. Cumulative impacts

No cumulative impacts on habitats are foreseen in relation to the proposed project.

Negligible – PV Plant and OHL

6.4.2. Impacts on Protected Areas

According to the baseline studies and official data published by the Albanian government, there are four protected areas in surroundings of the proposed project footprint. These areas are as follows:

- The National Park of Divjaka-Karavasta located north and north-west of the PDA;
- The Nature Managed Reserve of Pishe-Poro located in the south-western part of the PDA;
- The Protected Area Landscape of Vjose-Narta located south of the PDA;
- The Nature Monument of “Kurora e Semanit” located south-east of the PDA; and,
- The Nature Managed Reserve of “Pylli i Levanit”, south-east of the PDA.

The Project footprint overlaps with an internationally-recognised area (Karavasta KBA). The KBA also meets the EBRD definition of PBF. According to TBC’s CHA report, the species which meet the thresholds for Criteria 1-3 / Criteria ii-iv: wetland habitats within the Karavasta KBA are CH for Dalmatian Pelican and Pygmy Cormorant.

An Appropriate Assessment (AA) Screening was conducted for the Candidate Emerald Site, where potential impacts on the site and related measures have been identified in consultation with the Government authorities. At the end, the AA concluded that no significant effects will arise on the Candidate Emerald site of Divjaka-Karavasta (also National Park according to the Albanian legislation) due to the development of the proposed project. Nevertheless, some species might be affected; such as the Greater Spotted Eagle *(Clanga clanga)* and the Collared Pratincoles (*Glareola pratincola*) which may lose a small part of their foraging territory. However, this is not considered to have a significant impact on either of these species’ population density in the region.

The final statement of the Ministry of Tourism and Environment on AA is provided in 0.

6.4.2.1. Potential impacts during construction phase

The solar plant PDA and OHL route alignment avoids all existing protected areas in the project region. Nevertheless, the solar plant PDA communicates with the coastal lagoon of “Godulla e Ushtarit” through the drainage system. Drainage waters collected in the PDA through secondary and tertiary channels reach the pumping station and from there they enter the coastal lagoon. Construction works in the solar plant PDA may affect the drainage network and result in the increase of sediments, temporary interruption or decrease of the water flow, which as a consequence would pose adverse effects in the lagoon. However, it should be noted that no drainage channels will be removed and the only works on the channels will be to rehabilitate them in line with their original design.

For the OHL route risks are anticipated to be lower as there are no direct impacts on protected areas.

Aspect					
Earthworks, vehicle movement, PV modules installations, tower and cable installations for the OHL					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary	Local	Daily	Unlikely	Medium - PV Plant and - OHL
Receptor					**Sensitivity**
Local habitats, drainage network, protected areas and biodiversity species					Medium - PV Plant Low - OHL
Overall Significance of Impact					
Moderate – PV Plant					
Minor - OHL					

Management and Mitigation

Mitigation of impacts in relation to habitats will be managed through the development of the ESMP, CEMP andBMP, which will specify appropriate measures for the management of site clearance and excavation activities, training of staff for the preservation of biodiversity values, and soil and waste management both along the PV solar plant and OHL, as well as for associated infrastructure, such as base camp and any small length access/entrance roads, etc.

Some of mitigation measures that are recommended to be implemented for the preservation and functionality of the drainage network scheme include:

- The irrigation and drainage pattern/network scheme in and around the PV plant site and areas of work for the OHL towers shall not be altered, but kept disciplined and functional to the maximum extent possible with the natural/ existing water flowing, channel depth and slope inclination to prevent blockages and/or flooding in surrounding areas;
- Develop an Irrigation and Drainage Preservation Procedure within the CEMP; to define mitigation and management measures for temporal diversion of the channels (when necessary) or when construction works are being implemented in a particular section;
- Develop an Erosion and Sediment Control Procedure within the CEMP to define measures that prevent and/or reduce impacts due to erosion and sediment creation.

Residual Impact

Following implementation of mitigation and management measures, the residual impact will remain:

Minor – PV Plant
Negligible - OHL

6.4.2.2. Potential impacts during operation phase

During this phase there will be no impacts associated with the project operation. There might be only localized maintenance activities within the PV plant area and along the OHL route, but these activities will not affect any of the protected areas.

Negligible – PV Plant and OHL

6.4.2.3. Potential impacts during decommissioning phase

During the decommissioning phase there will be similar impacts on protected areas as those during construction phase. All project structures and facilities will be removed and work activities will be conducted within the project areas of the PV solar plant and OHL.

Minor – PV Plant
Negligible - OHL

6.4.2.4. Cumulative impacts

No cumulative impacts are foreseen in relation to impacts on protected areas.

Negligible – PV Plant and OHL

6.4.3. Impacts on Flora

The project, including the PV solar plant and OHL route passes through mixed Mediterranean landscape of agricultural, abandoned, meadows and pasture lands. Vegetation in the PV solar plant area is dominated by salty marshes and meadow lands with low biodiversity values. The OHL route encompasses a larger area and a more diverse environment in terms of habitat diversity and biological species.

The field surveys performed in August-November of 2020 and May 2021 have identified several habitats and biodiversity species within the project footprint area and area of influence. Each of the habitats has their own specifics and biodiversity species. Overall were observed 352 vascular plant species during the field surveys. Around 100 species were under IUCN protected status, respectively under NT category 3 species, under LC category 96 species and under DD category 1 specie. From all these threatened plants, it results that 70 of them are globally threatened, 21 plants are under European protection level and 9 plants are under Mediterranean level of protection. With respect to the trend: 73 are stable, 19 are unknown, 4 are increasing and 4 is decreasing. Based on the Albanian Red List, within the Area of interest there are 8 species under EN category and 7 species under VU category. There are no species that under Annex II & IV of EU Directive EEA meet the criteria for Priority Biodiversity Features present within the PDA and along the OHL route.

Important is to be analysed are the impacts of the main invasive species, which were observed during the field surveys. These species include as follows:

(i) The greatest positive contribution of *Eucalyptus globulus* is perhaps replacement of indigenous species for fuelwood, thereby preventing further degradation of natural forests. Eucalyptus species, by quickly producing firewood, would eliminate the causes which frequently may have led to land degradation and desertification. Eucalyptus has a persistent effect on the land use of both temperate and tropical areas by affecting the microclimate condition, decreasing soil fertility, attracting seed dispersers and depressing competitive grasses. These species are one of the foremost tree species since they are fast growing and can fix more CO_2 by the process of photosynthesis, thereby serving as a carbon sink. They are not good trees to be used for erosion control. Under dry conditions ground vegetation can be suppressed by root competition. In areas, where eucalyptus tree is inter cropped with other trees, this issue is minor and can be even absent, whereas in areas covered with only Eucalyptus woodlots there is more soil erosion and gully formation. The main criticisms that have been launched against Eucalyptus plantations in this respect are that they can deplete water supplies and on sloping catchments they do not regulate the water flow, as well as they might substitute or replace the natural vegetation in these areas. Eucalyptus plantation evaporates high ratio of the groundwater into atmosphere causing dryness of the rock reservoirs, changes in the water flow from the springs and can also decline in water table.

(ii) Dense populations of *Arundo donax* may affect riversides and stream channels, compete with and displace native plants, interfere with flood control, and are usually extremely flammable increasing in this way the likelihood and intensity of fires. *Arundo donax* (giant reed) is an

herbaceous, perennial and non-food crop producing dry biomass with relatively high yields with lower agronomic inputs requirement compared to the traditional (bioenergy) crops. The biological raw materials (biomass) gained from giant reed can be utilized mainly for three types of bioenergy: Bioethanol, bio-methane and solid biofuels. Giant reed can be identified as one of the most promising candidates for biomass production.

(iii) *Dittrichia viscosa* is a perennial small shrub belonging to the Asteraceae family, widespread in the Mediterranean basin. *Dittrichia viscosa* originally was found mainly in dry riverbeds and abandoned fields up to a 1500 m elevation. Nowadays it is adapted to a wide range of environmental stresses, becoming quite common in roadsides and ruderal habitats, degraded areas, even in urban areas. It is considered an invasive species, easily adaptable to a wide range of stress conditions. The false yellowhead is a tough plant, very resistant to adverse conditions and degraded environments. It is important as food for the caterpillars of certain butterflies and moths. Given its entomophilous characteristics, *Dittrichia viscosa*, could potentially be used in integrated pest management systems, but this capacity is never use in Albania. *Dittrichia viscosa* associated with olive groves, is of considerable interest in relation to its role in olive pest control, as its flowers are attacked by the gall-producing *Myopites stylatus*. The intensive cutting, overgrazing and intensive agriculture has led to a simplification of the landscape and a reduction in biodiversity, which have affected various ecosystem services, such as natural pest control and pollination.

(iv) *Amaranthus albus* is recognized as being one of three pigweed species capable of having a negative impact on crops. Its rapid growth during the summer and its ability to outcompete crop species for water, light, and nutrients lead to the reduction of crop yields. In addition, *Amaranthus albus* has been shown to be an acceptable alternate host to many common agriculture pests. It is demonstrated that exudates of a closely-related species, have negative impacts through allelopathic effects on the germination and growth of several crops.

(v) *Erigeron canadensis* causes damage to the local ecosystems and has demonstrated great potential for invasion. *Erigeron canadensis*, as an invasive species, not only have threatened biodiversity and caused ecological security issues in the agricultural system, but have also brought huge economic losses to society. *Erigeron canadensis* has a strong drought resistance and is suitable for growing in lawns, roadsides, wastelands and other habitats and even grows in crevices, forming a community with a single dominant species with a strong competitive advantage, which has a serious impact on the diversity of local species and the structure and function of the ecosystems.

6.4.3.1. Potential impacts during construction phase

The key impact during construction includes the loss of vegetation cover over the 196 ha PV solar plant area. Vegetation clearance will be also required for the transmission line. This will be necessary during the excavation process at tower pylon construction sites and laying of access routes, however the numbers of plants and vegetation removed will be minor. The PV plant area possess no particularly important flora species within the direct project footprint to be affected by work activities. Vegetation in this area is represented by grass, bushes, shrubs and reeds, the latter ones observed in the drainage channels. The OHL route includes a variety of habitats and vegetation cover areas, most of them located in in agricultural and abandoned lands.

The baseline surveys identified seven (7) flora species with a priority or protected status. These species include: Marram grass *(Ammophila arenaria)*, Joint Pine *(Ephedra distachya)*, Sea-poppy *(Glauchum flavum)*, Perforate St. John's wort *(Hypericum perforatum)*, Three-Horned Stock *(Matthiola tricuspidate),* Sea Dalfodil *(Pancratium maritimum)*, and the lesser water plantain *(Baldellia ranunculoides)*. *Ephedra distachya* and *Baldellia ranunculoides* hold globally protected species status according to the IUCN Red List, respectively LC and NT. The other flora species are classified as species with national protected status and rated as EN besides *Baldellia ranunculoides* which on national level is classified as CR. It is noteworthy to highlight that all these species area located outside of the project footprint area and area of influence

(both PV plant and OHL). In this context there are no risks associated or impacts on flora species with protected status due to the project activities.

Construction works for the installation of the PV solar panels and foundations of the tower pylons will include earth movement (soil) and disturbance of the natural soil configuration in the project footprint areas. The removal of vegetation and soil in the site clearance footprint could result in alterations of hydrology of the areas and the surface water run-off regime, in particular for the PV plant. The loss of vegetation can also have an adverse effect on soil quality and hamper survival of neighbouring flora species, fauna species and foraging for herbivores in the area. However, considering the baseline conditions these risks are anticipated to be minimal.

Aspect					
Construction works, such as site clearance and excavation processes for the installation of PV solar modules and tower pylon installations for the OHL					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary (weeks)	On-site	Daily	Possible	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local flora species					Low - PV Plant and OHL
Overall Significance of Impact					
Minor – PV Plant and OHL					

Management and Mitigation

Specific mitigations of potential impacts on flora are required during the construction phase, although the ESMP will provide for worker awareness and training sessions in relation to protection of local flora. This may include procedure for the identification of rare and protected species for removal under license if necessary. Furthermore, mitigation of impacts in relation to fauna will be also managed through the development of the ESMP which will specify appropriate measures for the management of site clearance and excavation activities, and soil and waste management both along the OHL, as well as for associated infrastructure, such as worker base camp, access roads, etc.

A number of measures will be incorporated into the Project ESMP to prevent and/or minimize impacts on flora. These measures will include (but not limited to):

- Vegetation clearing shall be limited within the boundaries of the project footprint areas where it is absolutely necessary;
- Demarcate work areas clearly for construction workers to ensure that the disruption of vegetation does not occur outside of designated areas;
- A Biodiversity Management Plan (BMP) which will include demarcation of the flora species on-site by a botanist, identifying measures to protect them from any accidental damage during construction is developed;
- To the extent possible the site design will consider retaining as many flora species as possible, and the relocation (if necessary) of those that cannot be retained and protected;
- Provide training to staff to enable the identification of flora species with protection status; Rehabilitation of the site, and areas cleared during construction, encouraging the establishment of native flora species; details of this will be defined within the BMP. It is suggested the revegetation of the affected area with *Quercus robur* (VU-Alb) and *Fraxinus angustifolia* as threatened species, in particular for riparian areas nearby the streams or river habitats. Cultivating specific plant species of certain economics benefit (e.g., medicinal plants) it is also suggested and anticipated to be easily

achievable. In general, compensation measures with native vegetation species would be a good example for the minimisation of environmental impacts.

Residual Impact

Following implementation of mitigation and management measures, the residual impact will be:

Negligible – PV Plant and OHL

6.4.3.2. Potential impacts during operation phase

During this phase there will be no impacts on flora as no work activities will be performed. There might be only localized maintenance activities within the PV plant area and along the OHL route, but these activities will not pose any effects on flora species. Some recent studies have found that rooftop PV panels can reduce daytime air temperature by 0.2–0.8^{0}C during the summer time, causing a cooling effect[147]. Precipitation and vegetation conditions are the key factors in determining local evapotranspiration (ET). In many ecosystems ET is dominated by plant transpiration even in the areas with low vegetation cover, similarly to the solar plant PDA. The PV plant will have little impact on vegetation after the construction of the PV plant, giving priority species more shade tolerant. The precipitation and ET over the PV plant and their surrounding area will not change following the construction of PV plant.

Natural vegetation growth will be allowed within the PV project area. The BMP will also cover management and monitoring of flora during the operation phase with the overall aim of no net loss of flora species within the project area when compared to the before project scenario.

After installation of the solar panels, the vegetation under the PV modules will periodically be cut to prevent shading of the panels, which in principle will limit their height to below 1 m. On the other hand, the installation of the PV plants will increase the surface roughness and slightly change the wind profile in the area. It can be anticipated that the PV plant will have little effect on the vegetation growth due to maintaining a balanced effect between the temperature, soil moisture, and ET within the PV plant.

Management and Mitigation

The installation of PV plant modules will lead to keeping similar land conditions, barren land, which as a consequence may lead to soil erosion during rainy periods and/or in highly windy weather. So, to avoid such phenomenon it is recommended the cultivation of the specific plant species which provide good cooling effect by extracting heat from PV panels and that can be use in the barren land. Cultivating specific plants of certain economics benefit can be easily achieved as well (e.g., medicinal plants).

Negligible – PV Plant and OHL

6.4.3.3. Potential impacts during decommissioning phase

During the decommissioning phase there will be no impacts on flora species. All project structures and facilities will be removed and work activities will be conducted within the project areas of the PV solar plant and OHL. The affected areas will be restored and re-vegetated.

Negligible to Minor Positive – PV Plant and OHL

6.4.3.4. Cumulative impacts

No cumulative impacts are foreseen in relation to flora species.

Negligible – PV Plant and OHL

[147] Zhang, X. and Xu, M., (2020). Assessing the Effects of Photovoltaic Power plants on Surface Temperature Using Remote Sensing Techniques. *Remote Sensing*, 12(11), p.1825.

6.4.4. Impacts on Fauna

Based on desk and field studies conducted in August-November 2020, and January-February-May 2021, a full list of terrestrial fauna was compiled. Around 34 species of mammals were observed in the wider study area out of 86 terrestrial mammal species that are hosted in Albania, out of which 20 species were recorded/observed during the field surveys, while the presence of other species is potential or presumed present due to habitat suitability and presence in the areas nearby. Presence of otters (*Lutra lutra*), badger (*Meles meles*), and golden jackal (*Canis aureus*) was confirmed within the PDA and adjacent drainage channels, including Semani river. Herpetofauna of the PDA and OHL is composed of 6 amphibians (out of 16 amphibian species recorded in Albania) and 23 reptiles (out of 43 species reported in Albania). Two frog species *(Rana dalmatina and Hyla arborea)* are Annex IV of EU HD, while one species *(Pelophylax shqipericus)* is an endemic species of Albania and Montenegro, estimated as Vulnerable species (VU) by the IUCN. The May 2021 field survey confirmed the breeding evidence of *P. shqipericus* in primary and second grade drainage channels crossed by the OHL route, although in lower numbers than other sibling frog species (P. kurtmuelleri), but not inside the PDA Presence of 3 frog species (*Pelophylax kurtmuelleri, Rana dalmatina* and *Hyla arborea*) was confirmed in the PDA and along the drainage channels intersected by the OHL route. From 23 reptile species, the presence of 11 species was confirmed during the field surveys of August, November 2020, and May 2021. The European Pond turtle (*Emys orbicularis*) was confirmed in few places along the drainage channels of the PDA and those intersected by the OHL route, an indication that this species is common within AoI. However, the presence of other species in the PDA project footprint is certain provided the suitable habitats and presence of the species reported by other surveys in the wider project area

6.4.4.1. Potential impacts during construction phase

During construction phase the changes near the natural habitats (White Poplar and White Willow galleries along the Semani River) within the Buffer area the project footprint will pose effects on local fauna species. The potential fragmentation of habitats, Loss and disturbance of fauna species may also occur in the project area (PDA and OHL working route) and access roads (including construction works in new and upgraded access roads), although the impact is anticipated to be of low significance. Beside the earthworks, the increased presence of traffic and people on site and in the access, road will also contribute to the disturbance of fauna species that are normally mobile in the area. Other activities which may contribute to impacts on fauna species include dust and noise emissions during the excavation processes and vehicle movement.

Overall, the impacts on fauna will be negative during construction phase; however, they will be restricted to the project footprint boundaries of the PV solar plant and OHL. Most of the impacts are considered reversible over the long-term, except for the loss of the habitat in the PV plant site and OHL tower pylons which will be permanent for the whole project duration.

The baseline studies revealed that few fauna species with protected status were observed within the wider study area. This includes eight (8) mammal species, four (4) reptile species and three (3) amphibian species. Mammal species with protected status according to the IUCN Red List that were identified in the wider region include: Greater horseshoe bat (NT), Greater mouse-eared bat (LC), Kuhl's pipistrelle (LC), Common pipistrelle (LC), Common dormouse (LC), Jackal (LC), Badger (LC) and Otter (NT). From this list the Otter, badger, jackal, and two pipistrelle bat species were identified within the project footprint of the PV plant. Reptile species with protected status according to the IUCN Red List include: Aesculapian Rat snake (LC), European pond turtle (NT), Hermann's tortoise (NT) and European green lizard (LC). The European Pond turtle was observed within the project footprint of the PV plant site and drainage channels intersected by OHL. Amphibian species with protected status according to the IUCN Red List include: Albanian water frog (VU), Agile frog (LC) and European tree frog (LC), where the latter one was observed within the project footprint of the PV plant site. From fauna species with protected status otter *(Lutra lutra)* badger *(Meles meles)*, jackal (*Canis aureus*), Albanian water frog (*Pelophylax shqipericus*), European pond turtle (*Emys orbicularis*) were identified within the project footprint area of the OHL route.

Presence of otter (*Lutra lutra*), badger (*Meles meles*) and golden jackal (*Canis aureus*) red-listed in the National Red list of Albania (2013), was confirmed within the PV project site and adjacent drainage channels, including Seman River, while red fox is most widespread in the whole study area. Seman River, and Riparian Forest, together with a network of primary and second grade drainage channels provide important habitats for otters, as they provide feeding grounds and commuting corridors for the species. The network and primary, secondary and tertiary grade drainage channels of the PDA area are creating and maintaining feeding grounds and bio-corridors for daily commuting of otters, jackals, foxes and badgers in the site.

The PV solar plant areas ground preparation, and fencing may interrupt the existing corridors for badger, otter and jackal during their daily commuting for forage and dispersal. However, the impacted number of these species is limited (one or two otters, badgers and a few jackals are currently using the PV solar plant areas as part of their hunting grounds and commuting corridors) and overall, the impact on these species is assessed as minor. These animals, nevertheless, are highly adaptive and will find other safer commuting corridors during night in the adjacent areas.

The Pipistrelle bats are present in the project footprint area, while *Rhinolophus ferrumequinum* and *Myotis myotis* were observed inside the military bunkers at the top of the hill, west of Fieri city. The drainage channels and open terrains of salty marshes provide foraging grounds for pipistrelle bats. Also, the bunker along the drainage channel (WP009. Heading North): was observed bats activity (droppings) inside the bunker in PDA during the summer visit, however, there is evidence of being used by a limited number of bats during the night. May 2021 site visit confirmed that none of the bats are using the existing bunkers inside the PDA for roosting, and thus the removal of these bunkers will not have any significant impacts on bats.

The selected OHL route Fier-Hoxhare does not intersect with any military bunkers, and therefore, no direct impact on this bat roosting site is anticipated. Military bunkers in the hilly area close to Peshtan, intersected by the 22220 kV OHL show evidence of being important roosting sites for bats (*Rhinolophus ferrumequinum*, *Myotis myotis*) and tortoise (*Testudo hermanni*). In one the series of bunkers from the amount of guanos found on the ground, inside of the deepest part of the bunker, it is believed that the site is commonly used by bats. Although during the May 2021 field survey only one individual of *Rhinolophus ferrumequinum* was found inside these military bunkers, further survey and monitoring should be conducted in this site as part of the BMRP.

Referring to the abovementioned discussions, baseline findings show that besides the variety of the fauna species within the wider study area, their presence is limited within the project footprint area, as a consequence impacts on fauna are deemed moderate. A key factor influencing this evaluation is the fact that there are no protected areas within the project footprint or priority type habitats. Thus, the impact assessment rating is concluded as below.

Aspect					
Construction works, vehicle movement, site clearance, excavation processes for the installation of PV solar modules and tower pylon installations for the OHL					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	On-site	Daily	Possible	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local fauna species.					Medium - PV Plant Low - OHL
Overall Significance of Impact					
Moderate – PV Plant					

Minor - OHL

Management and Mitigation

Mitigation of potential impacts on fauna will be managed through the development and implementation of the ESMP, which will provide for worker awareness and training sessions in relation to protection of local fauna, and a code of conduct that forbids poaching or deliberate killing of animals listed in baseline studies.

Specific mitigation measures for the protection of biodiversity are listed in the ESMP section; these measures are applicable to the management and mitigation of impacts of construction to terrestrial fauna as well as avifauna. Mitigation of potential impacts on fauna are managed through the development and implementation of the Biodiversity Management Plan (BMP), which includes but is not limited to the following:

- Require the presence of a qualified ecologist or environmental expert during major earthworks in particular for works on drainage channels
- Restriction on access to forested areas during and following construction;
- Demarcate work areas clearly for construction workers to ensure that work activities do not occur outside of designated areas of the project;
- Maintain a distance of at least 30 m “no-go area” from the primary and second grade drainage channels as they are important breeding habitats for frogs, including the Albanian water frog (*Pelophylax shqipericus*), and other species of conservation concern that use this channel's network.
- Incorporation of protection measures for the protected fauna species as some of them hold a protection status according to the Albanian and IUCN Red Lists;
- Ensure that all drivers receive training on the ecological sensitivities and driving techniques required to minimize disturbance to fauna which may be nocturnal or have specific migratory routes during the day;
- Identify post construction rehabilitation measures that seek to enhance the local biodiversity and create habitats that support the local population of the identified key species
- provide for worker awareness and training sessions in relation to protection of local fauna, and a code of conduct that forbids poaching or deliberate killing of animals listed in baseline studies.
- Ensure a gap (around 15-20 cm) is provided under the fence around the whole site to ensure that small faunal species can continue to move through the site.
- Reduce vehicle speed while travelling on all construction roads (20 km/h at the project area, for other access roads limits will be established at the Traffic Management Plan);
- Fauna species should not be caught or killed during construction;
- Establishment for a procedure to avoid, monitor and control invasive species if necessary;
- At trenches, trench plugs to be incorporated and daily fauna retrieval is to be conducted; • Works to be supervised by on-site ECoW;
- Where appropriate, temporary or permanent provisions for fauna to cross the working strip/ roads using underpasses, tunnels or other measures should be installed;
- Incorporate specific measures for protected species across the entire study area (refer BAP); Restrict construction to certain periods/seasons where possible to be outside the breeding season ie 1st March – 31st July for birds.No tree cutting shall be performed during the nesting/maternity period for birds and bats (between April and July). During the same period new ground disturbance activities shall also be limited in order to avoid disturbing ground nesting species.
- Night works shall be avoided (from 8 pm to 6 am at least) to reduce impacts to nocturnal fauna species, in particular for bats.

- Establish on-site conservation areas for natural habitats adjacent or within the Project sites that need to be protected from accidental disturbance during construction.
- Define temporary demarcation by highly visible wooden sticks (50 cm high) planted into the ground and /or flagging tape, while a more permanent fencing could be provided in areas of particular sensitivity (e.g. channels and wetlands).
- Avoid the accumulation of stagnant water and organic waste within the construction site and on the roads, that could attract wildlife, especially amphibians;
- Avoid spreading of invasive species by implementing an appropriate eradication and checking prior to commencement of any activities.
- Restrict vehicle movement to the existing roads that connect the Project site with the surrounding areas. Off-road driving shall be prohibited in order to avoid any unnecessary disturbance of natural vegetation and fauna.
- Speed limits of vehicles shall be established and enforced during works on site. Install animal crossing signs on the access road and enforce speed limit along the site access road.
- Domestic wastewater shall be treated and/or disposed accordingly. No wastewaters shall be directly discharged to the environment. Chemical toilets shall be provided to workers and regularly emptied and cleaned under a safe protocol.
- Use of culverts/channels as appropriate to avoid impact on the stagnant water within and around the construction areas.
- Awareness raising among employees and subcontractors working on-site regarding the protected species/habitats potentially present in the area will be developed, in order to ensure constant monitoring and promote mitigations or actions to be taken if wildlife is encountered.
- The use of pesticide for the management of alien invasive species will be under strict control and on as necessary. No agents identified as being prohibited will be used and wherever possible mechanical means will be the preferred method.Particular care will be taken to avoid vegetation management during spring so as to avoid impacting pollinators and any nesting fauna. The use of herbicides will not be allowed. Consideration will be given to allow local grazers to periodically use the site for grazing sheep in order to manage vegetation.

Residual Impact

Following implementation of mitigation and management measures, the residual impact will be:

Minor – PV Plant and OHL

6.4.4.2. Potential impacts during operation phase

During this phase there will be habitat loss due to the presence of the solar panels and this will impact on PDA terrestrial fauna. Another factor that can impact might be localized maintenance activities within the PV plant area and along the OHL route, but these activities will not pose any effects on fauna species.

Potential damage to local fauna will be managed by ensuring that only designated access tracks are used for maintenance traffic and the appropriate handling and use of paints and chemicals.

The use of pesticide for the management of alien invasive species will be under strict control and on as necessary. No agents identified as being prohibited will be used and wherever possible mechanical means will be the preferred method.Use of any toxic/non-biodegradable pesticides will be prohibited in accordance with the Stockholm Convention on banned chemicals. Only organic, chloride-free, and environmentally friendly fertilizers will be allowed to apply. Particular care will be taken to avoid vegetation management during spring so as to avoid impacting pollinators and any nesting fauna. The use of herbicides will not be allowed. Consideration will be given to allow local grazers to periodically use the site for grazing sheep in order to manage vegetation. These will be managed through the operational ESMP, which will also provide for worker awareness and training sessions in relation to protection of local fauna, and a code of conduct

that forbids poaching or deliberate killing of animals listed in baseline studies. Specific mitigation measures for the protection of biodiversity for operation period should include the following measures:

- The Project should develop the BMP to cover the operational phase of the Project (see Construction Phase mitigation measures above), and includes the identification and implementation of biodiversity enhancement measures and provide the scope for ongoing biodiversity monitoring.
- Ensure a gap (around 15-20 cm) is provided under the fence to ensure that small faunal species can continue to move freely through the site.

Minor – PV Plant
Negligible – OHL

6.4.4.3. Potential impacts during decommissioning phase

During the decommissioning phase there will be no impacts on flora species. All project structures and facilities will be removed and work activities will be conducted within the project areas of the PV solar plant and OHL. The affected areas will be restored and re-vegetated.

Minor – PV Plant and OHL

6.4.4.4. Cumulative impacts

During the studies for this project, the Consultant has collected all data and related information related to any existing and / or planned projects or plans in the study area, which may lead to the generation of cumulative impacts on fauna. The research revealed that a considerable area (about 2,057 ha) between Karavasta Lagoon and the Seman River has been approved as a Detailed Plan for the Area of National Importance (DPANI) through the Decision of the National Council of the Territory no. 3, dated 14.10.2020. About 1,636.5 ha of the DPANI are located within the Divjaka-Karavasta Natural Park (also the candidate Emerald site). The DPANI is bordering the PV solar plant site to the north-west (Figure 175 and Figure 176**Figure** 66). Within the boundaries of DPANI have been approved the following traditional and economic investments by the Council of Strategic Investments (CSI) that will be developed in the near future:

- Aquatic shpk (approved by DCSI No. 4/4, dated 19.04.2018) – aquaponics (aquaculture and hydroponic) farm for cultivation of fish species.
- Agro-Iliria shpk (approved by DCSI No. 6/9, dated 24.06.2020) – agriculture farm cultivated with pomegranate, goji berry, avocado, finder lime, kiwi, grape, and pear.
- Albpanel shpk (approved by DCSI No. 7/5, dated 07.01.2020) - production of MDE panels using as raw materials such as cane and any other type of agricultural wastes or product with fibrous composition.

So far, the only economic investment currently implemented is the agriculture farm of pomegranate, goji berry, avocado, finder lime, kiwi, grape, and pear by Agro-Iliria shpk.

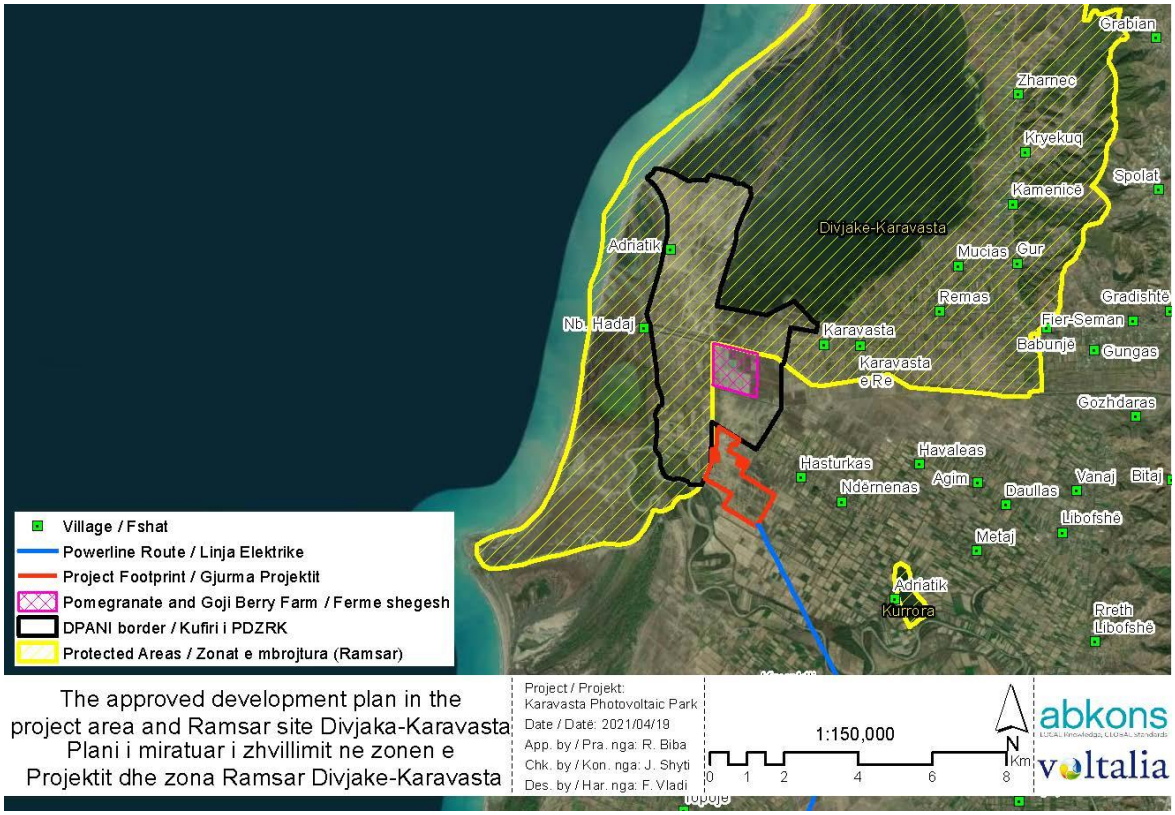


Figure 175. The approved development plan in the project area and Emerald site Divjaka-Karavasta (black colour)

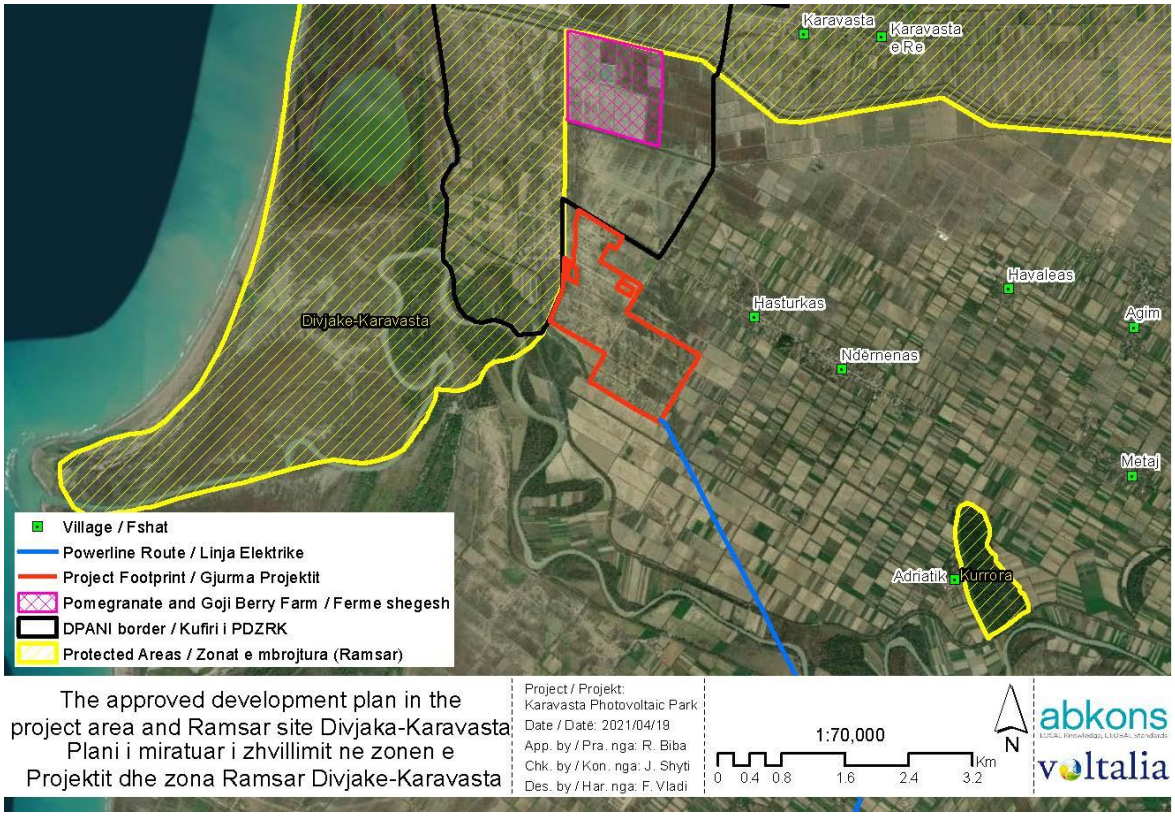


Figure 176. The approved development plan in the project area and Emerald site Divjaka-Karavasta (black colour)

Since the DPANI area is on the border with the proposed site of the PV plant, there may be cumulative impacts associated with fauna in the future; however, at this time an accurate assessment cannot be made as the magnitude of the impacts associated with DPANI is not known as no construction activity is currently underway in this area.

Near the proposed project area of the PV plant, approximately 1 km away in the northern part, there is a Pomegranate Cultivation Farm (Agro-Iliria shpk) that is currently operating. Regarding the cumulative impacts on fauna, it is estimated that this activity at present does not present any negative effects or combination with the proposed project. However, in the future this activity may be further developed and extended to the surrounding areas near the solar PV project. This can create potential cumulative impacts if the construction phase takes place simultaneously. However, there is still no clear indication that this scenario could occur, so the magnitude of the potential accumulating impacts remains unknown. The final assessment for cumulative impacts is as follows:

Minor – PV Plant
Negligible – OHL

6.4.5. Impacts on Avifauna

The surveys conducted in August (late breeding birds and early migrants), November migratory birds and early wintering) 2020, January, February (wintering birds), May and June 2021 (breeding birds) revealed the presence of 125 bird species or circa 35% of the bird species regularly observed in Albania. The area of the OHL and its adjacent areas registered 76 species compared with 90 species in Area of Influence (AoI) and 56 species in the Project Development Area (PDA).

6.4.5.1. Potential impacts during construction phase

During construction works there will be occupation of grounds for birds foraging or breeding within the PDA, and disturbance to birds due to the increased presence of human activity, vehicle and machinery movement, site clearance, and noise and vibrations from the construction activities. The impact is expected to be more significant for birds occurring within the PDA while for other birds it is likely to be not significant as they are highly mobile.

The baseline surveys and desk study revealed that around 33 bird species in the project area and in the wider study areas trigger the criteria for Priority Biodiversity Features while the aquatic habitats of Divjaka-Karavasta National Park are Critical Habitats for the Dalmatian Pelican *(Pelecanus crispus)* and the Pygmy Cormorant *(Microcarbo pygmaeus)*. Most importantly 17 bird species considered as Priority Biodiversity Features (PBF) species were found within the PDA, 19 PBF bird species in the area of the transmission line and 29 PBF bird species in the area of project influence. From the 125-bird species observed in the project area, three of them are Globally Endangered, four species are endangered in Europe, while 19 species are endangered at national level.

10 bird species with protection status were identified within the PV solar plant footprint which include:

- Eurasian Sparrowhawk *(Accipiter nisus)* – EN at national level;
- Common Buzzard (*Buteo buteo*) – VU at national level;
- Marsh Harrier (*Circus aeruginosus*) – VU at national level;
- Greater Spotted Eagle *(Clanga clanga)* – VU global, EN European, CR in national level;
- Little Egret *(Egretta garzetta)* – VU ay national level;
- Common Kestrel *(Falco tinnunculus)* – VU at national level;
- Collared Pratincole (*Glareola pratincola*) – VU at national level;
- Black-winged Stilt (*Himantopus himantopus*) – EN at national level;

- European Bee-eater (*Merops apiaster*) – EN at national level; and
- Dalmatian Pelican (*Pelecanus crispus*) – CR at national level.

The OHL route offered habitats for 13 bird species endangered at different geographical levels while the area of project influence, including parts of the Divjaka-Karavasta National Park, the IBA, KBA and Emerald Site, is home to 21 endangered birds.

Based on the above as well as information provided in Chapter 1.1.8. Avifauna and on the characteristic of the avifauna community for each project area, the Consultant considers that the potential adverse effects during construction phase will likely be of variable significance. It is worth noting that the impact would be higher if construction works are undertaken during the breeding season, i.e., March-August. Overall, the impact assessment rating will be as follows.

Aspect					
Construction activities, vehicle movement, equipment and machinery working, traffic and presence of humans on site					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	On-site (local)	Daily	Possible	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local and migratory avifauna species.					Medium - PV Plant Low - OHL
Overall Significance of Impact					
Moderate – PV Plant					
Minor - OHL					

Management and Mitigation

Mitigation of potential impacts on fauna and avifauna will be managed through the development and implementation of the ESMP and associated Biodiversity Management Plan (BMP), which will provide for worker awareness and training sessions in relation to protection of local avifauna, and a code of conduct that forbids disturbance, poaching or deliberate killing of animals listed in baseline studies and present in the project site. Specific mitigation measures for the protection of biodiversity during construction should include the following measures:

- The Consultant undertook additional breeding birds' surveys in Spring and Autumn 2021 to confirm whether breeding and nesting birds were present in the PDA. Further recommendations are suggested for the EPC Contractor to perform additional preconstruction and during construction surveys on fauna species and birds.
- The Project should develop the BMP to cover the construction phase of the Project (see above) and includes the identification and implementation of biodiversity enhancement measures.
- Avoid construction works during breeding season, i.e., between late March-mid-August or require the presence of a qualified ornithologist during major earthworks in particular for works on soil levelling and work in drainage channels;
- During the construction activities, identify places where fauna species with protected status are most often observed, demarcate the area and install warning signs for workers/drivers.
- Maintain a distance of at least 30 m "no-go area" from the primary and second grade drainage channels as they are important breeding and migratory habitats for several bird species;

- No tree cutting and vegetation clean shall be-up should be performed during the breeding season. During the same period new ground disturbance activities shall also be limited in order to avoid disturbing the ground nesting species;
- Pre-clearance checks will be undertaken by an experienced ornithologist for ground and tree nesting birds within the working width prior to the commencement of the habitat clearance works to avoid causing disturbance or harm to nesting birds and their young from collisions with machinery. A 'no-go area' comprising a 5 m radius will be demarcated around each active nest by the Project contractors with guidance from the ornithologist. And the habitat clearance will be prohibited within these 'no-go areas' until the birds have fledged.
- Monitoring of bat collision fatalities following a standardized methodology potentially using trained dogs. Monitoring to be completed monthly and concurrently with bird collision monitoring.
- A post-construction bird survey will be conducted along the OHL route to inform the design of a post-construction fatality monitoring (PCFM) program to evaluate the effectiveness of mitigation and monitor bird flight activity.
- Night works shall be avoided (from 8 pm to 6 am at least) to reduce impacts to nocturnal birds;
- Restrict vehicle movement to the existing roads that connect the Project site with the surrounding areas. Off-road driving shall be prohibited in order to avoid any unnecessary disturbance of natural vegetation and fauna. Speed limits of vehicles shall be established and enforced in order to avoid any accident with birds;
- Conduct regular awareness-building and environmental education campaigns for workers:
- Ensure construction site areas and base camp are kept clean, and that good practice with respect to waste management is applied, to ensure food attraction sources are eliminated;
- Engage suitably qualified biodiversity expert(s) to undertake the necessary training, awareness raising, and necessary survey work.

Residual Impact

The residual impact is susceptible for species of conservation concern such as the Dalmatian Pelican (*Pelecanus crispus*), Pygmy Cormorant (*Microcarbo pygmaeus*) and Collared Pratincole (*Glareola pratincola*).

The project will have no residual impacts upon the Dalmatian Pelican and the Pygmy Cormorant as those waterbird species are strictly related to water surfaces. Even during their movements from one wetland site to the other, they do follow the water surfaces with very rare passages above the PDA and the OHL Karasvasta-Fier. The OHL does not interfere with the migratory routes for waterbirds which compose the majority of the migratory birds using the Eastern Adriatic Flyway.

Meanwhile, the Collared Pratincole will be affected only by the loss of a potential foraging habitats. Nevertheless, the surrounding areas are occupied by the similar habitat and it is very likely that the Collared Pratincole will forage in the adjacent habitats.

Following implementation of mitigation and management measures, the residual impact will be:

Minor – PV Plant
Negligible – OHL

6.4.5.2. Potential impacts during operation phase

There are several risks to birds associated with operation and presence of the Project, but these principally relate to the power transmission line component and include:

- Collision with power lines;
- Electrocution with electric pylons during perching.

There is limited evidence of birds getting confused by the presence of PV panels mistaking them for a water body or resource; however, should this phenomenon occur, it will be quickly identified through biodiversity monitoring programme to be developed within the BMP during the operation phase of the project. Birds may use power line towers as a perch during hunting, nesting and rest, where they can be exposed to electrocution depending on the design and insulation of the electric pylons. Large birds can also die through collision with powerlines. The risk of collision is higher in areas of large bird concentrations such as migratory routes or sites connecting important bird areas. Such areas include water bodies or wetlands used as stop-over sites, feeding or nesting sites, or where the peculiarities of the terrain narrow the migration routes.

Bird communities in the coastal protected areas of Divjaka-Karavasta National Park, the Nature Managed Reserve of Pishe-Poro and the Landscape Protected Area of Vjose-Narte are represented by aquatic birds and terrestrial birds.

With aquatic birds, it is understood those birds closely related to the aquatic habitat, including open water bodies, marshes with aquatic vegetation, etc. Aquatic birds are represented mainly by pelicans, flamingos, herons, ducks, waders, gulls etc. Nevertheless, even some other bird species such as birds of prey, warblers etc could be visiting the wetland areas either for feeding or breeding. All the above species visit all the above-mentioned wetlands sites, either during spring and autumn migration or during their local seasonal movements.

The rest of the bird species is composed by terrestrial birds or those closely related to terrestrial habitats. The most common terrestrial birds are birds of prey (buzzards, falcons, eagles etc.) and passerines such as wagtails, swallows, larks, buntings, sparrows etc

Waterbirds tend to migrate through corridors over the water bodies. This was observed also during our surveys in both the PDA and OHL where a very limited number of waterbirds have been recorded in the terrestrial habitats of PDA and OHL. Furthermore, the OHL does not cross the large open water bodies. As such the impact of the OHL, construction and operation phase, on waterbirds is very likely to be of minor importance.

This would be the same even for waterbirds (Little Grebes, Moorhen, Water Rails, etc) present at Peshtan reservoir close to OHL towers T 49(1.47 m) and T 54 (1.44m). Furthermore, the installation of bird diverters would reduce the chances for collision.

Terrestrial waterbirds will certainly use and migrate through the PDA and the areas crossed by OHL. The more relevant impact in such a case could be the collision with powerlines. Nevertheless, this impact will be only of minor importance if mitigation measures such as the placement of bird diverters are undertaken before the project operation phase.

During this phase, consideration has to be paid to bird species with protection status and migratory birds that may be damaged due to the presence of the PV panels on site and/or cross the proposed OHL route during the spring and autumn migrations.

Minor – PV Plant
Moderate –OHL

Management and Mitigation

The following management and mitigation measures are recommended to further understand and reduce the potential impact associated with the operation of the PV solar plant and OHL:

- The BMP to cover the operational phase of the Project and includes the identification and implementation of biodiversity enhancement measures and restoration/rehabilitation measures.
- Install bird markers / diverters on OHL towers and powerlines;
- Bird friendly design of towers to reduce risk of electrocution;
- A PCFM program will be implemented to monitor the of impact of existing line on bird speciesin the area.

The above key aspects are discussed further below.

Details of final and additional mitigation measures, including any required for specific species, will be detailed within the BMP and BAP and further enriched/ improved by the ornithological expert of the, following completion of the pre-construction surveys.

Bird Markers / Diverters

One of the key mitigation measures used to protect birds from collision with transmission lines is to use line markers (diverters) to increase their visibility. Bird markers will significantly reduce the risk of collisions of birds with wires. Bird markers on the line will improve the visibility of the lines and should provide sufficient mitigation. However, as part of the further avian monitoring specific attention should be paid to the presence of bird species with protected status and areas where they stopover within the project area, so that the levels of risks and any additional specific mitigation measures can be identified. Therefore, it is necessary to organize regular observations of possible spring (March) and autumn (September-October) flyover of the project area prior and during construction phases.



Figure 177. Examples of bird markers[148]

Tower Design

[148] https://www.researchgate.net/figure/Two-types-of-line-markers-were-present-on-the-power-line-we-studied-at-the-Iain-Nicolson_fig1_333903783

Using bird-friendly power line designs is the most effective way of preventing electrocution on distribution lines; good designs protect birds by deterring perching and nesting, and by using insulated components and/or large air gaps. Proved successful examples of bird protective devices are often installed on the top of pylons to inhibit birds from landing on pylons, however, there is a risk that such measures are not bird friendly since may lead to collision with parts of the pylons due to difficulty in landing. Thus, such measures are recommended to be provided by relevant experts of the field.

Residual Impact

The project will have no residual impacts upon the Dalmatian Pelican and the Pygmy Cormorant as these waterbird species are strictly related to water surfaces and they rarely pass over the PDA and the OHL Karasvasta-Fier. Moreover, the OHL does not interfere with the migratory routed for waterbirds which compose the majority of the migratory birds using the Eastern Adriatic Flyway.

Following implementation of mitigation and management measures, the residual impact will be:

Negligible – PV Plant
Minor –OHL

6.4.5.3. Potential impacts during decommissioning phase

During the decommissioning phase there will be no impacts on avifauna species. All project structures and facilities will be removed and work activities will be conducted within the project areas of the PV solar plant and OHL. The affected areas will be restored and re-vegetated.

Negligible – PV Plant and OHL

6.4.5.4. Cumulative impacts

Cumulative impacts in relation to avifauna species are anticipated only for the OHL route considering that those to the PDA are covered in the chapter 6.4.4.4. The cumulative impacts for the OHL are related to the construction of the additional proposed 110kV line which will follow the same route as the project 220kV line for large portion of the route. Near the substation of Fier there is an existing transmission line that crosses with the proposed OHL route of the project in the section between towers 64 and 65. The construction of the new transmission line might present risks for avifauna species flying in this area due to the increased presence of cables. Birds, in particular lager species (e.g., herons, storks, eagles, etc.) might be damaged through collision or electrocution with powerlines. Nevertheless, mitigation measures foreseen by the project such as bird markers or diverters might facilitate the process and lower risks for birds. At the same time, the installation of markers/diverters will increase the overall visuality of the transmission lines in the area to birds and warn them for potential obstacles in the way. This will also set a good precedent for other transmission line projects in the area regarding the adequate management and increased awareness for birds during operation phase. As such, potential impacts are foreseen to be minimal and easily manageable through implementation of mitigation measures.

Negligible – PV Plant
Minor – OHL

6.4.6. Impacts on Aquatic Ecology

During the surveys of August and November 2020 were recorded 15 aquatic plant species (both submersed and emergent), 16 macro-invertebrate species connected mostly with benthic environments, and 5 fish species.

6.4.6.1. Potential impacts during construction phase

Construction works for the installation of the PV solar panels and foundations of the tower pylons will include earth movement (soil) and disturbance of the natural soil configuration in the project footprint areas. These

activities could result in alterations of hydrology of the affected areas by the project and alterations of the surface water run-off regime, in particular for the PV plant. This could further result in sedimentation of surface drainage channels, which may impact upon the quality of natural water systems and ultimately the biological aquatic systems that use these water bodies. Although it is noted that all drainage channels will remain within the PDA and there will only be rehabilitation works on some selected tertiary channels to reinstate them to their original design and functioning. The baseline survey revealed that there are no aquatic plant species with protected status within the PV plant area. A priority specie also classified as a protected species was observed outside of the PV footprint area and AoI. This includes lesser water plantain *(Baldellia ranunculoides)* which is classified as NT according to the IUCN Red List and CR according to the Albanian Red List. In this context there are no significant risks for the PV solar plant site.

Along the OHL route were observed two species with protected status White-clawed crayfish *(Austropotamobius pallipes)* and European crayfish *(Astacus astacus)*, respectively EN and VU according to the European classification. These species were observed in the main irrigation channel of the areas close to OHL towers 30-31 and 40-41. This means that construction works in these sites have to be conducted on adequate mitigation and management measures.

The effects of solar energy projects on aquatic ecosystems and biodiversity may be related to the loss and change of habitats, and in case of water connections of the European eel (*Anguilla anguilla*) and killifish (*Aphanius fasciatus*). Further on the supporting infrastructure (e.g. access roads rehabilitation and electrical facilities/ equipment) and the spacing requirement of the panels can result in an increased impact in terms of actual space (PDA) of the panels themselves. In summary the following impacts on aquatic ecology may be associated with construction work activities:

- The habitat change, infrastructure and land preparation activities (e.g. vegetation clearing, removal of upper soil layers) can fragment aquatic habitats (ones the removed upper soil is disposed in non-proper locations) and become a barrier to the movement of species, affect hiding places, preying strategies and the availability of food. This effect is connected mostly to the migratory species as European eel (*Anguilla anguilla*).
- Discharge of used water in non-proper locations might affect the water bodies/pools and connectivity (through increased water temperature and decrease of salinity), pursuing thus the appearance of alien species and the spread of mosquitofish (*Gambusia holbrooki*), replacing the killifish (*Aphanius fasciatus*) that lives in brackish and salty coastal waters.
- The aquatic habitats might be affected by pollution due to the fact that in order to keep panel access to the sun, the cleared land is often maintained with dust suppressants and herbicides (in addition to other toxins used in panel operation). The use of dust avoidance components can both increase runoff and alter key chemical and physical properties of adjacent water connections when washed out.

Aspect					
Construction works, such as site clearance and excavation processes for the installation of PV solar modules and tower pylon installations for the OHL					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary	On-site	Daily	Possible	Medium - PV Plant Low - OHL
Receptor					**Sensitivity**
Local aquatic ecology species.					Low - PV Plant Medium - OHL
Overall Significance of Impact					
Moderate – PV Plant					
Minor – OHL					

Management and Mitigation

Mitigation of impacts in relation to aquatic ecology will be managed through the development of the ESMP and BMP, which will specify appropriate measures for the management of site clearance and excavation activities, aquatic ecology protection, soil and waste management both within the PV solar plant footprint and along OHL route, as well as for associated infrastructure. Some of these mitigation measures are as follows:

- Staff and contractors will develop an Erosion and Sediment Control Procedure within the CEMP to minimise the risk of adverse impacts to waterbodies near the PDA arising from construction activities, erosion and suspended sediments on aquatic ecology and their habitats. These include surface water management infrastructure (e.g., cut-off / diversion drains, velocity dissipation devices, culverts) to be installed in appropriate locations to minimise and control surface water
- Emergency spill management procedures will be in place to minimise the risk of impacts to receiving aquatic habitats and species. This will be communicated to all relevant staff and contractors during their induction.
- Project staff and contractors will be banned from fishing and the collection of aquatic natural resources within or in the vicinity of the project to minimise impacts to aquatic habitats and species.
- If trees are cut, they should be replaced with mostly indigenous species. Provision should be made for an irrigation network and maintenance of greenery.
- .. The use of pesticide for the management of alien invasive species will be under strict control and on as necessary. No agents identified as being prohibited will be used and wherever possible mechanical means will be the preferred method.
- Environmental education and awareness programmes will be conducted for project staff and contractors (e.g., through staff inductions) to emphasise the importance of conserving biodiversity for wildlife and communities.
- Establish buffer zones around perennial and larger temporary surface waters/Maintain a distance/buffer zone of at least 30 m “no-go area” from the primary and second grade drainage channels as they are important fish spawning and migration ways that use this channel's network.
- Avoid high-value aquatic habitats, including ponds, waterways (temporary and perennial), riparian habitat, and habitats supporting protected species.
- Avoid surface water or groundwater withdrawals that affect sensitive habitats (e.g., aquatic, wetland, and riparian habitats).
- Maintain small ponds or create new ones inside the project area.
- Follow recommended dust abatement practices.
- Limit chemical used during regular site maintenance to non-persistent chemicals.
- Decontaminate equipment used in surface water.
- Monitor disturbed areas for invasive alien species and eradicate these species when found.
- Design waterways crossings to allow for and maintain uninterrupted movement and safe passage of fish during all project periods.

Residual Impact

Following implementation of mitigation and management measures, the residual impact will be:

Minor – PV Plant
Negligible – OHL

6.4.6.2. Potential impacts during operation phase

During this phase there will be no impacts on aquatic ecology as no work activities will be performed.

Regarding the flooding in this area, there is a small risk that may result in cases of flooding in the area, but this risk is manageable as:

- There is a pump storage system pre-existing located not far from the PV plant and managed and will be managed by the local authorities, independently of Voltalia.
- Voltalia's responsiblity is limited to the maintenance of drainage ditches and canals inside the PV plant.

There might be only localized maintenance activities within the PV plant area and along the OHL route, but these activities will not pose any effects on the aquatic biodiversity species. Pollution of waters of streams should be avoided with the uncontrolled use of pesticides and fertilizers in the plantation areas and during maintenance operations. The Project will also undertake periodic maintenance works on the drainage channels inside the PV plant to ensure they are functioning as required as well as Voltalia will insist that Local Authorities will maintain periodically the cleaning of channels outside of PV Plant till to the Pump Station, and this could bring benefit to aquatic species by ensuring good flow regimes are maintained which should improve overall water quality.

The Project will also undertake periodic maintenance works on the drainage channels to ensure they are functioning as required, and this could bring benefit to aquatic species by ensure good flow regimes are maintained which should improve overall water quality. The BMP for the operation phase of the project should consider the protection and potential enhancement of biodiversity features present within the drainage channels, and in particular during maintenance of the channels. Furthermore, the BMP will include scope of on-going monitoring of aquatic habitats within the PDA.

Negligible – PV Plant and OHL

6.4.6.3. Potential impacts during decommissioning phase

During the decommissioning phase impacts on aquatic ecology will be similar to those during construction. All project structures and facilities will be removed and work activities will be conducted within the project areas of the PV solar plant and OHL. The affected areas will be restored and re-vegetated.

Minor – PV Plant
Negligible - OHL

6.4.6.4. Cumulative impacts

No cumulative impacts are foreseen in relation to aquatic biodiversity species.

Negligible – PV Plant and OHL

6.5. Socio-Economic Impacts

6.5.1. Impacts on Economy and Employment

6.5.1.1. Potential impacts during construction phase

The following project actions will generate impact factors on the economy and, employment component during the construction phase:

- Land acquisition;
- Mobilization of vehicles, workers and equipment, transport of materials and waste;
- Surface levelling and grading;
- Pile driving for mounting structure;
- Excavation, trenching and cable laying;
- Marking out of foundation, earth works and excavations;
- Installation of foundations and grounding devices;
- Assembly, installation, alignment and fixing of pylons;
- Construction of buildings.

The potential impacts on economy and, employment deriving from the above actions are associated with the following impact factors:

- Demand for workforce;
- Demand for goods, materials and services.
- In the pre-construction phase, Voltalia will hire staff locally, nationally or internationally, according to the skills required and the availability of workforce.

The Project, to the extent possible, will supply its workforce from local communities (i.e., communities within the municipalities of Fier and Divjakë where the Project is located), reducing also in such way the presence of external workforce. It is the project intention to rely on local contractors that will employ workers mainly from local communities, in line with Voltalia's local content strategy for the project, therefore reducing the need for workers from outside the area.

It is expected that at peak of construction activities, approx. 200 workers will be needed for the construction of the PV and OHL. At a local level, employment opportunities will mainly be for semi-skilled and unskilled workers and Voltalia will maximize the efforts to employ local workforce. Real percentage to be confirmed when subcontractors are contracted; Voltalia policy is to prioritize local skills and when not available, national or foreign ones. No skills assessments of the local people have been done. Voltalia will use the data collected in the framework of the LRP process to conduct a skills assessment of the area. The number of workers on site will build up over time until peak construction activity is reached and then will start to tail-off as construction nears completion and the Project enters the commissioning phase. It is anticipated that there will be no need for a workers' camp related to the implementation of the Project. This will avoid creating the typical tensions between workers in camps and the local communities.

Also, the indirect employment has to be taken into consideration in this phase that might be associated with:

- The project's supply chain (goods and services);
- Spending of project employees in local communities.

The Project will generate economic opportunities linked to the demand of goods, materials and services. The Pylons and Panels will be imported and will be transported using the existing infrastructure, but it is highly likely that materials needed for civil works (i.e., cement, clay), as well as the materials needed for infrastructure improvements (i.e., for the upgrading of access tracks) will be procured locally in the pre-construction phase of the Project.

Additional employment opportunities will rise for the security safeguard of the PDA area and to prevent H&S risks to the local population. The security personnel will be hired from local residents, although the number of employees required is still unknown.

There is no available data from which to estimate levels of indirect employment and indirect economic opportunities generated by the Project and the impacts will depend on the nature of the local economy, the availability of required goods and services in the Project Area and ways in which employees choose to spend their earnings.

Womens' income is likely to be more impacted than men due to the fact that the compensation of assets and crops deriving from the project will be given to the owners/users of the land, which are usually men.

In addition, the employment of women in construction projects is likely to be minor than men, which are seen as the main workforce.

Construction activities may create employment related expectations among the local population, which are unrealistic. If this is not managed appropriately, it could lead to worsened relationships between the Project and the local population once these expectations do not materialise.

The impact for this phase is considered to be ***Minor to Moderate Positive*** for both PV and OHL.

Aspect					
Economy and Employment - Request for workforce, goods, materials, and services					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local and Regional	Daily	Likely	Low - PV Plant and OHL
Receptor					**Sensitivity**
Eligible and able people in the local communities and in the region					Medium - PV Plant and OHL
Overall Significance of Impact					
Minor to Moderate Positive – PV Plant and OHL					

Management and Mitigation

The following measures required by EBRD PR 2, IFC PS 2 will be implemented during the pre-construction and construction phase for the economy, employment and livelihood component:

- Collaborate with the State Employment Offices;
- Collaborate with local institutions (Municipality and Administrative Units)
    - Put in place transparent and fair recruitment procedures by:
- Strictly following the Albanian Code of Work requirements;
- ILO conventions ratified by Albania;
- EBRD PR2 Labour and Working Conditions;
- IFC PS 2 Labor and Working Conditions;
- Adopt and maintain human resources policies and management systems or procedures with the requirements of PR 2, PS 2 and national law. These policies and procedures will be understandable and accessible to workers, and in the main language(s) spoken by the workforce. HR policies and management will ensure:
    - Non-discrimination and equal opportunities to all workers;
    - Compliance with national laws and international standards regarding employment of minors;
    - Avoidance of any form of forced labour and child labour;
    - Voltalia internal policy prohibits employment of workers under the age of 18 through its Code of Conduct.

- Provide clear and transparent information on wages, benefits and working conditions;
- Provide workers with a safe and healthy work environment;
- Use an international workforce for a term-limited period for compliance and training purposes, where national personnel cannot be sourced.
    - The Project will develop a Labour Management Plan (LMP) that details the strategy for maximising local employment and specifies worker employment conditions and welfare requirements.
    - Project will develop a Retrenchment Plan for the construction phase workers./ Spitalla PV Plant construction will start and Voltalia can reemployed workforce, where is possibile.
    - An audit of the selected hotels will be carried out to see if they meet the EBRD/IFC criteria.
    - Although no dedicated worker accommodation is planned for the project will develop a Worker Accommodation Strategy that outlines the EPC strategy for housing its worker force in existing accommodation, and where this is not possible specifying the details of any temporary accommodation arrangements that may be required.
    - Implement a grievance mechanism open to employee and non-employee workers. Ensure that all workers directly and indirectly employed are informed on how to submit grievances.
    - No skills assessments of the local people have been done. Voltalia will use the data collected in the framework of the LRP process to conduct a skills assessment of the area in order to identify the skills local people have in line with the needed workforce for the project.

These same measures will be applicable to non-employee workers. The company will monitor employee standards of its contractors throughout the lifetime of the Project through regular labour and OHS audits.

In addition, the following enhancement measures will be implemented to increase Project benefits on the economy and employment component:

- Contractors will be contractually required to maximise use of local workforce in the Project;
- Prioritize employment of members of vulnerable groups and individuals
- The presence of CLOs through the construction phase will allow any future issues to be identified and addressed refering to women and vulnerable groups and individuals;
- In order to increase the project's Local Contents, the Company will aim to procure goods, services and materials from local businesses to the extent possible;
- A strategy for the procurement of goods, services and materials will be prepared, including a demand-and- supply analysis, in order to identify to what extent local sources can contribute to procurement needs and to implement tailored measures to support local businesses;
- Ensure priority of women owned businesses during the procurement process;
- The Company will provide information on procurement, tendering, and contracting processes with a transparent and clear approach, to ensure that equal access to opportunities is guaranteed;
- Information on procurement opportunities will be given to local businesses, through tailored communication with Local authorities and other appropriate parties;
- Local companies identified as able to provide goods, materials and services during the strategical analysis will be contacted directly providing information on tendering opportunities;
- Ensure Voltalia's "Ethics Guide and Code of Conduct" is enforced also in the supply chain, so all contractors, subcontractors and suppliers shall comply with it.
- Local authorities and local communities will be informed and consulted on impacts due to project activities and planned mitigation measures during the pre-construction meetings and throughout the Project life cycle as planned in the Stakeholder Engagement Plan;

In order to increase women employment opportunities, the following measures should be taken by Voltalia:

- Provide equal trainings for men and women;
- In field training during the development of implementation phase, also through Contractor/s and Sub-Contractors;
- Establish training and re-training program that specifically target women, to increase their opportunities;
- Define number of persons to be interviewed for a new position which need to be women;
- Clearly indicate that the position opportunity is for both men and women;
- Provide a women friendly working environment.

Residual Impact

Considering the application of the enhancement measures, the impact on the economy, employment and livelihood components is expected to be ***Moderate positive*** both for the PV and OHL area.

Moderate Positive – PV Plant and OHL

6.5.1.2. Potential impacts during operation phase

The following project actions will generate impact factors on the economy and, employment component during the operation phase:

- Operation and maintenance of the PV;

The operation and maintenance of the OHL will be managed by the Transmission Line Operator (OST), to whom will be handed over after the line will be completed and commissioned.

The potential impacts on economy, employment and livelihood deriving from the above actions are associated with the following impact factors:

- Demand for workforce;
- Production of energy.

Employment during this period on both direct and indirect directions, will be limited and will consist essentially in a few workers dedicated to the operation of the PV and workers periodically contracted for maintenance activities. It is anticipated that the number of a total of around 20 job opportunities will arise during the operation phase, including skilled and semi-skilled labour (such as electrical and mechanical technicians) and unskilled labour (such as module cleaners and security personnel) for a duration of 30 years. Workers in this phase will be, to the extent possible, hired from local communities.

Likewise, the need for goods, materials and services will be limited, and will essentially consists in products necessary for the periodic maintenance of the PV. The Company will prepare a strategy and implement activities to increase local procurement and to support the creation of a local supply chain that can provide products and services needed for the periodic maintenance of the PV.

Production of energy during the operation phase will lead to general benefits on Albania's energy market, increasing the amount of energy available to businesses, industries and families, and decreasing the dependence on water sources. Works on the OHL and the substation will introduce new infrastructures and will overall improve the power transmission network.

Aspect					
Economy, Employment and Livelihood - Request for workforce, goods, materials, services and production of energy					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term	Local, Regional, and National	Continuous	Likely	Low - PV Plant and OHL

Receptor	Sensitivity
Local communities, regional and national receptors	Medium - PV Plant and OHL
Overall Significance of Impact	
Minor Positive – PV Plant and OHL	

Management and Mitigation

The following measures required by EBRD PR 2 and IFC PS 2 will be implemented during the operation phase for the economy, employment and livelihood component:

- Put in place transparent and fair recruitment procedures;
- Adopt and maintain human resources policies and management systems or procedures with the requirements of PR 2 and national law. These policies and procedures will be understandable and accessible to workers, and in the main language(s) spoken by the workforce. HR policies and management will ensure:
    - Non-discrimination and equal opportunities to all workers;
    - Compliance with national laws and international standards regarding employment of minors;
    - Avoidance of any form of forced labour;
- Ensure that workers are not discouraged from forming or joining workers' organisations;
- Provide clear and transparent information on wages, benefits and working conditions;
- Provide workers with a safe and healthy work environment;
- Provide training opportunities for local workforce to be employed during the operational phase;
- Provide equal employment opportunities for men women;
- Implement a grievance mechanism open to employee and non-employee workers. Ensure that all workers directly and indirectly employed are informed on how to submit grievances. Ensure that the grievance mechanism is managed in line with indications of the SEP.

These same measures will be applicable to non-employee workers. The company will monitor employee standards of its contractors throughout the lifetime of the Project through regular labour and OHS audits.

In addition, the following enhancement measures will be implemented to increase Project benefits on the economy, employment and livelihood component:

- Contractors will be contractually required to maximise use of local workforce in the Project;
- In order to increase the project's Local Contents, the Company will aim to procure goods, services and materials from local businesses to the extent possible;
- A strategy for the procurement of goods, services and materials will be prepared, including a demand-and- supply analysis, in order to identify to what extent local sources can contribute to procurement needs and to implement tailored measures to support local businesses;
- The Company will provide information on procurement, tendering, and contracting processes with a transparent and clear approach, to ensure that equal access to opportunities is guaranteed;
- Information on procurement opportunities will be given to local businesses, through tailored communication with Local authorities and other appropriate parties;
- Local companies identified as able to provide goods, materials and services in the during the strategical analysis will be contacted directly providing information on tendering opportunities;

- Local authorities and local communities will be informed and consulted on impacts due to project activities and planned mitigation measures during the pre-construction meetings and throughout the Project life cycle as planned in the Stakeholder Engagement Plan;
    - As described in Contractor Management Plan Voltalia will control and monitoring activities regarding Contractor constructors' actions and has overall responsibility for employment, social, health and safety, and cultural heritage aspects of the Project.

Residual Impacts

Considering the application of the enhancement measures, the impact on the economy and employment components and it is expected to be Minor to Moderate positive both for the PV and OHL area.

Minor to Moderate Positive – PV Plant

6.5.1.3. Potential impacts during decommissioning phase

Potential impacts to employment associated with decommissioning of the OHL will entail temporary to short-term work. Overall, during decommissioning, the impact will be similar to the construction phase, Moderate Positive.

Minor to Moderate Positive – PV Plant

6.5.1.4. Cumulative Impacts

No cumulative impacts are foreseen in relation to economy, employment and livelihood.

Negligible – PV Plant and OHL

6.5.2. Impacts on Land Use and Livelihood

6.5.2.1. Potential impacts during preconstruction and construction phase

The following project actions will generate impact factors on the land use and livelihood component during the preconstruction phase:

- Land acquisition;
- Surface levelling and grading.

The potential impacts on land use and livelihood deriving from the above actions are associated with the following impact factor:

- Change in land use and ownership.
- Loss of land available for farming and grazing activities
- Loss of incomes from farm activities due to loss of land

For the preconstruction, construction and operation of the Project, the following land requirements are planned:

- Land Acquisition: land required by the Project for installing of permanent facilities.
- Lease: land required by the Project during construction activities will be temporary leased.

It should be noted that no displacement of houses is necessary for this Project.

The following type of impacts will occur during the preconstruction and construction phase in terms of land use.

Land necessary for permanent facilities: these plots of land will be acquired from current landowners and will permanently change their status (at least for the entire construction and operation phase), hence it

will not be possible to conduct current activities, such as farming or animal grazing; land owners and land users will be compensated for the losses, as further explained below. The land needed for the construction of the PV is State Land, so land acquisition is limited for the land required for the OHL pylons, which will limit the impact on the private owners and their activities.

Land necessary for temporary facilities: these plots of land will be leased from current land owners and will be used during the construction phase. Hence it will not be possible to conduct current activities, such as farming or animal grazing, for a certain period of time, which may be equal to the entire construction period or shorter. Early works is expected to last 2 months and construction is expected to last 11 months, but certain activities may require a shorter time. This means that either one season's crops or no crops will be affected (depending on the season in which construction is carried out on a particular plot). Land owners and land users will be compensated for the temporary occupation of land and for the loss of crops, as further explained below. The leased land will then be handed back to owners after the end of construction and reinstatement, in its original conditions, to the extent possible.

These two impacts will occur during the preconstruction phase of the project where the land necessary for the permanent and temporary facilities will be acquired or leased prior to the commencement of works and of the construction phase.

The following groups will be affected by changes in land use:

- Persons who own the land plots which will be acquired for the project, and whose land and crops may be affected by construction;
- Persons who are using the land plots which will be crossed during the transport and installation of the pylons in their future locations or other land which may be disrupted during construction, whose crops may be affected;
- Persons who are using the land plots which have been or will be acquired for the project, but who are not owners of land, and whose crops may be affected by construction.
- Informal land users whose activities have benefited from the land use and whose crops might be affected by the project implementation.

The majority of land is required for the implementation of the PV Plant. The land for the PDA is located in State owned land, it is also a very salty area with difficulties of crop cultivation. Informal users of state land will be compensated for the assets and crops planted. The area of the OHL is a fertile agriculture area with the majority of the land planted with annual crops, but there are also areas planted with perennial crops.

In the area of the PV plant, although situated in state land, there is observed activity of seasonal herders and areas of grazing land. The proponent will compensate the users of the land for the loss of crops and assure that a way of passage for the herds to access other pastures or grazing areas nearby is granted. Similarly, continued access for residents or visitors who may have previously crossed the PDA area to reach the beach will also be assured.

According to the results of the baseline study, lease of privately-owned land is rare in the area and therefore the likelihood of the existence of users of land, who are not owners, is small. In any case the Livelihood Restoration Plan (LRP) has been developed for the Project, and has ensured that land users that are not land owners will be compensated for losses of crops, pasture or forest. The state land users will be compensated for the loss of crops and/or pasture.

Those who are going to be more affected are obviously the land owners along the OHL route. Some of them have more than one parcel or plot affected by the Project and, in this case, the impact will be higher than for those partially affected or affected only by the Easement.

Land that will be permanently acquired, or temporarily leased will be compensated to land owners and land users in line with the indications of LRP, prepared in line with National Legislation and IFC and EBRD Standards. In addition, compensations will be provided when project impacts will occur on crops, trees, pastures and other assets present within the Project footprint, both for permanently acquired and leased

land. The application of the LRP will reduce to the extent possible impacts on the livelihood of current land owners and users.The table below identifies the parcels required for the various project phases with the identified impacts.

Table 73 Required Land Take for the Project and Impacts (source LRP)

Project Phase	Component	Estimated Land Take	Estimated Land Parcels	Duration	Potential Impacts
Construction	Plant Site	185 Ha	21 land parcels	Permanent	Impacts on informal grazing and other activities; access restrictions
	Plant Site Construction camps and laydown areas	4 Ha	2 land parcels	Temporary	Impacts on informal grazing; access restrictions
	Plant Site Access Roads	To be determined	25 land parcels	Temporary	Impacts on informal grazing and other activities; access restrictions; loss of crops
	OHL Pylons	57 pylons with on average 10m x 10m land take	57 land parcels	Permanent	Loss of land; loss of crops and agricultural income
	OHL Pylons access roads	57 land parcels access roads (estimation of 5m x 5m temporary land take)	57 land parcels	Temporary	Temporary loss of land, Loss of crops and agricultural income; land disturbance
	OHL Access Roads and Construction Corridor	Approx. 17 Ha	725 land parcels	Temporary	Loss of crops and agricultural income; land disturbance

The initial approach to permanent land acquisition foresaw Voluntary Agreements that would result in a Sale-Purchase Agreement as the main mechanism, and expropriation to be used as a last resort. However, from initial engagement activities with affected households it resulted that households face significant challenges to prepare the required documentation to reach a Sale-Purchase Agreement due to land tenure complexities in Albania and high immigration rates. As a result, the LRP has been updated to adopt a new approach that ensures timely land acquisition process that gives way to obtainment of required permits and licences and in the same time ensures fair compensation to affected households in line with IFC and EBRD requirements. The new approach foresees three simultaneous and independent processes: legal

expropriation process that ensures rights to lands required for the implementation of the project b) engagement with affected households to compensate for impacts in accordance with LRP, and c) support to households to secure ownership documents for the impacted land parcels.

During the upgrading of access tracks, and as a result of increased traffic, particularly the presence of heavy vehicles, some of the local farmers may have temporary difficulties accessing their plots of land. In such way the magnitude of the impact might be higher in temporary land plot use and in perception. This impact may occur only occasionally, under certain circumstances, but nevertheless it will be managed to prevent impacts on livelihoods and preserve good community relations.

A total of eight potential ecosystem services have been identified along or in vicinity of the OHL route and near with PV site area. These include:

- Livestock
- Honey production
- Capture fisheries
- Hunting
- Pollination
- Hydrology processes
- Ethical / Recreational and tourism
- Semi and natural habitats

Following a screening process, the following six services were selected for a more detailed assessment:

- Livestock
- Honey production
- Pollination
- Hydrology processes
- Recreational and tourism
- Semi and natural habitat.

All impacts were determined as minor or negligible and no significant / priority ecosystems services were identified.

Table 74 Summary of Ecosystem Services Assessment

Ecosystem Service Name & Type	Type	Impact Magnitude	Service Sensitivity	Overall Impact Ranking
Livestock: Provisioning	Type I: Impacts on such services may adversely affect communities	4 Medium	2 Low	Minor

Honey production: Provisioning and Pollination: Regulating		2 Low	2 Low	Negligible
Natural Habitat: Supporting		3 Medium	2 Low	Minor
Recreational and tourism: Cultural		2 Low	2 Low	Negligible
Hydrology processes: Regulating	Type II: Impacts which the project directly depends for its operations	2 Low	2 Low	Negligible

None of the Type I ecosystem services value or functionality are at risk from the construction or operation of the Karavasta Solar Project and associated impacts are not considered as significant. No Type 1 ecosystem services qualify as priority as per the IFC Guidance Note 6 (Ref. 3).

Aspect					
Reduced access to land, permanent acquisition and temporary lease					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Permanent and temporary	Project footprint	Continuous	Likely	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Land owners and Land users affected					Low to Medium - PV Plant Low - OHL
Overall Significance of Impact					
Moderate– PV Plant and OHL					

Management and Mitigation

The mitigation measures listed below follow the mitigation hierarchy and will be performed for the preconstruction phase for land use and ownership component:

- Avoidance:
  - When selecting the site of the project elements, construction sites and access roads, avoid to the extent possible locating them on farmed land or land with the presence of fruit trees or other assets;
  - Minimize the amount of land occupied during construction;
- Minimization:
  - Support the vulnerable groups and individuals in the completion of the necessary documentation to achieve the Ownership Certificate;
  - Ensure all compensations prior to the commencement of the construction activities;
  - All land users, formal and informal ones will be compensated at full replacement value as defined in the table 76 and as defined in the LRP.

- Ensure continued access for herders and herding activities to grazing areas around the PDA and that local residents can continue to gain access to the beach;;
- Implement a grievance mechanism specific for land acquisition and livelihood restoration issues. Ensure that all PAPs (project affected people) are informed on how to submit grievances. Ensure that the grievance mechanism is managed in line with indications of the LRP.

- Rehabilitation:
  - Upon the completion of construction activities, fully reinstate leased land and ensure it is handed over in its original conditions, to the extent possible.

The following reccomendations are made to support the minimazition of impacts for the ecosystem services:

- If beekeeping within the area of PV Plant is determined material, consideration should be given to promoting revegetation of suitable native vegetation to support pollinators with a growth height that will not interfere with PV panel performance and a maintenance regime to support pollinators

The project has foreseen as per the following table measures for the management of mitigations related to land use and livelihood.

Table 75 Mitigation/Compensation Measures on Land Acquisition

Type of Impact	Type of Compensation
1. Permanent Land Acquisition	To Landowner (including holders of Akti i Marrjes së Tokës në Pronësi (AMTP) certificate without registration): Compensation of land required at Project Land Acquisition Rate* based on market value in addition to the expropriation value. Compensation for any fixed asset affected at full replacement value (e.g., irrigation, drainage structures, sheds, wells etc.)
	To Land User: Compensation for loss of crops at the Project Crops Rate based on full replacement value
2. Temporary Land Acquisition	To Landowner (including holders of Akti i Marrjes së Tokës në Pronësi (AMTP) certificate without registration): Compensation for land at 12.5% of the Project land Acquisition Rate, paid annually
	To Land User: Compensation for loss of crops at the Project Crops Rate based on full replacement value
3. Temporary Land Access	To Landowner (including holders of Akti i Marrjes së Tokës në Pronësi (AMTP) certificate without registration): Compensation for land at 12.5% of the Project Land Acquisition Rate, pro rated to the period of land use during construction (from land entry to land exit) To Land User: Compensation for loss of crops at the Project Crops Rate based on full replacement value.
4. Orphan Land	Subject to case-by-case review by expert opinion of project agronomists. Where land access results in any portion of the land parcel being deemed uneconomical, the project will compensate the remaining land deemed uneconomical as per the principles above.

Residual Impacts

Considering the application of the mitigation measures, the negative impact on the land use and ownership component is expected to be:

Minor – PV Plant and OHL

6.5.2.2. Potential impacts during operation phase

The following project actions will generate impact factors on the land use and ownership component during the operation phase:

- Operation and maintenance of the PV;
- Operation and maintenance of the OHL;

The potential impacts on land use and ownership deriving from the above actions are associated with the following impact factor:

- Change in land use and ownership.
- Loss of land available for farming and grazing activities.
- Loss of incomes from farm activities due to loss of land.
- Damages to crops or lands due to maintenance activities

During the operation phase Fieri Substation will not require additional land, and Fier substation is not considered as an associated facility. The upgrade works that VOLTALIA will perform in the substation of Fieri, are mostly related to the construction of the connection point, and installation of equipment to increase the carrying capacity of this substation. These works will be mostly mechanical and electrical works. These investments will increase the carrying capacity of this substation.. Compensation related to damages to crops or lands following maintenance activities of the OHL by OST will be managed by OST and not Voltalia.

Aspect					
Reduced access to land, easement					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Permanent and temporary	Project footprint	Continuous	Likely	Low - PV Plant and OHL
Receptor					**Sensitivity**
Land owners and Land users affected					Low - PV Plant and OHL
Overall Significance of Impact					
Minor – PV Plant and OHL					

Mitigation Measures

Once the project is operational, there will be a minor impact for those with permanent loss of land from the towers/ pylons, while the agricultural activities on the remainder of the land will resume as usual.

The mitigation measures listed below follow the mitigation hierarchy and will be implemented for the construction phase for land use and ownership component:

- **Avoidance:**
    - When selecting the siting of the OHL right of way, avoid to the extent possible locating it on farmed land or land with the presence of fruit trees or other assets;
- **Minimization**:
    - Implement a grievance mechanism specific for land acquisition and livelihood restoration issues. Ensure that all PAPs are informed on how to submit grievances. Ensure that the grievance mechanism is managed in line with indications of the LRP.
    - Should affected people need to raise grievances for damages to crop or lands following OST's maintenance activities of the OHL, voltalia will encourage affected people to raise grievances directly to OST. In the case where affected people would not be able to raise grievances to OST, Voltalia's grievance mechanism will be open to those grievances and Voltalia will support affected people in raising the grievance with OST.
    - Consider allowing grazers to gain periodic and controlled access into the PDA to graze their animals as part of the Project's vegetation management strategy

Residual Impacts

Considering the application of the mitigation measures, the negative impact on the land use and ownership component is expected to be:

Negligible – PV Plant and OHL

6.5.2.3. Potential impacts during decommissioning phase

Potential impacts to employment associated with decommissioning of the OHL will entail temporary to short-term work. The land will return to their legitimate owners and they can continue their farming activities without any restrictions after taking anyregeneration of the soil quality and revegetation.

Overall, during decommissioning, the impact will be proportionally inverse from those during the construction phase, minor positive.

Minor Positive – PV Plant

6.5.2.4. Cumulative impacts

The new 110 kV OHL connecting Fier substation to Hoxhare substation will require additional land acquisition during construction phase and permanent restriction during operation. This will not impact the PDA.

Negligible – PV Plant
Minor - OHL

6.5.3. Impacts on Health and Safety

6.5.3.1. Potential impacts during construction phase

The following project actions will generate impact factors on the health, safety and security component during the construction phase:

- Mobilization of vehicles, workers and equipment, transport of materials and waste;
- Vegetation clearance;
- Construction/improvement of internal and external access roads;
- Levelling off the ground;
- Pile driving for mounting structure;
- Construction of electrical substation and foundations;
- Excavation, trenching and cable laying;
- Marking out of foundation, earth works and excavations;
- Installation of foundations and grounding devices;
- Assembly, installation, alignment and fixing of pylons;
-

The potential impacts on community health, safety and security deriving from the above actions are associated with the following impact factors:

- Emission of dust and particulate matter;
- Emission of noise and vibrations;
- Increase of traffic;
- Increased risk of traffic hazards and incidents associated with the use of the highway for freight and local roads for workers;
- Influx of workers, increased incidence of communicable disease
- Risks associated with the presence of personnel on site (within the project area) and at offsite operations and activities (within the community).
- Risk of unauthorized access to the site

The construction of the PV and of the OHL, like all large industrial and infrastructure construction projects, carries with it several key health and safety risks to the workers employed on the project as well as members of the surrounding communities. Key issues for consideration associated with the proposed project are as follows:

- Working at height and in confined spaces;
- Working with large scale structures;
- Ground excavation hazards;
- Potential for electrocution;
- Traffic;
- Issues associated with unauthorised access and vandalism.

Impacts to surrounding communities will mainly have to do with risk of accidents with vehicles and people due to transport and traffic along the road. Specific mitigation measures will be implemented also in this case to reduce risks to the extent possible.

Another risk at this stage is related to the outbreak of the Covid-19 and the health issues with it associated. The risk is related with both the local populations and all the employees.

The influx of workers in the Project Area can lead to an increase of communicable diseases among the population. This value impact however is considered to be limited, considering that no workers' camp is foreseen in the area and similarly the interactions between workers and local population will be limited. The presence of workers can also lead to tensions and conflicts with the local population, in case of inappropriate behaviours and frictions. Once again interactions between workers and the local population will be limited during the construction phase, hence the potential impact is expected to be low and manageable through appropriate measures.

Voltalia will have a limited number of employees, as the works will be performed with a subcontractor. It is expected that between 10 to 20 workers from Voltalia. VOLTALIA staff will be accommodated in suitable hotels in the Fier city or apartment (1+1) for rent, for each employee.

Should local accommodation not meet EBRD or IFC requirements for workers' accommodation, Voltalia will endeavour to hire and manage directly accommodations that meet these standards for this limited amount of expatriate workers. Transportation will be provided by Voltalia.

Given the low number of the external workforce in the area and the decision of Voltalia not to implement a workers' camp in the area, the impact of the workforce on the local population and on the GBVH is deemed to be negligible. Nonetheless, mitigation measures should be taken to avoid or reduce impacts related to GBVH.

There is also a risk of GBVH within the workforce, given the fact that in construction projects like this one, the majority of workers is likely male.

Another risk is presented by unauthorized access to work sites from residents or passers-by, which might lead to incidents. This risk is particularly relevant for children who out of curiosity might be willing to access the work site and risk falling into open trenches or be cause of other incidents related to construction works.

Additional workforce might be needed to implement the security of the construction area to prevent risks related from unauthorized access for open trenches, risks of heavy trucks and other machineries moving in the construction area and other risks related to the construction works.

Finally, construction activities, particularly those related to transport, can lead to disruptions in roads and hence limit accessibility to health centres and hospitals for the local population. This potential impact will have to be properly managed in collaboration with local authorities, to ensure that impacts are reduced to the extent possible.

The overall impact on health and safety risk of the project during construction is deemed to be medium negative.

Aspect					
Risks on health, safety and security - Influx of workers, construction works and excavations, influx of workers, increased traffic and movement of vehicles, noise and air emissions during construction					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local	Continuous	Possible	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local Communities and workforce					Medium - PV Plant and OHL
Overall Significance of Impact					
Moderate – PV Plant and OHL					

Management and Mitigation

For the mitigation of impacts on the community health, safety and security component all measures indicated for the air quality, noise and vibration and transportation, traffic, security components have to be applied. Potential impacts on workers' health and security can be managed through specific Management

Plans, in order to reduce risks to the extent possible. Safety and security measures will have to be applied by all workers, both of Contractors and Subcontractors.

In line with the European guidelines and Health and Safety suggestions, Voltalia will follow the national Albanian safety procedures, EBRD, IFC, WB and WHO guidelines regarding Covid-19. The safety measures will be acknowledged by staff and any visitors prior to entering the working site and to interaction with local communities. The mentioned Albanian regulations, EBRD, IFC, WB guidelines and safety measures in regard to Covid-19, issued by the Ministry of Health and Social Protection, Institute of Public Health and by e-Albania (the official governmental website of Albania) will be observed by all employees.

The EPC Contractor will develop a OHSMP in which will identify and propose measures that shall be observed by all employees in matter of social distancing and H&S guidance. The mitigation measures shall include but not limited to:

- Wash hands regularly with soap or hydro alcoholic solutions;
- Avoid shaking hands or hugging people;
- Avoid gatherings in meetings: respect safety distance 2m;
- Avoid gatherings in toilets: respect safety distance 2m;
- Avoid gatherings in smoking areas: respect safety distance 2m;
- Avoid gatherings during work on site: respect safety distance 1m.

The mitigation measures for the stakeholder engagement regarding Covid-19 have been extensively assessed in the SEP.

Some of the mitigation measures to comply with the risk associated with GBVH are as follows:

- Appoint a female CLO who will manage the possible cases related to GBVH;
- Mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women;
- Provide training to workers on the company's CoC and policies related to the GBVH;
- Provide training and regular communications to human resources and/or other relevant persons (employees, supervisors, managers and contractors) on understanding sexual harassment in the workplace, and on how to respond to allegations of sexual harassment in the workplace;
- Provide training to community liaison officers and/or other relevant persons on how to respond to allegations of GBVH perpetrated by employees and contractors in affected communities;
- All Contractor as discribded in Contractor Management Plan will follow all Health and Safety measuremants. Implement a confidential grievance mechanism for making anonymous reports of incidents of sexual harassment in the workplace;
- Require all employees and contractors to sign the sexual harassment policy or commit to comply with this policy as part of the terms and conditions in their employment contract;
- Implement a code of conduct for employees and contractors that includes the prohibition of GBVH in local communities; Provide induction training on the code of conduct for all employees and contractors;

In addition, the mitigation measures listed below will be implemented for the construction phase for the community health, safety and security component according to the mitigation hierarchy:

<u>Minimization:</u>

- Workers' health and safety should be managed in line with national regulations, EBRD and IFC standards and OHSAS18001 standard;
- Enforce workers code of conduct;
- Cooperate and coordinate with local health and safety facilities to minimize impacts on health centres and access for the local population.

- Develop a Security Management Plan (SMP);
- Use security personnel in working site;
- Ensure that local communities are timely informed about road closures, works on roads or use of heavy good vehicles;
- Plan and implement awareness campaigns on risks related to the traffic increase, especially in the schools present in the area;
- Place flagman for traffic management in sensible receptors like schools and health centers;
- Notify through local government all the habitants on the affected areas to coordinate the traffic flow for the local users;
- Secure / make safe all plant and machinery at the end of each working day;
- Establish mutual support agreements with local and national police and emergency services, as appropriate and feasible;
- Provide regular updates to farmers, vulnerable groups and other residents about potential Project hazards and changes to Project activities that may have community safety impacts;
- Ensure a hazard and risk identification process is in place and updated annually;
- Assure presence of ambulance and site doctor during the implementation of the works;
- Prepare and put in place the Emergency Response Plan.

Residual Impacts

Considering the application of the abovementioned mitigation measures, the impact on the community health, safety and security component is depicted in the following table and it is expected to be negative and negligible both for the PV and OHL area.

Minor – PV Plant and OHL

6.5.3.2. Potential impacts during operation phase

The following project actions will generate impact factors on health, safety and security component during the operation phase:

- Operation and maintenance of the PV;
- Operation and maintenance of the OHL;

The potential impacts on community health, safety and security deriving from the above actions are associated with the following impact factors:

- Generation of electromagnetic fields;
- Potential for electrocution;
- Lightning strike and fire; and
- Issues associated unauthorised access and vandalism.

A direct lightning strike on a conductor of a power line causes extremely high voltage pulses at the strike point, which are propagated as traveling waves in either direction from the point of strike. Lightning strikes on electrical lines or substations are those that cause problems in the distribution network. The Power Lines are always protected in case of lightning strikes, but sometimes lightning does happen to strike the line or the earthing of the wires.

There is a risk associated whether there are trees nearby that might be caught on fire or, in the worst-case scenarios, people staying under the trees and, in this case, the strike might involve even them. These are extremely rare cases, but this can be prevented by keeping clean the RoW near the towers and wires. This can happen also to the workers trying to keep clean the RoW. Also, the substation might be subject to lightning strikes or fires but will be designed with a fire protection system.

Hazardous situations may occur, these include downed power lines that may still be energized, associated fires, unstable structures, and wet/damaged electrical panels.

The power transmission towers, are not located near any national or local airport or known flight paths, therefore no direct risks through collision or indirectly through radar interference are expected.

The unauthorized access in electric towers or Power Lines can lead to fatalities for the perpetrator. Although these are extremely rare cases, it might happen that unauthorized people or children playing might access the electric towers.

Another risk is associated with the presence of the Electric Towers near the crossroads or near the roads, associated with incidents that might occur. These are extremely rare cases and the design has been implemented with the best international practices.

Another impact during operation might be related with attempts to climb the towers by children or unskilled personnel, although this possibility is extremely remote and the impact as negligible, but has to be taken into consideration and mitigate as possible risk.

With regards to the impact linked to the generation of electromagnetic fields, this will occur only along the OHL.

There has been considerable research over the last 30 years associated with the potential impacts on human health associated with EMF. A detailed review and discussion of the scientific literature associated with this area of research is outside of the scope of this project, however, the IFC health and safety guidance for overhead power lines (IFC, 2007c) states the following in regard to the available scientific information:

Although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high voltage power lines and substations, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.

The National Grid (an international electricity and gas company based in the UK and north-eastern US) provides typical electric and magnetic field limits for various voltage lines (132kV, 275kV, and other). The values indicate that electric and magnetic fields are within the ICNIRP[149] limits and even reach negligible amounts at around 50m – 100m[150] from the OHL.

Same, the IFC EHS guideline also state that transmission lines require RoW to protect the system and also protection from potential hazards and in which RoW for transmission lines are generally from 15m to 100m.

Assuming the worst-case scenario that there is a link between EMFs and impacts on human health, it is evident that EMFs have the highest intensity in close proximity to their source, with intensity declining in relation to distance from the source. Therefore, it is logical that only receptors that have long term close contact with high exposure rates to EMF may potentially be affected. Such a receptor can be categorized as residential situated in close proximity to a high voltage source.

The scope of the assessment is also to verify that all the electrical and safety measures have been followed in the designing of the power line in order for the overhead transmission line to be safe and pose no health risks to local residents during operation.

The assessment includes checks of clearance distances from civil buildings, road intersections, and all the safety distances that a 220 kV Overhead Transmission Line must ensure in the nearby area. No building construction is allowed on the wayleave, which is 25 meters [ES1] on each side from the centerline of the OHL.. There are no residential settlements or public facilities (including educational or health facilities)

[149] https://www.icnirp.org/en/applications/power-lines/index.html
[150] https://www.emfs.info/sources/overhead/specific/275-kv/

located close to 25m from the edge of the OHL. There are identified only two business activities closer than 25 m from the OHL.

The unauthorised access as the probability may be low, but the consequence could be severe. There is also the risk of illegal connection and of landowners not complying with restrictions.

Another risk at this stage is related to the outbreak of the Covid-19 and the health issues with it associated. The risk is related with both the local populations and all the personnel working for the PV Plant.

Overall, the impact in this phase is considered to be ***minor negative*** for PV plant and Moderate for OHL.

Aspect					
Risks on health, safety and security - electromagnetic field from the OHL, risk of electrocution, lightning strike, maintenance activities for the PV Plant and OHL					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term, Permanent	Local	Continuous	Possible	Low - PV Plant and OHL
Receptor					**Sensitivity**
Local Communities and workforce					Medium - PV Plant and OHL
Overall Significance of Impact					
Minor – PV Plant and moderate for OHL					

Management and Mitigation Measures

The major risks are associated with lightning strikes and fires. The measures to be taken are the following:

- Design of the route of the OHL to avoid health risk for the public and ensure the OHL does not pass directly over any residential property; this has been detailed and achieved through the developed OHL Route Alignment Plan;
- Shifting of the towers where in the proximity of residential or industrial buildings;
- Preventative maintenance to ensure the robust connection of the lighting protection (earthing) system;
- Recommended techniques to prevent the electrocution hazards include: use of signs, barriers (e.g., locks on doors, use of gates, use of steel posts surrounding transmission towers, and education signs/ public outreach to prevent public contact with potentially dangerous equipment, b) Grounding conducting objects (e.g., fences or other metallic structures) installed near power lines, to prevent shock;
- The provision of automatic fire detection systems linked to automatic shutdown systems will allow them to be dealt with in the shortest possible time by disconnection from the power supply systems. This prevention is connected with the Substation;
- After any damage has been assessed and documented in case of storm damage / wind damage - downed power lines, associated fires (similarly relevant to PDA), electrocution ect., the appropriate utility companies will be notified. Lastly, if safe to do so, the damaged areas will be protected from further damage (e.g., cover damaged roof sections with tarp to prevent water intrusion).;
- Regular monitoring will be conducted by OST to verify illegal connections and of landowners or landusers not complying with restrictions, etc. Monitoring shall be designed and implemented by accredited professionals as part of an occupational health and safety monitoring program. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents;

The overhead lines request low maintenance. The risks are usually related to extraordinary events, such as lightning strikes or fires that might disrupt the service or pose risk to people living nearby. There is also a risk on safety related to acts of vandalism or climbing of the towers. The mitigations are such:

- Installation of anti – climbing devices in order to avoid accidental or intentional attempts;
- Painting with fluorescent colours of towers near the crossroads or near the borders of the road to make them visible to cars passing nearby.

In addition, the mitigation measures listed below will be implemented relatively to the generation of electromagnetic fields for the operation phase for the community health, safety and security component according to the mitigation hierarchy:

Minimization:

- Awarenes raising and dissemination of information along the OHL route and in the areas nearby on risks related to OHL and electrocution;
- Frequent controls to check the construction of buildings or illegal buildings near the area of risk (50 Meters);
- Frequent control to check if any animal shelter, residential or industrial building is being built in the same safety zone;

The mitigation of impacts related to the Covid-19 pandemic; it will depend on the course of the virus at period of entering into the operation of the Project. Voltalia shall follow the IFI guidelines and safety measures in regard to Covid-19, issued by the Ministry of Health and Social Protection, Institute of Public Health and by e-Albania (the official governmental website of Albania) that will be in force at the period.

Residual Impacts

Considering the application of the abovementioned mitigation measures, the negative impact on the community health, safety and security component is depicted in the following tables and it is expected to be:

Negligible – PV Plant and Minor for OHL

6.5.3.3. Potential impacts during decommissioning phase

In general, the health and safety risks from decommissioning activities will be similar to those during the construction phase. The project will be designed to reduce potential risks during its decommissioning. This is typically done by ensuring that a design risk register is kept and maintained through the design process, allowing potential risks that can arise during decommissioning to be identified and addressed in the design process.

It will be important that documentation is maintained during the operational phase that shows that any incidents or accidents have been managed and that no significant contamination has been caused that could lead to health and safety risks during decommissioning.

The Impact on health, safety and security is considered to be minor negative during this phase.

Minor – PV Plant and OHL

6.5.3.4. Cumulative impacts

Cumulative impacts are foreseen in relation to EMF due to the foreseen implementation of the new OHL connecting Fier substation to Hoxhare substation. The line is situated in agriculture areas with no residential areas nearby, thus not creating significant impacts on sensitive receptors.

Negligible – OHL

6.5.4. Impacts on Transport and Traffic

6.5.4.1. Potential Impacts during Construction Phase

The following project actions will generate impact factors on the transportation and traffic component during the construction phase:

- Mobilization of vehicles, workers and equipment, transport of materials and waste;
- Construction/improvement of internal and external access roads;
- Levelling off the ground;
- Pile driving for mounting structure;
- Construction of electrical substation and foundations;
- Excavation, trenching and cable laying;
- Marking out of foundation, earth works and excavations;
- Installation of foundations and grounding devices;
- Assembly, installation, alignment and fixing of pylons;
- Construction of deposit areas;
- Waste management.

The potential impacts on transportation and traffic deriving from the above actions are associated with the following impact factors:

- Increase of traffic;
- Increased risk of road accidents;
- Interruption/limitation of infrastructures/services.
- Vibration and traffic increase in areas near the access roads.

The components of the PV and OHL will be transported from Port of Durrës, situated 96.9 km from the construction site, by trucks through the National Highway then directed to the site through secondary roads. Another alternative is the Port of Vlorë situated 70.6 km from the site.

Widening of some segments of the road and upgrade and improvement of some sections of the road are required for the passage of vehicles to reach the PV Plant site.

In addition, temporary access roads will be required for the construction of the OHL and tower installations. These road upgrades will require leasing of the land for its implementation. The total length of these temporary access roads is 13.682 meters.

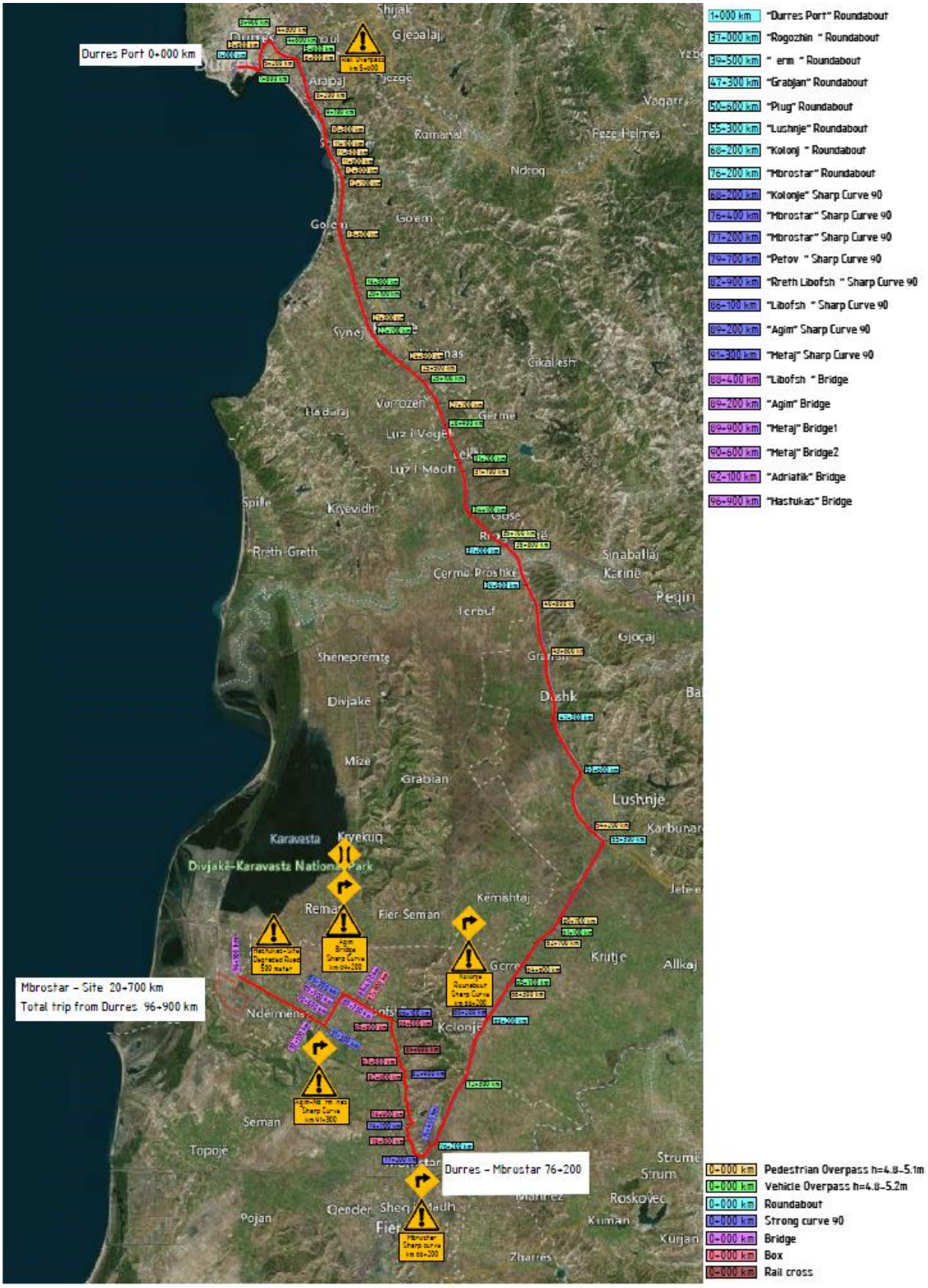


Figure 178. Transport Route from the Port of Durrës to the site

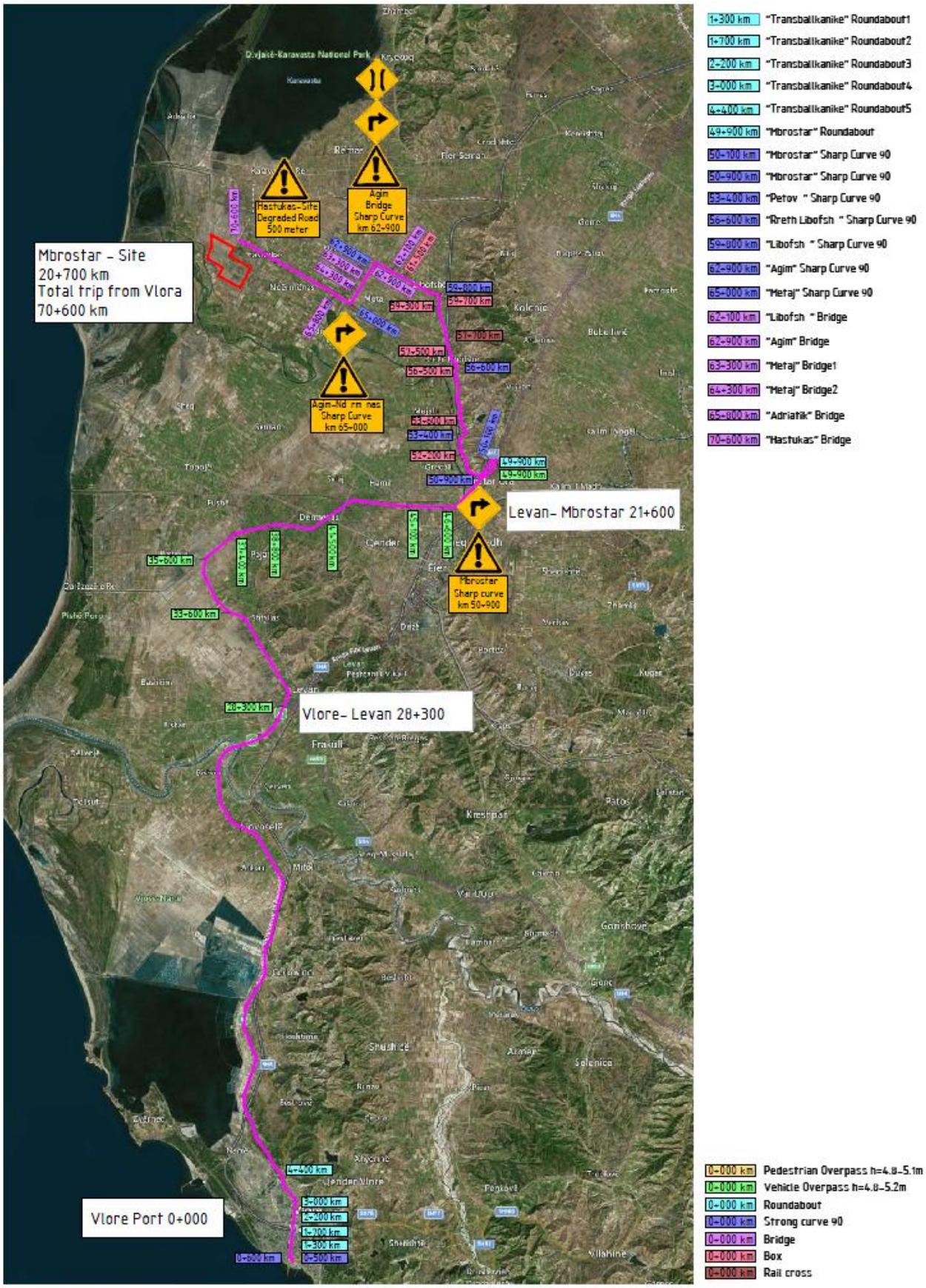


Figure 159 Transport Route from the Port of Vlora to the site

Voltalia has developed a preliminary Traffic and Transport Survey Report from another consultant , which has considered three alternatives to reach the site. Two of them are alternatives from the Port of Durrës to the site and the other one is from the Port of Vlora. Both the Ports are connected to the site via National Highway to Mbrostar and from the village of Mbrostar to the site through the secondary road of 19.5 km long.

The conclusion of this Report from the consultant is that the best alternative to be used is the Route:

- Port of Durres – Mbrostar – Libofshe – Agim – Ndermenas – Site
- The recommended alternative Mbrostar – Libofshe – Agim – Ndermenas – Site, requires minimal road maintenance work to ensure smooth traffic to minimize the risk of the heavy loads.

A part of the segment of the road (as shown in figure 2 below) crosses/passes by through several urban areas, specifically the village of Mbrostar, Petova, Rreth-Libofshë, Libofshë, Ndërnenas and Hastukas. Voltalia has performed the assessment of the road and video logs are kept. The aim is to minimize and mitigate all the potential risks for the local communities by identifying the potential hotspots while passing through the transport route and taking possible mitigation measures to avoid such potential risks. These hot spots are considered to be sensitive receptors such as densely populated areas, centers of communities, schools, hospitals or clinics.

Impacts will also be generated due to the need to transport materials and workers to and from the sites. There are two alternatives for access roads to the site as displayed in figure below.

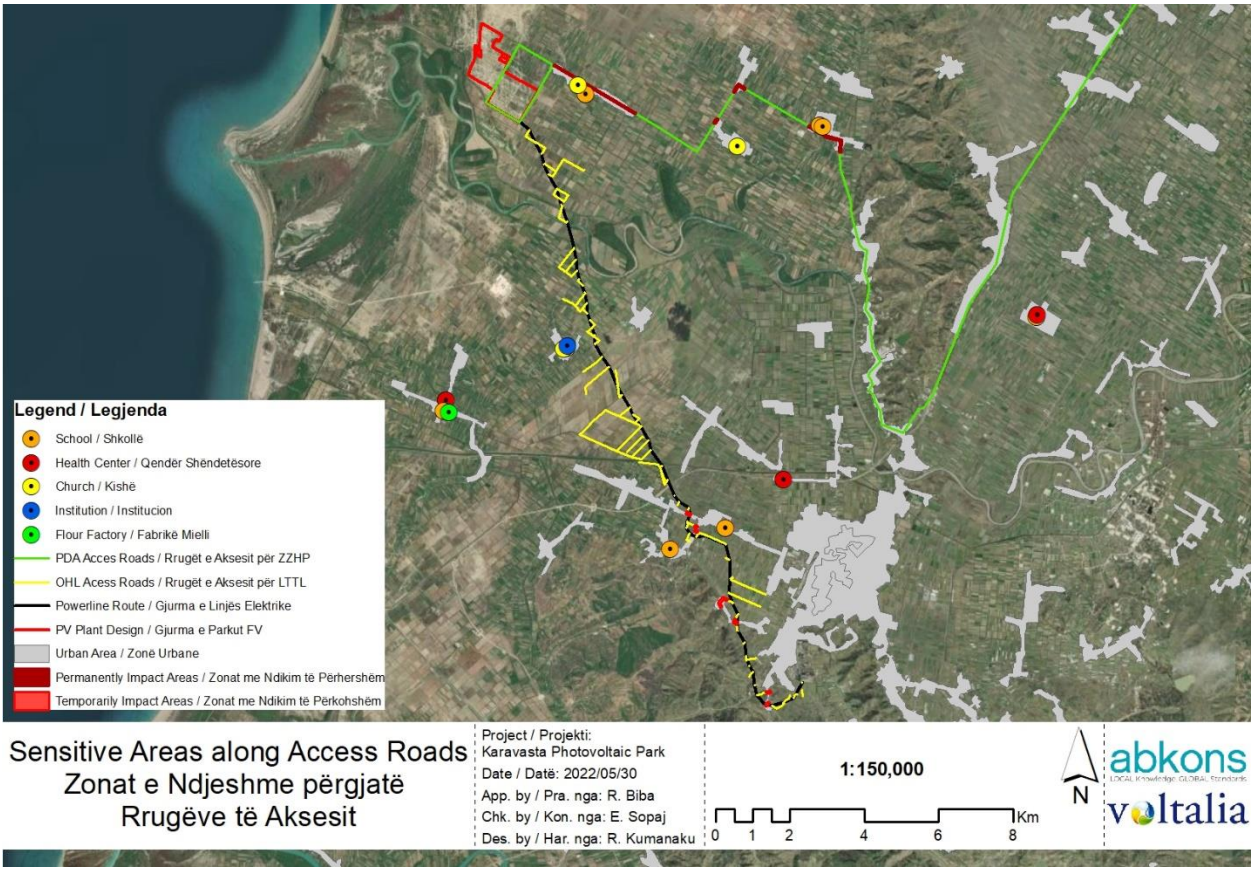


Figure 179. Rural road segment of the transport routeto the hole Project including OHL

However, these traffic flows will be limited and will not have significant impacts.

The access roads will be upgraded, but no additional land will be required for this activity leading to no additional impact on land-take for the local landowners.

At the end of construction activities, improvements of existing roads will actually leave a positive legacy on the local road conditions, resulting in benefits for the local communities.

Overall significance of the impact is considered ***moderate negative.***

Aspect					
Risk of accidents due to traffic increase, interruption/limitation of services.					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local and Regional	Continuous	Possible	Low - PV Plant and OHL
Receptor					**Sensitivity**
Local Communities and workforce					Minor - PV Plant and OHL
Overall Significance of Impact					
Minor – PV Plant and OHL					

Management and Mitigation

Avoidance:

- Avoid the route segment of Babunje – Agim because of the bridge condition and low load capacity and because of the curves with minimal radius;
- Avoid the alternative route from Vlora port - Site as it is not recommended because of the low capacity and flexibility of Vlora Port;
- Plan transportation routes in consultation with Municipality, road department and Police;
- Avoid transport activities, particularly those involving heavy goods vehicles during peak hours (7:30-8:30 AM and 12:00-13:00 pm);

Minimization:

- Conduct a detailed traffic survey of the access roads to be used for PV plan and OHL. Specific focus, to assess any social risks along the selected transportation route. The data shall be used to avoid high traffic hours if the local communities and provide data for development of the CTMP;
- Ensure that local communities are timely informed about road closures, works on roads or use of heavy good vehicles;
- Develop and implement a Construction Traffic Management Plan (CTMP);
- Ensure that all Contractors and Subcontractors follow the CTMP;
- Assessment of buildings and houses during preconstruction surveys to present in the proximity of the roads and access roads to be performed before the starting of the works and continuous monitoring of the buildings conditions is required and included in the CTMP.
- Notify through local government all the habitants on the affected areas to coordinate the traffic flow for the local users;
- Plan and implement awareness campaigns on risks related to the traffic increase, especially in the schools present in the area;
- Place flagman for traffic management in sensible receptors like schools and health centers;
- The transportation will be protected and patrolled by the crash trucks and possible police escort to guaranty the safety of other road users and to inform the respective authority for the overloaded trucks for the national road segment, Durres – Mbrostar, to be used also for the rural segment of Mbrostar – Libofshe – Agim – Ndermenas –Site or Babunje – Agim – Ndermenas – Site;

- Ensure that all drivers (both of Contractors and Subcontractors) receive induction and training on road safety rules.
- Frequent testing of drivers to eliminate drink driving, also check for use of seatbelts and identify speed limits that are monitored during the construction phase.
- Any generated impact, permanent or temporary, on land and livelihoods (including agricultural produce and livestock) will be compensated in line with the LRP.

Rehabilitation:

- Undertake route and access surveys on road conditions and ensure that possible damages to existing roads are repaired promptly and that at the end of construction activities roads are left in original or better conditions.
- The segment Hastukas – Old Bridge, is in very bad condition and inappropriate for such transport. It must be rehabilitated with the granular layer and asphalt layer in top of it;
- The last segment Old Bridge – Site, needs proper rehabilitation because is on the muddy area and heavy equipment cannot pass on it to reach the site.
- Return the land required for the temporary access roads to its original conditions;

Additional mitigation measure

- Possible “dry runs” by the drivers to get familiar with the area before actual transportation begins.
- Proper identification of the hazards in the Job Safety Analysis (JSA).
- Possible signage improvement where it is missing.
- Possible use of flag men or other means of traffic control at key points on roads, especially during school hours in the hotspot areas.
- All vehicle drivers/operators must be in possession of valid driver’s license;
- Drivers must use designated routes only;
- All traffic signs (and others) present in the installation must be respected;
- The driver must ensure they are aware, prior to starting journey, of which site entrance is to be used and the information present in this Plan;
- When approaching the site on the road, drivers must follow instruction of the Project Management Team in order to avoid congestion;
- The vehicle driver will perform the vehicle a pre-start checklist and ensure the vehicle is roadworthy before driving;
- No persons are to be transported on the back of the vehicle;
- Safety belts are to be worn by the driver and all passengers in the vehicle;
- No vehicles should be driven if loaded in excess of its manufacturer-specified weight bearing capacity;
- The use of cell-phones while driving is prohibited;
- Reckless driving is prohibited, including overtaking in oncoming lane;
- Drivers will manage any poor road conditions by reducing speed and will avoid encroaching onto the opposite lane;
- All accidents, incidents and traffic violations must be reported by drivers to the Project Management Team;
- Only company employees are to be transported in the company vehicle;
- Drivers must never operate a vehicle whilst under the influence of drugs or alcohol;
- Drivers must adhere to rules on driving and rest hours and must not drive when insufficient rest has been taken;

- Notification of any significant delays to journey must be communicated to the Project Management Team.

Residual Impacts

Considering the application of the mitigation measures, the impact on transportation and traffic component is expected to be negative and minor for both the PV and OHL area.

Minor – PV Plant and OHL

6.5.4.2. Potential Impacts during Operation Phase

No project actions will generate impact factors on the transportation and traffic component during the operation phase, therefore the impact assessment is not performed in this phase. Limited traffic will be generated in this phase during periodic maintenance activities that will be conducted on the PV and OHL. Voltalia will consider semi-annual regular maintenance schedule during operations phase. Improvements to the roads performed during the construction phase can be considered a positive legacy on the local road conditions, resulting in benefits for the local communities.

Aspect					
Risk of accidents due to traffic increase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term	Local and Regional	Continuous	Possible	Negligible - PV Plant and OHL
Receptor					**Sensitivity**
Local Communities and workforce					Negligible - PV Plant and OHL
Overall Significance of Impact					
Negligible – PV Plant and OHL					

6.5.4.3. Potential Impacts during Decommissioning Phase

The impact on traffic and transportation during this phase will be similar to that of the construction phase with the majority of risks related to that of road accidents and increase of traffic in the area.

The overall impact in this phase is considered ***minor negative***.

Minor – PV Plant and OHL

6.5.4.4. Cumulative Impacts

No cumulative impacts are foreseen in relation to transport and traffic.

Negligible – PV Plant and OHL

6.5.5. Impacts on Infrastructure and Community Services

6.5.5.1. Potential impacts during construction phase

The following project activities will pose impacts on the infrastructure components and community services during the construction phase:

- Mobilization of vehicles, workers and equipment, transport of materials and waste;
- Construction/improvement of internal and external access roads;
- Levelling off the ground;
- Pile driving for mounting structure;
- Construction of electrical (step-up) substation and foundations;
- Excavation, trenching and cable laying;
- Marking out of foundation, earth works and excavations;
- Installation of foundations and grounding devices;
- Assembly, installation, alignment and fixing of tower pylons;
- Temporary deposit and disposal areas;
- Waste management.

The potential impacts on housing/dwellings and infrastructures deriving from the above actions may be associated with the following impact factors:

- Demand for waste disposal services;
- Deterioration of road infrastructure services;
- Interruption/limitation of community infrastructure and services.

The construction of the PV solar plant will not directly affect any dwellings or other buildings within the project footprint. OHL will cross the TAP alignment but from TAP procedures and engineering consultation, the Towers will be more than 10 m high and will not affect the SCADA system in which TAP operates. On the other side, the OHL route encompasses through a large surface area of agriculture. The designed route has avoided crossing near residential areas, although there are some areas of concern, as follows: The OHL crosses the National Road SH4 between towers T31-T32 in the premises of Dërmenas village. This crossing was unavoidable to reach the Fier electrical substation. There are few sections that cross commercial activities in the area, for which Voltalia has relocated the towers to avoid risks for the sensitive receptors. These sections are shown in the table below.

Table 76 Red flag locations along the OHL route

No	Short description of findings	Location (in/out of the project area)	Sensitivity rating	Risk-based prioritization rating	Indicative Waypoint coordinates (UTM)
1	Periphery of Dërmenas villages. Section from Towers 31-32. Crossing of the National Road SH4.	In	*High*	1	E: 19°30'23.39 N: 40°44'46.03"
2	Crossing in the proximity of the “Weatherford” storage and	In	*Low to Medium*	2	E: 19°30'45.42 N: 40°44'19.32

No	Short description of findings	Location (in/out of the project area)	Sensitivity rating	Risk-based prioritization rating	Indicative Waypoint coordinates (UTM)
	structures between towers T35-T36				
5	Crossing in the proximity of a quarry between towers T38-T39.	In	*Low to Medium*	2	E: 19°30'52.20 N: 40°44'2.49
6	Line between T56 to T57 (Storate)	In	*Low*	3	E: 19º32'52.28 N: 40º41'56.37

Risk-based prioritization

1	*Highest priority for upgrades and mitigation/prevention measures. Impact quantification might be necessary to inform shifting, project design changes (rerouting), infrastructure upgrades, management, mitigation, compensation and/or restoration measures.*
2	*Moderate priority. Shifting, project design changes (rerouting), infrastructure upgrades, avoidance and mitigation measures may be sufficient.*
3	*Contingency Planning. Impact unlikely, but will require verification through management and monitoring measures.*
4	*Remain aware. No additional actions required.*

Sensitivity

High	*The OHL route passes through/ over dwellings and/or community infrastructure facilities.*
Medium	*The OHL route passes in close proximity from dwellings and/or community infrastructure facilities.*
Low	*Dwellings and/or community infrastructure facilities are located within the area of influence of the OHL route.*
Negligible	*The OHL route passes far away from dwellings and/or community infrastructure facilities*

Other impacts will potentially occur on road infrastructure due to vehicle movement and traffic, as indicated in section 6.5.4. Construction activities are unlikely to have impacts on water distribution networks, considering that their extent is limited in the project footprint area or can be easily avoided.

The irrigation and drainage systems, although present, are not functioning properly, and only a small portion of the agricultural land in the area benefits from proper functioning of these services. This mostly arises due to lack of maintenance over the years which has not been performed periodically, and the channels are continuously filled with sediment materials that create blockages and do not allow proper functioning. Out of 6,200 ha in the area, only 320 ha is irrigated through the system.

Based on the aforementioned discussions the impact significance can be rated as follows:

Aspect					
Infrastructure and community services – construction works for the PV solar plant and OHL route, interruption of infrastructure					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local	Continuous	Possible	Medium - PV Plant Low - OHL

Receptor	Sensitivity
Local Communities, residential houses/ properties, and other community facilities or buildings	Low - PV Plant and Medium to high - OHL
Overall Significance of Impact	
Minor – PV Plant	
Moderate - OHL	

Management and Mitigation

The mitigation measures listed below follow the mitigation hierarchy and will be implemented for the construction phase for the infrastructures and utilities component:

Avoidance:

- When selecting the siting of project elements, construction sites and access roads, avoid to the extent possible creating interferences with existing infrastructure (e.g., residential houses, properties, greenhouses, power lines, commercial activities and community services);
- For the 'red flag locations' presented in Figure 142 Table above, the Developer and EPC Contractor have preliminary evaluated potential alternatives for rerouting or shifting of the OHL towers located close to dwellings within the scope of this ESIA study and provided an updated route design which fits more appropriately to minimizing environmental-social impacts. This change in the project design is displayed in Figure below. Changes in the realignment of the OHL route include as follows:
    - The new Route Alignment of the OHL crosses only once over Seman river;
    - The new route avoids double or triple crossing of the highway of Fier;
    - The new route avoids passing of the OHL over any residential houses/properties displayed in Table above.
    - The OHL route should have at least a safety distance of 21 m on each side (or 25 m on each side from the axis of the transmission line)[151] from sensitive receptors such as residential houses/properties, wherever practicable to the greatest extent possible that will be allowed by the project design.
- Apply best practices for the reduction of waste produced to the extent possible.

[151] The Albanian standards KTP and KTZ have been updated and are in line with the European Standard EN-50351 2012 "Overhead electrical lines exceeding AC 1kV".

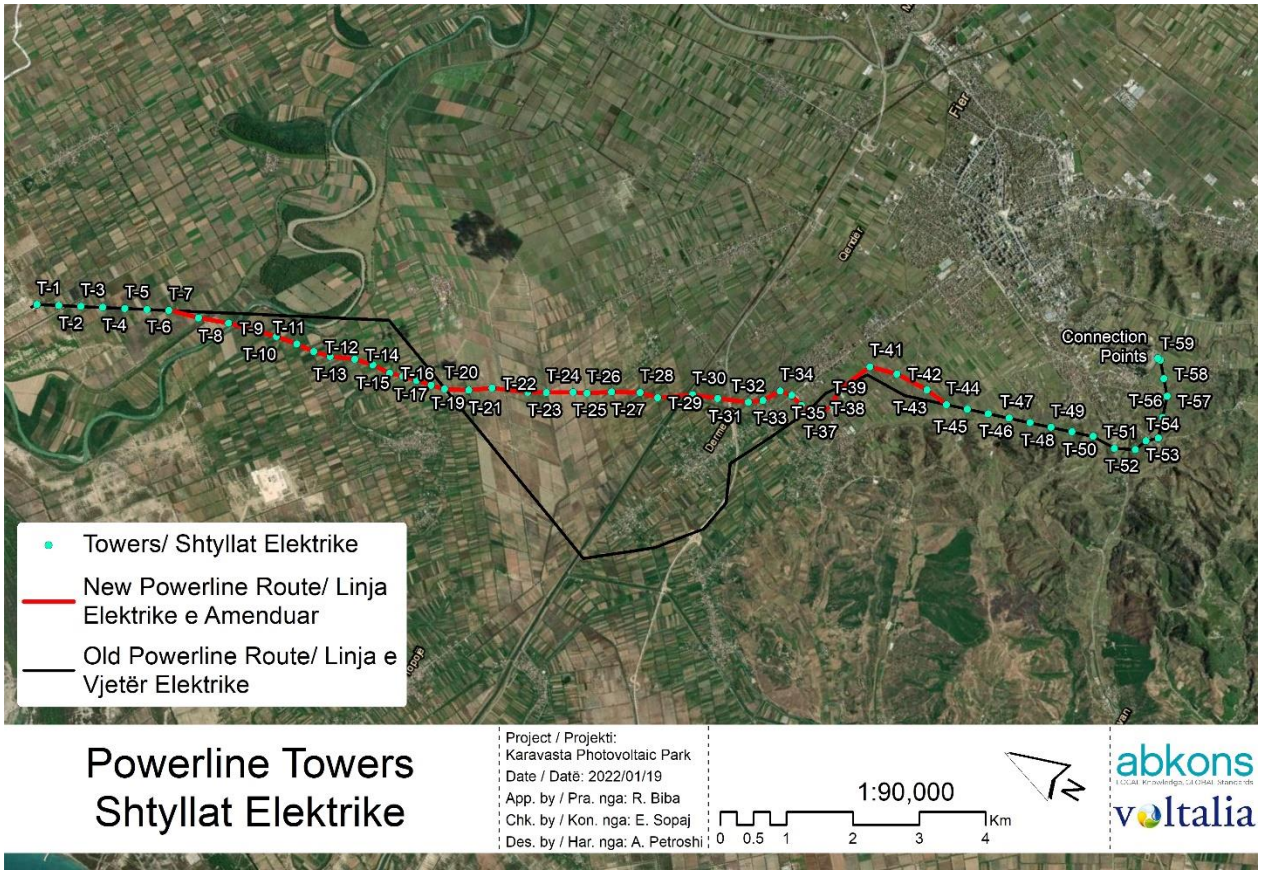


Figure 180. Towers Location of the OHL route

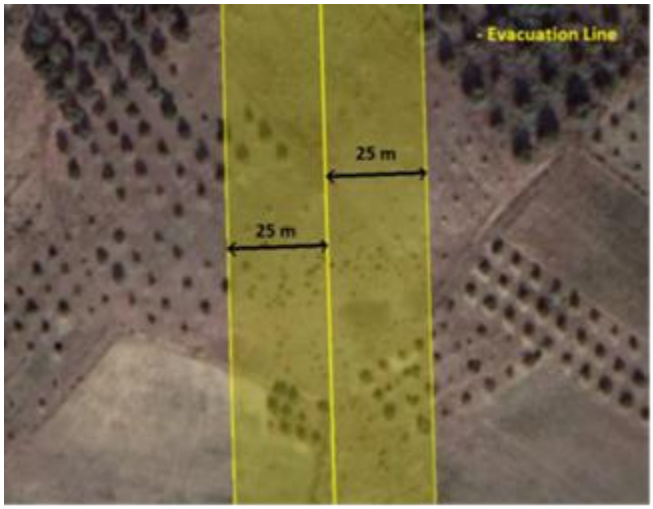


Figure 181. Security/evacuation line for the OHL route

Minimization:

- Ensure that local communities are timely informed about road closures, works on roads or use of heavy good vehicles;
- Ensure that local communities are timely informed about any disruptions on infrastructures (water distribution, energy distribution) that might be caused by construction activities;

- Ensure that waste is recovered and recycled to the extent possible, so to reduce the need of sending it to landfills;
- Identify and use waste disposal facilities as close as possible to the Project location, so to reduce the need of transport.

Rehabilitation:

- Ensure that possible damages to existing infrastructures are repaired promptly and that at the end of construction activities roads are left in original or better conditions.

Community Investments

- Ensure the development of a Community Investment Plan (CIP) within the HSMP to support potential investments on the community infrastructure and services during the project implementation.

Residual impacts

Considering the application of the abovementioned mitigation measures, the impact on the infrastructures and utilities component is depicted in the following table and it is expected to be negative and negligible both for the PV and OHL area.

Negligible – PV Plant
Minor - OHL

6.5.5.2. Potential impacts during operation phase

The following project actions will generate impact factors on the infrastructure components during the operation phase:

- Operation and maintenance of the PV;

The potential impacts on infrastructures deriving from the above actions are associated with the following impact factors:

- Potential community investments
- Production of energy.

During this phase, the production of energy will lead to general benefits on Albania's energy market, increasing the amount of energy available to businesses, industries and families. Works on the OHL and the substation will introduce new infrastructures and will overall improve the power transmission network. This investment will probably have positive effects also at the local level, improving the overall quality of the energy distribution system and other community services (e.g., roads or other investments in the project area.).

Aspect					
Infrastructure and community services					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term	Local	Continuous	Likely	Low - PV Plant Low - OHL
Receptor					**Sensitivity**
Local Communities					Low to Moderate - PV Plant Low - OHL
Overall Significance of Impact					

Negligible to Minor Positive – PV Plant
Negligible – OHL

Management and Mitigation Measures

The Developer will prepare an ESMP in order to enhance community engagement and provide support to them in the most practicable manners possible through potential investments in the infrastructure and community services close to the project area.

Residual Impacts

Considering the application of the abovementioned mitigation measures, the impact on the infrastructures and community services component is expected to be as follows:

Negligible to Minor Positive – PV Plant and OHL

6.5.5.3. Potential impacts during decommissioning phase

In the decommissioning phase the impacts will be similar to those during the construction phase, considering that interruptions on the local infrastructure will be minor. The impact at this phase is considered to be negligible.

Negligible – PV Plant and OHL

6.5.5.4. Cumulative impacts

Cumulative impacts in relation to infrastructure and community services are anticipated only for the OHL route. Near the substation of Fier there is an existing transmission line that crosses with the proposed OHL route of the project in the section between towers 64 and 65. Final OHL design will be available in July, 2022.The construction of the new transmission line might create issues during the construction phase of the towers and installations of cable conductors in this section.

Negligible – PV Plant
Minor - OHL

Management and Mitigation Measures

An additional mitigation measure to reduce cumulative impact is for OST and Voltalia to consider the feasibility of the 110kV line and 220kV line to share towers. This would be a significant impact reduction.

Residual Impacts

Considering the application of the abovementioned mitigation measures, the cumulative impact on the infrastructures and community services component is expected to be as follows:

Negligible – PV Plant and OHL

6.5.6. Impacts on Landscape and Visual Amenities

6.5.6.1. Potential impacts during construction phase

Landscape effects include direct and indirect effects on the landscape as well as effects on the general landscape character. During the pre-construction phase, in the project area will be performed the vegetation clearance process for the placement of working machineries, equipment and other associated facilities needed for the PV construction. This will undoubtedly change the landscape view in general, but considering the low value of vegetation cover in the area, the significance of potential impacts during this stage is considered to be very low.

During the pre-construction phase of the OHL, the vegetation has to be cleaned out in the areas designated for the construction of the electric pylons. This will undoubtedly change the landscape visual, especially in the forest areas, where the vegetation has to be followed also by a cut-off of the trees in the RoW.

During construction works for opening of trenches, earth works, foundations and installations, the impacts on landscape are anticipated to be more visible. The use of pesticide for the management of alien invasive species will be under strict control and on as necessary. No agents identified as being prohibited will be used and wherever possible mechanical means will be the preferred method.. Only in case vegetation control is necessary will be considered use of organic fertilizers. A lot of staff personnel will be involved and several work activities will be performed simultaneously at this stage. Although, it shall be emphasized that there is absence of human receptors in surrounding of the area, potential impacts may arise due to the presence of passers-by and potential visitors. In this context, the sensitivity of receptors is considered to be low-moderate and the magnitude is considered to be medium.

The following project actions will generate impact factors on the landscape and visual quality component during the construction phase:

- Vegetation clearance;
- Construction/improvement of internal and external access roads;
- Levelling off the ground;
- Pile driving for mounting structure;
- Construction of electrical substation and foundations;
- Marking out of foundation, earth works and excavations;
- Installation of foundations and grounding devices;
- Assembly, installation, alignment and fixing of pylons;
- Construction of deposit areas;
- Environmental reinstatement of the construction areas.

The potential impacts on landscape and visual quality deriving from the above actions are associated with the following impact factors:

- Landscape features alteration;
- Presence of new buildings/infrastructures.

Aspect					
Visual impact and landscape - landscape visual and landscape character					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local	Permanent	Likely	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Local Communities, Visitors, Tourists					Low to Medium - PV Plant and OHL
Overall Significance of Impact					
Minor to Moderate – PV Plant and OHL					

Management and mitigation measures

Mitigation measures for overhead line developments are relatively limited and it is recognized that there is limited potential to relocate the infrastructure or screen these structures. However, there is potential to include integrated mitigation measures that would protect, and potentially enhance, the landscape features and character, and also maximize the screening capability of the landscape, thereby minimizing visual impacts. In relation to landscape and visual impacts, objectives of mitigation measures for the proposals during construction shall include, but are not be limited to:

- Judicious vegetation clearance to ensure only limited vegetation is cleared to facilitate construction access and operations;
- Where construction access is required in the vicinity of existing vegetation, suitable protection to existing tree canopies and root zones should be provided with protective fencing and ground protection surfacing, which should be removed immediately upon completion of construction works;

The PV plant, as previously explained, is located in a plain area with very low height from the sea level, and some areas are located even below the sea level. During construction, the following mitigation measures should be included:

- Limit and phase vegetation clearance and the footprint of construction activities to what is absolutely essential;
- Use of existing access roads as far as possible;
- Avoid excavation, handling and transport of materials which may generate dust under very windy conditions;
- Consolidate the footprint of the construction base camp to a functional minimum. Screen the yard with materials that blend into the surrounding area;
- Keep construction sites tidy and all activities, material and machinery contained within an area that is as small as possible;
- Rehabilitate disturbed areas incrementally and as soon as possible, not necessarily waiting until completion of the construction phase;

Residual Impacts

Considering the application of the abovementioned mitigation measures, the impact on the infrastructures and utilities component is depicted in the following table and it is expected to be negative and minor both for the PV and OHL area.

Minor – PV Plant and OHL

6.5.6.2. Potential impacts during operation phase

Visual impacts will result from operations throughout construction phases, including construction operations and traffic movements, facility installation and operational phases. The prominence of the development proposals will be dependent upon a combination of land use, land cover and topographic factors relative to the position of the visual receptor and their sensitivity.

The sensitivity of visual receptors is an important issue in the assessment of the significance of an impact. This sensitivity is based on the type of receptor, as well as the special nature of the view. For example, residential properties are considered to have a high sensitivity.

Impacts on the landscape caused by a Project are generally of two types: visual obstruction and visual intrusion. Visual obstruction occurs when new element constitutes a total or partial barrier to the perception of elements and landscapes behind. In the specific case of a power line or of a PV Plant, this can occur in a very limited way. Visual intrusion, on the other hand, occurs when new element causes a visual disturbance due to its aesthetic perceptive characteristics, regardless of the size of the field of vision it occupies. In the case in question, as the Project is configured, the impact will mainly concern the second aspect. Due to their shape, in the case of the OHL the main impact generated is due to the visual intrusion of the pylons, rather than the visual obstruction.

As far as the impact on the typology of landscape is concerned, the presence of power lines is nowadays a common trait of landscape. This is the reason why, in normal conditions of territories without very accentuated peculiarities, the presence of power lines does not constitute a particularly significant disturbance element. More significant impacts can occur when a power line is placed near cultural heritage or structural elements of particular landscape significance. In this case, when identifying the impact, the relationship of scale is fundamental, as well as the effect on possible visitors of these sites. However, in the present case, no cultural heritage elements are present within the Project footprint, and cultural sites with limited significance are present within the overall Project Area, therefore not specific interferences are expected.

The Project area is actually free of tall industrial building or structures and the placement of electric pylons might result in negative change to the landscape character, except for the area of connection with the Fier substation, which is an industrial area. The line of electric towers would introduce additional modern and dominant elements to the landscape which would both dwarf the existing poles and contrast with the character of the rural landscape. Therefore, they would become the dominant feature and a key characteristic of the landscape within the local area. The impact of the sensitivity in this phase it is deemed to be moderate, while the magnitude is low, with an overall impact significance is assessed to be ***Minor negative***.

The PV Plant area is located at sea level and the human receptors are located at nearly 800 meters at the village of Hasturkas, although there are some single receptors in the proximity of the PV plant. The plant is situated in an area not visible by the main roads crossing the area. The sunlight reflection of the panels can be seen from long distance if the receptor is located in hilly areas.

There are some types of visibility factors that affect perception of large objects in the landscape like the view shed limiting factors, viewer characteristics, lighting factors, atmospheric conditions, distance and the objects visual characteristics. In real landscapes, interactions between these visibility factors are extremely important in determining the actual visibility of an object such as a solar facility (Benson 2005; BLM 2013a). For example, distance interacts strongly with atmospheric conditions as a determinant of visibility; a distant facility that is visible on clear days may be completely invisible on hazy days or appear greyer and less distinct. Some of these factors are highly variable and the effects may change due to even the slightest changes in one of the contributing factors, like for example as the viewer moves over or the angle of the sun changes over a few minutes.

The impact of the sensitivity in this phase it is deemed to be moderate, while the magnitude is low, with an overall impact significance is assessed to be ***Minor negative***.

Aspect					
Visual impact and landscape - landscape visual and landscape character					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term	Local	Permanent	Likely	Low - PV Plant and OHL
Receptor					**Sensitivity**
Local Communities, Visitors, Tourists					Moderate - PV Plant and OHL
Overall Significance of Impact					
Minor Negative – PV Plant and OHL					

Management and mitigation measures

In relation to landscape and visual impacts for the OHL, objectives of mitigation measures for the proposals during operation phase shall include, but are not be limited to:

- The application of a programme of advanced mitigation planting as well should be provided. Proposed replacement planting to replace areas removed during construction and decommissioning phases to facilitate machine access should also be included, all planting should comprise native plant species to reflect the local landscape character;
- All mitigation and replacement planting should be suitably protected, maintained and monitored during medium term establishment for a minimum of 5 years upon completion of the proposed development.

For what concerns the PV plant the following mitigation measures shall be included:

- Use consistent colour treatments: wherever possible, use uniform (and well-chosen) colour treatments on all structures and surfaces, which blends well with the surrounding landscape.
- Minimize vegetation clearing outside of the arrays: vegetation removal causes strong colour and texture contrasts by exposing light-coloured soils that lack the visual texture that vegetation provides.
- Carefully choose the exposed metal support structures or reflective surfaces in order to not reflect the sun. These elements might be coated or treated or replaced by materials that are less reflective.
- Plant vegetation outside the plant in strategic points that might be visible from the roads crossing the area so the PV remains not visible passing by.

Residual Impacts

Considering the application of the abovementioned mitigation measures, the impact on the infrastructures and utilities component is depicted in the following table and it is expected to be ***negative*** and ***minor*** for the PV and negative and minor for the OHL area.

Minor – PV Plant and OHL

6.5.6.3. Potential impacts during decommissioning phase

Upon decommissioning the impacts will have a proportionally inverse impact that had in Pre-construction, given the nature of the Project. The area will return to its previous and natural conditions with the vegetation and trees populating again the mountainous areas and field visual free of these dominant elements. This impact is deemed to have a proportional positive impact, so it is assessed to be ***minor positive***.

Minor Positive – PV Plant and OHL

6.5.6.4. Cumulative Impacts

In the same area of implementation of the OHL, OST is implementing an independent OHL that is running parallel with the proposed actual route of the OHL from Radostine to the Fier substation.. The impact on the visual amenities in this segment during construction (if occuring in the same time) and operational phases will increase to Minor Negative for the OHL, while for the PV Plant will remain negligible.

Negligible – PV Plant
Minor – OHL

6.5.7. Impacts on Cultural Heritage

6.5.7.1. Potential impacts during construction phase

Based on the available published literature, NICH website, the results of the Cultural Heritage site survey in the framework of the implementation of the project "New Development Zone in the Administrative Unit of Rremas and Libofsha", and information from stakeholder meetings (i.e., local communities, municipalities,

etc.), there are no important cultural heritage assets in the project area. The closest cultural monuments with the PDA and OHL route are Kulla e Pirgut - First Category Monument, stables that are now used for animals (621 m from PDA) and Church Shen Marines (686 m from PDA). The information gathered on site (ground-truthed survey in PDA area and OHL route) and historical data (literature review) also show that there is a low potential for unknown cultural heritage to be uncovered during the construction process. A separate Cultural Heritage investigation report is finalized in January 2021 on the PDA area and Cultural Heritage permit is issued in March 2021 from the National Cultural Heritage Council (NCHC). Another Cultural Heritage report was prepared on the realigned OHL route in November 2021 and a permit awarded by NCHC on 20 December 2021.

The field reconnaissance conducted by the Cultural Heritage expert also revealed no Cultural Heritage assets or archaeological remains in the project development area. The only finds scattered throughout the Tracts were those left by the drainage canals (6-angle drainage bricks and fragments thereof), fireplaces for the production of bricks and tiles of the cooperatives time, bunkers of various sizes or bunker debris, pottery for water retention during work and piles of garbage from various places and bars (beer bottles, dishes before the '90s, TV stands, construction waste, etc.). It is noteworthy to mention that bunkers of the communism period are not classified as archaeological objects or objects with any particular cultural heritage values, therefore no anticipated risks are deemed for their presence within sites or even removal during construction phase.

Nevertheless, there is always a possibility that earthworks can potentially uncover any cultural heritage material or archaeological findings. Because of this the impact significance will be deemed as ***minor***.

Aspect					
Cultural Heritage					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	On-site	Daily	Possible	Medium - PV Plant and OHL
Receptor					**Sensitivity**
Cultural Heritage Monuments					Low - PV Plant and OHL
Overall Significance of Impact					
Minor– PV Plant and OHL					

Management and mitigation measures

The project area is poor in classified and unclassified CH assets, historical monuments, and archaeological remains, historical towns, mosques, tekkes, graves, graveyards, and some natural landscapes. Special attention must be given to those located within and in proximity of the project's area.

During the site visit, are not identified CH assets, representing periods and typologies as shown Baseline.

There are still archaeological potential sites that have not been ground-truthed and there has been no pedestrian survey by archaeologists. There is still a minor potential that ground-truthed archaeological sites exist within the footprint of any of the project components, even if pedestrian survey by archaeologists has been done.

Therefore, the following mitigation measures will be taken into account during construction works in proximity to observed and potential CH assets:

- Following national requirement, a tri-partite agreement should be developed with a licensed entity and the National Institute of Cultural Heritage, detailing the specific requirements, which will be periodically followed the excavation works;

- During the implementation, as prescribed in the Cultural Heritage legislation, the earth works will be supervised as per Law no.27, dated 17.05.2018, " On Cultural Heritage and Museums", article 144-147;
- The project activities are to be scheduled in such way to avoid/reduce impacts to the environment during significant events such as visits to the Tekkes, during religious days according to the community's calendar or funerary ceremonies
- Consultation with the site users shall occur through the CLO to understand site use, site boundaries, and timing of religious and cultural activities that could interfere with construction, operation or decommissioning activities.
- Disruption of user access, particularly to sites with ICH value, is likely to cause community issues, and so, where feasible, the construction programme shall ensure that Project equipment and activities are be planned and placed to avoid restricting any site access and potential noise during any religious and cultural activity.
- Regularly monitor for cultural heritage findings during earthworks and other related construction works
- Develop a Chance Find Procedure within the CEMP for managing cultural heritage and implement this procedure if any cultural heritage is discovered during construction; a confidentiality provision will be included.
- Avoid/minimise disturbance of sensitive areas within a buffer of 100 m. Whenever possible, disturbance of sensitive areas, as identified during the walkover by the qualified archaeologist
- Restoration actions. If impacts on sensitive/important sites are found to be impossible to be entirely avoided within the bounds of acceptable impact levels, then specific restoration and documentation activities will be developed.

Residual Impacts

Considering the application of the abovementioned mitigation measures, the impact on the cultural heritage component is depicted in the following table and it is expected to be Negligible both for the PV and OHL area.

Negligible – PV Plant and OHL

6.5.7.2. Potential impacts during operation phase

Historical and literature data show that the project area is not represented by archaeological monuments, artefacts and/or other related material. In addition, there are no risks anticipated during the operation phase.

Negligible – PV Plant and OHL

6.5.7.3. Potential impacts during decommissioning phase

Impacts during decommissioning will therefore be of the same nature as for construction, therefore, the impacts and mitigation measures of the construction phase are also needed during the decommissioning phase. So, it is assessed to be Negligible.

Negligible – PV Plant and OHL

6.5.7.4. Cumulative Impacts

No cumulative impacts are foreseen in relation to Cultural heritage.

Negligible – PV Plant and OHL

7. Mitigation, Environmental and Social Management Plan, and Monitoring Framework

7.1. Introduction

This section provides an outline of the framework for the effective management of potential environmental and social (E&S) impacts associated with the construction and operation of the proposed 140 MW Karavasta PV Solar Project, as identified through the ESIA process that has been undertaken, providing an outline for the Environmental and Social Management Plan (ESMP) to be developed for the project.

The principal purpose of an ESMP is to provide a guide for the Project Developer – "Karavasta Solar shpk" (Project Owner), and its EPC Contractor, in the formulation of appropriate management systems, plans and procedures to ensure compliance with national and lender E&S requirements. The requirements set out in this section and subsequent project ESMP should be included within contractual documentation with the relevant parties, as appropriate, to ensure there is clarity and commitment regarding Contractor's obligations related to E&S and H&S management of the Project. For H&S aspects, a dedicated Occupational Health and Safety Management Plan (OHSMP) shall also be prepared by the EPC Contractor.

Management of impacts and opportunities at relevant stages of the Project development should be considered in the ESMP, from design through to mobilisation and construction and into the operational phase.

7.2. Overview

The ESMP is intended to provide a link between the mitigation measures identified for the assessed project impacts and risks, and the environmental, social and health & safety (H&S) management system that will be implemented on the ground during project construction and operation. In this regard, the principal purpose of the ESMP is to provide an overall framework management strategy for the project, allocating responsibility to ensure E&S aspects are managed appropriately and effectively, and will form the basis for the EPC Contractor Environmental and Social Management System (ESMS), or equivalent, that will be implemented on the ground by all project participants. The ESMP and OHSMP will be developed in line with ISO 14001: 2015, ISO 9001:2015 and ISO 45001:2018 standards, as appropriate. As such, the document will serve the following functions:

- Inclusion within contractual documentation for EPC Contractor and all sub-contractors as a means to provide clear commitment to meeting Project E&S standards and requirements.
- Promote good management practices and communicate the aims and goals of the ESMP.
- Ensure compliance with national and international standards, including IFI E&S Performance Requirements.
- Provide a guide for the developer and contractors in the formulation of appropriate procedures and plans to ensure compliance with national and lender E&S requirements.
- Appointment of appropriate personnel with specific roles and responsibilities covering all aspects of EHSS management of the project.
- Identification of a suite of plans and procedures, providing an outline for the management of specific impact areas.
- Establishment of an Environmental, Health and Safety (EHS) training regime for all staff.
- Define monitoring requirements to determine the efficiency of all mitigation and management measures.
- Address concerns and issues raised during the ESIA stakeholder consultation process and those that will likely continue to arise during the Project's lifetime.

Management of impacts and opportunities at all stages of the project should be considered in the ESMP, from design through mobilisation and construction to the operational phase, relating to the following areas:

- Soil, water and air quality.
- Noise and vibration levels.
- Ecology / biodiversity, including avifauna and aquatic ecology.
- Hydrology.
- Visual and landscape effects.
- Local communities and stakeholder engagement.
- Cultural heritage.
- Land acquisition and resettlement.
- Employment and training.
- Procurement.
- Workers' rights and welfare.
- Occupational Health and safety.
- Traffic.

Overall, the EPC Contractor will be responsible for the development of an appropriate ESMS, or equivalent, for the management of E&S risks and impacts during the construction phase, meeting the requirements, standards and commitments set out in the ESMP, and therefore will include all mitigation, management and monitoring actions as recommended within this ESIA.

Voltalia (HSES team) is in the drafting phase of the first draft of ESMS/ESMF, we are also in the process of analyzing if the VOLTALIA team needs external support to finalize it.

The ESMS should ensure that all impact mitigation measures identified in this ESIA, as well as any additional requirements established by regulatory bodies as part of the ESIA approval, and IFI through their due diligence process, are effectively implemented, monitored and reported and that relevant national and international standards and guidelines are complied with. By following the framework presented in this section and ESMP, the project should be able to appropriately manage impacts through the implementation of the mitigation measures identified within the ESIA for the development of the project, and monitor and report to relevant parties on its E&S performance, thereby fulfilling its E&S obligations to the relevant authorities and Lenders. The Contractor ESMS will be provided to the Sponsor for review and approval prior to the start of construction.

The ESMP will serve to provide a framework for this ESMS and will outline the various aspects of E&S management of the Project as described below:

- Roles and responsibilities of parties and individuals key to the E&S management of the project.
- Plans and procedures that are required for the effective E&S management of the project, outlining the scope of each plan, its schedule and identifying the party responsible for its production; key plans to be included are:
    - Code of Conduct
    - Contractor Management Plan & Vendor Management,
    - Biodiversity Action Plan
    - Stakeholder Engagement Plan
    - Livelihood Restoration Plan
    - Community Investment Plan
    - EPC Contractor Plans
    - Recruitment and Labour Management Plan, including the Skills Development and Local Procurement sub-plan.
    - Occupational Health and Safety Management Plan
    - Biodiversity Management Plan
    - Waste Management Plan
    - Construction Environmental Management Plan

- Construction Traffic Management Plan
- Emergency Response Plan
- Security Management Plan
- Cultural Heritage Management Plan
- Project E&S Procurement Policy / Plan
- Environmental and Social Management Plan

- Monitoring and reporting processes required to ensure the appropriate implementation and efficacy of the management plans and procedures. These processes are also necessary to meet national and lender requirements as well as promoting transparency to all project stakeholders.

An outline of the above listed topic specific E&S Management Plans is provided in Section 0 below.

7.2.1. Project Participants

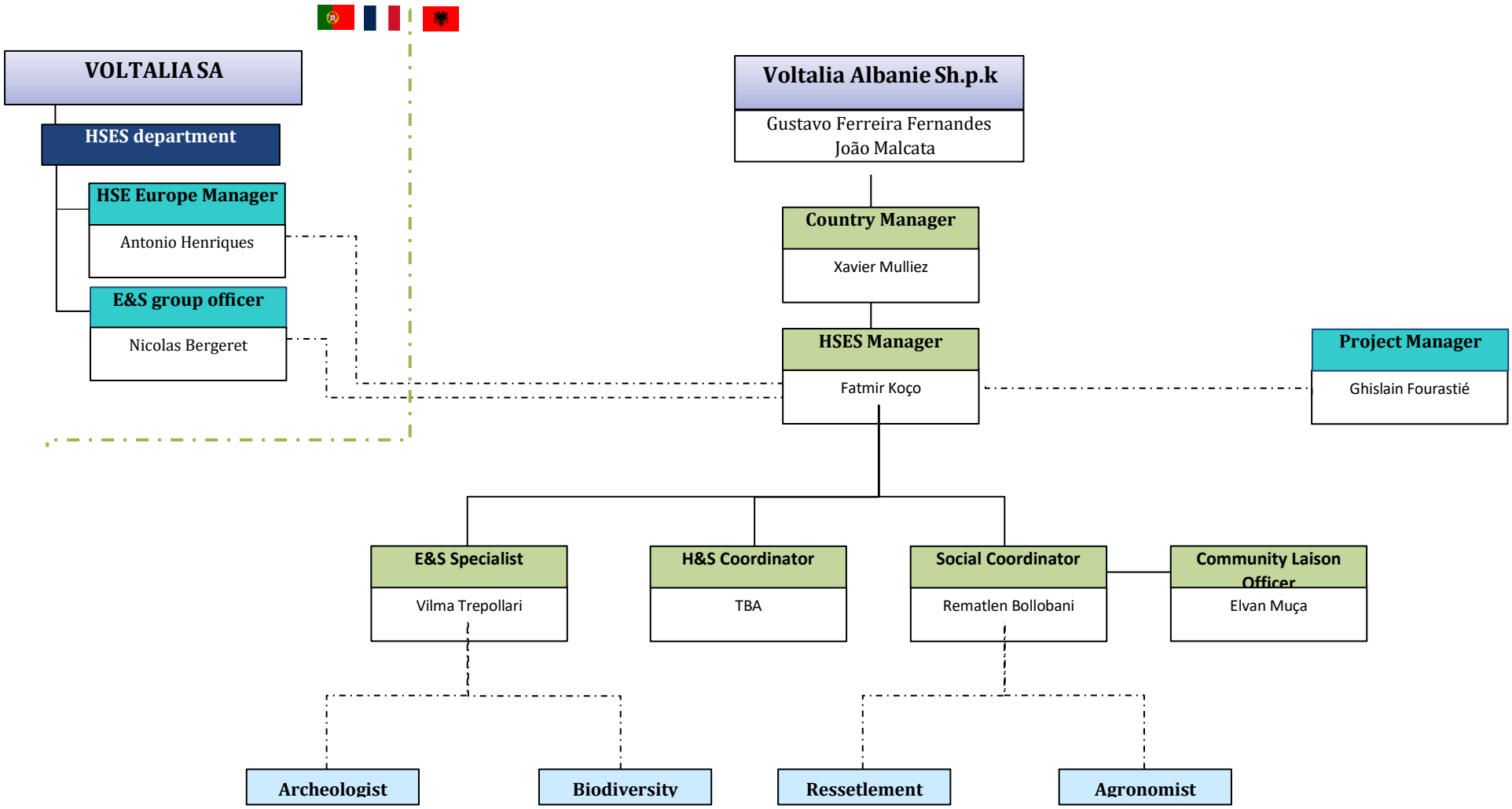
Environmental and social management of the project will involve a number of parties, each assuming different levels of responsibility during the lifetime of the project. This section presents the various parties and personnel relevant to the E&S management of the project and provides an outline of the responsibilities of each. The key parties and their overall responsibilities are described in the table below.

Table 77. Indicative ESMP roles and responsibilities

Position	Responsibility
Karavasta Solar shpk	The owner will assume ultimate responsibility for environmental, social, health and safety performance and compliance with national regulations, permitting conditions and international standards. Initially, the Owner shall develop the Project ESMP and relevant management plans (such as Livelihood Restoration Plan, BMP etc.) and ensure that the EPC Contractor has the appropriate experience and resources to adequately manage the E&S and H&S risks associated with the project. The owner will then make appropriate contractual provisions with the EPC contractor, to ensure all relevant environmental, social and health and safety responsibility is appropriately allocated to the contractor, and that through effective monitoring, all contracted responsibilities are upheld. This may be achieved by including the ESMP within the EPC contract. The owner's project manager will ensure the provision of any E&S and H&S records or reporting upon request from the lenders and the appropriate regulatory authorities.
EPC Contractor	The EPC Contractor will be responsible for the management of E&S and H&S aspects of the project associated with their activities on site, as specified in its contract with the owner. As such, it will be responsible for developing and implementing an overarching project ESMS, or equivalent, following the requirements set out in the ESMP and associated plans. The EPC will continually review its performance and the performance of its subcontractors in relation to the environmental, social, health and safety provisions under the EPC contract.
Subcontractors	A number of subcontractors could be engaged by the EPC contractor in activities on site during the construction phase of the project, each of which will be required to comply with project environmental, social, health and safety requirements. Contractual provision will be required through the EPC Contractor to ensure appropriate compliance. This could be achieved by including the ESMP and OHSMP within sub-contracts with EPC.

Position	Responsibility
Supervision Consultant	A Supervision Consultant will be engaged by "Karavasta Solar" shpk, and will have appropriate environmental, social, health and safety responsibility allocated under contractual provision.
HSES (Health, Safety, Environment and Social) Manager	The EPC Contractor will be required to appoint a suitably qualified and experienced HSES Manager who will be overall responsible for ensuring that the Project and contractor(s) operate in accordance with the applicable legal framework, regulatory environmental, social, health and safety requirements and plans. The HSES Manager is responsible for preparing all documents and reports as required by the national laws and international best practices. Monitor the implementation of environmental, social, health and safety mitigation measures. Ensure that any potential HSES incidents during construction and operational works are reported, and from these situations' lessons are learned and documented. Prepare additional documents and other supporting plans of the ESMP, if required. Ensure effective communication with all stakeholders. Deliver training on environmental, social, health and safety matters to the HSES officers and staff.
Community Liaison Officer (CLO) – required during construction phase	Implementation of the SEP and LRP and liaise with local communities and government regulators on the Project's behalf. Implement E&S awareness and education programmes with communities. Deliver training on social matters to the staff. CLOs and Resettlement expert will be employed by Voltalia.
Livelihood Restoration Planning Expert (LRPE) –recommended during construction phase	Prepare and follow-up the correct implementation of the LRP in accordance with EBRD PR5, IFC PS5 and Albanian legislation requirements, in liaison with the CLO. Conduct pre-construction socioeconomic surveys of the areas potentially impacted by the project (PV solar plant and OHL route), assessing the likely social impacts of the project options; prepare a profile of beneficiaries for each option; prepare a program for monitoring and evaluating the benefits and impacts of the project before and after construction. Collaborate closely with the CLO and HSES Manager to address the socio-economic matters in relation to the livelihood restoration planning in line with EBRD PR5, IFC PS5 including land market survey, mapping and video filming of the existing households, land use and infrastructure that might be affected by the project activities. Identify and cost a program of potential community development activities that could be funded in affected communities.
Biodiversity Experts – periodic inspections during construction phase	Ensure construction works are followed and implemented in compliance with the Biodiversity Management Plan. Perform periodic inspections during earthworks and other major work activities, as well as suggest additional mitigation-management measures to the HSES Manager on biodiversity matters (covering flora, fauna, aquatic and terrestrial biodiversity). Undertake biodiversity monitoring and prepare detailed reports on biodiversity findings.

The table below shows the Project HSES team.



* This organization is subject to final contractualization and hierarchial relationship may vary

7.3. Outline of E&S Management Plans

7.3.1. Developer Plans

These plans will be prepared by the Developer.

7.3.1.1. Code of Conduct

Karavasta PV Plant Code of Conduct (CoC) will be designed to preserve and foster the integrity and reputation of the Project and to help avoid misconduct. In concrete terms, the CoC indicates that the Project has to ensure compliance with legal and regulatory requirements, as well as with their own internal policies and directives, while upholding good market practices, at all times.

In order to achieve its goals, it is vital for the Project to maintain an undisputed reputation and to be considered as a professional and reliable partner by its stakeholders, customers and other business partners, a position which can be maximized through professional project management and a responsible behavior.

7.3.1.2. Contractor Management Plan & Vendor Management,

The CMP Plan will highlight all responsibilities, requirements and work statements that are expected of the contractors and how they will be delivered to the beneficiary. The Parties will establish contacts points to monitor actions and to correct any non-conformances. All the proposed solutions will be reported to Voltalia, management of change structure. This structure is responsible for decisions, under Project manager-management services approval, for drawing procedures able to be applied on all sites or on specific sites, and for updating the CESMP documents.

The approach to managing the Project will be based on the following guiding principles:

- Voltalia will establish on the bidding documents the conditions and obligation for Contractors;
- a Statement of Work will be drawn by the team, jointly with each Contractor taking responsibility for the services outlined in its areas of responsibility;
- effective channels of communications will be clearly defined and established within the Statement of Work document;
- each Contractor/Subcontractor will have its responsibilities and authority limits clearly defined in the Statement of Work;
- each Contractor will have its deliverables and execution time identified in the Statement of Work;
- each Contractor will have the services it is responsible for providing clearly identified and described in the Statement of Work;
- all constraints imposed on the Contractor will be clearly identify in the Statement of Work, including schedule and budget constraints;
- all environmental, social, health and safety and cultural heritage constraints imposed on the Contractor will be clearly identify in the Statement of Work;
- each Contractor will have requirements for quality clearly identified within the Statement of Work, including the requirement to allow independent quality inspections of materials and work processes;
- all products and services provided by the subcontractor (partners of Contractor) will be subject to the acceptance of Voltalia;
- each subcontract will contain appropriate terms and conditions;
- adequate facilities will be provided to meet the needs of the Contractors, and the Contractors will support subcontractors in processing invoices and payments, subject to

the invoices being delivered to Voltalia in an acceptable format. To this end, Voltalia will establish format requirements for invoices in list of Standard Documents;
- the Contractors will be directly responsible for their part of the contract in relation with Voltalia., even for the subcontracted parts;
- the Contractors will be obliged to contract only with solvable and reliable subcontractors, and only with the written approval issued by Voltalia; and
- the subcontractors will have no legal relation with Voltalia. and Voltalia will have no obligation towards the subcontractors.
- Voltalia will be responsible, for project management, for control and monitoring activities regarding constructors' actions and has overall responsibility for environmental, social, health and safety, and cultural heritage aspects of the project

7.3.1.3. Biodiversity Action Plan

A Biodiversity Action Plan (BAP) comprises of a set of actions that lead to the conservation or enhancement (where possible) of biodiversity, for a specific site or project.

The Karavasta PV Plant BAP is necessary, in order to ensure that the Project:

- Implements the mitigation, compensation (where possible) and biodiversity offsetting measures within the project area and area of influence;
- Complies with national legislation/policy requirements; and
- Complies with international environmental requirements and best practices, including IFC PS6, and EU Directives.

The objectives of the BAP are to:

- Review existing biodiversity baseline information and legislative/policy frameworks for the Study Area and identify gaps;
- If necessary, implement a consultation process with relevant stakeholders and biodiversity experts to inform priorities and actions for biodiversity conservation;
- Identify priorities and actions for biodiversity conservation, in consultation with stakeholders and biodiversity experts; and
- Establish a monitoring and evaluation program for biodiversity allowing for the success of the BAP interventions to be assessed.

The draft BAP includes both long-term biodiversity conservation actions and on-site mitigation measures linked to the construction and operation activities of the Project. The biodiversity baseline, conservation actions and mitigation in the BAP will supplement further the information in the Karavasta PV Plant ESIA and ESMP. The conservation objectives and actions in the BAP will be developed to ensure the systematic implementation of the mitigation hierarchy i.e., avoid, reduce (minimize), remedy (restore) and offset and reach net gains in Critical Habitat. This will help provide a careful management of risk and the best possible outcomes for the project and local communities, without compromising the health, function and integrity of the ecological system. In addition to the actions linked to the mitigation hierarchy, the draft BAP includes Additional Conservation Actions (ACA), which will represent actions to enhance the biodiversity of the Study Area, irrespective of the developments taking place there.

7.3.1.4. Stakeholder Engagement Plan

The proposed project will be operating for a relative long-term period and therefore it is essential to maintain good long-term relationships with stakeholders, in particular with the local community. The ESIA study has laid the foundations for interaction and building of relationships with stakeholders and local community since the early phases of the project and also during the public consultations/hearings throughout process. The Developer has already prepared a Stakeholder Engagement Plan (SEP), last updated in April 2021 in line

with EBRD Performance Requirements (PR1, PR5 and PR10) and IFC PS1 and guidelines. The SEP is a living document and will be updated accordingly through the various phases of the project, including operation and decommissioning. During construction the EPC Contractor shall implement the stakeholder engagement activities as per updated plan. This will help to maintain a constructive relationship with key stakeholder and local communities. In addition, a third-party Grievance Mechanism and worker's Grievance Mechanism shall be implemented in order to receive complaints or grievances from communities, employers, and other stakeholders.

Workforce grievance mechanism from SEP will have two systems; one for contractor and the other for Voltalia which is open to non-employee workers.

The scope of the Developer and the Contractor(s), regarding the engagement with the interested Parties/stakeholders, comprises of the following:

- Ensure that impacts during construction and operation phases of the Project are managed in a way that prevents or reduces impacts on the local community.
- Ensure that the local community, directly affected by the project, is aware of the ongoing construction activities and potential impacts.
- Provide the necessary information on community security measures, in the directly affected project area.
- Ensure that stakeholders are aware of how to contact project representatives if in need of asking questions and/or making complaints/grievances.
- Ensure that complaints/grievances are investigated and responded fairly and on time.

A Stakeholder Engagement Plan has been developed with these key objectives:

- Understand the stakeholder engagement requirements of Albanian legislation and provide guidance that meets the IFI standards and international best practice;
- Identify Project stakeholders and categorise them according to their influence on the project and its activities;
- Identify the most effective methods to provide relevant, timely and accessible information to stakeholders in a culturally appropriate and understandable format;
- Consult stakeholders on their opinions, concerns, preferences and perceived gains and risks with respect to the Project design, planning and implementation;
- Describe methods for future engagement;
- Incorporate stakeholder feedback into the impact assessment process and the development of management and mitigation measures to reduce potential negative effects and to enhance possible benefits;
- Define reporting and monitoring measures to ensure the effectiveness of the SEP and periodical reviews of the SEP based on findings;
- Establish formal grievance/resolution mechanisms; and
- Establish a process of on-going reporting to the PACs;
- Build a two-way communication link to address the identified project's environmental and social impacts and other performance requirements.

The SEP includes information on methodology, stakeholder engagement mapping and planning, data gathering and communication tools, team structure, activity timeline, and survey outcomes reporting.

7.3.1.5. Livelihood Restoration Plan

The LRP addresses impacts of the proposed project related to land acquisition, livelihood, access and damage impacts on the project footprint including along construction traffic routes, access roads, and temporary land needs of the EPC and other subcontractors. The LRP has considered feasible alternative project designs and sites to avoid or minimize land acquisition or restrictions on land use, other assets or

natural resources, while balancing environmental, social and financial costs and benefits, as well as paying particular attention to gender impacts and impacts on vulnerable persons.

The proposed LRP covers topics such as:

- Avoidance of involuntary resettlement, or when feasible, avoid involuntary resettlement by exploring alternative project designs;
- Avoid forced eviction, mitigate unavoidable adverse social and economic impacts from involuntary resettlement on affected persons;
- Improve, or as a minimum restore the livelihoods and standards of living of affected persons compared to pre-displacement levels;
- Improve living conditions of physically displaced persons through the provision of adequate housing (including essential services and utilities) with security of tenure at resettlement sites;

The LRP shall apply the national requirements, EBRD PR5 and IFC PS5 requirements as best international practices.

7.3.1.6. Community Investment Plan

The purpose of the Community Investment Plan (CIP) is to include a bespoke programme for potential investments on community infrastructure and services that will help improve the local communities nearby the project area.

Voltalia is presently preparing a Community Investment Plan (CIP) with the objective to ensure good relations with neighbouring communities, to compensate for unspecific communal impacts and to share benefits. The CIP sets out how investment opportunities are identified, assessed, selected, planned, implemented and supported over the entire lifespan of the project as a long-term commitment.

This plan will cover all PDA and OHL area and will be implemented during construction and in the first 5 years of operation. Budget will be allocated directly from Project outcomes anualy.

Based on the Developer's Internal Social Policy, potential areas of social investments will be identified, evaluated and prioritized in support to the socio-economic component and local community's needs. The CIP will be developed and elaborated by the Developer in cooperation with local/regional government authorities during construction phase and further implemented at the end of this phase.

7.3.2. EPC Contractor Plans

These plans will be responsibility of the Contractor to prepare prior to the commencement of construction works. The EPC Contractor will be required to provide copies of such plans for review and approval by the Developer, supported by the Supervision Consultant, prior to start of construction (as may be relevant).

7.3.2.1. Recruitment and Labour Management Plan, including the Skills Development and Local Procurement sub-plan.

The EPC Contractor develops and implements a Human Resources Policy and labour management principles in alignment with national, Lenders and ILO requirements.

A detailed Recruitment and Labour Management Plan (RLMP) will be prepared and implemented as part of the ESMP. The plan will detail the manpower needs for the entire construction period, the local recruitment process and the approach planned to maximize local employment and local content opportunities.

To ensure maximum local benefits are achieved through the construction phase, the EPC Contractor and subcontractors will aim at 100% of unskilled workers recruited from the local area, if available. If not available, the recruitment will be extended to the nearest villages in the Fier Municipality and the region as secondary catchment areas.

A Skills Development and Local Procurement Plan is prepared as a sub-plan of the Recruitment and Labour Management Plan. The plan is structured as such:

- Identification of the Skills and Labour Needs
- Existing Skills Capacity Gaps and Training Demand Analysis
- Tailored Skills Development Programmes
- Local Procurement Opportunities
- Mapping Local Companies
- Communicating Local Content
- Pre-Qualification of Companies
- Strategies to Encourage Local Companies to Tender

Four (4) months before the start of power generation, prepare a Retrenchment/demobilization Plan with the EPC Contractor, to anticipate significant job losses resulting from the Project's transition from construction to operation. The plan will be prepared and implemented in line with national law and good industry practice and based on the principles of non-discrimination, and will reflect the Project's consultation with employees and their organizations, and eventually with the appropriate governmental agencies.

This plan should include:

- the reasons why job losses are necessary,
- the timescale and when notice of employment contract end will be given,
- what jobs are likely to be maintained during the operation phase and how best employees would be selected for the transition construction operation,
- how broader community impact issues are to be addressed,
- the consultation process proposed with the workforce and the local authorities.

Management Actions

- Local labour needs will be estimated prior to the start of the main construction works with the following information: Positions that could be filled by local staff and the level of qualification required, planned procedure for the effective recruitment of these members of staff, Deployment schedule for these positions, Initial training to be provided for each job description.
- A voluntary local recruitment policy for the contractor's personnel involved in the construction activities for the duration of the works will be implemented and controlled by Concessionaire.
- The EPC Contract will advertise positions to maximize local recruitment and to demonstrate that no local skills are available despite all efforts made to recruit locally should the above local recruitment target not be achieved.
- A voluntary recruitment policy for women for the contractor's personnel involved in the construction activities for the duration of the works will also be implemented and controlled by Concessionaire.
- A training programme aiming to support the voluntary local and women recruitment policies will be implemented.
- Local recruitment at the Worksites, including at the entrance, will be prohibited to limit the influx and settlement of spontaneous population waiting for employment. Written employment contracts will be established by the EPC Contractors and its subcontractors for all recruitments.
- Individual records will be established per local employee indicating the worked hours, the type of tasks carried out, and any training provided.
- Collective bargaining: workers will have a right to be part of a union.
- Local employees not housed in the camps and living more than 15 minutes' walk from the Worksite and less than one hour by land transport will be provided or enabled access to daily collective transport.
- A Workers Grievance Mechanism is established for the construction period. The mechanism will be explained to workers as part of their formal induction and signage will be placed in communal areas around site providing details of the mechanism and how grievances can be made. A workers

representative will be elected and a Workers Safety Committee will be established. The workers will be able to raise their grievance by referring to their elected representative or by filing a form and posting it in the complaint boxes that are disposed in key locations in each construction sites (offices and canteens). All workers grievances will be registered and tracked by the EPC contractor HSE site manager.

7.3.2.2. Occupational Health and Safety Management Plan

The Occupational Health and Safety Management Plan (OHSMP) will be developed by the EPC Contractor and will specify the Health and Safety statutory requirements, specifications and standards to be applied to the Project, and how these will be managed. The purpose of this plan is to cover all related OHS matters, emergency preparedness and response, incident and disaster management, the prevention, management and rehabilitation of injuries and illnesses, and specific identification and management of hazards and risks associated with the workplace.

The plan will detail the measures taken by the EPC Contractor to manage the hygiene conditions and medical care in each of the workers camps. It will also address occupational health & safety in alignment with ILO recommendations, Good International Industry Practices (GIIP), EBRD PR4 and IFC PS2. This plan shall include (but not limited to) the following topics:

- Health and safety policy and commitment from management,
- Description of organization; human resources, definition of roles and responsibilities,
- Workers accommodation, hygiene facilities and food supply, and to meet the requirements of EBRD/IFC Guidance Note[152] on accommodation,
- Description of material resources including Personal Protective Equipment (PPE) to be used by workers,
- Health and safety procedures,
- Risk assessment,
- Pollution prevention and protection,
- Monitoring of health and safety performance, and
- Medical checks.
- Training and skill development activities;
- Employee grievance mechanism;
- Measures for fair treatment, non-discrimination, and equal opportunity in employment.
- Requirements related to provision of safe and healthy working conditions, and the health of workers;
- Management of potential communicable diseases associated with construction workforce.
- Local Content measures address inter alia: Promotion of local recruitment at all levels of the Project and facilitating the qualification and recruitment of local candidates, for example with appropriate skills training. Measures to maximize use of national subcontractors and suppliers.
- Workers' community interaction behavioural code of conduct ;
- Contractor employment practices conformance, reporting and monitoring ;
- Management measures related to child labour, forced labour, third-party workers.
-

A H&S risk assessment based approached shall be taken during the construction phase to manage H&S risks to workers. This would involve assessing all the various risks that are involved in each aspect of the job and educating workers on how to manage these risks. The people working around the area shall also be warned of the risk involved i.e., warning signs shall be erected for people to see clearly.

A risk is also presented by the security on site for both local residents and the personnel present. Additional measures in this regard will be added in the ESMP to monitor the security on the ground and the project will adjust to the necessities that will present during implementation.

[152] A guidance notes by IFC and the EBRD: Workers' accommodation: processes and standards

The OHSMP shall be supported by relevant documentation, which are intended to provide a coordinated and consistent management based on a risk-based approach for the various project's activities. The documentation shall be fully compliant with national legislation, EBRD PR4, IFC PS4, international standards and guidelines, and where applicable, to provide a proper standard for the management of OHS.

7.3.2.3. Workers' Accommodation Strategy

The EPC Contractor shall prepare and apply a detailed worker's accommodation strategy for the Project. The purpose of this strategy is to ensure the appropriate accommodation of project's workers and how they will interact with the surrounding environment.

Voltalia propose to use non-camp accommodation during the construction phase (i.e. workers in hotels or other existing residential facilities), so they should:

Update the Accommodation Management Plan included in their Employment, Training and Worksite Management Plan. This Plan should maintain compliance with international guidance of worker accommodation and ESIA commitments;

- Present a Project Change Proposal to the Change Board;
- Facilitate Voltalia ESMS team review of Contractor Employment, Training and Worksite Management ESIPs (including Accommodation Management Plans) to ensure risks and issues associated with use of non-camp accommodation are appropriately documented and mitigation measures identified;
- Facilitate continuing periodic ESMS team audits of non-camp accommodation;
- Ensure effective management of third-party grievances related to worker accommodation;
- Ensure effective management of worker grievances related to worker accommodation;
- Ensure worker participation in camp accommodation inspections;
- Incorporate non-camp accommodation into compliance assurance programme.

7.3.2.4. Biodiversity Management Plan

The Biodiversity Management Plan (BMP) will set out how potential impacts on biodiversity will be mitigated and also cover specific monitoring and management measures to be implemented by the Project both during construction and operation. This plan shall also identify the commitments and requirements for restoration/rehabilitation of affected areas from work activities, covering as well the other project's phases. A monitoring program will also be incorporated into the Project's ESMS, which will include a post-construction fatality monitoring (PCFM) program.,

The BMP shall apply all the necessary requirement by the Albanian legislation, EBRD PR1, PR3 and PR6, IFC PS1, PS3 and PS6, and international best practices.

7.3.2.5. Waste Management Plan

The purpose of the Waste Management Plan (WMP) is to present the waste management practices to be applied by the Project, following the principles of the waste management hierarchy (avoid, reduce, reuse, recycle etc.), and protecting the environment and other sensitive receptors. The Plan will be developed by the EPC Contractor and will initially be focused on construction phase of the Project; the plan can then be updated to cover the operational phase of the Project.

The WMP will contain topics as follows items (but not limited to):

- Identification and estimation of types of waste to be generated during the construction, operation and decommissioning phases
- Identification of waste management subcontractors for the collection, transferring, disposal and/or recycling/treatment (if available);

- Detailed mitigation measures for waste minimisation and management;
- Monitoring measures and reporting requirements;
- Training requirements.

Poor waste management can increase the risk of local complaints/grievances, the risk associated with community and employee health, the risk of environmental pollution, bad publicity, and long-term damage to the reputation of the company.

Specifically, this plan incorporates the following items:

- Types of waste to be generated during the construction and operational phases of the Project plant;
  - Urban waste;
  - Hazardous waste;
  - Construction waste (excess/surplus spoil material from excavation process, etc.);
  - Wastewater network, treatment and release;
  - Other types of waste;
- List of recycling companies for different categories of waste, to handle the collection, transportation, recycling/treatment and disposal of waste;
- Determination of waste disposal sites, bins/containers and proper signaling for the identification of areas and waste, as per respective type;
- Detailed measures for waste management;
- Monitoring measures for waste management;
- Waste transfer form;
- The registration form of waste quantities, according to waste category;
- Various recommendations based on national and international practices;
- Specific work practices for employees, and delivering of training regarding (toolbox talks) waste management.

This plan shall apply all the necessary requirement by the Albanian legislation, EBRD PR1, PR4 and PR6, , IFC PS1, PS3 and PS6,and international best practices.

7.3.2.6. Construction Environmental Management Plan

The CEMP will be prepared by the EPC Contractor and will set out how it will manage the various construction activities to avoid and/or minimize potential adverse environmental impacts, as well as associated health and safety risks.

The CEMP will form part of the ESMS, and shall include all of the requirements necessary to ensure that ESIA commitments, national requirements, EBRD PRs and IFC PSs are accomplished. This plan shall explain in detail how the management, mitigation and monitoring actions are expected to be developed and implemented by the EPC Contractor (i.e., what will be done, where, by who, and with which resources).

The CEMP will cover topics such as:

- Mitigation measures and management actions for:
  - Dust control and management;
  - Noise and vibration abatement;
  - Water resources management (surface water and groundwater);
  - Drainage and irrigation system/network preservation;
  - Erosion and sediment control;
  - Soil management;
  - Biodiversity Managmant; and

- Other topics as appropriate.

- Monitoring requirements.
- Implementation and operation requirements (e.g., training and competence, emergency preparedness, etc.).

7.3.2.7. Construction Traffic Management Plan

The Construction Traffic Management Plan (CTMP) will be developed by the EPC Contractor to manage construction traffic, rerouting or diversion during work activities, identify and approve routes to be used by the project, perform driver trainings, correctly implement the project's code of conduct, maintenance of vehicles and heavy machineries, etc.

The plan shall detail arrangements such as (but not limited to):

- minimize and control, wherever possible, the interaction and impact between public and project traffic;
- ensure a safe working environment for all personnel working at the project site is provided and maintained;
- implement temporary traffic controls, including detours and signage;
- notify the local community about project-related traffic impacts;
- respond to any emergency repair or maintenance requirements;
- implement a strategy, to help minimize the traffic impacts associated with the use of over dimensional vehicles;
- ensure the project does not disrupt the use of any travelling stock route on site; and
- implement protocols that address:
  - on site traffic signs;
  - travelling speed;
  - procedures to ensure that drivers adhere to the designated heavy and over-dimensional vehicle routes;
  - procedures to ensure that drivers implement safe driving practices, particularly if using the national roads; and
  - monitor the effectiveness of these measures, and update as necessary.

The plan identifies traffic routes during the project, as well as highlighting traffic control measures for vehicles entering and operating on the project site. Separate Traffic Management Plan will be prepared for the Operational phase.

Implement specific protocols in relation to good traffic management practices. The plan shall comply with relevant national legislation, EBRD PR4, IFC PS4 and best international practices.

7.3.2.8. Emergency Response Plan

Prior to construction works, the EPC Contractor shall prepare an Emergency Response Plan (ERP). The purpose of this plan is to define the principles and procedures for the prevention and response in case of emergencies, incidents/accidents and unplanned events. The EPC Contractor shall be responsible for providing adequate equipment, machineries, and tools for the full implementation of the plan and providing qualified personnel for emergency response cases. The ERP will cover topics such as:

- Oil or fuel leakage;

- Fires;
- Floods;
- Accidents related to machineries, equipment and/or vehicles;
- Emergency health evacuations
- Security threats;
- Seismic event;
- Undertake community consultations on the draft ERP in coordination with CLO and local administrative unit;
- Electrocution;
- power loss in the community;
- Other topics as appropriate.

This plan shall apply all the necessary requirement by the Albanian legislation, EBRD PR1, PR4 and PR6, IFC PS1, PS4 and PS6 and international best practices.

The Contractor/ Developer must appoint a person to coordinate actions in case of an emergency. The selected person will oversee the proper implementation of the plan, the training process, and the execution of the appropriate measures. This person will report potential incidents and measures/responses undertaken in regard to the Project.

The contractor shall ensure that leakages to the environment are prevented and, if appropriate, means of treatment and disposal are available. Such treatment materials include absorbent clays, absorbent parts/materials, textile pieces, water containers, etc. Containers for storing contaminated soil and materials shall be available on site.

The ERP document, is a critical plan for project execution on a daily basis and the relevant Field Manager/Engineer will always possess a copy of it with them.

7.3.2.9. Cultural Heritage Management Plan

The Cultural Heritage Management Plan (CHMP) seeks to outline a structured approach to providing mechanisms for the identification, protection and management of cultural heritage finds during construction of this project. CHMP will have the objective of avoiding potential damages to cultural resources.

The Cultural Heritage Management Plan (CHMP) scope includes:

- Recognize and protect the cultural and historic value, meaning and significance of places and objects of present and future communities in the project area and area of influence;
- Provide protection for any historical heritage material that is found during the construction phase of this project;
- Detail the actions and procedures (including Chance Finds Procedures) to be carried out during the implementation phase of the project, in order to ensure that all project sites and places are assessed, mitigation options fully outlined and approved management recommendations implemented;
- Roles and responsibilities, including details on the communication lines between the onsite Cultural Heritage Managers, the construction team and local and national conservation bodies.

7.3.2.10. Security Management Plan

The Security Management Plan (SMP) intends to provide and promote the safest possible physical environment during the project implementation. The main purpose of this plan is to describe how the EPC Contractor will provide and maintain a safe physical environment, set out appropriate security arrangements

for the project, ensure personnel, equipment and other tools are on-site, as well as manage staff activities to reduce the risks of personal injury, property loss and any adverse impacts on local communities.

Plan shall include:

- Security arrangements roles and responsibilities
- Security procedures (contractor and company personnel identification, visitors identification vehicles identification etc.)
- Security-related communication arrangements
- Interface with host government agencies and public security forces
- Provisions to ensure compliance with regulations and good industry practice regarding:
    - Security personnel selection and employment
    - Security personnel rules of conduct,
    - Security personnel training, equipment
    - Monitoring of compliance and investigation process of non-compliance acts
- Security training program including:
    - Code of Conduct modules specific to security personnel
    - Voluntary Principles on Security and Human Rights
- Grievance mechanism

7.3.2.11. Project E&S Procurement Policy / Plan

The EPC Contractor will be required to develop a Project E&S Procurement Policy / Plan that clearly sets outs the process for identification and selection of suppliers for equipment and services, and specifically for key major Project components / items, such as PV panels, inverters etc. will specify minimum performance standards and/or require information from suppliers covering the following areas: Our prevention Plan and good practices:

- Internal dedicated Task force
- Comprehensive « Know Your Third Party » analysis of all Voltalia’s Chinese suppliers
- Mandatory signature of the Ethical Charter and the Code of Conduct
- Permanent constructive dialogue with suppliers
- Mandatory reinforced contractual and audit clauses
- Checking the integrity of our third parties to deter misconduct and non-compliance to Voltalia’s ethical standards and reduce risk exposure in terms of:
    - Fraud & corruption = Sapin 2 Law
    - Human rights and fundamental freedoms
    - Health and safety of individuals
    - Environment
- Labour and working conditions, including within main supply chain of raw materials
- Environmental stewardship
- Social responsibilities
- Resource management
- H&S performance and practices.

7.4. Environmental and Social Management Plan

The following tables summarise the potential E&S impacts and risks, and the required mitigation measures to be implemented during construction and operation phase of the Project to appropriately manage them.

Table 78. Environmental and Social Components – Construction Phase

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
Air	Emission of pollutants due to combustion and exhaust emissions generated from the construction equipment, generators, vehicles and Project traffic.	Ambient air quality deterioration due to pollutants emissions.	Development of the CEMP and dust management procedures as part of the ESMS for the construction phase which will specify appropriate measures for the management of site clearance, excavation and construction activities to minimise generation of dust, including: • Construction activity will be located away from sensitive land areas and receptors where possible, in particular for the OHL, and ensure that activities are carried out when wind direction will direct material away from these receptors. • Open excavation areas will be minimized. • Stockpiling of soil and earthen material will be minimized by proper coordination of earthworks and excavation activities (excavation, grading, compacting, etc.). • When there is visible dust being generated by vehicles and other activities, apply water sprinkling measures to reduce dust. • Develop a Construction Traffic Management Plan (CTMP) to incorporate all relevant mitigation measures for vehicle movement nearby and within the project areas (PV plant and OHL). • Reduce speeds on unpaved roads and take other measures as needed to reduce emissions if intensive fugitive dust emission occurs, until water sprinkling or other mitigation measures are put in place. • All vehicles will be required to only use designated internal and external routes.	***Minor – PV plant and OHL***
	Generation of dust during construction works and vehicle movement.	Ambient air quality deterioration due to dust emissions.		

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Design all earthworks to allow future successful re-vegetation. For stockpiles left for long periods, apply native grass seeds no invasive seeds or other covers. • Vehicle speeds will be restricted on construction sites and access roads. • All construction machinery and equipment to be maintained in good working order and not left running when not in use. • No burning of any material anywhere on or construction sites • Vehicles carrying aggregate material and workings will be sheeted at all times. • Observe dust levels and amount of dust settling on properties near (200 m) construction sites and take action to reduce dust generation if there is excessive dust on surfaces. • Project OHS Management Plan will ensure that Project workers are protected from dust and emissions impacts, for example through requirements for the provision of dust masks when working near dust generating activities.	
Soil	Excavations for foundations, backfilling and access road construction.	Disturbance of soil layer structure.	• Minimise the removal of topsoil and limit to only those areas where grading is strictly required for the tracker system • Removal and storage of top layer of fertile soil, followed by land re-cultivation and restoration after works implementation.	***Minor – PV plant and OHL***
	Spillage or leakage of oils and fuels from construction vehicles and other machinery, improper storage of waste oils, fuels and other chemicals and poor management of waste and wastewater	Contamination of soils.	• Regular maintenance of vehicles and machinery, • Implement good practice in use and storage of chemicals and management of wastes through measures specified in Project ESMP, and CEMP, including hazardous material management procedures to be developed for the construction phase.	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
	at worker accommodation compounds.			
	Risks from surplus/spoil material due to excavations	Pollution of the environment and improper management of spoil material	• Allocate temporary disposal areas for excavated soils within the project area footprint. • Stockpiles will be located within designated soil stockpile areas where movement of vehicles and equipment are excluded and up-slope (at least 20 m away) from local waterways and flood inundation areas to minimise the risk of erosion and sediment run-off. • Stockpiles will be stabilised with matting, geotextile/ silt fencing or other appropriate controls if they are to remain bare for more than 3 months, particularly during the winter in the rainy season. • Slope ratios will be no more than 2:1 (horizontal/vertical). • Compaction of stockpiles will be avoided as this will hinder establishment of vegetation during rehabilitation / restoration. • Location of soil stockpiles and batters will be geo-referenced and mapped in a GIS database with details on type of material and duration of stockpiling recorded. • Use all excavated materials within the site for landscaping and site restoration.	
Hydrology	Excavations for foundations of the OHL towers and PV plant, spillage or leakage of oils and fuels from construction vehicles and other machinery, improper storage of waste oils, fuels and other	Contamination of surface and groundwater with runoff from construction sites, and sedimentation and erosion within the PDA and drainage/ irrigation channels	• Regular maintenance of vehicles and machinery; • Implement good practice in management of excavations, use and storage of chemicals and management of wastes through measures specified in Project ESMP and CEMP to be developed for the construction phase. • The hydrological pattern and scheme around the PV plant site and areas of work for the OHL towers shall not be altered and kept disciplined to the maximum extent possible with the natural/ existing water flowing, channel depth and slope inclination;	***Minor***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
	chemicals and poor management of waste and wastewater at worker accommodation compounds.		• Implement effective Erosion and Sediment Control Procedure within the CEMP to define measures that prevent and/or reduce impacts due to erosion and sediment creation. • Surface water management infrastructure (e.g., cut-off / diversion drains, velocity dissipation devices, culverts) will be constructed in appropriate locations to minimise and control surface water flow over disturbed areas and hard surfaces. • Excavation and stockpiling will cease during prolonged periods of wet weather. • Schedule major earthworks and grading operations for early in the dry season. Avoid the wet / rainy season or periods of high intensity rainfall wherever possible; • Measures will be employed to stabilise exposed soil and unstable surfaces (i.e., through using slope shaping or other geotextiles) where necessary. • The integrity of the road structure and associated drainage and irrigation system in the project footprint area will be maintained on a regular basis to ensure that impacts to local community, fauna and their habitats arising from suspended sediments and run-off continue to be minimised. • Ensure that the existing drainage channels are maintained and function effectively (no additional drainage channels are anticipated for the project drainage system).	
		Modification of irrigation and drainage patterns	• The irrigation and drainage pattern/network scheme around the PV plant site and areas of work for the OHL towers shall not be altered, but kept disciplined and functional to the maximum extent possible with the natural/ existing water flowing, channel depth and slope inclination to prevent blockages and/or flooding in surrounding lands;	***Minor – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Develop an Irrigation and Drainage Preservation Procedure within the CEMP; This procedure should clearly define mitigation and management measures for temporal diversion of the channels when necessary or when construction works are being implemented in a particular section; • Develop an Erosion and Sediment Control Procedure within the CEMP to define measures that prevent and/or reduce impacts and control the risk of erosion and sedimentation impacts on existing water bodies in the project area. This measure could include potential silt fencing in specific working locations, changes or improvements in the project design, erosion protection interventions, reshaping of slopes, hydro seeding or planting of vegetation, etc.;	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
Landscape and Visual	Temporary storage of construction material, machinery and temporary access roads, construction of the PV plant, OHL tower foundations and erection of towers	Temporary change to landscape and visual intrusion.	• Implement good construction management and housekeeping to control activities and maintain clean working areas; this will be achieved through the development of the CEMP. • Ensure continued consultation with local communities throughout the construction period. • Salvage stripped topsoil and subsoil, where feasible, in stockpiles for future reuse. • Judicious vegetation clearance to ensure only limited vegetation is cleared only within the project footprint areas to facilitate construction access and working activities; • Where construction access is required in the proximity of existing vegetation, suitable protection to existing tree canopies and root zones to be provided with protective fencing and ground protection surfacing, which is to be removed immediately upon completion of construction works; • Use of existing access roads or paths as far as possible, in particular for access to the OHL tower pylon locations; • Avoid excavation, handling and transport of materials which may generate dust under very windy conditions; • Keep proper housekeeping in construction sites during all working activities; materials, wastes and machineries to be contained within areas that are as small as possible, adequately fenced and equipped with signage; • Rehabilitate and restore disturbed areas incrementally and as soon as possible, not necessarily waiting until completion of the construction phase.	***Minor – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
Noise and vibration	Pile driving for construction. Earth moving activity. Movement of construction vehicles. Access route construction. Construction activities for the PV plant. Erection of towers and conductors.	Noise nuisance.	• Equipment maintenance, and noise emissions monitoring, managed through the development of CEMP for construction phase. • Development of the OHSMP for protection of workers and equipment with adequate PPE • Development of the CTMP (see mitigation measures propose for traffic management); • OHS plan for protection of workers. • Micro-siting of towers during final design stage. • Temporary acoustic screening if required. • Restriction of construction activities to daytime hours and weekdays. • Vehicles, equipment and machinery will comply with industry standards for operation. • Vehicles, equipment and machinery will be regularly checked and maintained to ensure that they are in good working order and within industry standards for noise and vibration emissions. • Noise reduction, sound insulation and absorption measures will be applied to different equipment where required (e.g., mufflers on engine exhausts and compressor components; impedance mufflers / silencers and vibration insulating on air compressors, blowers and fans; installing sound barriers around generators, etc.).	***Minor – PV plant and OHL***
Traffic	Generation of construction traffic.	Community and workforce safety and local traffic flow.	• Development of Construction Traffic Management Plan (CTMP). • Implement road improvements where necessary - repair or restore road network if damaged by Project vehicles. • Notify through local government all the habitants on the affected areas to coordinate the traffic flow for the local users; • Engage with relevant authorities and local communities and landowners / land users prior to any change required for the access roads. • The transportation will be protected and patrolled by the crash trucks and possible police escort to guaranty the safety of other road users	***Minor – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			and to inform the respective authority for the overloaded trucks for the national road segment, Durres – Mbrostar, to be used also for the rural segment of Mbrostar – Libofshe – Agim – Ndermenas –Site or Babunje – Agim – Ndermenas – Site; • The segment Hasturkas – Old Bridge, is in very bad condition and unappropriated for such transport. It must be rehabilitated with the granular layer and asphalt layer in top of it; • The last segment Old Bridge – Site, needs proper rehabilitation because is on the muddy area and heavy equipment cannot pass on it to reach the site; • Training of drivers in road safety and code of conduct. • Traffic Risk/Hazard awareness program specifically including children as a target audience needed to be developed • Consideration of phasing work to ensure local access retained. • Communicate transport routes and predicted schedule to communities. • Identify and install all necessary warning signage on public roads. • Set speed limits, particularly in the Agricultural Zone which is populated by the local community. • Maintain vehicles and include details on inspections. • Zero tolerance for alcohol and illegal drugs. • Monitoring and evaluation of traffic and transport incidents. • Clearly demarcate internal routes for construction vehicles	
Waste	General construction activities. Waste generated by workforce. Poor housekeeping.	Temporary disposal of excavated material. Visual impact of uncontained /	• Avoidance of refuelling on site to prevent oil spills. If this is not possible procedures will be developed to avoid accidental spillage, like the provision of drip trays and bunding for stores of fuel and waste chemicals. • Responsible storage and disposal of liquid effluents such as sewage from temporary accommodation. • Provide a dedicated and adequate storage area for waste.	***Minor – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
		windblown waste / litter. Impact on soil and groundwater from poor management / storage of sanitary and hazardous wastes. Attraction of vermin to food wastes. Unnecessary volumes sent to landfill through lack of reuse and recycling.	• Segregation, reuse and, where feasible, recycling of wastes by registered operator. • Good general housekeeping. • Covering of solid waste containers to prevent windblown litter across and outside site. • Composting of organic wastes. • Appropriate handling and storage of hazardous waste for licensed collection for responsible disposal by registered operator. These measures will be managed and monitored through the development of a Waste Management Plan for construction phase.	
Habitats and protected areas	Site clearance work removing and soil and surface vegetation within PDA and for tower foundations. Maintenance and improvement to drainage channels. Improper disposal of excavation material. Poor management of solid waste and waste water generated at	Potential negative impacts on habitats.	• The loss of the habitat "1310 Salicornia and other annuals colonizing mud and sand" that will be affected by the PV plant, and which is listed in Annex I of the EU Habitat Directive has to be compensated in the adjacent area of influence next to the PV site. This could include planting of native vegetation in these adjacent areas. • The irrigation and drainage pattern/network scheme around the PV plant site and areas of work for the OHL towers shall not be altered, but kept disciplined and functional to the maximum extent possible with the natural/ existing water flowing, channel depth and slope inclination to prevent blockages and/or flooding in surrounding areas; • Develop an Irrigation and Drainage Preservation Procedure within the CEMP; to define mitigation and management measures for temporal	***Minor – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
	temporary construction base camp.		diversion of the channels (when necessary) or when construction works are being implemented in a particular section; • Develop an Erosion and Sediment Control Procedure within the CEMP to define measures that prevent and/or reduce impacts due to erosion and sediment creation. • Limit site clearance activities to only those areas where this is required and avoid where possible the removal of vegetation or disturbance of habitats. • To minimise habitat loss to the extent practicable, areas scheduled for habitat and land clearance will be demarcated and mapped in advance and personnel informed that any activities outside the designated areas will be strictly forbidden except for entry and exit along designated access routes. These mapped areas will be incorporated into this Biodiversity Management Plan (BMP). This will minimise the risk of habitat clearance outside of these areas. • Environmentally sensitive areas and critical habitats in surroundings of the project areas will be clearly marked and mapped as 'No-Go Areas' (e.g., "Godulla e Ushtarit" lagoon) and access by staff and subcontractors will be strictly forbidden, until habitat displacement outside the project area. • Vegetation clearance within the project footprint will be undertaken by the EPC Contractor in a progressive and sensitive manner to enable fauna to move away from the area of works, disperse into surrounding habitats and to avoid fauna from being isolated in fragmented areas of habitat. • Avoid disturbance or works within the drainage and irrigation channels within the PDA, and where works are required to safeguard the project as part of drainage scheme, ensure works are undertaken	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			sensitively and rehabilitation the channels to ensure no net loss in habitat. • Bushfire controls will be developed for the Project, including a Project ban on open burning of waste by the local communities; specific emergency response procedures developed for managing bushfires and the establishment of fire breaks where required. • An ecologist will be on hand to supervise the habitat clearance works and provide advice to the workforce when required. • Ensure implementation of appropriate measures for the management of site clearance and excavation activities, and soil and waste management both within PDA and along the OHL, as well as for associated infrastructure, such as access roads, etc. This is to be achieved through the development of the ESMP for the construction phase and CEMP. The construction-phase BMP identifies measures that will mitigate impacts on biodiversity and define monitoring requirements. The EPC is required to implement the requirements of the BMP.	
Vegetation and flora	Ground clearance at construction sites (PV plant and tower pylon) and during laying of access routes.	Impact on local flora, including rare species.	• Establishing a routine/program to check all open excavations/trenches for trapped animals (snakes, small mammals etc.) • Demarcate work areas clearly for construction workers to ensure that the disruption of vegetation does not occur outside of designated areas; • Minimise clearance of vegetation to only areas that are required, and only where grading is required for the tracker system. • Follow the requirements set out in the BMP and if appropriate undertake pre-clearance survey by a trained ecologist. • Implement appropriate measures for the management of site clearance and excavation activities, and soil and waste management	***Minor – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			within the PDA and along the OHL, as well as for associated infrastructure, such access roads etc. This is to be achieved through the development of the CEMP. • Worker awareness and training sessions in relation to protection of local flora; this may include procedure for the identification of rare and protected species for removal under license if necessary. • The BMP identifies measures to rehabilitate the site post construction, including re-establishment of native plant species within the PDA that support biodiversity. • Rehabilitation of the site, and areas cleared during construction, encouraging the establishment of native flora species; details of this are defined within the BMP. It is suggested the revegetation of the affected area with Quercus robur (VU-Alb) and Fraxinus angustifolia as threatened species, in particular for riparian areas nearby the streams or river habitats. Cultivating specific plant species of certain economics benefit (e.g., medicinal plants) it is also suggested and anticipated to be easily achievable. In general, compensation measures with native vegetation species would be a good example for the minimisation of environmental impacts. • Routine checks will be undertaken by the EPC Contractor's ESMS Team to ensure vegetation clearance is confined to defined areas of disturbance and periodic checks will also be undertaken supervising engineers.	
	Alien Invasive Species	Alterations in the existing habitats and ecosystem due to alien invasive species	• An alien invasive species protocol will be developed (by an experienced ecologist/biodiversity) within the BMP and implemented to minimise the risk of transferring and introducing alien invasive species into the project area. This will include: ○ A wash down procedure will be employed to prevent invasive weed spread and potential contamination of the project area from the receiving environment.	***Negligible – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			○ Pre-clearance checks for alien invasive species of areas designated for clearance and the site access / egress routes will be undertaken prior to the commencement of site preparation works. ○ Uncontaminated soil will be used for construction, restoration and rehabilitation.	
Terrestrial fauna and avifauna	Construction activities involving clearing of vegetation, excavation of soils, movement of vehicles or equipment over roads and terrain, loading and unloading of materials. Poaching, intentional killing of animals.	Injury or mortality of animals.	• Establishing a routine/ program to check all open excavations/trenches for trapped animals (snakes, small mammals etc.) • Follow the requirements set out in the BMP and if appropriate undertake pre-clearance survey by a trained ecologist. • Demarcate work areas clearly for construction workers to ensure that work activities do not occur outside of designated areas of the project; • Project construction will not be undertaken at dusk, dawn and at night to avoid disturbance to nocturnal and crepuscular fauna (i.e., protected status fauna species, bats, etc.) from increased noise and vibration. • Vegetation clearance within the project footprint will be undertaken by the EPC Contractor in a progressive and sensitive manner to enable fauna to move away from the area of works, disperse into surrounding habitats and to avoid fauna from being isolated in fragmented areas of habitat. • Prior to the commencement of works, an biodiversity expert will undertake pre-clearance checks of key potentially habitats to be affected, vegetation to be cleared within the project footprint to avoid causing disturbance or injury to roosting fauna species (i.e., bats) and tree nesting birds. A 'no-go area' comprising a 2-5 m radius will be demarcated around each active nest by the EPC Contractor with guidance from the ecologist. Vegetation clearance will be prohibited	***Minor – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			within these 'no-go areas' until the chicks have fledged. A method statement for this check and the management of active nesting sites will be prepared by an experienced biologist/biodiversity expert and included in the BMP. • Given the importance of the landscape (in particular for the PV plant area) to support bird species of high biodiversity value, a periodic monitoring programme for avifauna will be established for the Project by an experienced ecologist who will monitor the effectiveness of the mitigation measures. He will also assess for any significant changes in priority bird species numbers and habitat usage within the project area and adjacent sensitive habitats and identify the requirement for adaptive management. Key monitoring periods are during the breeding / nesting bird season (i.e., end May - early June) and during the migratory bird season (March - April / early May). Indicators will include: o Changes in habitat usage by priority bird species; o Changes in number of breeding / nesting and migratory bird species (benchmarked against existing monitoring data); o Changes in the frequency of habitat use by priority bird species. • Worker awareness and training sessions in relation to protection of local fauna. • Code of conduct forbidding poaching or deliberate killing of animals. • Reduced speed limits of project vehicles will be enforced in the construction site and all staff will adhere to the HSES policy to minimise the risk of accidental fauna collisions. To be communicated to all relevant personnel during staff inductions. • Ensure excavations do not become traps for animals.	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Reduce vehicle speed while travelling on all construction roads (20 km/h at the project area, for other access roads limits will be established at the Traffic Management Plan); • Fauna species should not be caught or killed during construction; • Establishment of a procedure to avoid, monitor and control invasive species if necessary; • At trenches, trench plugs to be incorporated and daily fauna retrieval is to be conducted; • Where appropriate, temporary or permanent provisions for fauna to cross the working strip/ roads using underpasses, tunnels or other measures should be installed; • Incorporate specific measures for protected species across the entire study area; • Restrict construction to certain periods/seasons where possible to be outside the breeding season i.e., 1st March – 31st July for birds. • Minimise the use of lighting within the PDA and other construction areas, and where lighting is required, ensure lighting is directional and spill is minimised. • An Injured Wildlife Protocol will be developed within the BMP for the project by an experienced ecologist which will be followed by staff and subcontractors in the event of an incident. This will include a mandatory reporting system which will enable an assessment of the incident to be undertaken and the requirements for any further actions or mitigation measures to be determined. Reports should include encounters of wildlife and observation of natural resource collection, illegal hunting and wildlife trade. The protocol will also include procedures for the safe management of injured and dead wildlife. • Appropriate management to be achieved through the development of the CEMP for the construction phase.	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
Ecosystem Services	Temporary loss of access to grazing areas, temporary impacts on natural habitats and the protected area	Impacts on provisioning, regulating, supporting and cultural ecosystem services	• Control of PV Plant construction to ensure downstream water supply and quality changes are minimized and do not disrupt grazing quality outside of the PV Plant • Hazardous materials and emergency response management to avoid contamination of surface water and soil • Prepare and implement an Alien Invasive Species Protocol • Construction stage pre-clearance ecological surveys, and construction mitigation developed if nesting sites are identified • Good construction industry wildlife management practise, including injured wildlife protocol, workforce awareness sessions, reduced speed limits, wildlife interaction reporting, waste and litter control	
Land Acquisition, Land Use and Livelihood	Temporary and permanent loss of agricultural land, in particular for the OHL.	Impacts to livelihoods – potential loss of income.	Develop a Livelihood Restoration Plan (LRP) that will manage the economic impacts on farmers. The LRP will be in-line with EBRD PR5 and IFC PS5 and national requirements. The plan includes the following elements: • When selecting the site of the project elements, construction sites and access roads, avoid to the extent possible locating them on farmed land or land with the presence of fruit trees or other assets; • Minimize the amount of land occupied during construction; • Position OHL pylons near edges of land plots to optimize land use; • Ensure way of passage for herders and herding activities through the PV plant; • Develop appropriate compensation, in line with market value, national legislation and EBRD PR5 and IFC PS5. Support the vulnerable groups and individuals in the completion of the necessary documentation to achieve the Ownership Certificate; • Ensure all compensations are made prior to the commencement of the construction activities.	***Minor – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Where relevant avoid, to the extent practicable, locating tower pylons on farmed land or land with the presence of fruit trees, olive trees or other assets, and away from residential properties. • Describe an inclusive and exhaustive consultation process with local residents affected by the project and other stakeholders. • Where livelihoods have been significantly impacted and monetary compensation is not sufficient, develop appropriate livelihood restoration programmes. • Disseminate an LRP grievance process. • Upon completion of construction activities, fully reinstate leased land and ensure it is handed over in its original conditions prior to work activities, to the extent practicable. •	
Employment and local economy	Employment opportunities for construction works.	Increased employment opportunities - Positive impact to communities.	• EPC should develop and implement a Recruitment and Labour Management Plan (RLMP) and HR policies that include indications aimed at increasing the use of local workforce and bring positive benefits to the local communities. The RLMP should include: ○ Advertising jobs locally. ○ Encouraging and attracting local workforce to apply for jobs. ○ Prioritising the hire of local workforce where reasonable and practical. ○ Training programs. ○ Monitor local workforce recruited. • Develop and implement a construction OHS Management system for the protection of worker health and management of occupational health and safety risks. • Prioritize employment of vulnerable individuals and of women during employment hiring phases; • Collaborate with the State Employment Offices;	***Moderate positive – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Collaborate with local institutions (Municipality and Administrative Units); • Put in place transparent and fair recruitment procedures by: • Strictly following the Albanian Code of Work requirements; • ILO conventions ratified by Albania; • EBRD PR2 Labour and Working Conditions; • IFC PS2 Labour and Working Conditions; • Strict application of Voltalia internal Policy prohibits employment of workers under the age of 18 through its Code of Conduct. • An audit of the selected hotels will be carried out to see if they meet the EBRD/IFC criteria. • Prioritize employment of members of vulnerable groups and individuals; • Ensure priority of women owned businesses during the procurement process; • Ensure Voltalia's "Ethics Guide and Code of Conduct" is enforced also in the supply chain, so all contractors, subcontractors and suppliers shall comply with it. In order to increase women employment opportunities, the following measures should be taken by Voltalia: • Provide equal trainings for men and women; • In field training during the development of implementation phase, also through Contractor/s and Sub-Contractors; • Establish training and re-training program that specifically target women, to increase their opportunities; • Define number of persons to be interviewed for a new position which need to be women;	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Clearly indicate that the position opportunity is for both men and women; • Provide a women friendly working environment. The priority will be given to the employment of local people, if is identified that their skills are in line with the requirements of the project.	
Infrastructure and Community Services	Work activities and unintentional damages	Potential deterioration and interruption of community services and infrastructures	• Ensure that local communities are timely informed about road closures, works on roads or use of heavy good vehicles; • Ensure that local communities are timely informed about any disruptions on infrastructures (water distribution, energy distribution) that might be caused by construction activities; • Ensure that waste is recovered and recycled to the extent possible, so to reduce the need of sending it to landfills; • Identify and use waste disposal facilities as close as possible to the Project location, so to reduce the need of transport. • Ensure that possible damages to existing infrastructures are repaired promptly and that at the end of construction activities roads are left in original or better conditions. • Ensure the development of a Community Investment Plan (CIP) within the HSMP to support potential investments on the community infrastructure and services during the project implementation.	***Minor – PV plant and OHL***
Occupational and community Health and Safety	Safety and security risks derived from project construction activities	Potential impacts on community health, safety and security.	• Workers' health and safety should be managed in line with national regulations, EBRD and IFC standards and OHSAS18001 standard; • Enforce workers code of conduct;	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
	Emission of dust, noise and vibration Unauthorized acces and vandalism	Risks on occupational health and safety and security Risk of GBVH	• Provide training and regular communications to human resources and/or other relevant persons (employees, supervisors, managers and contractors) on understanding sexual harassment in the workplace, and on how to respond to allegations of sexual harassment in the workplace; • Provide training to community liaison officers and/or other relevant persons on how to respond to allegations of GBVH perpetrated by employees and contractors in affected communities; • All Contractor as discribded in Contractor Management Plan will follow all Health and Safety measuremants.Implement a confidential grievance mechanism for making anonymous reports of incidents of sexual harassment in the workplace; • Require all employees and contractors to sign the sexual harassment policy or commit to comply with this policy as part of the terms and conditions in their employment contract; • Cooperate and coordinate with local health and safety facilities to minimize impacts on health centres and access for the local population. • Use security personnel to ensure no unauthorised public access; • Assure presence of ambulance and site doctor during the implementation of the works; • Put in place the Emergency Response Plan. Appoint a female CLO who will manage the possible causes related to GBVH Ensure that local communities are timely informed about road closures, works on roads or use of heavy good vehicles;	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Plan and implement awareness campaigns on risks related to the traffic increase, especially in the schools present in the area; • Place flagman for traffic management in sensible receptors like schools and health centers; • Notify through local government all the habitants on the affected areas to coordinate the traffic flow for the local users;	
Cultural Heritage	There are no known potential objects in the Project area of cultural or archaeological significance.	Potential damage to cultural or archaeological objects, which are newly discovered during construction groundworks.	• EPC to develop and implement a Chance Finds Procedure Plan in case of incidental archaeological discovery. • The plan should ensure that any cultural heritage management work undertaken complies with the HSES Policy, national legislation, and EBRD PR8, IFC PS8 in order to avoid all potential damages to cultural resources.	***Negligible – PV plant and OHL***

Table 79. Environmental and Social Components – Operation Phase

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
Land Acquisition, Land Use and Livelihood	Permanent loss of agricultural land for the PV plant area and OHL towers.	Impacts to livelihoods – potential loss of income.	• The LRP implemented and all compensation paid, no further mitigation measures can be applied; ensure full application of the LRP, in line with Albanian legislation and EBRD and IFC standards. • There might be impacts on structures, crops etc the ESMP and restoration plans will need to cover these impacts. • When selecting the siting of the OHL right of way, avoid to the extent possible locating it on farmed land or land with the presence of fruit trees or other assets; • Ensure that land users and owners are fully clear on the meaning of the easement and fully clear of the restrictions applied throughout the easement area; • Ensure all grievances by local community and other stakeholders are closed out. • SEP to be used to disseminate project information where necessary to land users. • Should affected people need to raise grievances for damages to crop or lands following OST's maintenance activities of the OHL, voltalia will encourage affected people to raise grievances directly to OST. In the case where affected would not be able to raise grievances to OST, Voltalia's grievance mechanism will be open to those grievances and Voltalia will support affected people in raising the grieavance with OST.	***Negligible – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
Landscape and Visual	Presence of PV panels and transmission line	Long-term changes to the landscape. Major new visual item in the scenery for small number of local residents. Glare (and glint) caused by sunlight reflected off the PV panel arrays.	• Perform proper housekeeping and cleaning at end of construction phase; materials, wastes and equipment to be removed from working areas and disposed or transferred in appropriate places; • Rehabilitate and restore disturbed areas incrementally and as soon as possible, not necessarily waiting until completion of the construction phase. • Revegetation of the affected areas by the project will have to be consulted with an ecologist to avoid planting of any alien flora species or non-native species. • Use consistent colour treatments: wherever possible, use uniform (and well-chosen) colour treatments on all structures and surfaces, which blends well with the surrounding landscape. • Minimize vegetation clearing outside of the arrays: vegetation removal causes strong colour and texture contrasts by exposing light-coloured soils that lack the visual texture that vegetation provides. • Carefully choose the exposed metal support structures or reflective surfaces in order to not reflect the sun. These elements might be coated or treated or replaced by materials that are less reflective. • Plant vegetation outside the plant in strategic points that might be visible from the roads crossing the area so the PV remains not visible passing by. • All mitigation and management measures for the restoration process of project-affected areas, including associated costs, will be included in the Biodiversity Management Plan (BMP).	***Minor – PV plant and OHL***
Physical receptors (air	Occasional visits to the PV plant to undertake	Dust generation. Vehicle emissions.	• Maintenance vehicles will be required to follow designed access routes.	***Negligible – PV plant and OHL***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
quality, soil, hydrology)	inspection and maintenance activities.	Fuel / oil spills from vehicles or machinery.	• Development of the Project ESMS for the operation phase, including provision for good working practices in relation to maintenance of vehicles and machinery, use, storage and handling of chemicals. • reduce the water demand of the project by using monthly dry-cleaning techniques, with wet cleaning (using water) only on a quarterly basis. • Installation and use of rainwater harvesting and steam cleaning equipment and • prohibiting extraction of groundwater or surface water for operation activities of the project.	
Climate Change and resilience	N/A	Potential impact on equipment and personnel due to increase in extreme weather event.	• Ensure potential changes in climatic conditions are considered when setting the design conditions in terms of maximum and minimum temperatures, wind loading, and rain events, with drainage system and foundations of the buildings based on at least 1 in 100-year rainfall / flood events. Measures to reduce of SF6 emissions: • Alternatives to SF6, with a low global warming potential; • Reduce filling quantity and minimized leakage rate through improvements in technology and management; • Increase recycling ratio prompted by stronger policy incentives; and • Increased ratio of substitution of SF6.	***Negligible – PV plant***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)

Biological receptors (including avifauna)	Occasional visits to the PV plant and OHL to undertake inspection and maintenance activities.	Impact of operation vehicles on local flora and fauna.
		Potential damage to flora and fauna from chemicals used during maintenance.
			• Potential damage to local fauna will be managed by ensuring that only designated access tracks are used for maintenance traffic and the appropriate handling and use of paints and chemicals. These will be managed through the operational ESMP, which will also provide for worker awareness and training sessions in relation to protection of local fauna, and a code of conduct that forbids poaching or deliberate killing of animals listed in baseline studies. Specific mitigation measures for the protection of biodiversity for operation period should include the following measures:
			  ○ The Project should develop the BMP to cover the operational phase of the Project (see Construction Phase mitigation measures above), and includes the identification and implementation of biodiversity enhancement measures and provide the scope for ongoing biodiversity monitoring.
			  ○ Ensure a gap (around 15-20 cm) is provided under the fence to ensure that small faunal species can continue to move freely through the site.
			• The installation of PV plant modules will lead to keeping similar land conditions, barren land, which as a consequence may lead to soil erosion during rainy periods and/or in highly windy weather. So, to avoid such phenomenon it is recommended the cultivation of the specific plant species which provide good cooling effect by extracting heat from PV panels and that can be use in the barren land. Cultivating specific plants of certain economics benefit can be easily achieved as well (e.g., medicinal plants).
			• Operations-phase BMP will include reinstatement/restoration measures for the PV site, as well as other related measures to
				Negligible – PV plant and OHL

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			avoid and minimize impacts on priority biodiversity at the entire project area. • Impcats on ecosystem services will be mitigated through measures like reinstatement/restoration of natural vegetation, prohibition of hunting and fishing, supporting the protected area management, and enabling continued access to grazing areas. • Use visual bird diversion techniques similar to those applied in airports for bird diversion including large scare-eye balloons and Mylar flash tape. • The use of aluminium-coloured frames for the PV panels was previously proposed as a mitigation measure to reduce impact on birds. • Include gap under fence (circa 20 cm) to allow the free movement of small animals across the site. • Allow vegetation cover across the site, with native and appropriate plant species, such as low growing species that do not shade panels. • A post-construction fatality monitoring (PCFM) program will be developed and implemented along the OHL route to evaluate effectiveness of mitigation and monitor bird flight activity. PCFM program will be developed by an international consultancy specialized in fatality monitoring and implemented by a local consultancy. A post-construction survey will be conducted to inform the design of the PCFM program. • The use of pesticide for the management of alien invasive species will be under strict control and on as necessary. No agents identified as being prohibited will be used and wherever possible mechanical means will be the preferred method.. Consider allowing local grazers to periodically use the site for grazing their sheep in order to manage vegetation.	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Avoid vegetation management during spring so as to avoid impacting pollinators and any nesting fauna. • Allow local grazers to periodically use the site for grazing sheep in order to manage vegetation. • Maintenance vehicles will be required to follow designed access routes. • Appropriate handling and use of chemicals. • Avoid and where this is not possible minimise the use of lighting within the PDA and security fencing. • Worker code of conduct forbidding poaching activities. • Development of the Project BMP for the operation phase, including provision worker awareness and training in relation to protection of local flora and fauna, including requirements for on-going biodiversity monitoring.	
Waste	Occasional maintenance visits.	Generation of electrical and packaging waste.	• The developer will prepare and maintain a Waste Management Plan (WMP) in compliance with Albanian legislation that will include arrangements for the disposal of hazardous and non-hazardous waste through licensed waste disposal subcontractors/ companies. The plan will also include measures to ensure: o Food/organic waste and recyclables such as. paper, plastic, scrap metal waste, etc. must be properly segregated and stored in designated waste bins/containers and periodically deposited in approved disposal areas or either sold to licensed recycling companies. o Ensure electrical waste (consumables, spare parts and obsolete equipment) and broken solar panels are	***Negligible – PV plant***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			properly packed and sent back to manufacturer and/or reused in other forms and locations; o Generated waste quantities - must be recorded in a separate/dedicated register according to the type of waste and the quantities generated. During the waste transfer process, a waste transfer format (Waste Transfer Format) shall be filled out to determine the respective quantities according to the type of waste leaving the site and the name of the company/entity that will handle these wastes. These data shall be regularly kept by the Developer during the operation activity, and presented/reported to the government authorities if required; o Conduct continuous training and education awareness of all employees of the project in regard to waste management practices in order to avoid, reduce the risks of waste generation and potential impact during the operation phase.	
Employment	Employment opportunities for operation/ maintenance works.	Increased employment opportunities - Positive impact to communities	• Ensure appropriate employment contracts are in place for all workers that meet both national and IFI standards. • Put in place transparent and fair recruitment procedures; • Adopt and maintain human resources policies and management systems or procedures with the requirements of PR 2, PS2 and national law. These policies and procedures will be understandable and accessible to workers, and in the main language(s) spoken by the workforce. HR policies and management will ensure: o Non-discrimination and equal opportunities to all workers;	***Minor to moderate positive – PV plant***

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			○ Compliance with national laws and international standards regarding employment of minors; ○ Avoidance of any form of forced labour and child labour;; • Ensure that workers are not discouraged from forming or joining workers' organisations; • Provide training to locals to increase employment during operation phase; • Provide clear and transparent information on wages, benefits and working conditions; • Provide workers with a safe and healthy work environment; • Implement a grievance mechanism open to employee and non-employee workers. Ensure that all workers directly and indirectly employed are informed on how to submit grievances. Ensure that the grievance mechanism is managed in line with indications of the SEP. • The EPC Contractor and subcontractors will be contractually required to maximise use of local workforce in the Project; • In order to increase the project's Local Contents, the Company will aim to procure goods, services and materials from local businesses to the extent possible; • A strategy for the procurement of goods, services and materials will be prepared, including a demand-and- supply analysis, in order to identify to what extent local sources can contribute to procurement needs and to implement tailored measures to support local businesses; • The Company will provide information on procurement, tendering, and contracting processes with a transparent and clear approach, to ensure that equal access to opportunities is guaranteed;	

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
			• Information on procurement opportunities will be given to local businesses, through tailored communication with Local authorities and other appropriate parties; • Local companies identified as able to provide goods, materials and services in the during the strategical analysis will be contacted directly providing information on tendering opportunities; • Local authorities and local communities will be informed and consulted on impacts due to project activities and planned mitigation measures during the pre-construction meetings and throughout the Project life cycle as planned in the Stakeholder Engagement Plan. • Provide training opportunities for local workforce to be employed during the operational phase; • Provide equal employment opportunities for men and women; • Controling and monitoring activities regarding Contractor constructors' actions, that have overall responsibility for employment, social, health and safety, and cultural heritage aspects of the Project.	
Health and safety	Operation and maintenance of the PV; Operation and maintenance of the OHL; Generation of electric and magnetic fields	Potential impact on health of local residents: ○ Potential for electrocution; ○ Electromagnetic Fields (EMF)	• Provision to local farm workers working on land under OHL of information on EMF along with recommendations to reduce potential exposure, as well as on safe working practices. • EMF safety program for Project workers will be managed through the development of a robust construction Occupational Health and Safety (OHS) Management Plan, in line with EBRD, IFC, WB and UNPN standards.	***Negligible*** – PV Plant and minor for OHL

Component	Issues from Project activities	Potential impacts	Proposed Mitigation Measures	Impact significance (post mitigation)
	around OHL route cables.	○ Lightning strike and fire; and Issues associated unauthorised access and vandalism	• Recommended techniques to prevent the electrocution hazards include: use of signs, barriers (e.g., locks on doors, use of gates, use of steel posts surrounding transmission towers, and education signs/ public outreach to prevent public contact with potentially dangerous equipment, b) Grounding conducting objects (e.g., fences or other metallic structures) installed near power lines, to prevent shock; • The provision of automatic fire detection systems linked to automatic shutdown systems will allow them to be dealt with in the shortest possible time by disconnection from the power supply systems. This prevention is connected with the Substation; • In case of storm damage / wind damage - downed power lines, associated fires (similarly relevant to PDA), electrocution ect., the appropriate utility companies will be notified. Lastly, if safe to do so, the damaged areas will be protected from further damage (e.g., cover damaged roof sections with tarp to prevent water intrusion).; • Regular monitoring will be conducted by OST to verify illegal connections and of landowners or landusers not complying with restrictions, etc. Monitoring shall be designed and implemented by accredited professionals as part of an occupational health and safety monitoring program. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents;	

7.5. EPC Contractor & Supply Chain Management

The ESMP will provide the overall framework for E&S management for the project and will clearly set out the E&S standards and commitments. The ESMP will form part of the EPC and other relevant Project contractual agreements to ensure that the EPC Contractor and sub-contractors are fully aware of and aligned with the required E&S commitments and performance requirements.

The EPC Contractor will be required to develop an ESMS, or equivalent, for the construction of the Project based on the requirements of the ESMP. The content of the ESMS will be shared with the Developer for their review and approval prior to the start of construction activities.

Furthermore, the EPC Contractor will be required to include E&S requirements within their criteria for the short-listing and selection of sub-contractors.

In order to manage supply chain risks with regards to worker welfare, as required under EBRD PR2, IFC PS2 the EPC Contractor shall prepare a Project E&S Procurement Policy / Plan and tendering procedures that include an assessment of the risks of child labour / forced labour, corruption, E&S etc. in the primary supply chain as part of the Project ESMS. This E&S Procurement Policy / Plan shall be reviewed and approved by the Developer, as well as the final selection of primary suppliers, prior to the signing of supply agreements.

The EPC Contractor should review / audit all sub-contractors and third-party suppliers to verify their eligibility to meet the E&S obligations prior to contracting.

The Developer will monitor the E&S performance of the EPC Contractor against the requirements of the ESMP throughout the construction phase of the Project through internal and external monitoring outlined in Section7.7, which will be further detailed and specified within the ESMP.

The ESMP will cover the requirements of the Project with regards to Contractor and Supply Chain E&S management.

7.6. Training of Personnel & Contractor(s)

Karavasta Solar shpk and EPC Contractor shall ensure that the job specific training and HSES Induction training needs are identified based on the specific requirements of ESMS and existing capacity of site and project personnel (including sub-contractors). Special emphasis shall be placed on biodiversity protection, waste management, traffic management, stakeholder engagement and grievance redressal. General environmental awareness shall be increased among the Project's team to encourage the implementation of environmentally sound practices and compliance requirements of the project activities. This will help in minimizing adverse environmental impacts, ensuring compliance with the applicable regulations and standards, and achieving performance beyond compliance.

The same level of awareness and commitment shall be imparted to the EPC Contractor's personnel and sub-contractors prior to the commencement of the project.

An environment, social, health and safety management training programme shall be conducted to ensure effective implementation of the management and control measures during construction and operation of the project. The training programme shall ensure that all concerned members of the team understand the following aspects:

- Purpose of action plan for the project activities.
- Requirements of the specific Action and Management Plans.
- Understanding of the sensitive environmental and social features within and surrounding the project areas;
- Be aware of the potential HSES risks from the project activities.
- A basic occupational training program and specialty courses shall be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments.

- Training shall be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.
- Workers with rescue and first-aid duties must receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers.
- Through appropriate contract specifications and monitoring, the employer shall ensure that service providers, as well as contracted and subcontracted labour, are trained adequately before assignments begin.

7.7. Monitoring

This section presents an overview of monitoring and reporting requirements for the project, outlining the procedures for E&S and H&S inspections, auditing and reporting and outlining systems to be adopted where non-compliance with E&S and H&S requirements are identified. These processes are necessary to meet the requirements of environmental authorisation and lender requirements, as well as promoting transparency to all project stakeholders. The ESMP will define an appropriate and practical programme to monitor construction and operation phase impacts, including allocation of responsibilities.

The key objectives of the project's monitoring plan are as follows:

- Ensure full compliance with the applicable national requirements, EBRD Performance Requirements (PRs), IFC Performance Standarts (PSs) and international guidelines on environment, social, health and safety components.
- Ensure that regulatory standards / limits for parameters of concern are not exceeded.
- Monitor changes in existing physical, chemical and biological characteristics of the environment of the Project area.
- Determine whether any detected changes in environmental components are caused by the project or by other factors.
- Determine the effectiveness of the mitigation measures as well as check mitigation measures are correctly implemented.
- Highlight areas of concern undetected during the ESIA study and provide a basis for recommending additional mitigation measures.
- Ensure ESMP's and HSMP's actions are appropriately addressed.

The EPC Contractor shall continuously monitor and keep records of all construction activities occurring along the project and prepare regular reports on the performance of HSES components. The ESMS that will be developed for the project will define the monitoring and reporting requirements, but as a minimum it shall cover:

- Daily walkovers;
- Weekly inspections;
- Monthly internal audits.

7.7.1. Environmental and Social Monitoring Programme

The table below represents a summary of key environmental, social, health and safety monitoring requirements that the EPC Contractor shall undertake during construction work activities; this will be further developed within the ESMP as required. Based on the provided table, the EPC Contractor shall prepare the ESMP and HSMP elaborating monitoring requirements, exact sampling/monitoring locations, sampling methods, accredited laboratories, frequencies, etc. The monitoring results shall be presented in the monitoring report with references to the baseline data and limit values as required by the Albanian legislation and best international practices.

- VOLTALIA will develop appropriate monitoring program prior to commission

Table 80. Environmental and Social Monitoring Programme during construction phase

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
Air Quality	• Visual inspection and monitoring along the project footprint (PV solar plant and OHL route). • Air quality monitoring (in particular dust) near sensitive receptors (e.g., dwellings, businesses, protected or sensitive biodiversity areas, etc.).	• TSP; • PM10; • PM2.5; • CO; • NOx; • SO2; • Others (if necessary).	Periodic monitoring during construction works in accordance with the requirements of environmental national authorities, environmental declaration and on the received complaints (if any).	• EPC Contractor; • Developer; • Third-party accredited laboratory.
Surface water	• Visual inspection along the Project footprint (PV solar plant and OHL route). • Visual inspection of working areas. • Visual inspection of excavation works near water bodies, watercourse crossings and/or irrigation/drainage channels. • Monitor surface water in different locations, where deemed relevant by the experts for further evaluation and assessment.	• pH value; • Dissolved oxygen (DO); • Electrical conductivity; • Suspended solids; • Nitrate; • Nitrite; • Ammonium; • Total Phosphorus; • COD; • BOD5; • Dry residue; • Total hardness; • Total iron; • Petroleum products; • Other heavy metals.	Periodic monitoring during construction works in accordance with the requirements of environmental national authorities, environmental declaration and on the received complaints (if any).	• EPC Contractor; • Developer; • Third-party accredited laboratory.

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
Noise and vibration levels	• Inspection of working areas and excavations during construction phase. • Monitor noise and vibration levels/ emissions in different locations, where deemed relevant by the experts for further evaluation and assessment.	• LAeq (noise); • Vibration level; • Other parameters.	Periodic monitoring during construction works in accordance with the requirements of environmental national authorities, environmental declaration and on the received complaints (if any).	• EPC Contractor; • Developer; • Third-party accredited laboratory.
Soil Quality	• Visual inspection of working areas. • Visual inspection of excavation works. • Identification and reporting of erosive events. • Soil quality measurements if necessary, in case of unplanned soil/land pollution or upon received complaints (if any).		Periodic monitoring during construction works in accordance with the requirements of environmental national authorities, environmental declaration and on the received complaints (if any).	• EPC Contractor; • Developer; • Third-party accredited laboratory.
Biodiversity (Flora and Fauna)	• Visual inspection along the project footprint (PV solar plant and OHL route) and surrounding areas. • Visual inspections and monitoring during land-clearance and excavation works.	• Records and evidence of sensitive biodiversity areas/ habitats/ species/ ecosystems;	Periodic visual monitoring during construction works in accordance with the requirements of environmental national authorities, and environmental declaration.	• EPC Contractor; • Developer.

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
	• Periodic monitoring of key biodiversity habitats, fauna and flora species with protection status (terrestrial and aquatic), and sensitive areas within and/or near the project footprint. •	• Specific locations where animals risk to be trapped; • Records and evidence of bird species; • Evidence of waste dumping or illegal disposal outside approved waste facilities (fly tipping); • Induction training and regular toolbox talks for environmental and biodiversity protection.		
Landscape	• Site monitoring to verify that landscape measures have been applied. • Visual inspections and monitoring during land-clearance, excavation works and restoration-rehabilitation works.	• Project footprint and surrounding areas; • Presence of fencing for vegetation protection during specific work activities; • Restoration and rehabilitation process after completion of works;	Periodic visual monitoring during construction works in accordance with the requirements of environmental national authorities, and environmental declaration.	• EPC Contractor; • Developer.

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
		• Induction training and toolbox talks.		
Cultural heritage	• Visual inspections and monitoring during land-clearance and excavation works. • Review and audit of mitigation activities to ensure satisfactory of implementation of mitigation measures.	• 100% completion of required reporting: Ground-disturbing activities; Chance finds; and, Periodic inspection of known cultural heritage sites in the study area; • Cultural heritage induction training and toolbox talks; • Implementation of all necessary additional measures such as signage, fencing, structural bracing and conservation in case of any cultural heritage findings; • Cultural heritage related grievances and cultural heritage	Periodic visual monitoring during construction works in accordance with the requirements of national authorities.	• EPC Contractor; • Developer.

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
		issues raised from consultation with local communities and state authorities.		
Economy and employment	• Evaluate economic indicators for local content and socio-economic issues. • Review and audit of mitigation activities to ensure satisfactory implementation of mitigation/ enhancement measures.	• Percentage of unskilled and skilled labour from the local communities; • Percentage of labour employed from local/regional communities nearby the project footprint; • Percentage of EPC Contractor's personnel/ subcontractors trained on gender policies.	Continuous cooperation with governmental authorities for the employment of workers and other staff; Periodic internal audits on employment within the project.	• EPC Contractor; • Developer.
Land use and value	• Investigate and monitor signed agreements for compensations.	• Percentage of landowners/users affected with signed compensation agreements; • Number of grievances registered on	Pre-construction phase – detailed surveys along the project footprint to clearly identify all affected people/lands/properties/buildings/crops by the project development prior to work activities. Continuous follow-up with affected people and stakeholders in line with national and international requirements, as well as best practices.	• EPC Contractor; • Developer.

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
		land compensation.		
Local Communities	• Pre-construction meetings with local communities. • Continuous consultations with local communities and governmental authorities (national, regional, local). • Consultation MoMs, participants and topics discussed. • Analyses of registered grievances.	• Percentage of meetings with minutes developed; • Number of community meetings held; • Number of grievances responded and addressed; • Community grievance trends and resolutions.	Pre-construction phase – consultation with all local communities affected directly and indirectly by the project prior to the commencement of work activities. Continuous follow-up with affected people and stakeholders in line with national and international requirements, as well as best practices.	• EPC Contractor; • Developer.
Infrastructure and utilities	• Visual inspection and recordkeeping of all infrastructure, utilities and community services along the project footprint (PV solar plant and OHL route). • Recordkeeping documented agreements with authorities and public utility companies and grievance mechanisms.	• Percentage of affected entities having a signed agreement; • Number of grievances responded and addressed; • Hours of utility service interruptions (sewage, electricity, irrigation) including private	Pre-construction phase – additional surveys along the project footprint to identify the existing conditions of infrastructure, utilities and community services, as well as potential risks for impacts/damages prior to the commencement of work activities. Regular monitoring of the conditions of infrastructure, utilities and community services during work activities.	• EPC Contractor; • Developer.

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
		irrigation systems.		
Working conditions	• Perform workforce surveys. • Maintain worker's grievance mechanisms. • Analyse workers and community grievance trends. • Maintain training records.	• Workforce surveys results; • KPIs for worker rights, discrimination, worker grievances; • Community and workers grievance trends; • Training records (compliance with assigned training); • Number of times where the project's Code of Conduct has been breached.	Regular audits (i.e., monthly) for working conditions during the project development (construction phase).	• EPC Contractor; • Developer.
Community and workers health and safety	• Monitor workers and community health. • Monitor application of training. • Monitor medical facilities and first aid equipment.	• Monitoring and audit reports; • Pre-employment screening records; • Health checks conducted for all workers periodically; • Training records;	Regular audits (i.e., monthly) for community and workers H&S during the project development (construction phase).	• EPC Contractor; • Developer.

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
		• Records on medical facilities and first aid equipment conditions.		
Traffic	• Monitor potential impacts related to traffic. • Record keeping of traffic related parameters. • Continuous traffic monitoring.	• Percentage of total new and updated roads constructed compared to originally planned; • Number of days and kilometres of road affected by the project (closed due to project's activities); • Reports and records showing application of mitigation measures (communications, records of road damage and repair, approval of road drawings, training registers);	Pre-construction phase – investigate and check the conditions of transport routes along the project footprint and surroundings, prior to the commencement of work activities. Update the CTMP if necessary. Monitor construction works occurring close to identified potential hot spots (based on the CTMP).	• EPC Contractor; • Developer.

Aspect	Monitoring Task	Monitoring Indicators	Timing/ Frequency	Responsibility
		• Number of vehicles per category; • Number of accidents and other events.		

Table 81. Environmental and Social Monitoring Programme during operational phase

Aspect	Monitoring Task	Monitoring Indicator	Frequency	Responsibility
Air	Detailed assessment and control.	Potential generation of GHGs emissions due to creation of the reservoir and decay of organic matter.	Annually	EHS Operation Team; 3rd Party Environmental Consultant (Laboratory).

Aspect	Monitoring Task	Monitoring Indicator	Frequency	Responsibility
Surface water quality	Visual inspection along the Project footprint (PV solar plant and OHL route). Visual inspection of working areas. Visual inspection of maintenance works near water bodies, watercourse crossings and/or irrigation/drainage channels. Monitor surface water in different locations, where deemed relevant by the experts for further evaluation and assessment.	• pH value; • Dissolved oxygen (DO); • Electrical conductivity; • Suspended solids; • Nitrate; • Nitrite; • Ammonium; • Total Phosphorus; • COD; • BOD5; • Dry residue; • Total hardness; • Total iron; • Petroleum products; • Other heavy metals.	Periodically assessment and monitoring. Continuous assessment and monitoring in compliance with national law requirements and international guidelines.	Developer; 3rd Party.

Aspect	Monitoring Task	Monitoring Indicator	Frequency	Responsibility
Biodiversity (terrestrial and aquatic)	Monitoring species identified in this ESIA and Biodiversity Action Plan (that will be developed). Visual inspections of all sensitive habitats in accordance with the recommendations of the field survey for biodiversity and ESIA report.	Potential habitat loss and disturbance of flora, fauna and avifauna.	Daily (visual assessment); Periodic inspections during construction works based on national and international standards and also in accordance with guidelines specified by relevant government authorities. (Specialized inspections shall be conducted by relevant biodiversity experts).	Developer; 3rd Party Environmental Consultant for Biodiversity.
Waste	Monitoring of types of waste identified in the ESIA and Waste Management Plan (that will be developed). Visual inspection in the project area for spills and leaks which might pose impacts on the environment; Visual inspection for waste management and housekeeping conditions.	Potential contamination of water and soil due to generation of waste. Potential for odor nuisances to local community and work staff.	Daily (visual assessment); Periodic inspections during operation based on national and international standards and also in accordance with guidelines specified by relevant government authorities. (Generation of waste quantities produced and record keeping in a dedicated format).	Developer; 3rd Party.

Aspect	Monitoring Task	Parameters to be Monitored	Frequency	Responsibility
Local Communities' Health, Safety and Security	• Meetings with local communities. • Analyses of registered grievances and accidents. • Monitor medical facilities and first aid equipment.	Increase in HSE and traffic related accidents.	Daily (visual assessment);	Developer; 3rd Party
Occupational Health Safety and Security:	• HSE Management System and associated Plans, including any contractors and subcontractors. • Meeting Minutes from Consultations and documented agreements/ coordination with traffic authorities prior to busy periods to coordinate	Strict application of the HSE measures HSE and traffic related accidents/incidents.	Periodic inspections during operation works	Developer; 3rd Party Environmental Consultant (Laboratory).

Aspect	Monitoring Task	Parameters to be Monitored	Frequency	Responsibility
	predicted increase in related traffic. • Register of training sessions and attendees.			
Local Communities' Cohesion	Summary of Karavasta PV Plant contributions to the area is regularly updated and publicised on their website (events for new mothers or elderly in the area co-organised by Karavasta PV Plant and local authorities, etc) Meetings with community	Meeting minutes related to discussions on Workers Camps and any agreements reached with contractors managing these sites; Records on any incidents that took place between workers and local residents. This data will be regularly included into Annual ESMP.	Periodic inspections during operation works Periodic meetings with Local community	Developer;
Local Economy and Employment	Local Employment of local people and development of the area economy related to project.	Regularly updated cumulative records on already filled and also advertised employment opportunities with clear indication of the minimum level of education, training and skills required Records regularly supplied by all contractors on any new jobs.	Periodic inspections during operational works based on national and international standards and also in accordance with guidelines specified by relevant government authorities.	Developer; 3rd Party.
Local Communities' Health	• Monitor workers and community health. • Monitor application of training.	PM_{10}, $PM_{2.5}$ (and other parameters such as gases NO_x, SO_x, CO). Noise levels in Leq, Leq day, Leq night.	Continuous assessment and monitoring in compliance with national law requirements and international guidelines.	Developer; 3rd Party.

Aspect	Monitoring Task	Parameters to be Monitored	Frequency	Responsibility
	• Monitor medical facilities and first aid equipment.			
Workforce Management	• Perform workforce surveys. • Maintain worker's grievance mechanisms. • Analyse workers and community grievance trends. • Maintain training records.	Accidents on work. Records on all incidents, lost time incidents, and other HSE indicators submitted monthly by all contractors to the Karavasta Solar HSE team. Records of spot health checks among workers at different sites (fit for work checks, dehydration/access to water, general health conditions, etc). PPE: records of regular training on, and monitoring of PPE condition and usage. Records of HSE audits of all contractors. Results of Evaluation of contractors' HSE performance. Approved contracts contain appropriate references to the IFC/EBRD guidance on workers' accommodation.	Daily (visual assessment); Periodic measurements during operational works based on national and international standards and also in accordance with guidelines specified by relevant government authorities.	Developer;
Local Economy and Employment	• Evaluate economic indicators for local content and socio-economic issues.	Regularly updated Karavasta Solar HR cumulative records on already filled and also advertised employment opportunities with clear indication of the minimum level of education, training and skills required Records regularly supplied by all contractors on any new jobs	Periodic inspections during operational work based on national and international standards and also in accordance with guidelines specified by relevant government authorities.	Developer; 3rd Party.

Aspect	Monitoring Task	Parameters to be Monitored	Frequency	Responsibility
	• Review and audit of mitigation activities to ensure satisfactory implementation of mitigation/ enhancement measures.			

7.8. Reporting, Documentation and Record Keeping

Typically, the EPC Contractor shall maintain a structured and well-organized reporting, which can be summarized as follows:

- Daily record keeping;
- Weekly reports/forms;
- Monthly reports;
- Quarterly (3-Monthly) reports;
- Annual reports.

The EPC Contractor shall submit at least a monthly report on HSES performance and key issues to the Developer and Supervision Consultant. The reporting shall contain at a minimum the following data, as related to the construction work activities:

- Documented Environmental and Social Management System;
- Documented Health and Safety Management System;
- Progress against implementation of the HSES planned activities;
- HSES performance during construction works;
- HSES near misses, accidents/incidents, non-conformities, and other related issues on-site;
- HSES lessons learned;
- HSES matters (positive and negative cases) and management-mitigation measures;
- HSES training records;
- HSES planning documentation, inspections performed and planned, future work activities planned, and other project-related issues;
- Environmental Monitoring reports;
- Grievance report;
- Auditing reports.

In addition, the EPC Contractor shall perform regular internal meetings on HSES matters on-site. Regular meeting shall be also performed with the Developer and Supervision Consultant to discuss different HSES matters.

The format, content and timeframe of the HSES Performance Reports and HSES statistics shall be agreed with the Developer and Supervision Consultant prior to the commencement of construction works.

In the event that the EPC Contractor receives communication from the Developer and Supervision Consultant on HSES under-performance, then EPC Contractor shall prepare and implement an HSES Improvement Plan to rectify such evaluation and undertake adequate management-mitigation measures to increase its HSES performance.

The EPC Contractor shall submit an HSES Performance Close-out Set of Reports at the end of the Contract period.

8. Appendixes

Appendix 1. Projects being developed in the area

Pomegranate Farm

Near the village of Karavasta e Re, at approximately 1,2 km from the PV Plant has started the development of a Pomegranate and Goji Berry Farm. The Project is being developed by the Company "Agro – Iliria" as a strategic investment in the Karavasta – Seman Area in state land property. The area planted so far is extended for 135 Ha (Map attached) with the intention of an extension up to 800 Ha. Other economic activities in the project area includes:

- Aquatic shpk (approved by DCSI No. 4/4, dated 19.04.2018) – aquaponics (aquaculture and hydroponic) farm for cultivation of fish species.
- Albpanel shpk (approved by DCSI No. 7/5, dated 07.01.2020) - production of MDE panels using as raw materials such as cane and any other type of agricultural wastes or product with fibrous composition.

So far, the only economic investment currently implemented is the agriculture farm of pomegranate, goji berry, avocado, finder lime, kiwi, grape, and pear by Agro-Iliria shpk.



Figure 182: Location of the Agro - Iliria Plantation

Other Photovoltaic projects in area

The area where the Karavasta PV Park will take place is one of the areas with the highest radiation in Albania. Starting from 2015, various companies have applied to the Ministry of Energy and Infrastructure to obtain the necessary licenses for the use of solar energy in the area. Most of the projects are locally invested and with a small capacity, about 2MW. While recently (2018-2020) are being applied and large areas with capacities around 50MW; the largest one is Karavasta PV Project (Project of this study) with capacities 140 MW.

Table 82: Photovoltaic projects in initial procedures of licenses in area

Project name	Capacity	Operation years	Location	Owner
"LM ENERGY CORPORATE" sh.a.[153]	50 MW	20 years	Sheq Marinas, Topojë, Qarku Fier	"LM ENERGY CORPORATE" sh.a.
"OSOJA ENERGY" SH.P.K[154]	2MW	20 years	Seman - 1, Sheq-Marinas	"OSOJA ENERGY" SH.P.K
Euron Solar	50 MW	-	Njesia administrative Dermenas/ Fushe Pelvece, Fier	Euron energy sh.p.k

Company that obtained the licenses are described below in Table 83.[155]

Table 83: Licensed Photovoltaic Power Plant

Company Name	NUIS	License		ERE Board Decision		License expiry date	Photovoltaic Power Plant	Installed Capacity
		No.	Series	No.	Date			[MW]
"AGE SUNPOWER" sh.p.k	L73015401Q	403	P18K	85	20.04.2018	20.04.2038	Topojë (Sheq Marinas), Fier	2
"SEMAN SUNPOWER" sh.p.k	K81722018P	404	P18K	86	20.04.2018	20.04.2038	Topojë (Sheq Marinas), Fier	2
"SEMAN1SOLAR" sh.p.k.	L81416014O	408	P18K	113	14.05.2018	14.05.2038	Seman-1 (Sheq Marinas), Fier	2
				193	**30.08.2018.			
"SEMAN2SUN" sh.p.k	L73629401M	409	P18K	114	14.05.2018	14.05.2038	Seman – 2, Sheq Marinas, Fier	2
"SONNE" sh.p.k	L73015405C	411	P18	118	04.06.2018	04.06.2038	Topojë	1.998
"AED SOLAR"sh.p.k	L73014403E	412	P18	125	04.06.2018	04.06.2038	Topojë	1.998
"SMART WATT" sh.p.k[156]	L72320013B	440	P19	72	10.05.2019	10.05.2044	Sheq Marinas, Topojë, Qarku Fier	2
"ES 2019" sh.p.k	L92801402B	444	P19	87	31.05.2019	31.05.2044	Lugani, Sheq Marinas, Qarku Fier	2

[153] https://www.infrastruktura.gov.al/wp-content/uploads/2019/02/Njoftim-online-per-aplikimin-e-shoqerise-LM-ENERGY.pdf
[154] http://www.akbn.gov.al/wp-content/uploads/2019/05/Renewable-Energy.pdf
[155] Information taken by ERE/ https://www.ere.gov.al/index.php?lang=2
[156] http://infrastruktura.gov.al/wp-content/uploads/2018/04/Njoftim-online-smartwatt.pdf

110 kV line from Fier Substation to Hoxare

A 110 kV Transmission Line is foreseen to connect the Fier substation to the new substation of Hoxhare. The two lines run quite parallel from Radostine to the connection point of Fier substation.

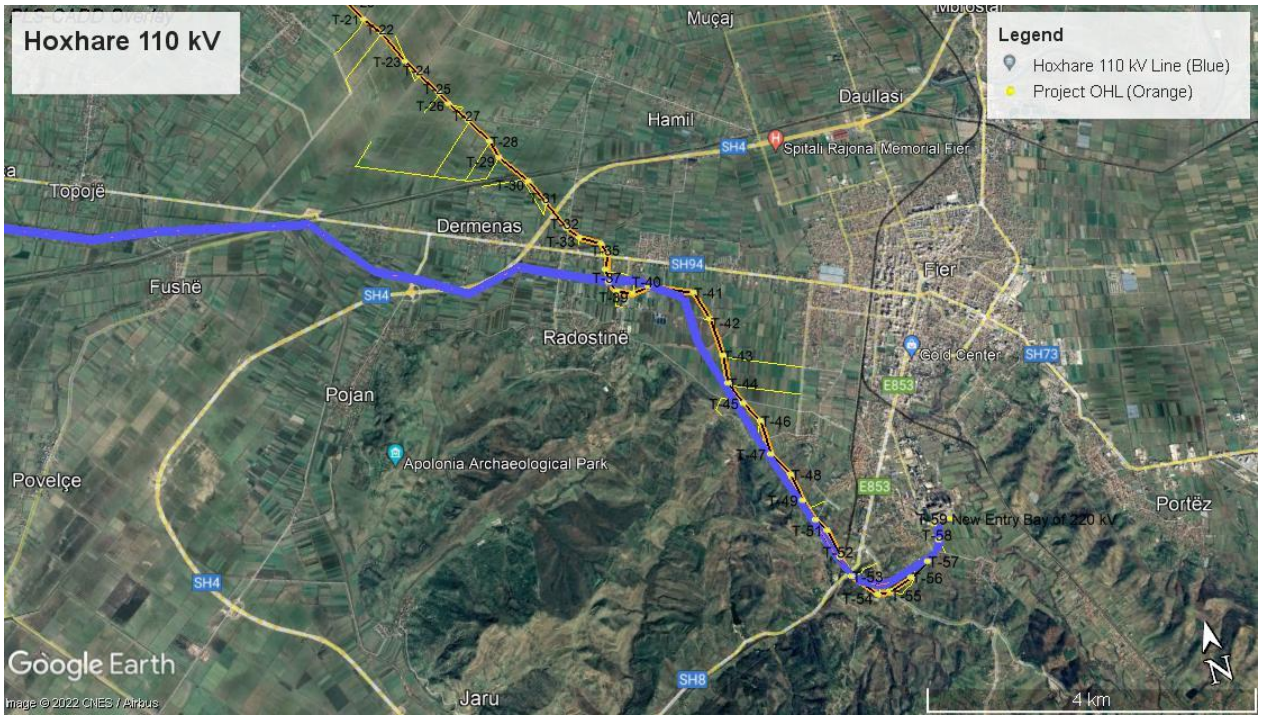


Figure 183 Project OHL and the new 110 kV OHL to Hoxhare

Appendix 2. Environmental Monitoring Report

ECCAT
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ANALYSIS REPORT

MEASUREMENT OF WATER PARAMETERS

LT 046 12 11 15

Reporting date: 08.02.2021

Company:	ABKONS sh.p.k	**Sample Information**	
Contact person:	Redion Biba	**Identification**	001/01/21 - Abkons
Client:	ABKONS sh.p.k	**Matrix**	GroundWater
Address:	Rruga Themistokli Gërmenji 6, Tiranë	**Sampling Date**	27/01/2021
City:	Tiranë	**Acceptance Date**	27/01/2021
Country:	Shqipëri	**Tested by:**	ECCAT shpk

Report No.1 – Sample 1 – Groundwater sample 01
(Coordinates UTM : 370824.00 m E; 4522985.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1	**Chloride**	mg/l	**53.2**	S SH ISO 9297:2000
2	**EC**	µS/cm	**1133**	S SH EN 27888:1993
3	**Total alkalinity**	mg/l	**425**	ISO 99631:1994
4	**TDS(Total Dissolved Solid)**	mg/l	**747**	ISO 7888:1985
5	**E-Coli**	No/100 ml	**<1**	ISO 9308-1:2014
6	**Sulphate SO4**	mg/l	**85.8**	S SH ISO 22742:2009
7	**Nitrate NO_3**	mg/l	**15.5**	ISO 78903:1988
8	**Nitrite NO_2**	mg/l	**0.01**	APHA/AWWA 4500-NO2
9	**Sulphide S_2^-**	mg/l	**0.32**	APHA/AWWA-4500-S2-:2000
10	**Turbidity**	NTU	**3.44**	S SH EN ISO 7027-1:2016
11	**Lead Pb**	µg/l	**<30**	AWWA/ APHA 1995 303 A
12	**Copper Cu**	mg/l	**0.19**	AWWA/APHA 1995 303 A
13	**Nickel Ni**	µg/l	**<30**	AWWA/APHA 1995 3030 A
14	**Mercury Hg**	µg/l	**<0.01**	ISO 12846:2012
15	**Iron Fe**	µg/l	**83**	AWWA/APHA 1995 3030 A
16	**Chromium Cr**	µg/l	**<30**	AWWA/APHA 1995 303 A
17	**Sodium Na**	mg/l	**43.26**	AWWA/ APHA 1995 303 A
18	**Calcium Ca**	mg/l	**35.0**	S SH ISO 6059:1984
19	**Zinc Zn**	mg/l	**<0.03**	AWWA/ APHA 1995 303 A
20	**DO**	mg/l	**4.46**	S SH ISO 17289:2014
21	**Phenolic Compounds**	µg/l	**<0.1**	APHA/AWWA 510 C/1995
22	**Hardness as $CaCO_3$**	mg/l	**352**	APAT CNR IRSA 2040 B Man 29 2003

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

ECCAT L51512003E TIRANA - ALBANIA

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ANALYSIS REPORT

MEASUREMENT OF WATER PARAMETERS

Report No.1/1 – Sample 1 – Groundwater sample 01
(Coordinates UTM : 370824.00 m E; 4522985.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1	**Bacterial Colony at 22°C**	No/100 ml	**8500**	ISO 6222:1999
2	**Bacterial Colony at 36°C**	No/100 ml	**3100**	ISO 6222:1999
3	**Colour**	-	**Light yellow**	S SH ISO 788
4	**Pesticide**	µg/l	**<0.5**	EPA Method 1699

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

L51512005E
TIRANA - ALBANIA

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RAPORT ANALIZË

MATJA E PARAMETRAVE TE UJIT

LT 046 12 11 15

Data e raportimit: 08.02.2021

Kompania:	ABKONS sh.p.k	**Informacioni i Mostrës**	
Kontakt:	Redion Biba	**Identifikimi**	001/01/21 - Abkons
Klienti:	ABKONS sh.p.k	**Matrica**	Ujë pusi
Adresa:	Rruga Themistokli Gërmenji 6, Tiranë	**Data e marrjes mostrës**	27/01/2021
Qyteti:	Tiranë	**Data e pranimit mostrës**	27/01/2021
Shteti:	Shqipëri	**Testuesi:**	ECCAT shpk

Raport Nr.1 – Mostra 1 – Mostër ujë pusi 01
(Koordinatat UTM : 370824.00 m E; 4522985.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1	**Klorure**	mg/l	**53.2**	S SH ISO 9297:2000
2	**Përcjellshmëria elektrike**	µS/cm	**1133**	S SH EN 27888:1993
3	**Alkaliniteti total**	mg/l	**425**	ISO 99631:1994
4	**TDS (lëndët e ngurta të tretura totale)**	mg/l	**747**	ISO 7888:1985
5	**E-Coli**	Nr/100 ml	**<1**	ISO 9308-1:2014
6	**Sulfate SO4**	mg/l	**85.8**	S SH ISO 22742:2009
7	**Nitrate NO_3**	mg/l	**15.5**	ISO 78903:1988
8	**Nitrite NO_2**	mg/l	**0.01**	APHA/AWWA 4500-NO2
9	**Sulfure S_2^-**	mg/l	**0.32**	APHA/AWWA-4500-S2-:2000
10	**Turbullira**	NTU	**3.44**	S SH EN ISO 7027-1:2016
11	**Plumb Pb**	µg/l	**<30**	AWWA/ APHA 1995 303 A
12	**Baker Cu**	mg/l	**0.19**	AWWA/APHA 1995 303 A
13	**Nikel Ni**	µg/l	**<30**	AWWA/APHA 1995 3030 A
14	**Merkur Hg**	µg/l	**<0.01**	ISO 12846:2012
15	**Hekur Fe**	µg/l	**83**	AWWA/APHA 1995 3030 A
16	**Krom Cr**	µg/l	**<30**	AWWA/APHA 1995 303 A
17	**Natrium Na**	mg/l	**43.26**	AWWA/ APHA 1995 303 A
18	**Kalcium Ca**	mg/l	**35.0**	S SH ISO 6059:1984
19	**Zink Zn**	mg/l	**<0.03**	AWWA/ APHA 1995 303 A
20	**Oksigjeni i tretur DO**	mg/l	**4.46**	S SH ISO 17289:2014
21	**Komponimet fenolike**	µg/l	**<0.1**	APHA/AWWA 510 C/1995
22	**Fortesia si $CaCO_3$**	mg/l	**352**	APAT CNR IRSA 2040 B Man 29 2003

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT
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RAPORT ANALIZË

MATJA E PARAMETRAVE TE UJIT

Raport Nr.1/1 – Mostra 1 – Mostër ujë pusi 01
(Koordinatat UTM : 370824.00 m E; 4522985.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1	**Koloni bakteriale në 22°C**	Nr/100 ml	**8500**	ISO 6222:1999
2	**Koloni bakteriale në 36°C**	Nr/100 ml	**3100**	ISO 6222:1999
3	**Ngjyra**	-	**Light yellow**	ISO 3025-4 (1983)
4	**Pesticide**	µg/l	**<0.5**	EPA Method 1699

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT L51512008E TIRANA - ALBANIA

ECCAT
Environment & Quality Together

ANALYSIS REPORT

MEASUREMENT OF GAS LEVEL

LT 046 12 11 15

The reporting date: 08/02/2021

Company:	**ABKONS sh.p.k**	**Sample Information**	
Contact person:	**Redion Biba**	Identification	**001/01/21- Abkons**
Client:	**ABKONS sh.p.k**	Matrix	**Air**
Address:	Rruga Themistokli Gërmenji 6	Sampling Date	**27-28/01/2021**
City:	Tirana	Sample acceptance date	**28/01/2021**
Country:	Albania	Tested by:	**ECCAT**

Report No. 1 – Sample AQ1

Measurement point	Coordinates	*Measurement results*	
		SO2 $\mu g/m^3$	*H2S* $\mu g/m^3$
AQ1	**N:4522920.67 E:370747.47**	**191.24**	**40.0**
Duration		*1 h*	
		12:46-13:46	
AQ1	**N:4522920.67 E:370747.47**	**191.78**	**41.5**
Duration		*1 h*	
		13:46-14:46	
AQ1	**N:4522920.67 E:370747.47**	**197.84**	**41.5**
Duration		*1 h*	
		14:46-15:46	
AQ1	**N:4522920.67 E:370747.47**	**198.65**	**41.5**
Duration		*1h*	
		15:46-16:46	
AQ1	**N:4522920.67 E:370747.47**	**254.1**	**55.3**
Duration		*1h*	
		16:46-17:46	
AQ1	**N:4522920.67**	**300.93**	**54.6**

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The results presented in this report are only valid for the monitoring point and time

	E:370747.47		
Duration		*1h*	
		17:46-18:46	
AQ1	N:4522920.67 E:370747.47	310.18	51.5
Duration		*1h*	
		18:46-19:46	
AQ1	N:4522920.67 E:370747.47	307.64	51.5
Duration		*1h*	
		19:46-20:46	
AQ1	N:4522920.67 E:370747.47	305.87	46.9
Duration		*1h*	
		20:46-21:46	
AQ1	N:4522920.67 E:370747.47	270.83	47.6
Duration		*1h*	
		21:46-22:46	
AQ1	N:4522920.67 E:370747.47	291.99	53.8
Duration		*1h*	
		22:46-23:46	
AQ1	N:4522920.67 E:370747.47	340.55	63.0
Duration		*1h*	
		23:46-00:46	
AQ1	N:4522920.67 E:370747.47	367.00	70.0
Duration		*1h*	
		00:46-01:46	
AQ1	N:4522920.67 E:370747.47	357.36	64.61
Duration		*1h*	
		01:46-02:46	

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The results presented in this report are only valid for the monitoring point and time

AQ1	**N:4522920.67 E:370747.47**	**377.10**	**69.2**
Duration		***1h***	
		02:46-03:46	
AQ1	**N:4522920.67 E:370747.47**	**376.12**	**69.2**
Duration		***1h***	
		03:46-04:46	
AQ1	**N:4522920.67 E:370747.47**	**388.62**	**70.7**
Duration		***1h***	
		04:46-05:46	
AQ1	**N:4522920.67 E:370747.47**	**386.71**	**70.0**
Duration		***1h***	
		05:46-06:46	
AQ1	**N:4522920.67 E:370747.47**	**369.0**	**62.3**
Duration		***1h***	
		06:46-07:46	
AQ1	**N:4522920.67 E:370747.47**	**338.78**	**62.3**
Duration		***1h***	
		07:46-08:46	
AQ1	**N:4522920.67 E:370747.47**	**313.34**	**57.6**
Duration		***1h***	
		08:46-09:46	
AQ1	**N:4522920.67 E:370747.47**	**257.10**	**50.7**
Duration		***1h***	
		09:46-10:46	
AQ1	**N:4522920.67 E:370747.47**	**200.70**	**42.3**
Duration		***1h***	

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The results presented in this report are only valid for the monitoring point and time

		10:46-11:46	
AQ1	**N:4522920.67 E:370747.47**	**161.70**	**41.8**
Duration		*1h*	
		11:46-12:46	

Measurement point	**Coordinates**	*Measurement results*
		NO2 $\mu g/m^3$
AQ1	**N:4522920.67 E:370747.47**	**31.12**
Duration		*4 h*
		12:46-16:46
AQ1	**N:4522920.67 E:370747.47**	**15.50**
Duration		*4 h*
		16:46-20:46
AQ1	**N:4522920.67 E:370747.47**	**13.45**
Duration		*4 h*
		20:46-00:46
AQ1	**N:4522920.67 E:370747.47**	**3.09**
Duration		*4 h*
		00:46-04:46
AQ1	**N:4522920.67 E:370747.47**	**2.33**
Duration		*4 h*
		04:46-08:46
AQ1	**N:4522920.67 E:370747.47**	**15.80**
Duration		*4 h*
		08:46-12:46

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The results presented in this report are only valid for the monitoring point and time

Measurement point	Coordinates	*Measurement results*
		VOC $\mu g/m^3$
AQ1	N:4522920.67 E:370747.47	262.69
Duration		*24 h*
		12:46-12:46

Measurement Method: *Wet Chemicals*

Standards of measured parameters:

- *Determination of SO_2 S SH ISO4221:1980*
- *Determination of S SH ISO 6768:2000*
- *Determination of i H_2S EPA (2000) Method 11*
- *Determination of VOC ISO 16000-5:2007*

Analysis done by:
Chemist:
MSc.Eldorida Molla

Aproved by:
Head of the Lab:
MSc.Gentjana Halili

Figure 1: *Location of the point on the map*



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RAPORT ANALIZË

MATJA E NIVELIT TË GAZEVE NE MJEDIS

LT 046 12 11 15

Data e raportimit: 08/02/2021

Kompania:	**ABKONS sh.p.k**	**Informacioni i Mostres**	
Kontakt:	**Redion Biba**	Identifikimi	**001/01/21- Abkons**
Klienti:	**ABKONS sh.p.k**	Matrica	**Air**
Adresa:	Rruga Themistokli Gërmenji 6	Data e marrjes se mostres	**27-28/01/2021**
Qyteti:	Tirana	Data e pranimit te mostres	**28/01/2021**
Shteti:	Albania	Testuesi:	**ECCAT**

Raporti Nr. 1 – Mostra AQ1

Pika e matjes	Kordinatat	*Rezultatet e Matjeve*	
		SO2 $\mu g/m^3$	*H2S* $\mu g/m^3$
AQ1	**N:4522920.67 E:370747.47**	**191.24**	**40.0**
Kohezgjatja		*1 h*	
		12:46-13:46	
AQ1	**N:4522920.67 E:370747.47**	**191.78**	**41.5**
Kohezgjatja		*1 h*	
		13:46-14:46	
AQ1	**N:4522920.67 E:370747.47**	**197.84**	**41.5**
Kohezgjatja		*1 h*	
		14:46-15:46	
AQ1	**N:4522920.67 E:370747.47**	**198.65**	**41.5**
Kohezgjatja		*1h*	
		15:46-16:46	
AQ1	**N:4522920.67 E:370747.47**	**254.1**	**55.3**
Kohezgjatja		*1h*	
		16:46-17:46	
AQ1	**N:4522920.67 E:370747.47**	**300.93**	**54.6**

Shënim: Nuk lejohet kopjimi i pjesshëm i këtij Raporti pa lejen me shkrim të Përgjegjësit të laboratorit

Kohezgjatja		*1h*	
		17:46-18:46	
AQ1	**N:4522920.67 E:370747.47**	**310.18**	**51.5**
Kohezgjatja		*1h*	
		18:46-19:46	
AQ1	**N:4522920.67 E:370747.47**	**307.64**	**51.5**
Kohezgjatja		*1h*	
		19:46-20:46	
AQ1	**N:4522920.67 E:370747.47**	**305.87**	**46.9**
Kohezgjatja		*1h*	
		20:46-21:46	
AQ1	**N:4522920.67 E:370747.47**	**270.83**	**47.6**
Kohezgjatja		*1h*	
		21:46-22:46	
AQ1	**N:4522920.67 E:370747.47**	**291.99**	**53.8**
Kohezgjatja		*1h*	
		22:46-23:46	
AQ1	**N:4522920.67 E:370747.47**	**340.55**	**63.0**
Kohezgjatja		*1h*	
		23:46-00:46	
AQ1	**N:4522920.67 E:370747.47**	**367.00**	**70.0**
Kohezgjatja		*1h*	
		00:46-01:46	
AQ1	**N:4522920.67 E:370747.47**	**357.36**	**64.61**
Kohezgjatja		*1h*	
		01:46-02:46	

AQ1	N:4522920.67 E:370747.47	377.10	69.2
Kohezgjatja		*1h*	
		02:46-03:46	
AQ1	N:4522920.67 E:370747.47	376.12	69.2
Kohezgjatja		*1h*	
		03:46-04:46	
AQ1	N:4522920.67 E:370747.47	388.62	70.7
Kohezgjatja		*1h*	
		04:46-05:46	
AQ1	N:4522920.67 E:370747.47	386.71	70.0
Kohezgjatja		*1h*	
		05:46-06:46	
AQ1	N:4522920.67 E:370747.47	369.0	62.3
Kohezgjatja		*1h*	
		06:46-07:46	
AQ1	N:4522920.67 E:370747.47	338.78	62.3
Kohezgjatja		*1h*	
		07:46-08:46	
AQ1	N:4522920.67 E:370747.47	313.34	57.6
Kohezgjatja		*1h*	
		08:46-09:46	
AQ1	N:4522920.67 E:370747.47	257.10	50.7
Kohezgjatja		*1h*	
		09:46-10:46	
AQ1	N:4522920.67 E:370747.47	200.70	42.3
Kohezgjatja		*1h*	

Shënim: Nuk lejohet kopjimi i pjesshëm i këtij Raporti pa lejen me shkrim të Përgjegjësit të laboratorit

		10:46-11:46	
AQ1	**N:4522920.67 E:370747.47**	**161.70**	**41.8**
Kohezgjatja		*1h*	
		11:46-12:46	

Pika e matjes	**Koordinatat**	***Rezultatet e matjes***
		NO2 µg/m³
AQ1	**N:4522920.67 E:370747.47**	**31.12**
Kohezgjatja		***4 h***
		12:46-16:46
AQ1	**N:4522920.67 E:370747.47**	**15.50**
Kohezgjatja		***4 h***
		16:46-20:46
AQ1	**N:4522920.67 E:370747.47**	**13.45**
Kohezgjatja		***4 h***
		20:46-00:46
AQ1	**N:4522920.67 E:370747.47**	**3.09**
Kohezgjatja		***4 h***
		00:46-04:46
AQ1	**N:4522920.67 E:370747.47**	**2.33**
Kohezgjatja		***4 h***
		04:46-08:46
AQ1	**N:4522920.67 E:370747.47**	**15.80**
Kohezgjatja		***4 h***
		08:46-12:46

Shënim: Nuk lejohet kopjimi i pjesshëm i këtij Raporti pa lejen me shkrim të Përgjegjësit të laboratorit

Pika e matjes	Koordinatat	Rezulatet i matjes
		VOC $\mu g/m^3$
AQ1	N:4522920.67 E:370747.47	262.69
Kohezgjatja		*24 h*
		12:46-12:46

Metoda e matjes: *Wet Chemicals*

Standartet e parametrave te matur:

- *Percaktimi i SO_2 S SH ISO4221:1980*
- *Percaktimi i NO_2 S SH ISO 6768:2000*
- *Percaktimi i H_2S EPA (2000) Method 11*
- *Percaktimi i VOC ISO 16000-5:2007*

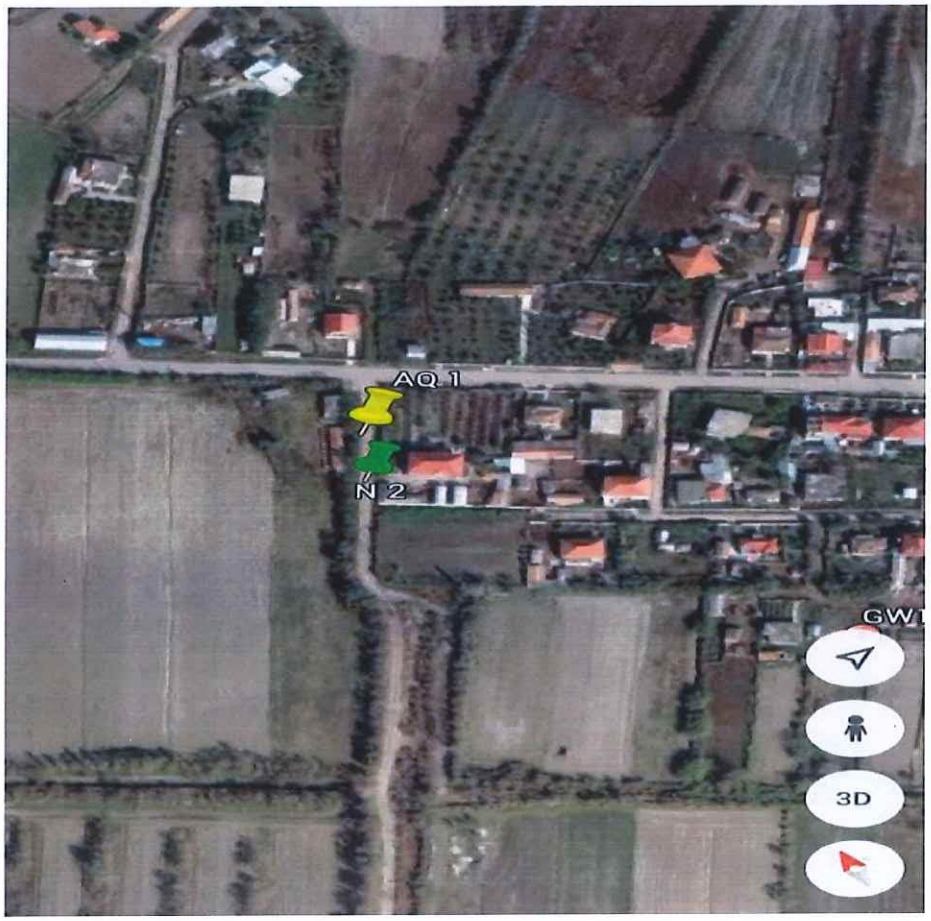
Analiza u krye nga:
Kimisti

MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit

MSc. Gentjana Halili

Figura 1: *Harta e pikes 1 e matjes*



ECCAT
Environment & Quality Together

ANALYSIS REPORT

MEASUREMENT OF DUST LEVEL

LT 046 12 11 15

The reporting date: 08/02/2021

Company:	**ABKONS sh.p.k**	**Sample Information**	
Contact person:	**Redion Biba**	Identification	**001/01/21- Abkons**
Client:	**ABKONS sh.p.k**	Matrix	**Air**
Address:	Rruga Themistokli Gërmenji 6	Sampling Date	**27-28/01/2021**
City:	Tirana	Sample acceptance date	**28/01/2021**
Country:	Albania	Tested by:	**ECCAT**

Report No. 1 – Sample AQ1

Measurement point	Coordinates	Duration of the test	Measurement results	
			PM10 µg/m³	*PM2.5 µg/m³*
AQ1	**N: 4522920.67 E: 377047.47**	**24h**	**29.0**	**4.15**

The standard used to measure the ambient noise level is: *EN 12341:2014- Standard gravimetric measurement method for the determination of the PM10 or PM2,5 mass concentration of suspended particulate matter*

Analysis done by:
Chemist:
MSc.Eldorida Molla

Aproved by:
Head of the Lab:
MSc.Gentjana Halili

ECCAT L51512...E TIRANA - ALBANIA

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The results presented in this report are only valid for the monitoring point and time

Figure 1: *Location of the point on the map*



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The results presented in this report are only valid for the monitoring point and time

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Environment & Quality Together

RAPORT ANALIZË

MATJA E NIVELIT TË PLUHURIT

LT 046 12 11 15

Data e raportimit: 08/02/2021

Kompania:	**ABKONS sh.p.k**	**Informacioni i Mostres**	
Kontakt:	**Redion Biba**	Identifikimi	**001/01/21- Abkons**
Klienti:	**ABKONS sh.p.k**	Matrica	**Air**
Adresa:	Rruga Themistokli Gërmenji 6	Data e marrjes se mostres	**27-28/01/2021**
Qyteti:	Tirana	Data e pranimit te mostres	**28/01/2021**
Shteti:	Albania	Testuesi:	**ECCAT**

Raporti Nr. 1 – Mostra AQ1

Pika e matjes	Koordinatat	Kohezgjatja	*Rezultatet e matjes*	
			PM10 µg/m³	*PM2.5 µg/m³*
AQ1	**N: 4522920.67 E: 370747.47**	**24h**	**29.0**	**4.15**

Standarti i perdorur per percaktimin e grimcave te ngurta ne suspension eshte: *EN 12341:2014- Standard gravimetric measurement method for the determination of the PM10 or PM2,5 mass concentration of suspended particulate matter*

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

Figure 1: *Vendodhja e pikes se monitoruar ne harte*



Shënim: Nuk lejohet kopjimi i pjesshëm i këtij Raporti pa lejen me shkrim të Përgjegjësit të laboratorit

ECCAT
Environment & Quality Together

ANALYSIS REPORT

MEASUREMENT OF NOISE LEVEL

LT 046 12 11 15

The reporting date: 08/02/2021

Company:	**ABKONS sh.p.k**	**Sample Information**	
Contact person:	**Redion Biba**	Identification	**001/01/21- Abkons**
Client:	**ABKONS sh.p.k**	Matrix	**Noise**
Address:	Rruga Themistokli Gërmenji 6	Sampling Date	**27-28/01/2021**
City:	Tirana	Sample acceptance date	**28/01/2021**
Country:	Albania	Tested by:	**ECCAT**

Report No. 1 – Sample N1

No:	Measurement point	Coordinates	LAF max (dB)	LAE (dB)	LAeq dB(A)	Limit acording to IFC LAeq, T day[1]
1	N1	N: 4523500.74 E: 369748.94	92.2	103.7	54.6	55
LAF1	**LAF5**	**LAF10**	**LAF50**	**LAF90**	**LAF95**	**LAF99**
65.0	57.6	54.2	39.9	32.1	31.2	30.1

Other data				
Date of Measurement / Testing	27-28.01.2021	**Duration of the test**	24 h	
			Start:	12:43:44
Uncertainty of measurement:	± 0.2 dBA		End:	12:59:47
Model, Type, Serial number	**Apparatus 1**	Model 45, Sound level meter (Pulsar Instruments Plc), PN1301 1/1Ott		
	Apparatus 2	Model 45, Sound level meter (Pulsar Instruments Plc), PN1301		
	Calibrator	Model 105, Calibrator (Pulsar Instrument Plc), 75023		
Latest Calibration certficate	**Apparatus 1**	21/06/2019 No. 185/8683		
	Apparatus 2	21/06/2019 No. 185/8677		
	Calibrator	21/06/2019 No. 185/8676		

The standard used to measure the ambient noise level is: *ISO 1996-2:2007 Acoustics- Description, measurement and assessment of Environmental noise.*

Analysis done by:
Chemist:
MSc.Eldorida Molla

Aproved by:
Head of the Lab:
MSc.Gentjana Halili

[1] Limit acording to IFC "Environmental Noise Management"

Note: Partial copying of this Report is not permitted without the written permission of the Lab Manager.
The results presented in this report are only valid for the monitoring point and time

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ANALYSIS REPORT

MEASUREMENT OF NOISE LEVEL

Figure 1: *Location of the point on the map*



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RAPORT ANALIZË

MATJA E NIVELIT TË ZHURMËS

LT 046 12 11 15

Data e raportimit: 08/02/2021

Kompania:	**ABKONS sh.p.k**	**Informacioni i Mostres**	
Kontakti:	**Redion Biba**	Identifikimi	**001/01/21- Abkons**
Klienti:	**ABKONS sh.p.k**	Matrica	**Noise**
Adresa:	Rruga Themistokli Gërmenji 6	Data e marrjes se mostres	**27-28/01/2021**
Qyteti:	Tirana	Data e pranimit te mostres	**28/01/2021**
Shqiperia:	Albania	Testuesi:	**ECCAT**

Raporti Nr. 1 – Mostra N1

Nr:	Pika e matjes	Koordinatat	LAF max (dB)	LAE (dB)	LAeq dB(A)	Limiti sipas IFC LAeq, T dite [1]
1	N1	N: 4523500.74 E: 369748.94	92.2	103.7	54.6	55
LAF1	**LAF5**	**LAF10**	**LAF50**	**LAF90**	**LAF95**	**LAF99**
65.0	57.6	54.2	39.9	32.1	31.2	30.1

Te dhena te tjera				
Data e matjes / Testimi	27-28.01.2021	**Kohezgjatja e testimit**	24 h	
			Fillimi:	12:43:44
Pasiguria e matjes:	± 0.2 dBA		Mbarimi:	12:59:47
Modeli, Tipi, Numri serial	**Aparati 1**	Model 45, Sound level meter (Pulsar Instruments Plc), PN1301 1/1Ott		
	Aparati 2	Model 45, Sound level meter (Pulsar Instruments Plc), PN1301		
	Kalibruesi	Model 105, Calibrator (Pulsar Instrument Plc), 75023		
Certifikata e fundit e kalibrimit	**Aparati 1**	21/06/2019 No. 185/8683		
	Aparati 2	21/06/2019 No. 185/8677		
	Kalibruesi	21/06/2019 No. 185/8676		

Standarti i perdorur per matjen e nivelit te zhurmes mjedisore eshte: *ISO 1996-2:2007 Acoustics- Description, measurement and assessment of Environmental noise.*

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

[1]Limiti sipas IFC "Environmental Noise Management"

Figura 1: *Vendodhja e pikes se monitoruar ne harte*



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ANALYSIS REPORT

MEASUREMENT OF NOISE LEVEL

LT 046 12 11 15

The reporting date: 08/02/2021

Company:	**ABKONS sh.p.k**	**Sample Information**	
Contact person:	**Redion Biba**	Identification	**002/01/21- Abkons**
Client:	**ABKONS sh.p.k**	Matrix	**Noise**
Address:	Rruga Themistokli Gërmenji 6	Sampling Date	**27-28/01/2021**
City:	Tirana	Sample acceptance date	**28/01/2021**
Country:	Albania	Tested by:	**ECCAT**

Report No. 2 – Point N2

No:	Measurement point	Coordinates	LAF max (dB)	LAE (dB)	LAeq dB(A)	Limit acording to IFC LAeq, T day[1]
1	N2	N: 4522920.67 E: 370747.47	90.4	102.3	52.9	55
LAF1	**LAF5**	**LAF10**	**LAF50**	**LAF90**	**LAF95**	**LAF99**
64.4	55.4	51.1	45.6	43.2	42.8	40.8

Other data				
Date of Measurement / Testing	27-28.01.2021	**Duration of the test**	24 h	
			Start:	12:47:10
Uncertainty of measurement:	± 0.2 dBA		End:	12:47:10
Model, Type, Serial number	**Apparatus 1**	Model 45, Sound level meter (Pulsar Instruments Plc), PN1301 1/1Ott		
	Apparatus 2	Model 45, Sound level meter (Pulsar Instruments Plc), PN1301		
	Calibrator	Model 105, Calibrator (Pulsar Instrument Plc), 75023		
Latest Calibration certficate	**Apparatus 1**	21/06/2019 No. 185/8683		
	Apparatus 2	21/06/2019 No. 185/8677		
	Calibrator	21/06/2019 No. 185/8676		

The standard used to measure the ambient noise level is: *ISO 1996-2:2007 Acoustics- Description, measurement and assessment of Environmental noise.*

Analysis done by:
Chemist:
MSc.Eldorida Molla

Aproved by:
Head of the Lab:
MSc.Gentjana Halili

[1] Limit acording to IFC "Environmental Noise Management"

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The results presented in this report are only valid for the monitoring point and time

Figure 1: *Location of the point on the map*



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RAPORT ANALIZË

MATJA E NIVELIT TË ZHURMËS

LT 046 12 11 15

Data e raportimit: 08/02/2021

Kompania:	**ABKONS sh.p.k**	**Informacioni i Mostres**	
Kontakti:	**Redion Biba**	Identifikimi	**002/01/21- Abkons**
Klienti:	**ABKONS sh.p.k**	Matrica	**Noise**
Adresa:	Rruga Themistokli Gërmenji 6	Data e marrjes se mostres	**27-28/01/2021**
Qyteti:	Tirana	Data e pranimit te mostres	**28/01/2021**
Shqiperia:	Albania	Testuesi:	**ECCAT**

Raporti Nr. 2 – Mostra N2

Nr:	Pika e matjes	Koordinatat	LAF max (dB)	LAE (dB)	LAeq dB(A)	Limiti sipas IFC LAeq, T dite[1]
1	N2	N: 4522920.67 E: 370747.47	90.4	102.3	52.9	55
LAF1	**LAF5**	**LAF10**	**LAF50**	**LAF90**	**LAF95**	**LAF99**
64.4	55.4	51.1	45.6	43.2	42.8	40.8

Other data				
Data e matjes / Testimi	27-28.01.2021	**Kohezgjatja e testimit**	24 h	
			Fillimi:	12:47:10
Pasiguria e matjes:	**± 0.2 dBA**		Mbarimi:	12:47:10
Modeli, Tipi, Numri serial	**Aparati 1**	Model 45, Sound level meter (Pulsar Instruments Plc), PN1301 1/1Ott		
	Aparati 2	Model 45, Sound level meter (Pulsar Instruments Plc), PN1301		
	Kalibruesi	Model 105, Calibrator (Pulsar Instrument Plc), 75023		
Certifikata e fundit e kalibrimit	**Aparati 1**	21/06/2019 No. 185/8683		
	Aparati 2	21/06/2019 No. 185/8677		
	Kalibruesi	21/06/2019 No. 185/8676		

Standarti i perdorur per matjen e nivelit te zhurmes mjedisore eshte: *ISO 1996-2:2007 Acoustics- Description, measurement and assessment of Environmental noise.*

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

[1] Limiti sipas IFC "Environmental Noise Management"

Figure 1: *Vendodhja e pikes se monitoruar ne harte*



ECCAT
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ANALYSIS REPORT

MEASUREMENT OF SOIL PARAMETERS

LT 046 12 11 15

Reporting date: 09.02.2021

Company:	ABKONS sh.p.k	**Sample Information**	
Contact person:	Redion Biba	**Identification**	001/01/21 - Abkons
Client:	ABKONS sh.p.k	**Matrix**	Soil
Address:	Rruga Themistokli Gërmenji 6, Tiranë	**Sampling Date**	28/01/2021
City:	Tiranë	**Acceptance Date**	28/01/2021
Country:	Shqipëri	**Tested by:**	ECCAT shpk

Report No.1 – Soil Sample 01
(Coordinates UTM : 369648.00 m E; 4521841.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1.	Cadmium (Cd)	mg/kg	<2	EPA Method 3050B
2.	Total Chromium (Cr)	mg/kg	73.34	EPA Method 3050B
3.	Copper (Cu)	mg/kg	32.02	EPA Method 3050B
4.	Nickel (Ni)	mg/kg	278.3	EPA Method 3050B
5.	Lead (Pb)	mg/kg	<15	EPA Method 3050B
6.	Zinc (Zn)	mg/kg	62.79	EPA Method 3050B
7.	TN	mg/kg	<0.5	S SH ISO 14255:2001
8.	TP	mg/kg	29.8	ISO 11263:1994
9.	pH	mg/kg	7.55	S SH ISO 10390:2005

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

ECCAT L51512...E TIRANA - ALBANIA

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ANALYSIS REPORT

MEASUREMENT OF SOIL PARAMETERS

Report No.1/1 – Soil Sample 01
(Coordinates UTM : 369648.00 m E; 4521841.00 m N)

No.	Parameter		Unit	Result	Method of Analysis
1.	Mercury (Hg)		mg/kg	<0.03	EPA Method 3050B
2.	Molybdenum (Mo)		mg/kg	<0.1	EPA Method 3050B
3.	Selenium (Se)		mg/kg	<0.3	EPA Method 3050B
4.	Chloride		mg/kg	6816.2	AASHTO T 291
5.	Fluoride		mg/kg	11.5	METHOD 9214
6.	Sulphate		mg/kg	1454.6	ASTM C1580 - 15
7.	Phenol index		mg/kg	31.7	ISO/TS 17182:2014
8.	Dissolved Organic Carbon		mg/kg	3244.2	EPA Method 415.3
9.	TK		mg/kg	1432.7	EPA Method 3050B
10.	Soil TEXTURE	Sand	%	84.78	ECCAT SOP.155
		Loam		4.35	
		Clay		10.87	
11.	Sodium		mg/kg	4338.8	EPA Method 3050B

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

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RAPORT ANALIZË

MATJA E PARAMETRAVE TE TOKES

LT 046 12 11 15

Data e raportimit: 09.02.2021

Kompania:	ABKONS sh.p.k	**Informacioni i Mostrës**	
Kontakt:	Redion Biba	**Identifikimi**	001/01/21 - Abkons
Klienti:	ABKONS sh.p.k	**Matrica**	Tokë
Adresa:	Rruga Themistokli Gërmenji 6, Tiranë	**Data e marrjes mostrës**	28/01/2021
Qyteti:	Tiranë	**Data e pranimit mostrës**	28/01/2021
Shteti:	Shqipëri	**Testuesi:**	ECCAT shpk

Raport Nr.1 – Mostër toke 01
(Koordinata UTM : 369648.00 m E; 4521841.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1.	Kadmium (Cd)	mg/kg	<2	EPA Method 3050B
2.	Kromi total (Cr)	mg/kg	73.34	EPA Method 3050B
3.	Bakër (Cu)	mg/kg	32.02	EPA Method 3050B
4.	Nikel (Ni)	mg/kg	278.3	EPA Method 3050B
5.	Plumb (Pb)	mg/kg	<15	EPA Method 3050B
6.	Zink (Zn)	mg/kg	62.79	EPA Method 3050B
7.	Azoti total TN	mg/kg	<0.5	S SH ISO 14255:2001
8.	Fosfori total TP	mg/kg	29.8	ISO 11263:1994
9.	pH	mg/kg	7.55	S SH ISO 10390:2005

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT L51512038E TIRANA - ALBANIA

ECCAT
Environment & Quality Together

RAPORT ANALIZË

MATJA E PARAMETRAVE TE UJIT

Raport Nr.1/1 – Mostër toke 01
(Koordinata UTM : 369648.00 m E; 4521841.00 m N)

Nr.	Parametri		Njësia	Rezultati	Metoda e Analizës
1.	Merkuri (Hg)		mg/kg	<0.03	EPA Method 3050B
2.	Molibdeni (Mo)		mg/kg	<0.1	EPA Method 3050B
3.	Seleniumi (Se)		mg/kg	<0.3	EPA Method 3050B
4.	Klorure		mg/kg	6816.2	AASHTO T 291
5.	Florure		mg/kg	11.5	METHOD 9214
6.	Sulfate		mg/kg	1454.6	ASTM C1580 - 15
7.	Indeksi i fenoleve		mg/kg	31.7	ISO/TS 17182:2014
8.	Karboni organik i tretur		mg/kg	3244.2	EPA Method 415.3
9.	Kaliumi total TK		mg/kg	1432.7	EPA Method 3050B
10.	Tekstura e tokës	Sand	%	84.78	ECCAT SOP.155
		Loam		4.35	
		Clay		10.87	
11.	Natrium		mg/kg	4338.8	EPA Method 3050B

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT L51512005E TIRANA - ALBANIA

ECCAT
Environment & Quality Together

ANALYSIS REPORT

MEASUREMENT OF SOIL PARAMETERS

LT 046 12 11 15

Reporting date: 09.02.2021

Company:	ABKONS sh.p.k	**Sample Information**	
Contact person:	Redion Biba	**Identification**	002/01/21 - Abkons
Client:	ABKONS sh.p.k	**Matrix**	Soil
Address:	Rruga Themistokli Gërmenji 6, Tiranë	**Sampling Date**	28/01/2021
City:	Tiranë	**Acceptance Date**	28/01/2021
Country:	Shqipëri	**Tested by:**	ECCAT shpk

Report No.2 – Soil Sample 02
(Coordinates UTM : 368746.00 m E; 4522817.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1.	Cadmium (Cd)	mg/kg	<2	EPA Method 3050B
2.	Total Chromium (Cr)	mg/kg	73.12	EPA Method 3050B
3.	Copper (Cu)	mg/kg	29.98	EPA Method 3050B
4.	Nickel (Ni)	mg/kg	270.7	EPA Method 3050B
5.	Lead (Pb)	mg/kg	<15	EPA Method 3050B
6.	Zinc (Zn)	mg/kg	57.73	EPA Method 3050B
7.	TN	mg/kg	<0.5	S SH ISO 14255:2001
8.	TP	mg/kg	31.7	ISO 11263:1994
9.	pH	mg/kg	7.01	S SH ISO 10390:2005

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

ECCAT
TIRANA - ALBANIA

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ECCAT
Environment & Quality Together

ANALYSIS REPORT

MEASUREMENT OF SOIL PARAMETERS

Report No.2/1 – Soil Sample 02
(Coordinates UTM : 368746.00 m E; 4522817.00 m N)

No.	Parameter		Unit	Result	Method of Analysis
1.	Mercury (Hg)		mg/kg	<0.03	EPA Method 3050B
2.	Molybdenum (Mo)		mg/kg	<0.1	EPA Method 3050B
3.	Selenium (Se)		mg/kg	<0.3	EPA Method 3050B
4.	Chloride		mg/kg	5611.6	AASHTO T 291
5.	Fluoride		mg/kg	15.8	METHOD 9214
6.	Sulphate		mg/kg	571.1	ASTM C1580 - 15
7.	Phenol index		mg/kg	139.5	ISO/TS 17182:2014
8.	Dissolved Organic Carbon		mg/kg	3080.8	EPA Method 415.3
9.	TK		mg/kg	1515.8	EPA Method 3050B
10.	Soil TEXTURE	Sand	%	33.33	ECCAT SOP.155
		Loam		55.0	
		Clay		11.67	
11.	Sodium		mg/kg	4723.5	EPA Method 3050B

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

ECCAT
L51512...E
TIRANA - ALBANIA

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RAPORT ANALIZË

MATJA E PARAMETRAVE TE TOKES

LT 046 12 11 15

Data e raportimit: 09.02.2021

Kompania:	ABKONS sh.p.k	**Informacioni i Mostrës**	
Kontakt:	Redion Biba	**Identifikimi**	002/01/21 - Abkons
Klienti:	ABKONS sh.p.k	**Matrica**	Tokë
Adresa:	Rruga Themistokli Gërmenji 6, Tiranë	**Data e marrjes mostrës**	28/01/2021
Qyteti:	Tiranë	**Data e pranimit mostrës**	28/01/2021
Shteti:	Shqipëri	**Testuesi:**	ECCAT shpk

Raport Nr.2 – Mostër toke 02
(Koordinata UTM : 368746.00 m E; 4522817.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1.	Kadmium (Cd)	mg/kg	<2	EPA Method 3050B
2.	Kromi total (Cr)	mg/kg	73.12	EPA Method 3050B
3.	Bakër (Cu)	mg/kg	29.98	EPA Method 3050B
4.	Nikel (Ni)	mg/kg	270.7	EPA Method 3050B
5.	Plumb (Pb)	mg/kg	<15	EPA Method 3050B
6.	Zink (Zn)	mg/kg	57.73	EPA Method 3050B
7.	Azoti total TN	mg/kg	<0.5	S SH ISO 14255:2001
8.	Fosfori total TP	mg/kg	31.7	ISO 11263:1994
9.	pH	mg/kg	7.01	S SH ISO 10390:2005

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT
Environment & Quality Together

RAPORT ANALIZË

MATJA E PARAMETRAVE TE TOKES

Raport Nr.2/1 – Mostër toke 02
(Koordinata UTM : 368746.00 m E; 4522817.00 m N)

Nr.	Parametri		Njësia	Rezultati	Metoda e Analizës
1.	Merkuri (Hg)		mg/kg	<0.03	EPA Method 3050B
2.	Molibdeni (Mo)		mg/kg	<0.1	EPA Method 3050B
3.	Seleniumi (Se)		mg/kg	<0.3	EPA Method 3050B
4.	Klorure		mg/kg	5611.6	AASHTO T 291
5.	Florure		mg/kg	15.8	METHOD 9214
6.	Sulfate		mg/kg	571.1	ASTM C1580 - 15
7.	Indeksi i fenoleve		mg/kg	139.5	ISO/TS 17182:2014
8.	Karboni organik i tretur		mg/kg	3080.8	EPA Method 415.3
9.	Kaliumi total TK		mg/kg	1515.8	EPA Method 3050B
10.	Tekstura e tokës	Sand	%	33.33	ECCAT SOP.155
		Loam		55.0	
		Clay		11.67	
11.	Natrium		mg/kg	4723.5	EPA Method 3050B

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT L51512003E TIRANA - ALBANIA

ECCAT
Environment & Quality Together

ANALYSIS REPORT

MEASUREMENT OF SOIL PARAMETERS

LT 046 12 11 15

Reporting date: 09.02.2021

Company:	ABKONS sh.p.k	**Sample Information**	
Contact person:	Redion Biba	**Identification**	003/01/21 - Abkons
Client:	ABKONS sh.p.k	**Matrix**	Soil
Address:	Rruga Themistokli Gërmenji 6, Tiranë	**Sampling Date**	28/01/2021
City:	Tiranë	**Acceptance Date**	28/01/2021
Country:	Shqipëri	**Tested by:**	ECCAT shpk

Report No.3 – Soil Sample 03
(Coordinates UTM : 368982.00 m E; 4523683.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1.	Cadmium (Cd)	mg/kg	<2	EPA Method 3050B
2.	Total Chromium (Cr)	mg/kg	69.11	EPA Method 3050B
3.	Copper (Cu)	mg/kg	32.56	EPA Method 3050B
4.	Nickel (Ni)	mg/kg	262.8	EPA Method 3050B
5.	Lead (Pb)	mg/kg	<15	EPA Method 3050B
6.	Zinc (Zn)	mg/kg	62.94	EPA Method 3050B
7.	TN	mg/kg	<0.5	S SH ISO 14255:2001
8.	TP	mg/kg	26.9	ISO 11263:1994
9.	pH	mg/kg	8.43	S SH ISO 10390:2005

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

ECCAT L51512

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ANALYSIS REPORT

MEASUREMENT OF SOIL PARAMETERS

Report No.3/1 – Soil Sample 03
(Coordinates UTM : 368982.00 m E; 4523683.00 m N)

No.	Parameter		Unit	Result	Method of Analysis
1.	Mercury (Hg)		mg/kg	<0.03	EPA Method 3050B
2.	Molybdenum (Mo)		mg/kg	<0.1	EPA Method 3050B
3.	Selenium (Se)		mg/kg	<0.3	EPA Method 3050B
4.	Chloride		mg/kg	11177.1	AASHTO T 291
5.	Fluoride		mg/kg	9.3	METHOD 9214
6.	Sulphate		mg/kg	209.6	ASTM C1580 - 15
7.	Phenol index		mg/kg	5.6	ISO/TS 17182:2014
8.	Dissolved Organic Carbon		mg/kg	2727.2	EPA Method 415.3
9.	TK		mg/kg	1700.4	EPA Method 3050B
10.	Soil TEXTURE	Sand	%	84.0	ECCAT SOP.155
		Loam		4.0	
		Clay		12.0	
11.	Sodium		mg/kg	4994.5	EPA Method 3050B

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

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RAPORT ANALIZË

MATJA E PARAMETRAVE TE TOKES

LT 046 12 11 15

Data e raportimit: 09.02.2021

Kompania:	ABKONS sh.p.k	**Informacioni i Mostrës**	
Kontakt:	Redion Biba	**Identifikimi**	003/01/21 - Abkons
Klienti:	ABKONS sh.p.k	**Matrica**	Tokë
Adresa:	Rruga Themistokli Gërmenji 6, Tiranë	**Data e marrjes mostrës**	28/01/2021
Qyteti:	Tiranë	**Data e pranimit mostrës**	28/01/2021
Shteti:	Shqipëri	**Testuesi:**	ECCAT shpk

Raport Nr.3 – Mostër toke 03
(Koordinata UTM : 368982.00 m E; 4523683.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1.	Kadmium (Cd)	mg/kg	<2	EPA Method 3050B
2.	Kromi total (Cr)	mg/kg	69.11	EPA Method 3050B
3.	Bakër (Cu)	mg/kg	32.56	EPA Method 3050B
4.	Nikel (Ni)	mg/kg	262.8	EPA Method 3050B
5.	Plumb (Pb)	mg/kg	<15	EPA Method 3050B
6.	Zink (Zn)	mg/kg	62.94	EPA Method 3050B
7.	Azoti total TN	mg/kg	<0.5	S SH ISO 14255:2001
8.	Fosfori total TP	mg/kg	26.9	ISO 11263:1994
9.	pH	mg/kg	8.43	S SH ISO 10390:2005

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT
L51512005E
TIRANA - ALBANIA

ECCAT
Environment & Quality Together

RAPORT ANALIZË

MATJA E PARAMETRAVE TE TOKES

Raport Nr.3/1 – Mostër toke 03
(Koordinata UTM : 368982.00 m E; 4523683.00 m N)

Nr.	Parametri		Njësia	Rezultati	Metoda e Analizës
1.	Merkuri (Hg)		mg/kg	<0.03	EPA Method 3050B
2.	Molibdeni (Mo)		mg/kg	<0.1	EPA Method 3050B
3.	Seleniumi (Se)		mg/kg	<0.3	EPA Method 3050B
4.	Klorure		mg/kg	11177.1	AASHTO T 291
5.	Florure		mg/kg	9.3	METHOD 9214
6.	Sulfate		mg/kg	209.6	ASTM C1580 - 15
7.	Indeksi i fenoleve		mg/kg	5.6	ISO/TS 17182:2014
8.	Karboni organik i tretur		mg/kg	2727.2	EPA Method 415.3
9.	Kaliumi total TK		mg/kg	1700.4	EPA Method 3050B
10.	Tekstura e tokës	Sand	%	84.0	ECCAT SOP.155
		Loam		4.0	
		Clay		12.0	
11.	Natrium		mg/kg	4994.5	EPA Method 3050B

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT L51512003E TIRANA - ALBANIA

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ANALYSIS REPORT

MEASUREMENT OF WATER PARAMETERS

LT 046 12 11 15

Reporting date: 08.02.2021

Company:	ABKONS sh.p.k	**Sample Information**	
Contact person:	Redion Biba	**Identification**	002/01/21 - Abkons
Client:	ABKONS sh.p.k	**Matrix**	SurfaceWater
Address:	Rruga Themistokli Gërmenji 6, Tiranë	**Sampling Date**	28/01/2021
City:	Tiranë	**Acceptance Date**	28/01/2021
Country:	Shqipëri	**Tested by:**	ECCAT shpk

Report No.2 – Sample 2 – Surfacewater sample 01
(Coordinates UTM : 368646.00 m E; 4523259.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1	**BOD_5**	mg/l	**35.8**	EPA Method 5210
2	**COD**	mg/l	**46.0**	S SH ISO 6060:1989
3	**TSS**	mg/l	**17.8**	S SH EN 872:2005
4	**EC**	µS/cm	**645**	S SH EN 27888:1993
5	**TDS(Total Dissolved Solid)**	mg/l	**424**	ISO 7888:1985
6	**Total alkalinity**	mg/l	**175**	ISO 99631:1994
7	**Calcium (Ca)**	mg/l	**18.0**	S SH ISO 6059:1984
8	**Magnesium (Mg)**	mg/l	**47.2**	AWWA/APHA 1994 303A
9	**Chloride**	mg/l	**140**	S SH ISO 9297:2000
10	**Sulphate SO4**	mg/l	**21.6**	S SH ISO 22742:2009
11	**Iron (Fe)**	µg/l	**59.2**	AWWA/APHA 1995 3030 A
12	**Free Residual Chlorine**	mg/l	**<2.5**	APHA/AWWA A 408/1995
13	**Nitrate**	mg/l	**1.8**	ISO 78903:1988
14	**Sulphide**	mg/l	**0.64**	APHA/AWWA-4500-S2-:2000
15	**Phenolic Compounds**	mg/l	**0.82**	APHA/AWWA 510 C/1995
16	**E-Coli**	Nr/100 ml	**<1**	ISO 9308-1:2014
17	**Total Coliforms**	Nr/100 ml	**4**	ISO 9308-1:2014
18	**Cadmium (Cd)**	µg/l	**<30**	AWWA/APH A 1995 3030 A
19	**Total Chromium (Cr)**	µg/l	**<30**	AWWA/APHA 1995 303 A
20	**Cr(VI)**	µg/l	**<50**	EN ISO 18415:2006
21	**Copper (Cu)**	µg/l	**<30**	AWWA/APHA 1995 303 A
22	**Lead (Pb)**	µg/l	**<30**	AWWA/ APHA 1995 303 A
23	**Nickel (Ni)**	µg/l	**<30**	AWWA/APHA 1995 3030 A
24	**Zinc (Zn)**	µg/l	**<30**	AWWA/ APHA 1995 303 A
25	**Mercury (Hg)**	µg/l	**<0.01**	ISO 12846:2012
26	**TOC**	mg/l	**24.3**	ISO 8245:1999

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

Notes: Partial copying of this Report is not permitted without the written permission of the Laboratory's Responsible Authority. The results presented in this report are only valid for the point and time of the monitoring.

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ANALYSIS REPORT

MEASUREMENT OF WATER PARAMETERS

Report No.2/1 – Sample 2 – Surfacewater sample 01
(Coordinates UTM : 368646.00 m E; 4523259.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1	**Colour**	-	**Not clear, yellowish, turbid**	S SH ISO 788
2	**Odour**	-	**Not acceptable for consuming**	S SH EN 1622
3	**Taste**	-	**Not acceptable for consuming**	S SH EN 1622
4	**Tin**	µg/l	**<1.7**	METHOD 200.9

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

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RAPORT ANALIZË

MATJA E PARAMETRAVE TE UJIT

LT 046 12 11 15

Data e raportimit: 08.02.2021

Kompania:	ABKONS sh.p.k	**Informacioni i Mostrës**	
Kontakt:	Redion Biba	**Identifikimi**	002/01/21 - Abkons
Klienti:	ABKONS sh.p.k	**Matrica**	Ujë sipërfaqësor
Adresa:	Rruga Themistokli Gërmenji 6, Tiranë	**Data e marrjes mostrës**	28/01/2021
Qyteti:	Tiranë	**Data e pranimit mostrës**	28/01/2021
Shteti:	Shqipëri	**Testuesi:**	ECCAT shpk

Raport Nr.2 – Mostra 2 – Mostër ujë sipërfaqësor 01
(Koordinatat UTM : 368646.00 m E; 4523259.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1	Nevoja Biokimike për oksigjen BOD_5	mg/l	35.8	EPA Method 5210
2	Nevoja Kimike për oksigjen COD	mg/l	46.0	S SH ISO 6060:1989
3	Lënda e ngurtë pezull TSS	mg/l	17.8	S SH EN 872:2005
4	Përcjellshmëria elektrike	µS/cm	645	S SH EN 27888:1993
5	TDS(lëndët e ngurta të tretura totale)	mg/l	424	ISO 7888:1985
6	Alkaliniteti total	mg/l	175	ISO 99631:1994
7	Kalcium (Ca)	mg/l	18.0	S SH ISO 6059:1984
8	Magnez (Mg)	mg/l	47.2	AWWA/APHA 1994 303A
9	Klorure	mg/l	140	S SH ISO 9297:2000
10	Sulfate SO4	mg/l	21.6	S SH ISO 22742:2009
11	Hekur (Fe)	µg/l	59.2	AWWA/APHA 1995 3030 A
12	Klori i mbetur i lirë	mg/l	<2.5	APHA/AWWA A 408/1995
13	Nitrate NO_3	mg/l	1.8	ISO 78903:1988
14	Sulfure S_2^-	mg/l	0.64	APHA/AWWA-4500-S2-:2000
15	Komponime fenolike	mg/l	0.82	APHA/AWWA 510 C/1995
16	E-Coli	Nr/100 ml	<1	ISO 9308-1:2014
17	Koliforme totale	Nr/100 ml	4	ISO 9308-1:2014
18	Kadmium (Cd)	µg/l	<30	AWWA/APH A 1995 3030 A
19	Kromi total (Cr)	µg/l	<30	AWWA/APHA 1995 303 A
20	Kromi 6-valent Cr(VI)	µg/l	<50	EN ISO 18415:2006
21	Bakër (Cu)	µg/l	<30	AWWA/APHA 1995 303 A
22	Plumbi (Pb)	µg/l	<30	AWWA/ APHA 1995 303 A
23	Nikel (Ni)	µg/l	<30	AWWA/APHA 1995 3030 A
24	Zink (Zn)	µg/l	<30	AWWA/ APHA 1995 303 A
25	Merkur (Hg)	µg/l	<0.01	ISO 12846:2012
26	TOC	mg/l	24.3	ISO 8245:1999

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT
Environment & Quality Together

RAPORT ANALIZË

MATJA E PARAMETRAVE TE UJIT

Raport Nr.2/1 – Mostra 2 – Mostër ujë sipërfaqësor 01
(Koordinatat UTM : 368646.00 m E; 4523259.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1	**Ngjyra**	-	**Jo e qartë, e verdhë, e turbullt**	S SH ISO 788
2	**Era**	-	**Jo e pranueshme për konsum**	S SH EN 1622
3	**Shija**	-	**Jo e pranueshme për konsum**	S SH EN 1622
4	**Kallaji**	µg/l	**<1.7**	METHOD 200.9

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT
Environment & Quality Together

ANALYSIS REPORT

MEASUREMENT OF WATER PARAMETERS

LT 046 12 11 15

Reporting date: 08.02.2021

Company:	ABKONS sh.p.k	**Sample Information**	
Contact person:	Redion Biba	**Identification**	003/01/21 - Abkons
Client:	ABKONS sh.p.k	**Matrix**	SurfaceWater
Address:	Rruga Themistokli Gërmenji 6, Tiranë	**Sampling Date**	28/01/2021
City:	Tiranë	**Acceptance Date**	28/01/2021
Country:	Shqipëri	**Tested by:**	ECCAT shpk

Report No.3 – Sample 3 – Surfacewater sample 02
(Coordinates UTM : 368939.00 m E; 4521928.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1	**BOD_5**	mg/l	**34.4**	EPA Method 5210
2	**COD**	mg/l	**43.0**	S SH ISO 6060:1989
3	**TSS**	mg/l	**15.8**	S SH EN 872:2005
4	**EC**	µS/cm	**1759**	S SH EN 27888:1993
5	**TDS(Total Dissolved Solid)**	mg/l	**1160**	ISO 7888:1985
6	**Total alkalinity**	mg/l	**265**	ISO 99631:1994
7	**Calcium (Ca)**	mg/l	**42.0**	S SH ISO 6059:1984
8	**Magnesium (Mg)**	mg/l	**43.5**	AWWA/APHA 1994 303A
9	**Chloride**	mg/l	**469.7**	S SH ISO 9297:2000
10	**Sulphate SO4**	mg/l	**78.8**	S SH ISO 22742:2009
11	**Iron (Fe)**	µg/l	**24.20**	AWWA/APHA 1995 3030 A
12	**Free Residual Chlorine**	mg/l	**<2.5**	APHA/AWWA A 408/1995
13	**Nitrate**	mg/l	**2.3**	ISO 78903:1988
14	**Sulphide**	mg/l	**1.28**	APHA/AWWA-4500-S2-:2000
15	**Phenolic Compounds**	mg/l	**0.14**	APHA/AWWA 510 C/1995
16	**E-Coli**	Nr/100 ml	**<1**	ISO 9308-1:2014
17	**Total Coliforms**	Nr/100 ml	**20**	ISO 9308-1:2014
18	**Cadmium (Cd)**	µg/l	**<30**	AWWA/APH A 1995 3030 A
19	**Total Chromium (Cr)**	µg/l	**<30**	AWWA/APHA 1995 303 A
20	**Cr(VI)**	µg/l	**<50**	EN ISO 18415:2006
21	**Copper (Cu)**	µg/l	**<30**	AWWA/APHA 1995 303 A
22	**Lead (Pb)**	µg/l	**<30**	AWWA/ APHA 1995 303 A
23	**Nickel (Ni)**	µg/l	**<30**	AWWA/APHA 1995 3030 A
24	**Zinc (Zn)**	µg/l	**<30**	AWWA/ APHA 1995 303 A
25	**Mercury (Hg)**	µg/l	**<0.01**	ISO 12846:2012
26	**TOC**	mg/l	**23.3**	ISO 8245:1999

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

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ANALYSIS REPORT

MEASUREMENT OF WATER PARAMETERS

Report No.3/1 – Sample 3 – Surfacewater sample 02
(Coordinates UTM : 368939.00 m E; 4521928.00 m N)

No.	Parameter	Unit	Result	Method of Analysis
1	**Colour**	-	**Not clear, yellowish, turbid**	S SH ISO 788
2	**Odour**	-	**Not acceptable for consuming**	S SH EN 1622
3	**Taste**	-	**Not acceptable for consuming**	S SH EN 1622
4	**Tin**	µg/l	**<1.7**	METHOD 200.9

Analysis done by:
Laboratory Chemist
MSc.Eldorida Molla

Aproved by:
Head of the Laboratory
MSc.Gentjana Halili

ECCAT L51512003E TIRANA - ALBANIA

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RAPORT ANALIZË

MATJA E PARAMETRAVE TE UJIT

LT 046 12 11 15

Data e raportimit: 08.02.2021

Kompania:	ABKONS sh.p.k	**Informacioni i Mostrës**	
Kontakt:	Redion Biba	**Identifikimi**	003/01/21 - Abkons
Klienti:	ABKONS sh.p.k	**Matrica**	Ujë sipërfaqësor
Adresa:	Rruga Themistokli Gërmenji 6, Tiranë	**Data e marrjes mostrës**	28/01/2021
Qyteti:	Tiranë	**Data e pranimit mostrës**	28/01/2021
Shteti:	Shqipëri	**Testuesi:**	ECCAT shpk

Raport Nr.3 – Mostra 3 – Mostër ujë sipërfaqësor 02
(Koordinatat UTM : 368939.00 m E; 4521928.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1	Nevoja Biokimike për oksigjen BOD_5	mg/l	34.4	EPA Method 5210
2	Nevoja Kimike për oksigjen COD	mg/l	43.0	S SH ISO 6060:1989
3	Lënda e ngurtë pezull TSS	mg/l	15.8	S SH EN 872:2005
4	Përcjellshmëria elektrike	µS/cm	1759	S SH EN 27888:1993
5	TDS(lëndët e ngurta të tretura totale)	mg/l	1160	ISO 7888:1985
6	Alkaliniteti total	mg/l	265	ISO 99631:1994
7	Kalcium (Ca)	mg/l	42.0	S SH ISO 6059:1984
8	Magnez (Mg)	mg/l	43.5	AWWA/APHA 1994 303A
9	Klorure	mg/l	469.7	S SH ISO 9297:2000
10	Sulfate SO4	mg/l	78.8	S SH ISO 22742:2009
11	Hekur (Fe)	µg/l	24.20	AWWA/APHA 1995 3030 A
12	Klori i mbetur i lirë	mg/l	<2.5	APHA/AWWA A 408/1995
13	Nitrate NO_3	mg/l	2.3	ISO 78903:1988
14	Sulfure S_2^-	mg/l	1.28	APHA/AWWA-4500-S2-:2000
15	Komponime fenolike	mg/l	0.14	APHA/AWWA 510 C/1995
16	E-Coli	Nr/100 ml	<1	ISO 9308-1:2014
17	Koliforme totale	Nr/100 ml	20	ISO 9308-1:2014
18	Kadmium (Cd)	µg/l	<30	AWWA/APH A 1995 3030 A
19	Kromi total (Cr)	µg/l	<30	AWWA/APHA 1995 303 A
20	Kromi 6-valent Cr(VI)	µg/l	<50	EN ISO 18415:2006
21	Bakër (Cu)	µg/l	<30	AWWA/APHA 1995 303 A
22	Plumbi (Pb)	µg/l	<30	AWWA/ APHA 1995 303 A
23	Nikel (Ni)	µg/l	<30	AWWA/APHA 1995 3030 A
24	Zink (Zn)	µg/l	<30	AWWA/ APHA 1995 303 A
25	Merkur (Hg)	µg/l	<0.01	ISO 12846:2012
26	TOC	mg/l	23.3	ISO 8245:1999

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

ECCAT
Environment & Quality Together

RAPORT ANALIZË

MATJA E PARAMETRAVE TE UJIT

Raport Nr.3/1 – Mostra 3 – Mostër ujë sipërfaqësor 02
(Koordinatat UTM : 368939.00 m E; 4521928.00 m N)

Nr.	Parametri	Njësia	Rezultati	Metoda e Analizës
1	**Ngjyra**	-	**Jo e qartë, e verdhë, e turbullt**	S SH ISO 788
2	**Era**	-	**Jo e pranueshme për konsum**	S SH EN 1622
3	**Shija**	-	**Jo e pranueshme për konsum**	S SH EN 1622
4	**Kallaji**	µg/l	**<1.7**	METHOD 200.9

Analiza u krye nga:
Kimisti
MSc.Eldorida Molla

Aprovuar nga:
Përgjegjësi i Laboratorit
MSc.Gentjana Halili

Appendix 3. Socio-economic Survey



abkons
LOCAL Knowledge, GLOBAL Standards

SOCIO-ECONOMIC SURVEY

of PV "Karavasta"

November 2020

Tirana, Albania

ABBREVIATIONS

FSAP	Field Survey Action Plan
EBRD	European Bank for Reconstruction and Development
PAP	Persons Affected by the Project
PR	Performance Requirement
AoI	Area of Influence
KII	Key Informants Interview
FGD	Focus Group Discussions
SSES	Sample Socio-Economic Survey
PV	Photovoltaic
SEP	Stakeholder Engagement Plan
GPS	Global Positioning System

Introduction

While the Albanian regulatory framework refers to Environmental Impact Assessment (EIA) only, Voltalia is following the EBRD Performance Requirements (PR) and practice and looking at the social assessment of the Project. Through the Environmental and Social Impact Assessment (ESIA) process, Abkons in coordination with Voltalia will identify and address, all social, environmental and cultural heritage impacts, risks and opportunities in a systematic and comprehensive manner. In this context, in addition to the Albanian local standards Abkon will carry out the baseline studies, in compliance with EBRD PR1, to serve as the benchmark to assure that adverse impacts on people, their rights, livelihoods, culture and environment is avoided or, where avoidance is not possible, minimized, mitigated, offset and/or compensated.

This Field Survey Action Plan (FSAP) presents the description and schedule of activities, team structure and description of roles and responsibilities, methodology and data collection tools for the baseline socio-economic survey for the area potentially affected by the construction and operation of the PV Karavasta.

The Socio-economic survey to be conducted will include land use context and socio-economic households' profile of Project Affected Persons (PAPs) whose land and assets they own, or use will be affected depending on the project impacts.

A detailed description on stakeholder identification and mapping and the timeline of the stakeholder process is included in the Stakeholder Engagement Plan (SEP).

1. Field Survey Area and Data Collection

Collecting baseline data prior to the implementation of the project activities is the crucial step to develop a prospective evaluation of the project. In order to assess all the socio-economic impacts it is crucial to gather socio-economic baseline data. The data collection for all the villages will be carried out through household questionnaires.

Considering the total land surface, and other infrastructures facilities that potentially will be affected by the project the overall study area is divided into two focus areas: the settlements directly affected / close to the PV plant footprint where the project could generate smaller or indirect impacts and the settlements directly / close to the transmission line which are considered as most impacted in terms of land usage. The number of settlements located in the overall study area is 10 villages as listed below;

- Hastukas
- Ndernenas
- Seman i Ri
- Seman
- Gjokalli
- Hoxhare
- Havaleas
- Dermenas
- Radostine
- Qafa e Kushovices (outskirt of Fier city)

Baseline information and data on the area, will be obtained directly from field observations, Focus Group Discussions (FGDs), Key Informant Interviews (KIIs) and socio-economic household questionnaires in the 10 villages identified in the Area of Influence (AoI).

The field survey will combine the collection of Sample Socio-Economic Survey (SSES), settlement profile, social baseline data (FGDs, KIIs) in the identified villages with respect to:

- demographics;
- economy, employment and income;

- land use and ownership;
- infrastructure and public services;
- traffic and transport;
- education and skills;
- health;
- cultural heritage and
- Vulnerable groups.

The following chapters present a detailed description of the activities that will be carried out to meet the objectives listed above. The data collection tools designed to capture information in a consistent and accurate manner are presented in the Annexes of this document.

1.1 Smapling procedure

1.1.1 Sampling size

The survey will be performed by sampling the population, so a sampling strategy is implemented. A sample is “a smaller (but hopefully representative) collection of information from a population used to determine truths about that population”. The area of interest is on the population in the Area of Influence (AoI).

The recommended size can be calculated through formulas that provide an automatic calculation base on;

- Population size
- Desired confidence level, i.e. the amount of uncertainty you can tolerate in generalizing the results of the survey to the whole population (usually 95 %;)
- Margin of error, i.e. the amount of error that you can tolerate in the generalization of the results of the survey (usually 5 %;)

The sampling size is determined through online sample size calculator “Survey Monkey”[157]. For the calculation is used the following formula;

$$\text{Sample size} = \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

N = population size • e = Margin of error (percentage in decimal form) • z = z-score. The z-score is the number of standard deviations a given proportion is away from the mean. For the confidence level 95% the z-score to use, is as below:

Table 84 - Desired Confidence Level

Desired confidence level	z-score
95%	1.96

Regarding the population size it is not defined yet the exact number per each village, because the information from 2011 CENSUS[158] is based on Municipality and Commune level. In cases where the

[157] Sample size calculator https://www.surveymonkey.com/mp/sample-size-calculator/
[158] Population and housing Census, Gjirokaster 2011

number of population is not defined it is suggested the population size 20,000. This because the sample size does not change much for population larger than 20,000.

Table-85 Recommended Sample Size

Population size	Confidence level	Margin of error	Recommended sample size
20000	95%	5%	377

1.1.2 Sampling dispersion

The dispersion of the recommended sample size will be done in order to cover all the project area, based on;

- the population/habitants for each village;
- the village area (project affection in m2)
- Coverage of the typology of land/plots/housing of all project area per each
- village (including land/pastures/farms/housing/living business areas etc.)
- the discovering of any points of interest – per each village

The selection of the household out of the sample will be based on probabilistic sampling (random sample) that means every unit in the target population has the same chance of being selected in the sample. The questionnaire dispersion starts from 25 % up to 50 % for the villages that are the most affected by the project. However, the number of questionnaires per each village will depend on the affected area.

1.2 Social Data Collection

The field survey is planned to be conducted in the period of 4 (four) weeks. A dedicated Abkons team of three personnel (social surveyor) will undertake the baseline data collection.

The primary activities that will be conducted are the following:

- *Key Informant Interviews* (KII): Interviews will be held with individuals/institutions that have knowledge of a specific subject (i.e. regional development programs, health, employment, education, and infrastructure) or are informed members of the community, such as district/local government representatives, schoolteachers, healthcare professionals and civil society organizations/NGOs where available. Perceptions of the Project will also be gathered during these meetings.
- *Focus Group Discussions* (FGD): Semi-structured meetings will be held with groups of settlement representatives to gather specific information pertaining to specific livelihoods as well as information on vulnerability and opportunities for overcoming/capitalizing on impacts.
- *Settlement profiling:* Meetings will be held with the leaders (formal or traditional) of each of the settlements to collect baseline data for the topics (e.g. demographics, health, education, employment, livelihoods, infrastructure, and vulnerable groups).
- *Socio-economic survey*: This survey will gather data on the economic activities and the social standards of the people that might be directly or indirectly affected from the project. The SSES will take a sample of the communities living within the direct affected area and outside the affected area, spread over the entire length of the transmission line footprint.
- *Field Observations* / ground trothing: The field team will record relevant information regarding general areas characteristics. This will be done through collecting waypoints (GPS records of places) and taking photographs of relevant areas within the communities (eg roads, health facilities, typical houses, sensitive receptors identified in the area).

During the field survey, data will be recorded using the data collection tools designed for this purpose and provided in Annexes of this document, including semi-structured questionnaires that alongside mapping data will help assess the impacts of the project. These tools are described in the section below.

1.2.1 Data collection Tools

Two primary tools have been designed to enable the teams to record information clearly and concisely whilst in the field. The questionary intends to collect information with varying levels of detail. These tools are presented in Annexes of this document and outlined in the table below.

Table 86 - Overview of social data collection tools

Tool Name	Description	Annex
Socio-economic questionnaire	• Questionnaires to collect quantitative and qualitative household level information with regards to; ○ demographics; ○ economy, employment and income; ○ land use and ownership; ○ infrastructure and public services; ○ traffic and transport; ○ education and skills; ○ health; ○ cultural heritage and ○ Vulnerable groups	*A*
Key Informant Interview / Focus Group Guidance Questionnaires	• Provides guidance regarding critical topics (i.e. health, ethnic groups, labor and employment, emergency services, regional development, agriculture, transportation etc.) • These are to be used during KII/FGD to help focus the discussion. • Questionnaire objectives: • to build an understanding of how livelihoods are organized and managed; • to build an understanding around certain key specific topics and how they are managed in the AoI; • to identify the main issues facing the communities and opportunities to tackle some of these; • to identify barriers that women and vulnerable groups might experience in relation to overcoming impacts generated by the Project; • to collect views and concerns about the Project.	*B*
Photolog and GPS Waypoints log	• Template to record the number, site, date and description of the waypoints and pictures collected during the field survey	*C*

2. Field Methodology and Work Organization

Every day before splitting into groups, the survey team will start the day with a health and safety refresher and a quick briefing setting out the plan for the day and outlining the settlements each team will be visiting and what time they expect to finish the day. Team members will also be reminded of the questionnaires and data collection forms they need to fill out as needed. These daily briefing sessions will be led by the team leader.

Each day will start at 8.00 am when teams will be expected to begin travelling to the first settlement of the day (this will vary slightly based on the team and distance required on a daily basis). Each team will be provided with HSE tools, emergency contact details, backup equipment and a packed lunch.

Each team will ensure that the work will be carried during day light. It is expected that during the day teams might reconvene to share findings and when possible completing the days data collection tools.

2.1Team Organization

The table below describes the roles and responsabilities of the field survey team.Table 87 – Roles and Responsabilities of the survey team

Table 87 – Roles and Responsabilities of the survey team

Role	Responsibility
Field Survey Team Leader	• Supervise field survey activities. • Coordinate activities with specialists. • Carry out team briefing and debriefing daily. • Perform quality control and ensure that field survey objectives are met.
Field Survey specialist	• Carry out field survey activities through field observations. • Conduct household socio-economic questionaires • Take pictures of the visited settlements • Record way points and photolog from ground trothing

3. Field survey Schedule

The schedule presented in the table below is a tentative for data collection activities. The engagement activities will be organized in each of the settlements as described in the schedule. Please note that the order of engagement list is only indicative and does not imply following the order as listed in the table. This will vary by the weather conditions, distance, road conditions and disponibility of the residencies.

Table 88 - Socio-Economic Survey Work Plan

Project Title: PV Karavasta **Programe:** Socio- Economic Survey **Client:** Voltalia **Doc:** Work Schedule						
No	**Task**	**Activity**	**Week 1**	**Week 2**	**Week 3**	**Week 4**
1	Field Survey	Socio - Economic Survey, Field Observation				

2	Database developing	Developing the Database		
3		Data entry		

Appendix 4. Village, Infrastructure and Road Assessment, Voltalia PV Solar Plant

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Logbook – Village, Infrastructure and Road Assessment, Voltalia PV Solar Plant

February 2021

Tirana, Albania

Logbook

Name/ Surname of the expert	**Johan Shyti, Bledar Shehu and Enkeleda Sopaj**
GPS	UTM Coordinates
Project	Karavasta 140 MW PV Solar Project in Albania
Aspect	Village, Infrastructure and Road Assessment
Survey	Site survey performed on February, 15th and 16th, 2021

ID	WP Coordinates	Photo from	Photo to	Description
WP01	E: 369818 N: 4523456	Photo 1	Photo 2	**Entrance road to the PV plant** Inhabited area, there are few houses and warehouses on both sides, between 40-50 m distance. Drainage channel on the left side of the road path. The road path is in very bad conditions, difficult to access due to mud. Road width varies from 4-5 meters. In surroundings there are abandoned lands and agricultural lands with wheat and alfalfa.
WP02	E: 369653 N: 4523185	Photo 3	Photo 4	**Entrance road to the PV plant** Drainage channel on the left side of the road path. The road path is in very bad conditions, difficult to access due to mud. Road width varies from 4-5 meters. In surroundings there are abandoned lands.
WP03	E: 369889 N: 4523471	Photo 5	Photo 6	**Urban wastes disposal** Urban wastes identified in this waypoint. Also, there is a house in this location.
WP04	E: 370921 N: 4522162	Photo 7	Photo 9	**Access road (and bridge) to the PV plant (village Hastukasi)** In this section was identified a bridge that connects the village to the lands where the PV plant will be constructed. The bridge is old and represents high risks for heavy vehicles and machineries, it may collapse.

ID	WP Coordinates	Photo from	Photo to	Description
WP05	E: 370658 N: 4522797	Photo 10	Photo 12	**Access road to the PV plant (village Hastukasi)** Access road is unpaved, in bad conditions. Road width is 5 meters. Drainage channel is on the left side of the road. In surroundings there are trees, shrubs, reeds (drainage channel), abandoned lands, and agricultural lands with wheat and alfalfa.
WP06	E: 371047 N: 4519232	Photo 13	Photo 20	**Between Towers 8 and 9 – OHL** Access road that connects village Ndërnenas to the lands nearby. In this location will be constructed both towers 8 and 9 of the OHL. The access road is paved with cobblestone; generally, it is in fair conditions although there are few sections difficult to access. Road width varies from 4-6 meters. There are drainage channels on both sides of the road. In surroundings there are abandoned lands, agricultural lands and pasture lands. On the left side of the road is could be observed that few lands were flooded due to the rainfalls. Agricultural lands are typically planted with alfalfa and wheat.
WP07	E: 370655 N: 4520709	Photo 21	Photo 31	**Access road to the PV plant and OHL** Access road unpaved, in bad conditions. Road width is 3.5 meters. Main drainage channel is on the left side of the road. The main drainage channel is not working properly and it is inundated. All the lands on this side are flooded. There are major risks for the proposed locations of the OHL towers 3-6 due to flooding in these lands.
WP08	E: 370138 N: 4521018	Photo 32	Photo 42	**Between Towers 2 and 3 – OHL** Access road is in very bad conditions. The main drainage channel is inundated and all the lands in the left side of the road/drainage channel are flooded. The drainage channel is full of sediments, mud and reeds which make is difficult to properly discharge the water, in particular in heavy rain periods. Local residents reveal that these lands are continuously flooded. Flooding periods typically last from November to April or May, or in case of heavy rainfalls during the year.

ID	WP Coordinates	Photo from	Photo to	Description
				The location where tower 3 of the OHL is proposed to be constructed is actually flooded due to overflow of water in the main drainage channel of the area and heavy rainfalls. Lands on the right side of the access road are represented by abandoned and agricultural lands. Agricultural lands are mainly planted with wheat. During the site survey there was one local resident that was fishing in the main drainage channel. He revealed that main fish species in this area include mullet/ grey mullet species. In this area there is a bridge that serves as a connection point between the rural roads (E: 370031; N: 4521057).
WP09	E: 371565 N: 4514614	Photo 43	Photo 50	**Between Towers 21 and 22– OHL** Access road paved with asphalt, in good conditions. There is no road signage. The road width is 5 meters. There are electric poles on both sides of the road. On the right side could be observed flooded lands. On this side, could be noticed 4 bunkers (constructed during the communism period), approximately 105 meters (northern part) from the OHL route. On the left side of the road there is a drainage channel. Lands on the left side are not flooded, typically they are abandoned lands and pasture lands.
WP10	E: 372277 N: 4516499	Photo 51	Photo 54	**Between Towers 16 and 17– OHL** Access road is paved with binder, but it is not in good conditions. Riad width is 3.5-4 meters. There are electric poles on the right side of the road. Drainage channels are located on both sides of the road. Lands in this area are typically planted with wheat.
WP11	E: 371311 N: 4513832	Photo 55	Photo 58	**Between Towers 23 and 24 – OHL** The access road is paved with asphalt, in good conditions. This is a rural road. Could be noticed marking signage (lines) on the sides of the road, but no other traffic signs such as speed limits or

ID	WP Coordinates	Photo from	Photo to	Description
				warning sings. Drainage channels could be noticed on both sides of the road. Typically, the area is represented by abandoned lands and pasture lands. At the time of the site survey most of these lands were flooded due to heavy rainfalls and non-proper functioning of drainage channels.
WP12	E: 370812 N: 4512507	Photo 59	Photo 64	**Between Towers 28and 29 – OHL** The access road is paved with asphalt, in good conditions. Road width is 4 meters. There are no traffic sings, speed limits or other warning signs in this section of the road. This road connects the other villages with village Hoxhare and Dermenas. There are abandoned lands in this area. On the left side of the road, next to the main waypoint location and road curve, there is a small construction site. It is not clear what is being constructed in this area.
WP13	E: 371812 N: 4511202	Photo 65	Photo 71	**Between Towers 31 and 32 – OHL** This waypoint represents the main entrance or connection of the rural roads with the main highway of Fier. The location of the waypoint was taken within the OHL route, in the roundabout of the area. The road is paved with asphalt and is in very good conditions. There are complete traffic sings and warning signs in this waypoint. The road width is 10 meters. In surroundings there are abandoned and agricultural lands. On the right side of the road could be mostly noticed agricultural lands with wheat. The drainage channel is located on the right side of the road.
WP 14	E: 372011 N: 4511030			**Towers 32-33 – OHL** The locations of the OHL towers 36, 37 and 38 are proposed to be constructed very close and/or within the highway of Fier. Surely their location will have to be shifted with few meters on the south-western part.
WP15	E: 373768 N: 4510833	Photo 72	Photo 81	**Between Towers 34 and 35 – OHL** Inhabited area, village Dermenas.. Typical houses in this section are 1-2 floors. The access road is paved with asphalt and it is in good conditions. There are drainage channels

ID	WP Coordinates	Photo from	Photo to	Description
				on both sides of the road. This road connects Radostinë village with Dermenas. The road width is 5 meters. There are no traffic sings. The road is equipped with PV lighting poles. This was a foreign investment in this region supported by the Municipality of Fier to equip some of the rural roads with PV lighting poles. There are agricultural lands and arable lands in surroundings, used and maintained by local residents. Also, it was observed the presence of trees, including fruit trees.
WP16	E: 374591 N: 4510483	Photo 82	Photo 91	**Between Towers 36 and 37 – OHL** Inhabited area, village Çlirim. The OHL route passes through a residential house. The main rural road is paved with asphalt. Road width is 4.5 meters. Generally, the road is in fair conditions. On the left side of the road there is the main drainage channel of the area. The drainage channel is full of reeds. In surroundings there are abandoned, agricultural and pasture lands. Approximately 172 meters in the south-western part of the OHL there is a concrete batching plant (E: 374517; N: 4510241). Approximately 240 meters in the southern part of the Ohl there is a poultry farm, named Driza Company (E: 374667; N: 4510197).
WP17	E: 375258 N: 4509785	Photo 92	Photo 94	**Between Towers 39 and 40 – OHL** The access road is unpaved and in bad conditions. Road width is 4 meters. In surroundings there are agricultural lands. On the right side of the access road there is a Low Voltage power line that supplies energy to the warehouses and houses in the area. In surrounding there are huts and small poultry farms, approximately 50-60 meters from the OHL route (E: 375384; N: 4509686).
WP18	E: 375523 N: 4508562	Photo 95	Photo 98	**Between Towers 42 and 43 – OHL** Village Vadizë.

ID	WP Coordinates	Photo from	Photo to	Description
				The road path in this section is muddy, and in very bad conditions. At the time of the site survey, it was very difficult to access. In surroundings there are olive trees parcels, abandoned lands and agricultural lands with alfalfa and wheat.
WP19	E: 376108 N: 4506883	Photo 99	Photo 106	**Between Towers 47 and 48 – OHL** Access road is unpaved and in bad conditions. Road width is approximately 3.5 meters. In surroundings there are olive trees parcels. .
WP20	E: 376194 N: 4506279	Photo 107	Photo 109	**Tower 57 – OHL** Access road is unpaved, but in fair conditions. Road width is 3 meters. Tower 57 is located on top of a hill. In surroundings There is a house located about 16 meters from the OHL route and 55 meters from the tower. There are few other houses and greenhouses located approximately 50-70 meters from the OHL route.
WP21	E: 376562 N: 4505854	Photo 110	Photo 120	**Between Towers 52 and 53 – OHL** Inhabited area, Zhupan village. Main road is paved with asphalt and is in good conditions. There are no traffic sings or warning sings in the road. Road width is 6 meters. In surroundings there are olive trees parcels. The OHL route encompasses one house and a car was located at the right side of the road. Tower 61 is located in close distance with two houses, approximately from 32-46 meters.
WP22	E: 377324 N: 4506044	Photo 121	Photo 129	**Between Towers 55 and 56 – OHL** Access road is paved with asphalt and is in fair conditions. Road width is 3.2 meters. In surroundings there are agricultural and abandoned lands. The OHL route encompasses a small building that most probably is a local store or small warehouse. At the time of the site survey this building was closed and no local residents were inside.

ID	WP Coordinates	Photo from	Photo to	Description
WP23	E: 377640 N: 4506322	Photo 130	Photo 132	**Tower 66 – OHL** Tower 66 is located next to the Fier substation. This will be the connection point with the substations. The OHL route crosses with the existing transmission line in the area.
WP24	E: 376314 N: 4505987			**Tower 57 – OHL (desk study)** This waypoint could not be reached during the site survey; however, an assessment can be made through desk study. The OHL route passes through agricultural lands and parcels with olive trees. This is a residential area and inhabited by several houses. Closest house is located approximately 7 meters from the OHL route and 35 meters from tower 60.
WP25	E: 371524 N: 4518367			**Between Towers 10 and 11 – OHL** This waypoint could not be reached during the site survey due to bad weather, mud and lack of access in this area. The OHL route encompasses through Seman riverbank. Close to the OHL route there is a building/ warehouse that is located approximately in 40 meters distance.
WP26	E: 370101 N: 4521804	Photo 133	Photo 133	**Beside the PV Plant footprint** Access road that connects the village of Hasturkas with the agriculture parcels at the other side of the PV plant. The road is unpaved and in bad conditions. Road width is approximately 5 meters. Difficult and sometimes impossible to drive by after rainy days. In surroundings there are agricultural and abandoned lands.
WP27	E: 369326 N: 4522555	Photo 134	Photo 135	**Within the PV Plant footprint** Old bunker built during the communist regime for protection during possible war. It is abandoned and partially covered with vegetation.
WP28	E: 368453 N: 4522689	Photo 136	Photo 136	**Corner of the PV Plant footprint** Old bunker built during the communist regime for protection during possible war. It is abandoned and partially covered with vegetation.
WP29	E: 369197	Photo 137	Photo 140	**Within the PV Plant footprint**

ID	WP Coordinates	Photo from	Photo to	Description
	N: 4523204			Road path used by the villagers and herders during spring and summer time to access the agriculture parcels at the other side of the PV plant. In addition, this path is used as a short route connecting to the access road that leads to the coast. The road path is dirty unpaved and in bad conditions. Impossible to drive by after rainy days. Will not restrict residents from reaching the other side of the PV plant since they have other alternatives of access.
WP 30	E:373232 N:4526238	Photo 141	Photo 142	**Karavasta Shën Athanasi Church** The church is built in 1721.This church now serves as a cemetery church in Moscopole. The church was declared a Cultural Monument of Albania however its icons have been stolen 5 times from 1990 to 2010. The church is situated along the second access road from Karavasta e Re to the PV plant.
WP 31	E:369464 N:4526823	Photo 143	Photo 146	**Road Infrastructure/ Unpaved Road/ Karavasta e Re** The second possible access road is unpaved and in bad conditions. Road width is 6 meters. In surroundings there are salted uncultivated lands. In the flooding period this area is under water as can be seined in Photo 143.
WP 32	E:368720 N:4526515	Photo 147	Photo 148	**Bridge/ Karavasta e Re** The second possible access road is unpaved and in bad conditions. Road width is 6 meters. In this section was identified a bridge that connects the village to the lands where the PV plant will be constructed. The bridge is old and represents high risks for heavy vehicles and machineries, it may collapse.
WP 33	E:369075 N:4523640	Photo 147	Photo 148	**Drainage channel** Emisari i Myzegese
WP 34	E:368720 N:4526515	Photo 149	Photo 150	**Along the access road is situated a 1 category drainage channel.**

ID	WP Coordinates	Photo from	Photo to	Description
				This channel is used as habitat for many bird species. The channel width is approximately 20 m and goes to the Divjaka pumping station.
WP 35	E:368650 N:4526349	Photo 151	Photo 151	**Pomegranate Farm / Karavasta e Re** Near the village of Karavasta e Re, at approximately 1,2 km from the PV Plant has started the development of a Pomegranate and Goji Berry Farm. The Project is being developed by the Company "Agro – Iliria" as a strategic investment in the Karavasta – Seman Area in state land property. The area planted so far is extended for 135 Ha with the intention of an extension up to 800 Ha.
WP 36	E:368690 N:4526301	Photo 152	Photo 154	**Karavasta Shën Marina orthodox church** This church is situated in the left side of the access road in a distance of 100 m from acess road.
WP 37	E:368767 N:4524949	Photo 155	Photo 158	**Road Infrastructure/ Village Road/ Karavasta e Re** The second possible access road is unpaved and in bad conditions. Road width is 6 meters. On both sides of this road, we have presence of drainage channels. Along road from PDA to Hastukas village have been identified electric power lines that goes to the pump station.
WP38	E:369737 N:4523563	Photo 160	Photo 160	**Inhabited area** Inhabited area, there are few houses and warehouses on both sides, between 40-50 m distance.
WP39	E:370299 N:4523233	Photo 167	Photo 167	**Water Supply Sources and water infrastructure** Hastukasi and Ndermenasi village have Water Supply infrastructure as can be seen in photos.
WP40	E:370742 N:4522975	Photo 169	Photo 170	**Infrastructure facilities** Road path used by the villagers as urban road. The road path is paved and in good conditions. Road width is 8 meters and have third category drainage channels.
WP 41	E:370763 N:4522970	Photo 171	Photo 171	**Wastes disposal areas** The Libofsha unit declare that there are waste collection points equipped with containers as you can see in photos below.

ID	WP Coordinates	Photo from	Photo to	Description
WP 42	E:370778 N:4522951	Photo 172 ;	Photo 180	**Water Supply Sources and water infrastructure** Hastukasi and Ndermenasi village have Water Supply infrastructure as can be seen in photos.
WP 43	E:370988 N:4522816	Photo 181	Photo 182	**Village Road Infrastructure and Energy infrastructure/ electricity cabin** Road path used by the villagers as urban road. The road path is paved and in good conditions. Road width is 8 meters and have third category drainage channels.
WP 44	E:371215 N:4522677	Photo 183	Photo 183	**Village Road Infrastructure / Ndernenas** Road path used by the villagers as urban road. The road path is paved and in good conditions. Road width is 8 meters and have third category drainage channels.
WP 45	E:371659 N:4522379	Photo 184	Photo 184	**Infrastructure facilities/ Ndernenas** Road path used by the villagers as urban road. The road path is paved and in good conditions. Road width is 8 meters and have third category drainage channels.
WP 46	E:371938 N:4522253	Photo 185	Photo 186	**Infrastructure facilities/ Irrigation and drainage channels/ canals, flooding/ Ndernenas**
WP 47	E:371994 N:4522217	Photo 187	Photo 187	**Village Road Infrstructure / Ndernenas** Road path used by the villagers as urban road. The road path is paved and in good conditions. Road width is 8 meters and have third category drainage channels.
WP 48	E:372611 N:4521861	Photo 188	Photo 188	**Infrastructure facilities/ Ndernenas** Road path used by the villagers as urban road. The road path is paved and in good conditions. Road width is 8 meters and have third category drainage channels.
WP 49	E:371441 N:4522421	Photo 189	Photo 190	**Ndërnënas Ungjillëzimi i Hyjlindëses Mari church** Building/objects of religious importance
WP 50	E:371656 N:4522196			**School of Ndernenas**

ID	WP Coordinates	Photo from	Photo to	Description
WP 51	E:371727 N:4522279			**Health Care Centre**

Photos from the site (PV plant & OHL) – baseline conditions

Photos	
	
Photo 1	Photo 2
	
Photo 3	Photo 4
	
Photo 5	Photo 6

Photos



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12

Photos



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18

Photos	
 Photo 19	 Photo 20
 Photo 21	 Photo 22
 Photo 23	 Photo 24
 Photo 25	 Photo 26

Photos



Photo 27



Photo 28



Photo 29



Photo 30



Photo 31



Photo 32

Photos	
	
Photo 33	Photo 34
	
Photo 35	Photo 36
	
Photo 37	Photo 38

Photos	
	
Photo 39	Photo 40
	
Photo 41	Photo 42
	
Photo 43	Photo 44
	
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Photo 47



Photo 48



Photo 49



Photo 50



Photo 51



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Photo 54



Photo 55



Photo 56



Photo 57



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Photo 171



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Photo 174



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Photo 177



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Photo 180

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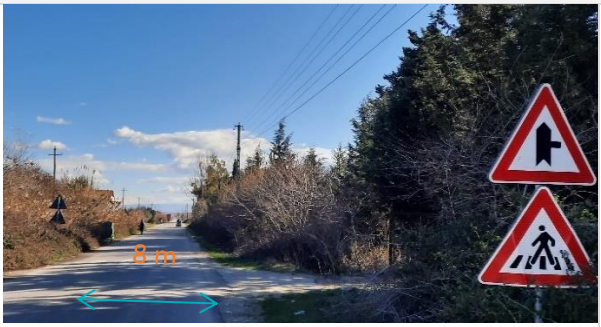


Photo 181



Photo 182



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Karavasta Solar Project

Ecosystem Services Assessment

REV	DESCRIPTION	DATE	APPROVED BY
5	Final revision following IFI review	12 July	BB
4	Revision following IFI review	17 May 2022	BB
3	Final Version	22 February 2022	BB
2	Final Version	11 February 2022	BB
1	Client Draft	19 January 2022	BB
0	Internal Draft	19 January 2022	BB

Executive Summary

The Karavasta Solar Project is a renewable photovoltaic (PV) energy project located in the Divjaka region of Albania, which includes the following components:

- A photovoltaic plant (PV Plant) occupying 185 hectares (Ha) with a peak installed capacity of 140 MW
- Approximately 19 km long 220 kV overhead line (OHL) with 57 towers connecting the PV Plant with an existing electrical substation in Fieri.

The Karavasta Solar Project ESIA has been approved and 2022 key project milestones include:

- Start of construction in 3Q 2022 (July)

Energies Group GmbH has been commissioned to undertake an Ecosystems Services Assessment (ESA) of the Karavasta Solar Project construction and operational impacts.

The key data sources used in the assessment were the Karavasta Solar Project ESIA, site visits completed in December 2021, consultation with the team completing the Livelihood Restoration Plan (LRP), review of the LRP household survey data and ESIA disclosure meetings in June 2022. An assessment framework has been implemented to align with applicable guidance and includes scoping, identification and screening of ecosystem services as well as an impact assessment stage to confirm significance. Mitigations included in the ESIA have been reviewed and additional mitigations have been recommended where applicable.

A total of eight potential ecosystem services have been identified at the scoping stage. These include:

- Livestock
- Honey production
- Capture fisheries
- Hunting
- Pollination
- Hydrology processes
- Ethical / Recreational and tourism
- Semi and natural habitats

Following a screening process, the following six ecosystem services were selected for a more detailed impact assessment:

- Livestock
- Honey production & pollination combined
- Pollination
- Hydrology processes
- Recreational and tourism
- Semi and natural habitat

The impact assessment ranked all impacts as minor or negligible, no significant adverse impacts were identified. There is no risk to the value or functionality of the ecosystem services from the construction or operation of the Karavasta Solar Project. There is potential to create a positive impact to hydrology processes, through rehabilitation and regular maintenance of the PV Plant area drainage that is currently poorly maintained.

Abbreviations

Abbreviation	Definition
AC	Alternate current
AU	Administrative Unit
dB	Decibel
DC	Direct current
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
ESA	Ecosystem Services Assessment
ESIA	Environmental and Social Impact Assessment
EU	European Union
GWh	Gigawatt-hour
GHG	Greenhouse gas
Ha	Hectares
HV	High Voltage
IFC	International Finance Corporation
km	Kilometre
kV	kilovolt
LAeq	A-weighted Leq sound level
LRF	Livelihood Restoration Framework
LRP	Livelihood Restoration Plan
MW	Megawatt
NDC	National Determined Contribution
OHL	Overhead Line
OST	Operatori I Sistemit të Transmetimit (Transmission System Operator)
PV	Photo Voltaic
REA	Regional Environmental Authority
RSIR	Route Social Impact Register
SCADA	Supervisory Control and Data Acquisition
TWh	Terawatt-hour

1. INTRODUCTION

1.1 REPORT PURPOSE

This report presents an ecosystems services assessment consistent with the requirements of the International Finance Corporation (IFC) and European Bank for Reconstruction and Development (EBRD) to support the approved Voltalia Karavasta Solar Project Environmental and Social Impact Assessment (ESIA) (Ref. 1).

The ESIA (Ref. 1) was approved in 2021 by the competent authority. The Livelihood Restoration Plan (LRP) baseline data collection, including household surveys, was completed in 1Q 2022 (Ref 9).

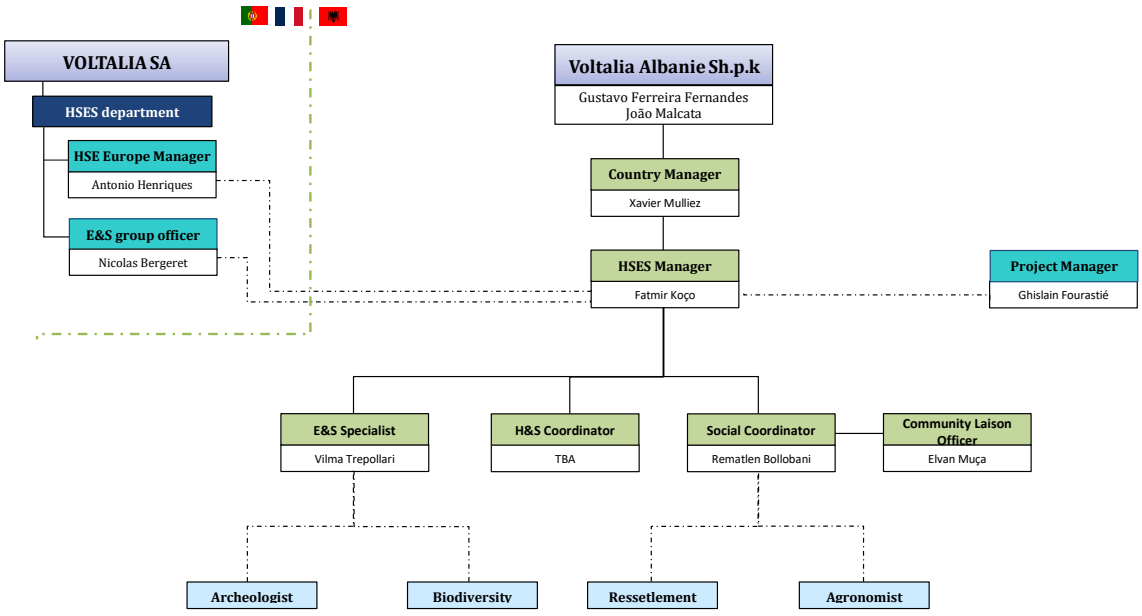
1.2 THE KARAVASTA SOLAR PROJECT

The Karavasta Solar Project is a renewable photovoltaic (PV) energy development located in the Divjaka region of Albania (see Figure 1.1), which includes the following components:

- A photovoltaic plant (PV Plant) occupying 185 Ha with a peak installed capacity of 140 MW
- Approximately 19 km long 220 kV overhead line with 57 towers connecting the PV Plant with an existing electrical substation in Fieri.

1.3 PROJECT ORGANISATION

The Voltalia Karavasta Solar Project organisation chart is provided below:



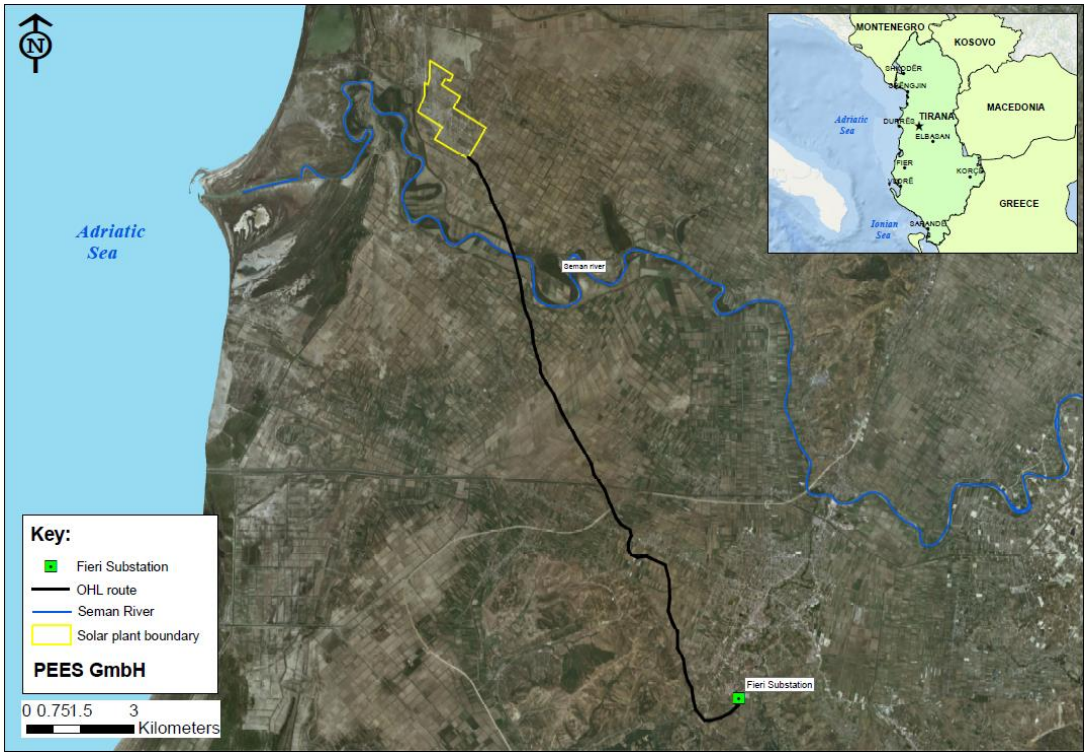


Figure 0.184 Karavasta Solar Project Location

2. ECOSYSTEM SERVICES OVERVIEW

2.1 APPLICABLE ECOSYSTEM SERVICES STANDARDS AND GUIDANCE

The EBRD and IFC environmental and social policies and supporting guidance notes (See Section 9 for all references, Ref. 2 and 3) recognise the need to protect and conserve biodiversity, including ecosystem services. The policies highlight the need for projects to consider ecosystem services and integrate their identification, monitoring and management into:

- The planning and execution of stakeholder engagement
- The environmental and social assessment of projects
- Land acquisition and social impact management
- Biodiversity data collection and assessments and
- General project governance and implementation of the mitigation hierarchy.

The World Resources Institute has issued a guidance on the integration of ecosystem service assessment into the impact assessment process (Ref. 4) and corporate ecosystem services review (Ref. 5).

Within Albanian legislation there is no explicit reference to ecosystem services; however, the legislative requirements for environmental, biodiversity and livelihood assessment and mitigation as well as stakeholder consultation cover the broader objectives of ecosystem services management and are detailed in Section 3 of the ESIA (Ref. 1).

2.2 ECOSYSTEM CLASSIFICATION AND ASSESSMENT GUIDANCE

Ecosystem services are defined by the IFC as the benefits that people, including businesses, derive from ecosystems. IFC Guidance Note for Performance Standard 6 (Ref. 3) includes four categories of ecosystem services:

- Provisioning ecosystem services provide goods or services and include:
    - Agricultural products, seafood and game, wild foods, and ethnobotanical plants
    - Water for drinking, irrigation and industrial purposes and
    - Forest areas, which provide the basis for many biopharmaceuticals, construction materials, and biomass for renewable energy.
- Regulating ecosystem services provide contribution to human well-being arising from an ecosystems influence of natural processes and include:
    - Climate regulation and carbon storage and sequestration
    - Waste decomposition and detoxification
    - Purification of water and air
    - Control of pests, disease and pollination and
    - Natural hazard mitigation.
- Cultural ecosystem services are non-material contribution to human well-being and include:
    - Spiritual and sacred sites
    - Recreational purposes such as sport, hunting, fishing and ecotourism and
    - Scientific exploration and education.
- Supporting services are the natural processes that maintain the other services and include:
    - Nutrient capture and recycling

  - Primary production and
  - Pathways for genetic exchange.

The IFC Guidance Note for Performance Standard 6 (Ref. 3) defines two types of ecosystem services, associated with the characteristics of interaction:

- Type I: Provisioning, regulating, cultural and supporting ecosystem services, over which the client has direct management control or significant influence, and where impacts on such services may adversely affect communities.
- Type II: Provisioning, regulating, cultural and supporting ecosystem services, over which the client has direct management control or significant influence, and on which the project directly depends for its operations.

If an impact to an ecosystem service is likely, a systematic assessment is required to determine whether priority ecosystem impacts will occur. The assessment shall consider:

- The project's likelihood to have an impact on the service and
- The project's direct management control or significant influence over that service.

Type I priority ecosystem services are defined under the following circumstances:

- Project operations are likely to result in a significant impact on the ecosystem service
- The impact will result in a direct adverse impact on affected communities "livelihood, health, safety, and/or cultural heritage"; and
- The project has direct management control or significant influence over the service.

Type II priority ecosystem services are defined under the following circumstances:

- The project directly depends on the service for its primary operations and
- The project has direct management control or significant influence over the service.

3. ECOSYSTEM SERVICES ASSESSMENT METHODOLOGY

The ESIA (Ref. 1) did not explicitly consider ecosystem services; however, to support the ESIA, stakeholder engagement was completed, and field-based assessments of the physical environment, including hydrological assessments, water and air quality and noise measurements and biodiversity surveys were undertaken.

The process of ecosystem services assessment for the Voltalia Karavasta Solar Project is summarised in Figure 3.1 below and constitutes a systematic approach to the evaluation of the project and its associated activities that complements the ESIA. Further detail is provided below.

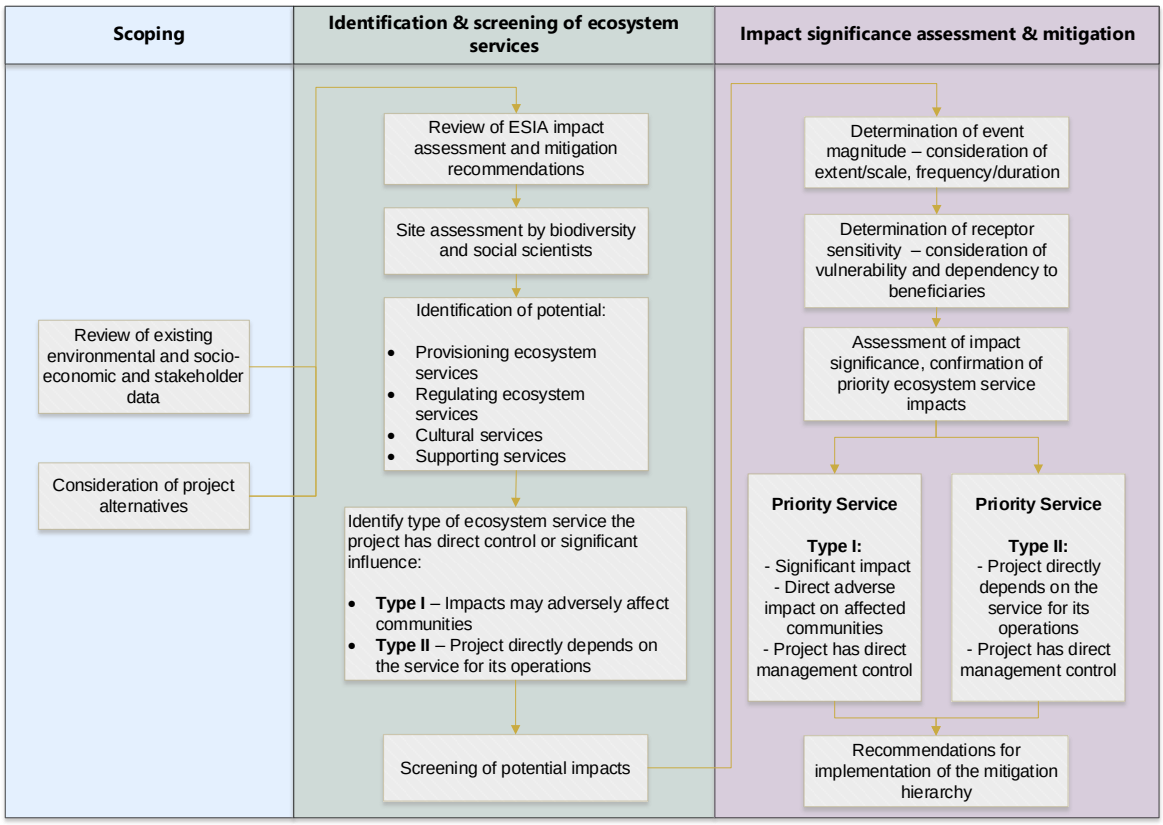


Figure 0.185 Ecosystem Services Assessment Process

3.1 SCOPING

Scoping is the first step in the ecosystem services assessment process, providing a high-level assessment of anticipated “interactions” between project activities and environmental and social components that provide or benefit from ecosystem services. Scoping focuses the assessment, eliminating activities from the full impact assessment process based on their limited potential to result in discernible impacts.

To arrive at a conclusion to ‘scope out’ an ecosystem service, a mixture of expert scientific judgement based on prior experience of similar activities and events and, in some instances, scoping level quantification / numerical analysis is used.

The Karavasta Solar Project scoping process has included:

- Review of existing environmental and socio-economic data provided within the ESIA
- A site visit to the project location and surrounding area
- Liaison with the team completing the LRP and supporting activities, detailed in Section 5.4.

3.1.1 ASSESSMENT OF PROJECT ALTERNATIVES

The initial step in defining a project is to identify, at a conceptual level, viable alternatives to the project at two levels:

- Alternatives to the development, including the “no development” option, and
- Engineering or construction alternatives within the selected project’s concept design definition.

Consideration of the no “development option” and Karavasta Solar Project alternatives are presented in Section 2.6 of the ESIA (Ref. 1). In addition, there has been further consideration of alternatives, summarised below.

The proposed location for the PV Plant was defined by the Ministry of Infrastructure of Albania and is a state land not owned by private entities. There is evidence of informal grazing of livestock on parts of the land, and this and any other livelihood activities on the site will be taken into account as part of the Livelihood Restoration framework (LRF) and LRP development.

The key principle in determining the route of the OHL was avoidance of the following areas to the extent possible:

- Populated areas and housing
- Forested areas
- Parks and natural reserves
- Special landscapes or landscapes with an architectural and historical value
- Geologically unstable areas
- Farming lands, especially those with vineyards and orchards.

The proposed route has been selected specifically to avoid the need for any physical displacement of buildings, including households and businesses. The route also avoids, to the extent possible, land parcels planted with perennial trees, including orchards and vineyards, which would otherwise be impacted by easement restrictions, as well as taking longer to recover following any construction disturbance.

Further route selection has resulted in a refinement of the route to reduce the number of agricultural land parcels impacted by the project as well as to reduce the number of crossings of the Seman river and associated disturbance to the riparian habitat.

Refinements to the final routing are now being undertaken in terms of location of individual pylons; where feasible, these are being located at the boundary/edge of farm parcels. This will reduce the impacts of permanent land take for the pylons and orphan land issues.

3.2 IDENTIFICATION AND SCREENING OF ECOSYSTEM SERVICES

To support the identification and screening of ecosystem services the following data was reviewed:

- ESIA and associated socio-economic survey data
- LRP household survey
- Four additional ESIA disclosure meetings where completed in June 2022 in communities along the OHL route and adjacent to the plant area
- Onshore environmental surveys presented in the ESIA that include biodiversity, noise, visual context, air quality, noise, soil quality, hydrological, socio-economic and cultural heritage baseline surveys
- Meteorological and hydrological data.

The review informed the planning of site visits completed by Spartak Koci (a biodiversity specialist) and Ani Plaku (a social scientist) in December 2021 to support the confirmation of possible ecosystem services and screening process.

The screening of ecosystems services focused on confirming the below criteria:

- Is the ecosystem service present within the footprint of the PV Plant and OHL and the area where construction or operational direct and indirect impacts may occur, defined as the Area of Influence
- Will the project likely have an impact on the service
- Does the project have management control or significant influence over the service

Those ecosystem services that did not trigger the above criteria were screened out of the assessment process and are listed in Appendix 1.

3.3 IMPACT SIGNIFICANCE ASSESSMENT

To systematically assess potential impacts (an interaction between a project activity and ecosystem service) to Type I and II services, an assessment framework has been developed that ranks impact according to its "significance" determined by considering "impact magnitude" of and "service sensitivity".

Professional judgement, with the input from relevant experts, has been used when applying the framework. The potential to use quantitative analysis of impacts was limited, and the key data sources were the ESIA, the site visits in December 2021, the LRP household survey and the additional ESIA disclosure meetings in June 2022.

3.3.1 METHOD FOR DETERMINING IMPACT MAGNITUDE

Impact magnitude considers two parameters, which are equally weighted and are each assigned a rating of "1", "2", or "3". Two indicators of impact magnitude used are:

- Extent / Scale – The spatial footprint of the impact created by the construction and operation of the Karavasta Solar Project as well as the spatial extent of the service that is impacted
- Frequency / Duration – The temporal extent of the impact created by the construction and operation of the Karavasta Solar Project, considering the duration and frequency

Extent / Scale: Ranges from:

- **1** – Impacts confined to within 1 km of the Karavasta Solar Project (the PV Plant Area and OHL) footprint
- **2** – Impacts extending beyond 1 km of the Karavasta Solar Project (the PV Plant Area and OHL) footprint but remaining within 7 km, and impacts no more than 50% of an area critical to the habitat / ecosystem service function
- **3** – Impacts extending beyond 7 km of the Karavasta Solar Project (the PV Plant Area and OHL) footprint, and impacts more than 50% of an area critical to the receptors habitat / ecosystem service function.

Frequency / Duration: Ranges from:

- **1** – Infrequent impacts and impacts of short duration
- **2** – Impacts of medium frequency and duration
- **3** – Frequent impacts and impacts of long duration.

Overall impact magnitude is scored from low (1) to high (6) by adding the individual parameter scores:



Resulting individual ratings are summed to give the overall impact magnitude ranking, see Table 3.1.

Table 0-89 Impact Magnitude Rankings

Impact Magnitude	Score (Summed Parameter Rankings)
Low	1-2
Medium	3-4
High	5-6

3.3.2 METHOD FOR DETERMINING SERVICE SENSITIVITY

Receptor sensitivity considers two parameters, which are equally weighted and are each assigned a rating of ”1”, ”2”, or ”3”. The two indicators of sensitivity used are:

- Vulnerability considers the nature, extent, condition, as well as changes (external to the project) of the service and its capacity to adapt to change
- Dependency considers importance of the service to users in terms of livelihoods, health, safety and cultural heritage

Vulnerability (to the identified stressor): Ranges from:

- **1** – Service supply / functionality affected to a minor extent, abundant sources available, beneficiaries’ access is at very low risk
- **2** – Service supply / functionality moderately affected, reduction in abundance / availability / access, where thresholds associated with dependence are not exceeded
- **3** – Material changes or constraints to service supply / functionality, to abundance / availability / access, where thresholds associated with dependence are exceeded.

Dependency: Ranges from:

- **1** – Service benefits generate very low to no dependency and there are other sources of easily available/accessible comparable alternative services
- **2** – Service benefits have a medium level dependency and there are other alternative sources with medium level availability/accessibility constraints
- **3** – Service benefits have a high level of dependency and there are very limited alternative sources with material availability/accessibility constraints.

Overall receptor sensitivity is scored from low (1) to high (6) by adding the individual vulnerability and dependency scores, see table 3.2.



Table 0-90 Service Sensitivity Rankings

Sensitivity	Score (Summed Parameter Rankings)
Low	1-2
Medium	3-4
High	5-6

3.3.3 METHOD FOR DETERMINING IMPACT SIGNIFICANCE

Impact significance, as a function of impact magnitude and sensitivity, is subsequently ranked, as presented in Table 3.3 below.

Table 0-91 Impact Significance

		Service Sensitivity		
		Low	**Medium**	**High**
Impact Magnitude	**Low**	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Significant
	High	Moderate	Significant	Significant

Any impact ranked as “significant” would trigger the priority ecosystem service classification as per the IFC Guidance for Performance Standard 6 (Ref. 3).

A type I priority ecosystem services associated with the construction and operation of the Karavasta Solar Project would result in an adverse impacts to affected communities.

A type II priority ecosystem services associated with the construction and operation of the Karavasta Solar Project would result in an adverse impact to the service the project is directly dependent for its operations.

4. ENVIRONMENTAL AND SOCIO-ECONOMIC OVERVIEW OF THE PROJECT AREA OF INFLUENCE

4.1 GENERAL CHARACTERISTICS AND HYDROLOGY

The Karavasta Solar Project PV Plant is located 3.8 km west from the Adriatic coast of Albania, 14 km northwest of Fieri. The PV Plant is ~ 0.5 km from the Seman river, a major river in western Albania with a catchment of over 5,000 km^2 that is formed by confluence of two rivers, the Devoll and the Osum.

The PV Plant will occupy 185 Ha of land within a relatively flat area with a 2 m change in elevation across the site, approximately 2 m above sea level and composed of sand to sandy load soils (see Figure 4.1).

The area is poorly vegetated by salt tolerate species including semi natural salt marsh / meadow habitat (recognised within Annex 1 of the EU Habitats Directive) which has been modified over time, is not actively cultivated, and is used by informal herders for grazing of livestock.

The PV Plant is adjacent to the Divjakë-Karavasta National Park; approximately 50% of the PV Plant lies within the International Bird Area and Key Biodiversity Area that is centred in the Divjaka-Karavasta National Park (see Section 4.3 for further details).



Figure 0.186 PV Plant Area

The PV Plant is situated within an extensive area of drainage channels of over 7,000 Ha, which were constructed in the second half of the 20th century and are no longer fully functional as a result of continued poor maintenance. Due to the low elevation and the poorly functional drainage systems in the vicinity of the PV Plant flooding and standing water in periods of sustained rainfall are common and can limit vehicle access (see Figure 4.2 of the key drainage features). There are 5 main drainage areas that include:

- The Seman river
- The Dokollareve canal
- The Myzeqe Canal and Canal North
- The Canal South
- The Hoxahara drainage channel

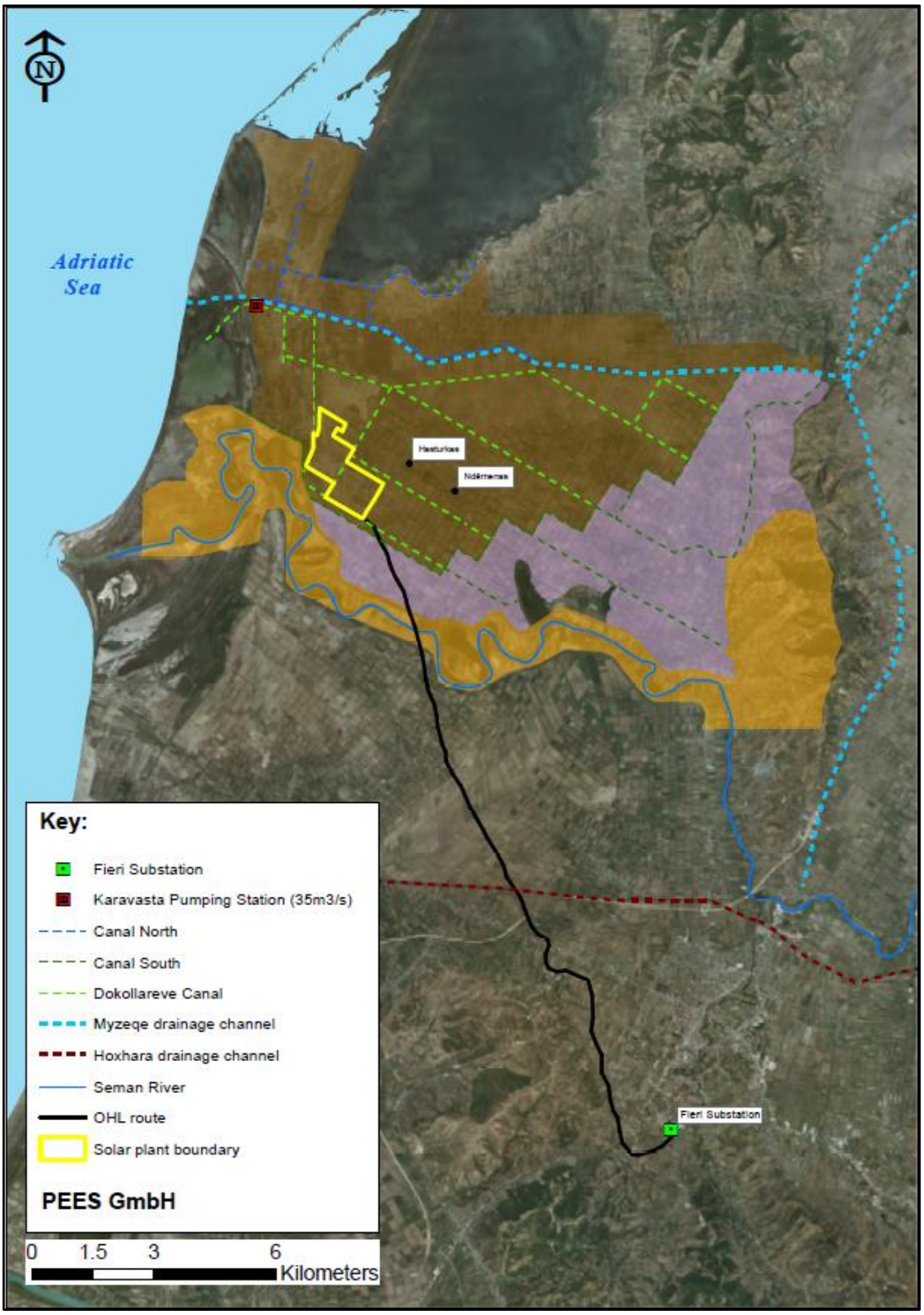


Figure 0.187 Key Drainage features in the Project Area of Influence

The nearest residential community, Hastukasi, is situated ~1 km from the north-western boundary of the PV Plant, with closest isolated single dwelling 500 m west (see Figure 4.3) and 350 m north-east of the PV Plant.



Figure 0.188 Single Dwelling 500 m west of PV Plant

The land along the OHL is predominantly actively cultivated agricultural land. There is a single OHL crossing of the Seman river at the locations of towers 9 and 10 and a crossing of the Ujitja / Hoxhara drainage channel near the Dermenas community between towers 29 and 30 (see Figure 4.4). The LRP socio-economic survey reported that along the OHL route, twice as many parcels were cultivated with annual arable crops (the most common at the time of the survey; alfalfa 46%, wheat 36% and oat 29%) and annual perennial fruit crops (the most common at the time of the survey; olive 43%, fig 10%, grape 6.5%, pomegranate 5.6% and citrus 4.5%). Grazing of livestock has been observed at the PV Plant as the area is not cultivated and provide sparse poor quality grazing vegetation.



Figure 0.189 Seman River Crossing Location

4.2 SOCIO-ECONOMIC CHARACTERISTICS

The ESIA (Ref. 1) reports that agricultural and livestock activities are the most common source of income for 46% of households; whilst 34% are retired, 7.4% of the respondents were unemployed and actively looking for employment and 7% worked in the private sector. These numbers are consistent with the LRP household survey.

According to the ESIA socio-economic survey 90.4% of the households in the study area cultivate their land for households needs and sporadically for sale. The ESIA socio-economic survey reported that 71% of the households owned livestock, LRP household survey the number was lower; 45% of the surveyed households owned livestock. The most common livestock during the LRP household survey were chickens and cows. The ESIA socio-economic survey reported and the LRP household survey reported that between 50-41% of the household residents use of livestock products for subsistence purposes.

During the ESIA socioeconomic survey, one household was reported as engaged in fishing. No households in the LRP household survey reported they engage in fishing. During the ecosystem services assessment site visit in December 2021, evidence of fishing activity was observed in many of the irrigation channels and natural water courses including the Seman river and the Ujitja / Hoxhara drainage channel (see Figure 4.5). During the ESIA disclosure meeting engagement, in June 2022, a single fisherman was identified and engagement confirmed fishing was exclusively for subsistence purposes to support his primary vocation, farming.



Figure 0.190 Evidence of fishing activity observed in December 2021

In the LRP socio-economic survey and the ESIA socioeconomic survey no participants reported participating in apiculture. A total of five households were confirmed in participating in apiculture via the ecosystem services assessment site visit in December 2021 and ESIA disclosure meetings in the June 2022. All five households were located within 1km of the PV plant area and the number of beehives ranged from three to ten for four of the households and used for personal consumption. One household reported as having 120 beehives and generates income from the activity.

As Informal hunting is common in Albania, it is likely to occur within the Project Area of Influence. Within 5 km south-west of the PV Plant evidence of hunting for waterfowl or brown hare has been observed by the report authors during visits to this area (not associated with the Karavasta Solar Project) prior to 2021. Evidence of hunting was not recorded in the ESIA (Ref. 1). No observations of hunting were recorded in the December 2021 visit but have been observed by the LRP team, but no households that participated in the LRP household survey reported the hunt.

There is an established paved road network in the vicinity of the PV Plant and OHL route. There is a paved access to the communities of Ndërmenas and Hasturkas, which are the communities closest to the PV Plant. Access beyond these communities to the PV Plant or

coastal area is via unpaved tracks, currently some of which go through the area of the PV Plant.

4.3 DESIGNATED BIODIVERSITY AREAS

There are three protected areas within the Project Area of Influence (see Figure 4.6), which include:

- The Divjaka-Karavasta National Park located adjacent to the western boundary of the PV Plant
- The Nature Monument of Kurora e Semanit located less than 3 km to the east of the OHL
- The Nature Monument Pylli I Levanit, located 2km south-west of the OHL.



Figure 0.191 Protected Areas within Project Area of Influence

In addition to the protected areas, important biodiversity features are:

- Approximately 50% of the PV Plant is within the International Bird Area and Key Biodiversity Area that is centred on the Divjaka-Karavasta National Park
- Breeding bird observations within the ESIA (Ref. 1) have limitations as the surveys were completed in January, February, August, and November and would have

missed the main breeding period in the spring / early summer. Within the ESIA (Ref. 1) up to five bird species out of a total of 35 species observed were considered as probably breeding.

- Within the PV Plant, due to the decline of the arable agricultural practices, saltmarsh / meadow habitat is now present, which is a recognised habitat within Annex 1 of the EU Habitats Directive (Habitat code 1310 and 1410)
- A number of species included in the EU Habitat Directive have been observed within the Seman river riparian habitat (note, the OHL towers avoid the riparian habitat and are located in cultivated land), the drainage channels and the general area of the PV Plant. These include otter, badger, golden jackal, three species of frog, five lizard species, seven snake species, one tortoise and two terrapin species.

4.3.1 DIVJAKË-KARAVASTA NATIONAL PARK

The Divjakë-Karavasta National Park borders the western boundary of the PV Plant for 1 km. The Park has a visitor centre and employs a team of rangers that also support enforcement of hunting bans. In 2017 Birdlife International reported that substantive conservation measures are being implemented but these are not comprehensive and are limited by resources and capacity. The Park covers 22,230 Ha that include:

- Four lagoonal areas that are connected to the surrounding rivers and irrigation channel network
- Estuaries of the Shkumbin river in the north and the Seman river in the south
- Forest areas including natural umbrella pine forests within the northern part of the Park and
- Coastal habitat including sand dunes.

The Park is of national and international importance for migratory, wintering and breeding bird populations and is a listed wetland area under Ramsar Convention. The Park has also been listed as a Candidate for the Emerald Network under the Bern Convention, as an Area of Special Conservation Interest, and Important Bird Area and as a pilot area for the Natura 2000 network.

In 2021 Birdlife International reported approximately 250 bird species, among them 15 Globally Endangered bird species, at least 80 species in Annex 1 of the Birds Directive and some five bird species exceeding the 1% threshold of the biogeographic population. The Park supports 84,000 wintering waterbirds, 12,000 breeding birds and many more migrating waterbirds. Important species of global conservation concern include:

- Wintering species, such as Common Pochard (*Aythya ferina*), Long-tailed Duck (*Clangula hyemalis*), Velvet Scoter (*Melanitta fusca*), White-headed Duck (*Oxyura leucocephala*), Greater Flamingo (*Phoenicopterus roseus*) and raptor species including the Greater Spotted Eagle (*Clanga clanga*)
- Resident / nesting species of seabirds, such as the Yelkouan Shearwater, Turtle Dove (*Streptopelia turtur*), Dalmatian Pelican (*Pelecanus crispus*), and triggering species for the Ramsar qualification – Pygmy Cormorant (*Microcarbo pygmaeus*).

The Divjakë-Karavasta National Park attracts domestic and international tourists, participating in bird watching activities as well visiting restaurants, hotels and beach facilities mostly located in the northern part of the Park, approximately 15 km to the north of the PV Plant.

Fishing is reported as an important occupation for the inhabitants of the lagoon communities, with participation via registered cooperative groups and on an informal basis. There is limited available data on the numbers of households that rely on fishing in the Divjakë-Karavasta area; the 1996 Karavasta Lagoon Management Plan reports that fishing is the secondary occupation for circa 500 coastal households.

4.3.2 Kurora e Semanit Nature Monument

Kurora e Semanit Nature Monument is a riparian forest area, less than 3 km to the east of the OHL, upstream of the Seman river (see Figure 4.7). The 44-Ha area of well-preserved natural forest provides nesting and roosting habitat for birds and natural riparian habitat.

The nature monument is adjacent to the Seman river to the south and surrounded by cultivated land to the east and north, with footpath access to the monument for day visitors via the adjacent community of Adriatik to the west. There is also a paved vehicle access to Adriatik.



Figure 0.192 Kurora e Semanit Nature Monument

4.3.3 PYLLI I LEVANIT NATURE MONUMENT

The Pylli I Levanit Nature Monument is a forest area located on a hilly terrain 2 km to the south-west of OHL towers 53 and 54 (see Figure 4.8), that provides nesting and roosting habitat for birds as well as terrestrial species. The nature monument is surrounded by cultivated land and is adjacent to a well-established road link between Fieri and Vlore.



Figure 0.193 Pylli I Levanit Nature Monument

4.4 CULTURAL HERITAGE

There are two established Christian cultural heritage sites Within the vicinity of the Karavasta Solar Project.

The Saint Thanasi Church built in 1778 is a recognised Christian place of worship (see Figure 4.9). It is located within the Divjakë-Karavasta National Park in the village of Karavasts, 5 km north-east of the PV Plant.

A small chapel called Kisha e Shën Marinës (see Figure 4.10) is located just over 1 km from the northern boundary of the PV Plant.



Figure 0.194 Saint Thanasi Church



Figure 0.195 Kisha e Shën Marinës Chapel

5. STAKEHOLDER ENGAGEMENT

Stakeholder engagement was completed to support the scoping and disclosure of the ESIA (Ref. 1) and further engagement was undertaken to support the development of the LRP including a household survey of the directly affected households. A summary of the engagement completed for the ESIA, extracted from the Voltalia Karavasta Solar Project LRF, is provided below.

1.1
5.1 ESIA PUBLIC MEETINGS

In accordance with Albania national EIA legislation, a public hearing was organised to present the ESIA process to stakeholders. Invitation letters with 30 copies of the non-technical summary of the ESIA were made available to the local communities and sent to the municipality of Divjake, Fieri and to the Regional Environmental Authority (REA). The same letter with 10 copies of the ESIA non-technical summary was sent to the Administrative Units (AU) of Karavasta, Libofshe, Topoje, Dermenas and Qender.

Posters with information about the public hearing and contact details were displayed in the villages near the site of the PV Plant and along the route of the OHL. In addition, an announcement was published in the local and national press and was disseminated through radio and television for 20 consecutive days. For stakeholders who could not be present at the public hearing, a link was provided to enable online participation.

5.2 ESIA CONSULTATION MEETINGS

Consultation meetings were organized during both the scoping and ESIA phases of the Karavasta Solar Project to provide stakeholders with background information about the proposed development and to give stakeholders the opportunity to raise issues and / or concerns. Invitations to stakeholders were sent via letters and emails. Invitation letters of notification were distributed to all key stakeholder groups identified. Other forms of notifications included display of posters and distribution of leaflets in the affected villages and residential settlements.

For the draft scoping report, an online consultation meeting was organized to discuss relevant issues related to the Scoping Report disclosure and its preliminary findings. All the stakeholders identified in the first phase of engagement were notified via email of the publication of the Scoping Report and then notified of online consultation after the lapse of the 30-day disclosure period. In addition, posters and flyers was distributed to inform the local communities. The Scoping Report was made available on the Project website and officially delivered to each of the AUs crossed by the Karavasta Solar Project.

The following onsite engagement meetings were carried out:

- Between the 21st – 25th September 2021: a total of 16 meetings were carried out with national, regional and local authorities with the participation of 53 officials
- October 2021: engagement with local communities was conducted through ad-hoc meetings with more than 30 community members in the villages of Ndërnenas and Hasturkas
- February 2021: following confirmation of the route alignment, engagement with local communities residing along the OHL was carried out.

Four additional ESIA disclosure meetings where completed in June 2022 in communities along the OHL route and adjacent to the plant area. The meetings were attended by 76 stakeholders. To support the identification of ecosystems service users during the meeting slides were included to describe the concept of ecosystem services and participants were asked if they or were aware of members of their community that use ecosystem services. A total of seven households were identified as potential ecosystem users. After further discussion with households and community visits, five new households that use ecosystems (one capture fishing and four apiculture) were verified and a questionnaire was used to assess the extent of their dependency and significance of the ecosystem services in terms of livelihoods, health, safety and cultural heritage.

5.3 ESIA SOCIO-ECONOMIC SURVEY

A socio-economic survey was undertaken to collect relevant baseline information and to engage with stakeholders. The survey team distributed leaflets to 364 households interviewed during the socio-economic survey.

According to the survey, the biggest challenges faced by the households residing in the area relate to unemployment and economic issues, as well as infrastructure and public utilities, such as access to drinking water and sanitation, and poor health service provision.

5.4 LIVELIHOOD RESTORATION PLAN ENGAGEMENT AND SUPPORTING STUDIES

To support completion of the LRP the below engagement was completed:

- Government ministries and agencies, including:
    - Transmission System Operator (OST)
    - Albanian Ministry of Infrastructure and Energy
    - Albanian Ministry of Agriculture and Rural Development
    - Albanian Ministry of Culture
- Local government stakeholders, such as representatives for the Fieri and Divjakë municipalities
- Agricultural institutions and agencies
- Civil society organisations
- Affected households to support land compensation and land access planning.

In addition to further stakeholder engagement, has been completed that provides additional information on the relevance of ecosystem services associated with those households affected by the Karavasta Solar Project:

- A comprehensive socio-economic survey of all identifiable directly-affected households to gather individual households data
- A Land, Farm and Crops Survey will be completed in parallel with the socio-economic survey to record all standing crops, grazing areas and confirm land ownership, as well as an agronomic baseline assessment to confirm land quality and productivity
- A Route Social Impact Register (RSIR) has been developed to ensure any impacts beyond the Karavasta Solar Project footprint (e.g., loss of access during construction that may impact agricultural areas, livestock, households and businesses) are identified and mitigation measures proposed.

The socio-economic survey of all identifiable directly-affected households involved 146 households. The survey questionnaire included questions to assess the extent of their dependency and significance of the ecosystem services in terms of livelihoods, health, safety and cultural heritage. None of the participants reported to be engage in hunting, fishing or apiculture. The most relevant information to the support this assessment of ecosystems services was the type of the annual crops and perennial trees to support an understanding of the pollinators foraging habitat in the project area of influence.

6. PROJECT DESCRIPTION

6.1 PROJECT PURPOSE

The Albanian government is working towards a reliable and more sustainable energy sector, development of which is based on exploiting all energy options to meet Albania's energy demand and create added value for Albanian citizens in alignment with the principles of environmental, economic and social responsibility.

Historically, electricity generation in Albania has been almost exclusively from hydropower. In 2017 the country had a total installed capacity of about 2,100 MW, of which only 100 MW was thermal. In 2017 annual electricity consumption was about 7.1 TWh with a peak load demand of 1.4 GWh. Therefore, Albania imports electricity from neighbouring countries.

Albania benefits from an average of 360 days of sunshine in key locations, and energy production from solar PV is an important potential source of electricity that will help to meet the goals of Albania's National Strategy on Energy and will, in particular, assist in:

- Diversifying energy sources
- Developing internal energy sources of primary energy in a sustainable and competitive manner
- Reducing Albania's dependence on hydropower and imported electricity
- Increasing the reliability and security of energy supply
- Improving the cost effectiveness of power supply systems
- Achieving objectives for renewable energy sources and energy efficiency
- Achieving National Determined Contribution (NDC) Objectives for reducing Greenhouse Gas Emissions (GHGs).

6.2 MAIN PROJECT COMPONENTS AND KEY CHARACTERISTICS

6.2.1 PV PLANT

The plot available for the PV Plant consists of 196 Ha of currently state-owned land, with the proposed footprint occupying a total area of 185 Ha. The PV Plant land ownership will be transferred to Voltalia Albanie Sh.p.k (Albania). Once built the ownership of the OHL infrastructure will be transferred from Voltalia Albanie Sh.p.k to Operatori i Sistemit të Transmetimit (OST

The Karavasta Solar Project is designed as a 140 MW direct current (DC) horizontal single-axis tracking PV park and will deliver 120 MW alternating current (AC) to the grid. The Plant itself consists of solar PV modules, module tracking systems, inverters and step-up transformer / sub-station, allowing connection to the OHL and ultimately to the national grid, through the sub-station at Fieri, approximately 20 km south-east.

The Karavasta Solar Project will also require a building to accommodate the Supervisory Control and Data Acquisition (SCADA) equipment for the command, control and protection. The SCADA system will be manned by technicians employed for the control, operation and maintenance of the Karavasta Solar Project.

In addition to the above key components the PV Plant will include the following infrastructure:

- Onsite (buried) cabling
- Drainage systems
- Fencing and security facilities
- Access tracks
- Material storage facilities.

During the construction phase, one or more temporary construction compound(s), including site offices, material, and equipment storage etc., will be required as well as temporary roads to facilitate access to all parts of the site under development.

Figure 6.1 shows the footprint of the PV Plant, including the demarcation of the perimeter fence and location of the substation.

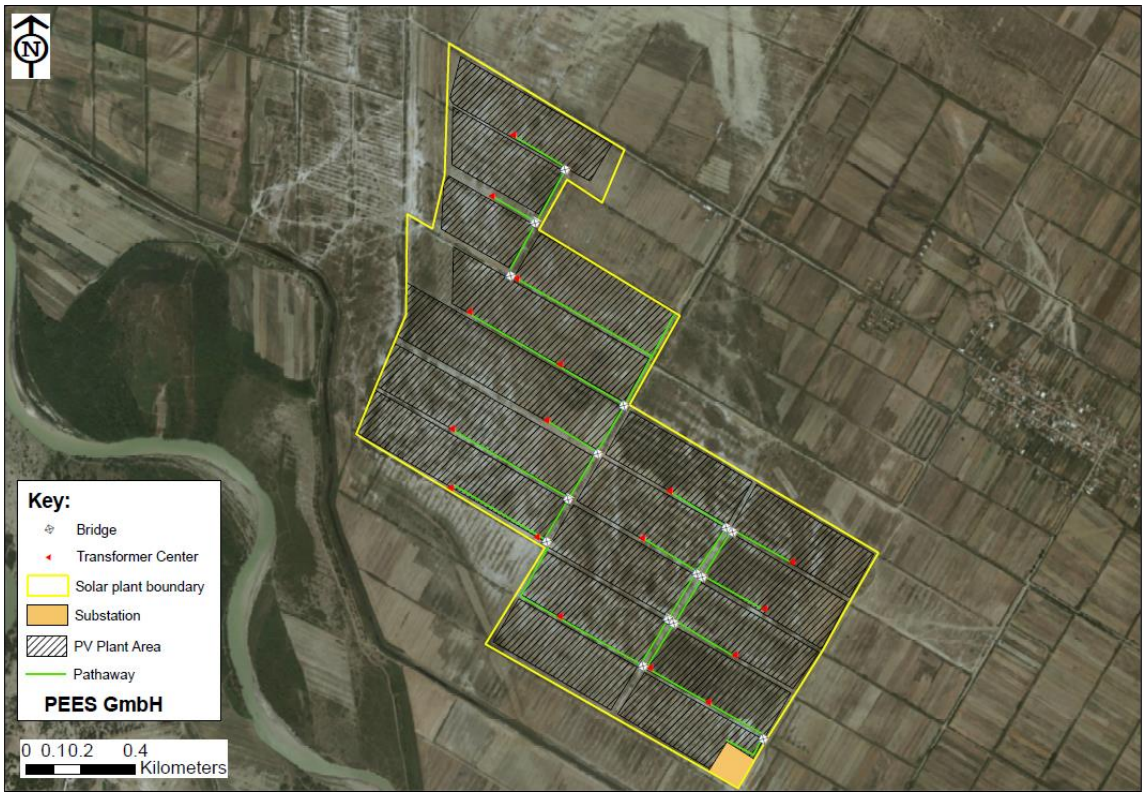


Figure 0.196 PV Plant Layout

6.2.2 OVERHEAD LINE (OHL)

The Karavasta Solar Project requires a 220-kV Overhead Line (OHL) to enable transmission and connection to the national grid. The height of the towers will be 30-40 m. The OHL will be approximately 19 km long, with 57 towers (see Figure 6.2).

Once built, the ownership of the OHL infrastructure will be transferred from Voltalia to OST. The footprint of each tower would be 10 m x 10 m, and the land required for these would be permanently acquired.

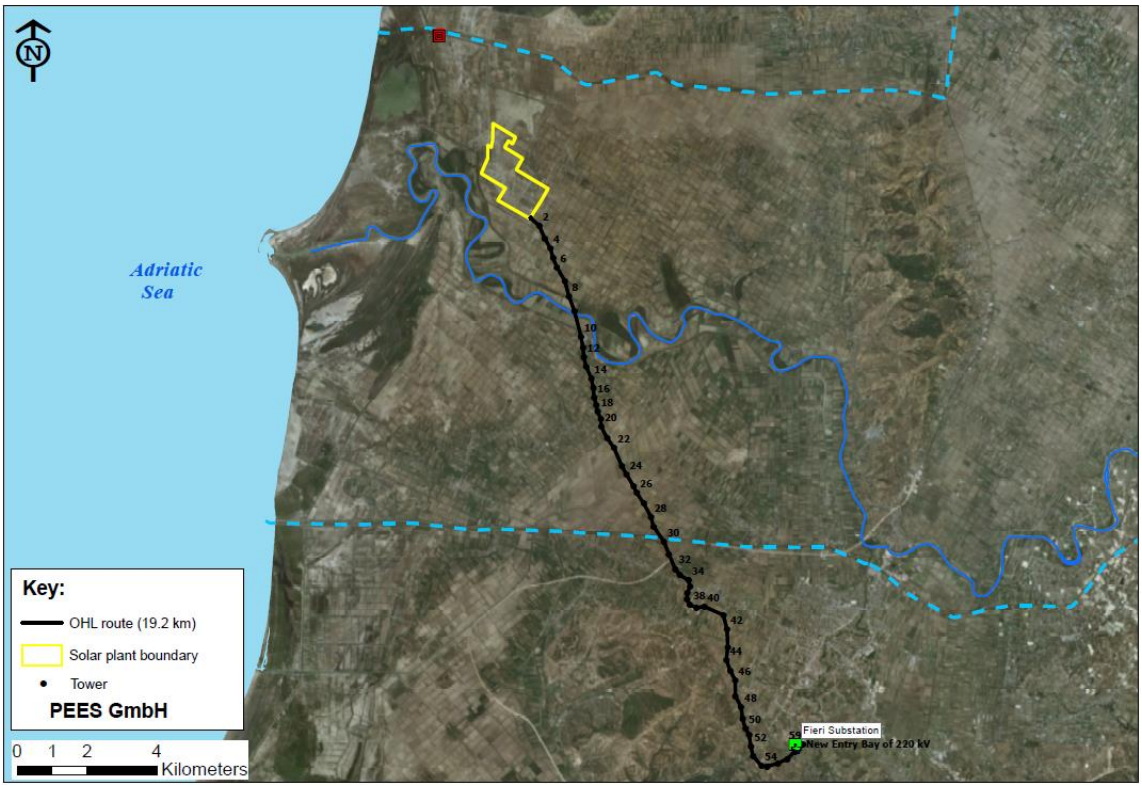


Figure 0.197 Route of Overhead Line

The wayleave required for the OHL will be a total width of 50 m, 25 m on either side of the cable centre line. The OHL will traverse approximately 700 land parcels, requiring permanent land acquisition for installation of the towers and access roads, temporary land access during construction, including vegetation height restrictions to ensure land use in the vicinity of the pylons does not create safety issues.

During the construction phase, access roads will be required to construct the pylons, as well as to provide temporary access for installation of the lines.

6.3 PROJECT PHASES AND ACTIVITIES

The Karavasta Solar Project can be divided into four key phases as follows:

- Mobilisation / Pre-construction: site preparation and mobilisation of equipment and materials to site
- Construction and Installation: civil and electrical works and equipment installation
- Operation and Maintenance: plant operation and routine maintenance
- Decommissioning or Extension: dismantling of equipment and associated facilities and site restoration, or extension of lifespan through renewal of components.

6.3.1 MOBILISATION / PRE-CONSTRUCTION

The mobilisation / pre-construction phase includes transportation of project components, equipment and materials to the site, as well as site preparation, which involves clearing, grading and levelling of the site and establishment of on-site facilities including a temporary construction compound.

During the site preparation period the workforce required for site security, manual labour, civil works, transportation of goods and other similar services will most likely be drawn from the local labour pool.

6.3.2 CONSTRUCTION AND INSTALLATION

The construction phase for the PV Plant will include many activities and phases, such as:

- Construction and upgrade of internal and external access roads
- Levelling off the ground
- Fencing around the site
- Installation of PV Power Units
- Pile driving for mounting structure
- Construction of electrical substation and foundations
- Excavation, trenching and cable laying
- Installation of a septic tank
- Construction of buildings
- Erection of overhead high voltage (HV) power lines
- Testing and commissioning
- Site clean-up.

A section of the site will be used as a laydown area where shelters, equipment, portable sanitary facilities and containers will be located.

To provide access to the site from the nearby public road a short access route will need to be prepared to a level acceptable for safe transport of equipment, material and people to and from the site (including diggers, loaders, bulldozers, cranes and transport trucks). The need for cut and fill areas and / or borrow pits at the PV sites, along roads and at substation / transformer sites will only be known after the final design has been completed.

The construction of the OHL will be undertaken in the following sequential steps:

- Preparatory work:
- Micro-siting and finalization of the locations of towers and route of OHL
- Mobilisation of engineering machinery to the OHL route
- Construction of platforms for pylons and delivery of materials along the OHL route
- Construction work:
- Marking out of foundation, earth works and excavations
- Installation of foundations and grounding devices
- Assembly, installation, alignment and fixing of pylons
- Installation work:
- Rolling out and connecting wires and cables, lifting them onto pylons, stretching and fixing on pylons
- Installation of vibration dampers, remote spacers and mounting loops.

It is envisaged that to 200 people will be employed during the construction. No onsite workers' accommodation is envisaged.

Voltalia have committed externally (within the LRP) to improve the existing access road to the east of the PV Plant, which will allow access to the coast and lagoon.

6.3.3 OPERATION AND MAINTENANCE

Due to the passive nature of solar PV plants, no emissions are expected during operation with a very limited quantities of waste being generated. No significant noise generating

equipment or machinery will be operated and the need for storage of hazardous materials on site is limited.

Day to day facility operations will involve both regular on-site preventive and corrective maintenance tasks in order to keep the PV Plant in optimal working order, ensuring an extended system lifespan and compliance with manufacturer warranty requirements (e.g. cleaning of PV modules). Corrective maintenance will be undertaken as required in response to failures, such as repair or replacement of damaged or faulty equipment.

Once completed and commissioned, the OHL it will be handed over to the State Transmission System Operator (OST) to manage operation and maintenance.

Approximately 20 jobs will be created through the operation phase, including skilled and semi-skilled labour (such as electrical and mechanical technicians) and unskilled labour (such as module cleaners and security personnel), for a duration of 30 years.

6.3.4 DECOMMISSIONING OR EXTENSION

The Karavasta Solar Project is expected to have an economic lifespan of 30 years, and the power plant infrastructure would either be decommissioned or extended and upgraded (if a new license is granted) once it has reached the end of its economic life.

Extending and upgrading the Karavasta Solar Project would consist of replacing old PV modules with new ones, increasing the total peak power of the PV Plant (a process called “repowering”) or increasing the power of the PV Plant by adding new elements such as trackers, PV modules or transformers.

If the Karavasta Solar Project is to be decommissioned, then the site will be returned to condition as close to its original state as possible decommissioning would be expected to take between 3 months for PV plant and 2 months for OHL, and a Decommissioning Plan would be prepared in advance to manage any temporary impacts arising from decommissioning works.

6.4 PROJECT SCHEDULE

The construction of the Project is planned to commence with Plant Site early works in Quarter 3 of 2022, and be in full operations in second half of 2023. The expected duration of the PV construction period consists of 2 months early works, and 11 months construction. The final construction schedule will be specified during the detailed design phase.. **Error! Reference source not found.** shows the key estimated dates.

Table 0.92: Key Estimated Dates

Project Stage	Estimated Duration	Estimated Date Range
PV Plant Site		
Permits and Approvals	3 months	Oct 20 - May 22
Early Works	2 months	July 22 – Aug 22
Construction Phase	11 months	Jul 22 – Aug 23
Testing & Commissioning	3 months	Aug 23 – Oct 23
OHL		
Permits and Approvals	3 months	Aug 22 – Oct 22
Construction Phase	10 months	Sep 22 – Aug 23
Testing & Commissioning	2 months	Aug 23 – Oct 23

6.5 SUMMARY OF PROJECT LAND TAKE

The Karavasta Solar Project is still in detailed design phase, which includes efforts to further avoid and minimize displacement. However, key land take impacts can be estimated at this stage and are provided in Table 6.2 below.

Table 6.2: Estimated Project Land Take

Project Phase	Component	Estimated Land Take	Duration
Construction	PV Plant Area	185 Ha	Permanent
	OHL Pylons	Approx. 57 pylons with 10 m x 10 m base	Permanent
	OHL Access Roads and Construction Corridor	Construction Corridor.The width to be confirmed during the implementationof the LRP and once a contractor is on site.	Temporary
Operations	OHL Right-of Way	25m Wayleave each side of OHL	Permanent (partial restrictions)

7. ECOSYSTEM IDENTIFICATION, SCREENING AND ASSESSMENT

7.1 INTRODUCTION

This section presents the identification, screening and assessment of ecosystem services associated with the construction and operational phases of the Karavasta Solar Project. The mitigation measures within the ESIA (Ref. 1) have been summarised and additional mitigations recommended, where required. The impact assessment methodology follows the process described in Section 3.

As the decommissioning activities have yet to be defined and are not planned within the next 30 years, decommissioning impacts have not been considered.

7.2 IDENTIFICATION OF ECOSYSTEM SERVICES

The ecosystem services identification process is described in Section 3 and included:

- Desk based review of existing information
- Meetings with the SRA team completing the LRP
- Site visits in December 2021 with the team completing the socio-economic survey.

A total of five ecosystem services have been identified and are summarised in Tables 7.1 to 7.4. The relationship between ecosystems, services, benefits and beneficiaries is provided in Figure 7.1. Appendix 1 lists those ecosystems services that are considered as not applicable to the Karavasta Solar Project.

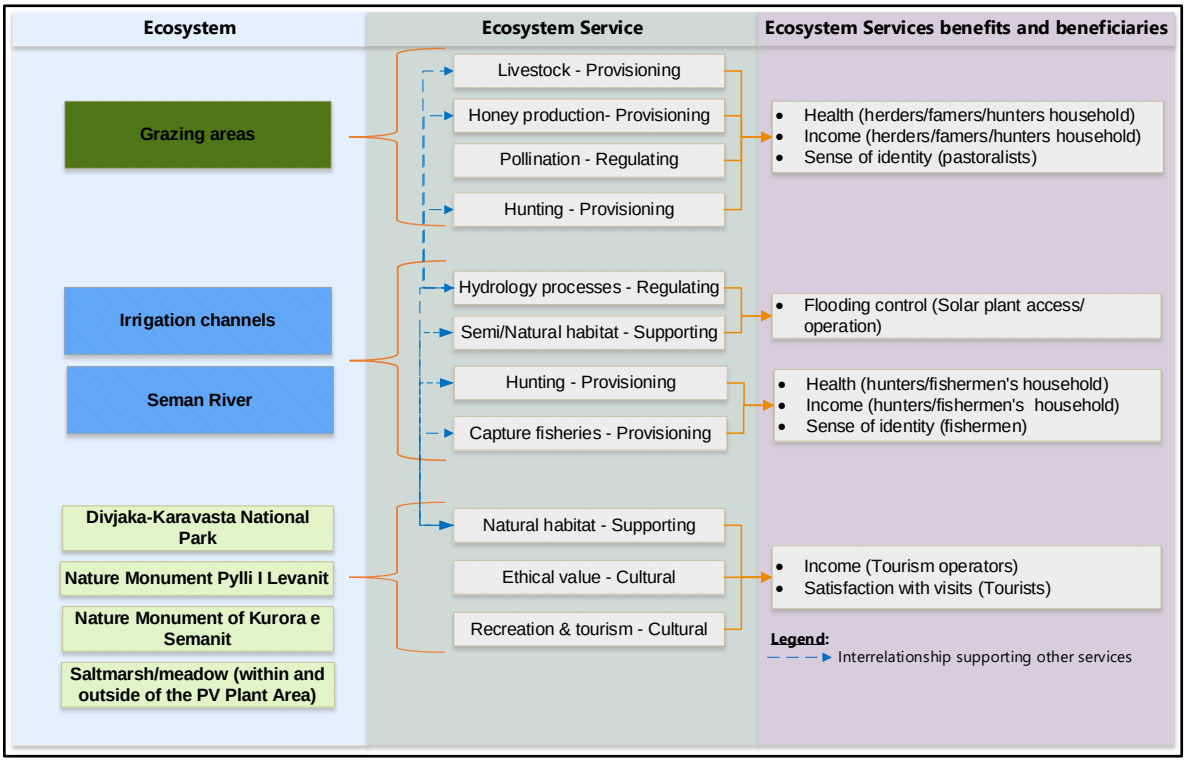


Figure 0.1 Ecosystems Services Relationships

Table 0-93 Karavasta Solar Project Provisioning Ecosystem Services

Name and Type	Summary
Livestock Type I impact – may adversely affect communities	The ESIA socio-economic survey reported that 71% of the households owned livestock, LRP household survey the number was lower; 45% of the surveyed households owned livestock. The most common livestock during the LRP household survey were chickens and cows. The ESIA socio-economic survey and the LRP household survey reported that between 50-41% of the household residents use of livestock products for subsistence purposes. Herder dwellings with livestock for non-subsistence purposes are more numerous within the Seman reiver area near the plant area and between OHL towers 1-10 where there is less intensive arable agriculture and better access to available grazing land. The PV Plant land is state owned with no currently enforced access restrictions and provides poor quality available grazing. In order to minimise disturbance, continued access will be assured for informal grazing to areas in the vicinity of the Plant Site. Following construction, access to the plant site for grazing of sheep will also be facilitated. This is aligned with standard practice, as grazing of sheep is normally used in PV Plant Sites to prevent grass and other plants from obstructing solar panels. The Project will engage with herders in advance to ensure grazing activities are carried out in a safe way. Access routes will be established in order to maintain passage around/through the PV Plant Area. The PV Plant land is within a larger area of similar if not better grazing potential.
Honey production, apiculture Type I impact – may adversely affect communities	In the LRP socio-economic survey and the ESIA socioeconomic survey no participants reported participating in apiculture. A total of five households were confirmed in participating in apiculture via the ecosystem services assessment site visit in December 2021 and ESIA disclosure meetings in the June 2022. All five households were located within 1km of the PV plant area and the number of beehives ranged from three to ten for four of the households and used for personal consumption. One household reported as having 120 beehives and generates income from the activity. The PV Plant Area includes saltmarsh / meadow, which are also extensively found in the surrounding area. Saltmarsh / meadow is a recognised foraging habitat for pollinators including honeybees (Ref. 6). It is assumed that vegetation cover within the PV Plant after construction phase clearing will re-establish however the impact of solar panel shade and livestock grazing will influence the extent and type of vegetation re-establishment and slow or alter revegetation.

Name and Type	Summary
Capture fisheries Type I impact – may adversely affect communities	During the ESIA socioeconomic survey, one household reported fishing as an activity for household subsistence purposes only. During the LRP household survey none of the households reported fishing activity. During the ecosystem services site assessment in December 2021, evidence of fishing activity was observed in many of the irrigation channels and natural water courses including the Seman river and the Ujitja / Hoxhara drainage channel outside of the PV Plant. In addition, fishing along the coastline occurs, with the PV Plant Site being used for access to the beach as well as other alternative access tracks. During the ESIA disclosure meeting engagement, in June 2022, a single fisherman was identified and engagement confirmed fishing was exclusively for subsistence purposes to support his primary vocation, farming. Irrigation channels within the PV Plant are connected to the surrounding extensive network of channels that extend over a significantly larger area. Alternative access to the beach area will be available throughout the project and access restrictions will be avoided. Voltalia have committed externally (within the LRP) to improve the existing access road to the east of the PV Plant, which will allow access to the coast and lagoon.
Hunting Type I impact – may adversely affect communities	During the ESIA stakeholder engagement and LRP household survey no households report as participating in hunting. Evidence of hunting has been observed less than 5km to the south-west of the PV Plant Area, along the OHL route between towers 7 and 9, and it is assumed that hunting will occur within the Project Area of Influence. The PV Plant Area habitat is not unique or of materially better quality than the surrounding habitat for commonly hunted waterfowl or brown hare. For waterfowl there is a far better quality habitat outside of the Project Area of Influence with extensive wetland areas.

Table 0-94 Karavasta Solar Project Regulating Ecosystem Services

Name	Summary
Pollination Type I impact – may adversely affect communities	The PV Plant Area includes saltmarsh / meadow, which are also extensively found in the surrounding area. Saltmarsh /meadow is a recognised foraging habitat for pollinators including honeybees (Ref. 6). It is assumed that vegetation cover within the PV Plant after construction phase clearing will re-establish however the impact of solar panel shade and livestock grazing will influence the extent and type of vegetation re-establishment and slow or alter revegetation. There is limited information on the cultivated crop types in the vicinity of the PV Plant, the LRP socio-economic survey provides information on the

Name	Summary
	OHL route. Assuming the LRP socio-economic survey is representative for the area surrounding the PV Plant, the dominance of alfalfa, a recognised agroecological crop, that supports pollinators and the limited extent of fruit trees indicate that the surrounding cultivated land would provide viable pollinator foraging habitat.
Hydrology processes Type II service: Operation dependent on service provision	The PV Plant is situated within a significantly larger area with extensive, poorly maintained irrigation channels. The whole area is at risk from a number of different flood events, caused by the Seman river, drainage channel flooding, or surface flooding during intense rainfall.

Table 0-95 Karavasta Solar Project Cultural Ecosystem Services

Name	Summary
Ethical/ Recreational and tourism Type I impact – may adversely affect communities	There is a limited amount of information on the extent of the ethical and spiritual importance of ecosystems within the Project Area of Influence and the assessment will focus on recreational and tourism aspects. The most important cultural ecosystem services within the Project Area of Influence are the three protected areas described in Section 4.3. The three protected areas have varying levels of enforcement with the Divjaka-Karavasta National Park being the largest, most mature and well established with hotels, beach facilities and Park visitor centre, 7-15 km to the north of the PV Plant. The two other protected areas within the Project Area of Influence (The Kurora e Semanit Nature Monument less than 3 km to the east of the OHL and the Pylli I Levanit Nature Monument 2 km south-west of the OHL) do attract tourist but there is no potential impacts from planned construction or operational activities as they are over 2 km from the OHL and access through/adjacent to the Protected areas to support Karavasta Solar Project construction or operation is not required.

Table 0-96 Karavasta Solar Project Supporting Ecosystem Services

Name	Summary
Semi and Natural Habitat that support Type I impact – may adversely affect communities	Within the PV Plant Area saltmarsh / meadow habitat is present which supports the native plant communities that support pollinators and avifauna foraging due to the decline in agricultural practices and maintenance of the irrigation channels. Saltmarsh / meadow is also present in the wider Project Area of Influence that supports a variety of natural and semi natural habitats including forest areas, riparian habitat, aquatic habitat and coastal habitats approximately 4km to the west of the PV Plant. The PV Plant has a very small direct interface with the Divjaka-Karavasta National Park boundary (1 km). The Divjaka-Karavasta National Park covers an area of over 22,230 Ha. This section of the Park is a mixture of actively or abandoned cultivated land or riparian habitat. The most ecological important parts of the Park are 7-15 km from the PV Plant. The OHL tower locations avoid the Seman river riparian natural habitat and are located in cultivated land.

7.3 SCREENING OF ECOSYSTEM SERVICES

To select ecosystem services that qualify full assessment process, a screening process was undertaken via discussions with the team working on the LRP and from the December 2021 site visits. Those ecosystem services that are considered to benefit from further assessment are listed in Table 7.5.

Table 0-97 Karavasta Solar Project construction and operation ecosystem services requiring full impact assessment

Name	Type	Justification
Livestock: Provisioning	Type I: Impacts on such services may adversely affect communities	Due to the extent of household reliance on livestock and potential restrictions to grazing within the PV Plant Area during construction and to a lesser degree during the operational phase. Noting grazing will be allowed to the extent possible and access restrictions will be mitigated by alternative access being provided.
Honey production: Provisioning Pollination: Regulating		On a precautionary basis as a five households were located within 1km of the PV plant area.

Name	Type	Justification
Natural Habitat: Supporting		On a precautionary basis as the PV Plant is adjacent to the Divjaka-Karavasta National Park and within its hydrological catchment and within the vicinity of the Seman river.
Recreational and tourism: Cultural		On a precautionary basis and only for the Divjaka-Karavasta National Park, as PV Plant is adjacent to the Park.
Hydrology processes: Regulating	Type II: Operation dependent on service provision	Due to the dynamic flood risk in the surrounding area, and fragility of the drainage network as a result of poor maintenance. Improvements to the drainage network within the PV Plant will reduce flood risk in the operations phase.

The following ecosystem services have been screened out of the further assessment process are listed in Table 7.6 and include:

- Ecosystem services which the Karavasta Solar Project has very limited interaction with
- Ecosystem services for which there is an absence of potential impact mechanisms to the associated beneficiaries
- Ecosystem services for which the supply is considered to be extensive and not at risk of fragmentation within the surrounding area.

Table 0-98 Karavasta Solar Project construction and operation ecosystem services NOT requiring full assessment

Name	Type	Justification
Capture fisheries: Provisioning	Type I: Impacts on such services may adversely affect communities	The absence of planned construction within or directly adjacent to the Seman river. Fishing has not been observed within the PV Plant and not considered to provide suitable locations. PV Plant construction and operation will improve drainage channel function and supply of water downstream. All of the engagement activities completed to date have identified two households participating in fishing.

Name	Type	Justification
Hunting: Provisioning		No reports of households participating in hunting within the PV Plant Access restrictions during construction and operation of the PV Plant will be mitigated by alternative access being provided. Voltalia have committed externally (within the LRP) to improve the existing access road to the east of the PV Plant, which will allow access to the coast and lagoon.

7.4 ASSESSMENT OF ECOSYSTEM SERVICES

7.4.1 LIVESTOCK: PROVISIONING

This section presents the assessment of impacts on potential livestock ecosystem service during the construction and operation of the Karavasta Solar Project.

Access changes and permanent loss of grazing land to informal herders that graze livestock within the PV Plant are the main potential source of impact. Alternative access will be established to maintain accessibility and grazing will be permitted within the PV Plant area to the extent that is possible.

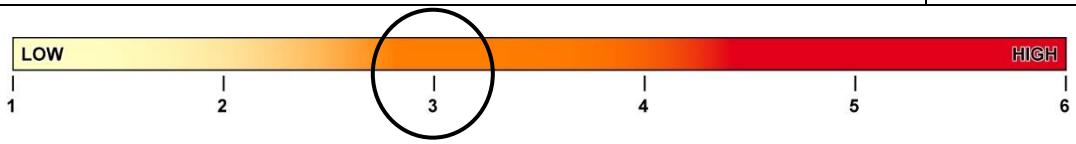
There are no continuous routine operational phase discharges, emissions or noise sources from the Karavasta Solar Project that could affected grazing quality.

Existing mitigation, defined in the LRP and ESIA (Ref. 1) considered in this assessment include:

- Avoidance:
  - Alternative access will be provided
  - Grazing will be permitted within the PV Plant area during the operations phase
- Minimisation:
  - Control of PV Plant construction to ensure downstream water supply and quality changes are minimized and do not disrupt grazing quality outside of the PV Plant
  - Hazardous materials and emergency response management to avoid contamination of surface water and soil
- Restoration:
  - Reinstatement of temporary disturbed areas during construction will include reprofiling and re-vegetation
- Offset/Compensation: Not applicable.

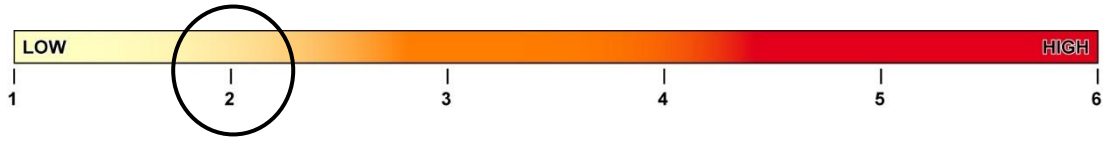
Impact Magnitude

Parameter	Explanation	Rating
Extent/ Scale	The PV Plant area is currently available for grazing and is of low quality due to the patchy and sparse vegetation. Within 5 km of the plant, the PV Plant covers ~12% of the accessible/non-cultivated grazing land, which is of similar or better quality. The PV Plant land includes tracks that are used to access grazing land in the surrounding area. Alternative access will be provided during construction and operation to avoid impacts. The OHL towers have a 6x6m footprint, which will be cleared of vegetation during construction. Natural revegetation of non-cultivated areas (~12 of the 57 towers) will enable their continued use for grazing where applicable.	1
Frequency/ Duration	Informal herders of the PV Plant land will not be restricted from using the area for grazing. Temporary grazing loss will occur in the tower locations during construction.	2
	Total	**4 Medium**



Service Sensitivity

Parameter	Explanation	Rating
Vulnerability	Grazing land supply will be impacted to a very minor extent as abundant alternative accessible grazing is available and will not be functionally impacted by the Karavasta Solar Project.	1
Dependency	Herders have very low to no dependency on the PV plant and OHL route for grazing. There are no reported users that exclusively use the PV Plant or the OHL tower locations for grazing and the extent of alternative accessible grazing is materially larger than the area impacted.	1
	Total	**2 Low**



Overall Impact Ranking and Recommendations for Livestock: Provisioning

		Service Sensitivity		
		Low	**Medium**	**High**
Impact Magnitude	**Low**			
	Medium	Minor		
	High			

The impact ranking for the livestock ecosystem service is considered to be minor and further mitigation is not recommended.

7.4.2 HONEY PRODUCTION: PROVISIONING AND POLLINATION: REGULATING

This section presents the assessment of potential impacts on honey production as well as pollination ecosystem service during construction and operation of the Karavasta Solar Project.

PV Plant construction will cause temporary and permanent changes to vegetation cover density, quality and type, the extent of permanent loss of land from the building of the PV Plant substation and support buildings is very limited. The 185-Ha PV Plant is surrounded by significantly larger area of more diverse foraging habitat including forest areas, riparian habitat, aquatic habitat, coastal habitats as well as more established better quality salt marsh/meadow that would support pollinators. In addition the current prevalence of cultivating alfalfa (growing on 46% of the agricultural parcels surveyed as part of the LRP household survey) also provides pollinator foraging habitat.

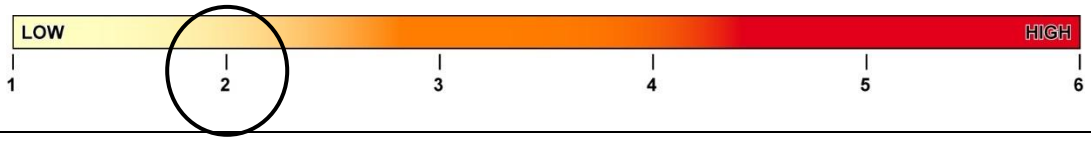
The impact from vegetation clearance of the OHL towers is considered not material.

There are no continuous operational phase discharges or emissions from the Karavasta Solar project that could affected pollinator foraging as side from vegetation clearance works during the operations phase.

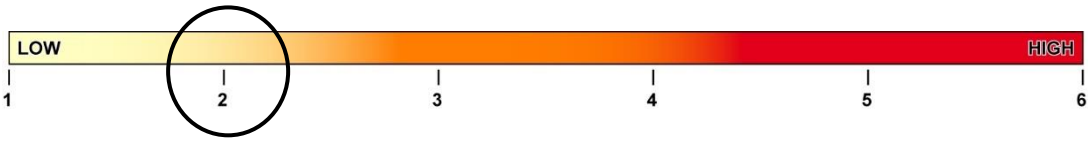
Existing mitigation, defined in the LRP and ESIA considered in this assessment include:

- Avoidance: Not applicable
- Minimisation:
    - Control of PV Plant construction to ensure downstream water supply and quality changes are minimized and don't disrupt vegetation cover outside of the plant
- The use of pesticide for the management of alien invasive species will be under strict control and on as necessary. No agents identified as being prohibited will be used and wherever possible mechanical means will be the preferred method. Restoration:
    - Reinstatement of temporary disturbed areas during construction will include reprofiling and re-vegetation
- Offset/Compensation: Not applicable.

Impact Magnitude

Parameter	Explanation	Rating
Extent/ Scale	A total of five households were confirmed in participating in apiculture, within 1km of the PV plant, via the ecosystem services assessment site visit in December 2021 and ESIA disclosure meetings in the June 2022. Assuming the bees and other wild pollinators have a conservative foraging range of 3km, the PV Plant Are represents less than 10% of the available surrounding foraging area, the majority of which is of better quality than the PV Plant area.	1
Frequency/ Duration	Temporary loss of pollinator foraging areas will occur during construction. Re-vegetation within the PV Plant Area will support re-establishment of habitat for pollinators.	1
	Total	**2 Low**
		

Service Sensitivity

Parameter	Explanation	Rating
Vulnerability	There are other pollinator foraging areas of at least equal quality and availability within the immediate area of the PV Plant.	1
Dependency	Four household has been identified as having beehives use the honey for subsistence purposes. One household undertakes commercial scale apiculture.	1
	Total	**2 Low**
		

Overall Impact Ranking and Recommendations for Honey Production: Provisioning and Pollination: Regulating

		Service Sensitivity		
		Low	**Medium**	**High**
Impact Magnitude	**Low**	Negligible		
	Medium			
	High			

The impact ranking for the honey production ecosystem service is considered to be negligible and further mitigation is not required.

To support this assessment, it is recommended that:

- Consideration should be given to promoting revegetation of suitable native vegetation to support pollinators with a growth height that will not interfere with PV panel performance as well as creating dedicated areas with the PV plant where grazing is controlled to promote flowering species survival
- All of those households participating in apiculture are included on a stakeholder watchlist which will be used by Voltalia to undertake regular engagement on the status of the project

7.4.3 NATURAL HABITAT: SUPPORTING

This section presents the assessment of potential impacts on natural habitats ecosystem service during the construction and operation of the Karavasta Solar Project.

The PV Plant construction and operation will interact with the below natural habitat:

- The PV Plant Area is located within an area of that includes saltmarsh / meadow habitat recognised within Annex 1 of the EU Habitats directive (Habitat code 1310 and 1410).
- The PV Plant area is ~0.5 km of the Seman river riparian habitat and the OHL crosses the river at one location (between OHL tower 9 and 10) and the towers are approximately 30 m and 300 m from the nearest riparian habitat.
- The Karavasta Solar Project has a very small direct interface with the Divjaka-Karavasta National Park boundary (1 km)
- The PV Plant is within a network of drainage channels not directly connected to the Divjaka-Karavasta National Park.

The ESIA (Ref. 1) does not include predicted noise modelling. There are numerous pre-existing 3rd party noise sources throughout the Project Area of Influence, especially along the OHL from the network of roads, wide spread farming, municipality drainage channel maintenance works, third party construction activity and residential areas.

Construction noise levels from mobile equipment and static generators will elevate existing noise levels locally during the construction of the OHL towers (less than 1 month per tower) and for over 6 months at the PV Plant location.

It is assumed that the most significant Karavasta Solar Project mobile construction noise sources are large equipment such as a large bulldozer (Caterpillar D9) operating during the daytime. Based on measured noise levels from previous use of this equipment in similar applications and natural noise attenuation as per British Standard 5228 (Ref. 7), constructed related noise impacts will be indiscernible from daytime background noise levels of 45 LAeq dB within 700 m.

There are no continuous routine operational discharges, noise sources or emissions from the Karavasta Solar project that could affected keystone species critical to the function of the natural habitat. However, there is the potential operational impact associated with the PV panels and the OHL causing bird collision mortality. The risk of electrocution from the high voltage OHL is considered low as the distance between the OHL earthed and live components is considered to exceed the wingspan of the largest of the bird typically found in the area (Greater Spotted Eagle, wingspan up to 1.70 m).

There is little evidence of behavioural changes in birds due to the reflective surface of PV panels being perceived as water bodies, termed “lake effect” (Ref. 8). To help qualify this assumption a recommendation has been included to help confirm the mortality of water-obligate birds, which rely on water for take-off and landing, compared to other bird types.

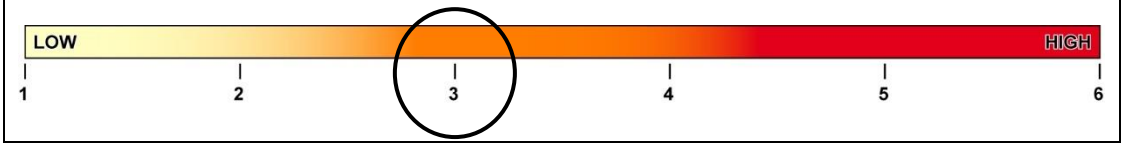
Existing mitigation, defined in the ESIA (Ref. 1) considered in this assessment include:

- Avoidance:
    - The OHL route was changed to reduce the crossings of the Seman river from total of two to one. In addition, the OHL towers avoid the riparian habitat
- Minimisation:
    - The OHL towers design includes measure to reduce electrocution potential
    - The OHL will have bird diverters
    - Hazardous materials and emergency response management to avoid contamination of surface water and soil
    - Alien invasive species protocol
    - Construction stage pre-clearance ecological surveys, and construction mitigation developed if nesting sites are identified
    - Good construction industry wildlife management practise, including injured wildlife protocol, workforce awareness sessions, reduced speed limits, wildlife interaction reporting, waste and litter controls
- Restoration:
    - Reinstatement of temporary disturbed areas during construction will include reprofiling and re-vegetation
- Offset/Compensation: Not applicable.

Impact Magnitude

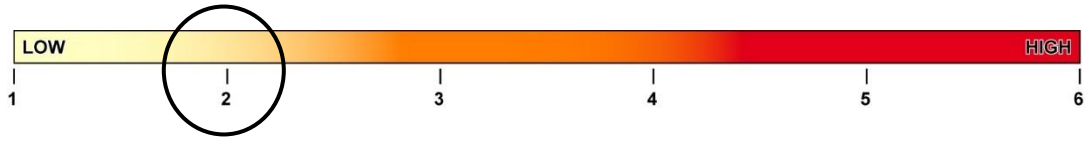
Parameter	Explanation	Rating
Extent/ Scale	Construction related changes to vegetation and drainage will be confined to natural habitat within the PV Plant. Noise impacts will extend beyond the boundary of the PV Plant by less than 1 km. Avifauna collision mortality has the potential to occur within the PV Plant and along the OHL, considering its proximity to adjacent areas of surface water and the Divjaka-Karavasta National Park, and to a lesser extent along the OHL route.	1

Parameter	Explanation	Rating
Frequency/ Duration	It is assumed that vegetation cover within the PV Plant after construction phase clearing will re-establish itself and impacts are temporary. Noise impacts will not be continuous and be primarily limited to the construction period. Bird collision mortality risk will exist for the duration of the project operation although the extent will be varying e.g., depending on weather/light conditions, operational activity within the PV Plant that will discourage bird presence.	2
	Total	**3 Medium**



Service Sensitivity

Parameter	Explanation	Rating
Vulnerability	Changes to the natural habitat functionality and associated benefits are considered to be minor due to the revegetation of the PV Plant area. The PV Plant is situated within a significantly larger areas of similar, more diverse natural habitat including the Divjaka-Karavasta National Park, the Seman river and coastal area. The saltmarsh / meadow within the PV Plant is similar to the surrounding area, especially to the immediate north and west which is also degraded former irrigated agricultural land. The changes to vegetation cover during construction and revegetation as well as the bird collision mortality risk are considered to present minor impacts to the natural habitat functionality.	1
Dependency	The potential isolated, localised and short-term disturbance to the natural habitat is not considered to create a risk to the associated service benefits or to the beneficiaries.	1
	Total	**2 Low**



Overall Impact Ranking and Recommendations for Natural Habitat: Supporting

		Service Sensitivity		
		Low	**Medium**	**High**
Impact Magnitude	**Low**			
	Medium	Minor		
	High			

The impact ranking for the natural habitat ecosystem service is considered to be minor and further mitigation is not required.

To support this assessment, it is recommended that:

- The use of bird diverters on the OHL is confirmed
- During the operations phase, records of bird mortality within the PV Plant are kept that include photographs to aid in bird identification.

7.4.4 RECREATIONAL AND TOURISM: CULTURAL

This section presents the assessment of potential impacts on recreational and tourism ecosystem service of the Divjaka-Karavasta National Park during the construction and operation of the Karavasta Solar Project.

Construction activities will be confined to the PV Plant and OHL, outside of but adjacent to Divjaka-Karavasta National Park. The primary potential impact to the Divjaka-Karavasta National Park is associated with construction related traffic disturbance and noise. Within the ESIA (Ref. 1) there is a predicted total of 600-800 construction truck movements, with an average of 12 trips per day. The construction site access roads will avoid the main road to the most popular and developed part of the Divjaka-Karavasta National Park. Noise impacts are discussed in Section 7.4.3 and are not considered to present a source of disturbance to the Park users.

Visual impacts are not considered material due to the low level of visual intrusion, considering:

- The PV Plant Area and OHL is >7 km from the main visitor areas within Divjaka-Karavasta National Park and will not be visible
- The OHL route will be visible from Kurora e Semanit Nature Monument, but the visual landscape at this location is already impaired by the adjacent village.

There are no continuous routine operational phase discharges, noise sources or emissions from the Karavasta Solar project that could affected the tourism potential, quality or function of the Divjaka-Karavasta National Park.

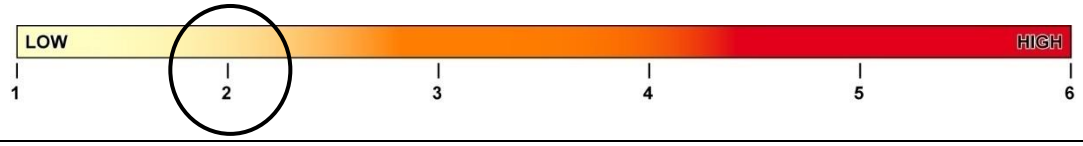
Existing mitigation, defined in the ESIA (Ref. 1) considered in this assessment include:

- Avoidance:
    - The PV Plant avoids direct impacts to the Divjaka-Karavasta National Park
- Minimisation:

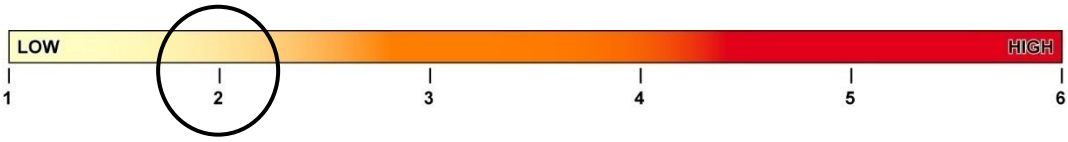
- A Construction Traffic Management Plan will be implemented to reduce traffic disturbance
- Measures have been adopted to reduce avifauna impacts (see Section 7.4.4)

- Restoration:
  - Reinstatement of temporary disturbed areas during construction will include reprofiling and re-vegetation
- Offset/Compensation: Not applicable.

Impact Magnitude

Parameter	Explanation	Rating
Extent/ Scale	PV Plant construction activities will create local noise disturbance that will extend less than 1 km from the PV Plant Area, into the adjacent Divjaka-Karavasta National Park confined to an area of abandoned agricultural land with no current tourism potential.	1
Frequency/ Duration	PV Plant construction will have the longest and most regular source of disturbance that will extend for up to 1 year.	1
	Total	**2 Low**
		

Service Sensitivity

Parameter	Explanation	Rating
Vulnerability	There is very low risk to the functionality or value of the Divjaka-Karavasta National Park to the absence of continuous direct impacts.	1
Dependency	The isolated, localised and short-term disturbance to the southern part of the Divjaka-Karavasta National Park is not considered to create a risk to the Park's associated service benefits or to the beneficiaries.	1
	Total	**2 Low**
		

Overall Impact Ranking and Recommendations for Recreational and Tourism Habitat: Cultural

		Service Sensitivity		
		Low	**Medium**	**High**
Impact Magnitude	**Low**	Negligible		
	Medium			
	High			

The impact ranking for the recreational and tourism ecosystem service is considered to be negligible and further mitigation is not required.

7.4.5 Hydrology processes: Regulating

This section presents the assessment of potential impacts on hydrology process ecosystem service during the construction and operation of the Karavasta Solar Project. Construction and operation of the Karavasta Solar Project is at risk to hydrological process as the PV Plant is in an area at risk of flooding.

Construction related ground disturbance, irrigational channel crossings and maintenance works have the potential to disturb water flows if construction planning and execution do not implement the mitigations outlined in the ESIA. Overall, it is considered that the Karavasta Solar Project has the potential to create a positive impact, through rehabilitation and regular maintenance of the drainage infrastructure within the PV Plant area, that currently is in a poorly maintained condition. No construction OHL works are planned in the Seman river or in its riparian habitat.

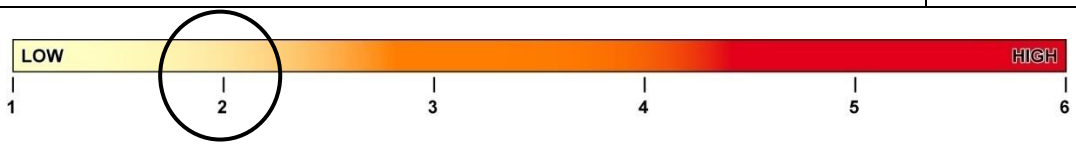
Existing mitigation, defined in the LRP and ESIA (Ref. 1) considered in this assessment include:

- Avoidance:
    - The OHL route was changed to reduce the crossings of the Seman river from total of two to one. In addition, the OHL towers avoid the riparian habitat
- Minimisation:
    - Control of PV Plant construction to ensure downstream water supply and quality changes are minimized and do not disrupt vegetation cover outside of the plant area
    - Implementation of the Erosion and Sediment Control Procedure
    - Hazardous materials and emergency response management to avoid contamination of surface water
- Restoration:
    - Reinstatement of temporary disturbed areas during construction will include reprofiling and re-vegetation
- Offset/Compensation: Not applicable.

Impact Magnitude

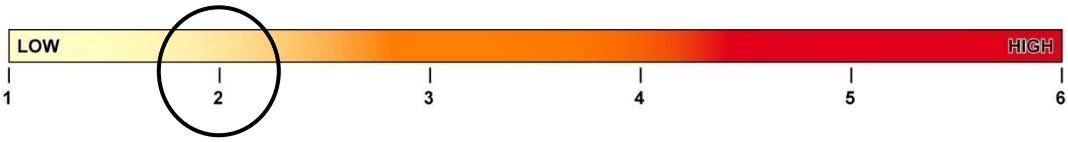
Parameter	Explanation	Rating

Extent/ Scale	Planned construction related changes to drainage within the PV Plant and OHL will not cause negative changes to hydrological processes. The PV Plant is within a network of drainage channels that has a total catchment more than 10 times larger than the PV Plant area and is not directly connected to the Divjaka-Karavasta National Park.	1
Frequency/ Duration	As the potential for an impact is only from an uncontrolled event that will be addressed and remedial works implemented, associated impacts are considered temporary.	1
	Total	**2 Low**



Service Sensitivity

Parameter	Explanation	Rating
Vulnerability	There is a very low risk from unplanned activities impacting the functionality of the area hydrology and creating disruption to flood risk or surface water supply/regulation for downstream users.	1
Dependency	Considering the small spatial area of the PV Plant compared to the wider catchment area and the lack of impact to the Seman river there is a very low level of dependency on the PV Plant area for hydrology processes.	1
	Total	**2 Low**



Overall Impact Ranking and Recommendations for Hydrology Processes: Regulating

		Service Sensitivity		
		Low	**Medium**	**High**
Impact Magnitude	**Low**	Negligible		
	Medium			

	High			

The impact ranking for the natural habitat ecosystem service is considered to be negligible and further mitigation is not required.

8. CONCLUSIONS

Following implementation of the ecosystems services assessment methodology provided in Section 3, six services were selected for a more detailed assessment:

- Livestock
- Honey production and Pollination – combined assessment completed
- Hydrology processes
- Recreational and tourism
- Semi and natural habitat.

A summary of the overall impact score is provided in Table 8.1.

Table 0-99 Summary of Ecosystem Services Assessment

Ecosystem Service Name & Type	Type	Impact Magnitude	Service Sensitivity	Overall Impact Ranking
Livestock: Provisioning	Type I: Impacts on such services may adversely affect communities	4 Medium	2 Low	Minor
Honey production: Provisioning and Pollination: Regulating		2 Low	2 Low	Negligible
Natural Habitat: Supporting		3 Medium	2 Low	Minor
Recreational and tourism: Cultural		2 Low	2 Low	Negligible
Hydrology processes: Regulating	Type II: Impacts which the project directly depends for its operations	2 Low	2 Low	Negligible

None of the Type I ecosystem services value or functionality are at risk from the construction or operation of the Karavasta Solar Project and associated impacts are not considered as significant. No Type 1 ecosystem services qualify as priority as per the IFC Guidance Note 6 (Ref. 3).

As described in Section 7.4.5, there is potential to create a positive impact to hydrology processes, through rehabilitation and regular maintenance of the PV Plant area drainage that is currently poorly maintained. Therefore hydrology processes is not considered a priority service.

To support the impact assessment, it is recommended that:

- The LRP household survey or wider stakeholder engagement is used to re-confirm the absence of households that depend entirely on the PV Plant area for grazing

Status: Households that participated in the LRP survey reported that they do not depend entirely on the PV Plant area for grazing.

- The LRP household survey wider stakeholder engagement is used to confirm extent of apiculture in the area of the PV Plant
    - Status: No participants in the LRP household survey reported participation in apiculture.
    - Further stakeholder engagement was completed to support the ESIA disclosure in June 2022 that identified four households participating in apiculture
- If apiculture within the area of PV Plant is determined material, consideration should be given to promoting revegetation of suitable native vegetation to support pollinators with a growth height that will not interfere with PV panel performance and a maintenance regime to support pollinators
    - Status: No participants in the LRP household survey reported participation in apiculture.
    - Further stakeholder engagement was completed to support the ESIA disclosure in June 2022 that identified four households participating in apiculture
    - All five households (four from the June 2022 ESIA disclosure meetings and one from December 2021 site visit) engaged in apiculture were located within 1km of the PV plant area. The number of beehives ranged from three to ten for four of the households and used for personal consumption. One household reported as having 120 beehives and generates income from the activity.
    - The impacts to apiculture are not considered significant as presented in section 7.4.2
    - The specific details on the revegetation approach and methods will be informed by the pre-construction surveys and provided in the BMP and supporting management plans. Voltalia is considering creating dedicated areas within the PV plant were grazing is restricted to encourage pollinator recovery and manage potential loss of grazing with the affected herders.
- The use of bird diverters on the OHL is confirmed and measures to reduce risk from earth/shield wires
    - Status: The use of bird diverters has been confirmed by Voltalia
- During the operations phase, records of bird mortality within the area of PV Plant are kept that include photographs to aid in bird identification.
    - Status: The project biodiversity management plan will include the detail of the bird mortality monitoring program

9. REFERENCES

Table 0-100 References

Ref No	Document / Source Title
1	Voltalia Karavasta Solar Project Environmental and Social Impact Assessment (April 2021)
2	EBRD Environmental and Social Policy 2014 and Guidance Note Performance Requirement 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
3	IFC Guidance Note Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (June, 2019)
4	World Resources Institute: Weaving Ecosystem Services into Impact Assessment. A Step-by-Step Method (October 2013). Available at: <http://www.wri.org/research/weaving-ecosystem-services-impact-assessment>
5	World Resources Institute: The Corporate Ecosystem Services Review. Guidelines for Identifying Business Risks & Opportunities Arising from Ecosystem Change (February 2012). Available at: <http://www.wri.org/research/corporate-ecosystem-services-review>
6	European Environment Agency. European Topic Centre on Biological Diversity. Report for a list of Annex I habitat types important for Pollinators (Technical Paper No 1, June 2020) Available at: <http://www.researchgate.net/publication/344630093_Report_for_a_list_of_Annex_I_habitat_types_important_for_Pollinators>
7	British Standard 5228:2:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites
8	Kosciuch K, Riser-Espinoza D, Gerringer M, Erickson W (2020) A summary of bird mortality at photovoltaic utility scale solar facilities in the Southwestern U.S. PLOS ONE 15(4). Available at: <https://doi.org/10.1371/journal.pone.0232034>
9	The Livelihood Restoration Plan (LRP) household survey socioeconomic report

Appendix 1 Ecosystems Services Excluded from Screening

The table below details those ecosystem services that are not considered applicable for assessment.

Service	Subcategory	Definition	Screening criteria questions – Yes/No		
			Is the ecosystem services present	**Will the project likely have an impact on the service**	**Does the project have management control or significant influence over the service**
Provisional Services: The goods or products obtained from ecosystems					
Food	Crops	Cultivated plants or agricultural products harvested by people for human or animal consumption as food	Yes – along the OHL route	Yes – compensation will be implemented	Yes
	Livestock	Animals raised for domestic or commercial consumption or use	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment
	Capture fisheries	Wild fish capturing via fishing	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment
	Apiculture	Production of honey for domestic or commercial consumption or use	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment
	Aquaculture	Fish, shellfish, and/or plants that are bred and reared in ponds, enclosures, and other forms of freshwater or saltwater confinement for purposes of harvesting	No	No	NA

Service	Subcategory	Definition	Screening criteria questions – Yes/No		
			Is the ecosystem services present	**Will the project likely have an impact on the service**	**Does the project have management control or significant influence over the service**
	Wild Foods	Edible plant and animal species gathered or captured in the wild	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment
Biological Raw Materials	Timber and other wood products	Products made from trees harvested from natural forest ecosystems, plantations, or non-forested lands	No	No	NA
	Fibres and resins	Non-wood and non-fuel fibres and resins	No	No	NA
	Animal skins	Processed skins	No	No	NA
	Ornamental Resources	Products derived from ecosystems that serve aesthetic purposes e.g. good weaved from reeds	No	No	NA
Biomass fuel		Biological material derived from living or recently living organisms	No	No	NA
Freshwater		Inland bodies of water, groundwater, rainwater, and surface waters for household, industrial, and agricultural uses	No	No	NA
Genetic resources		Genes and genetic information used for animal breeding, plant improvement, and biotechnology	No	No	NA

Service	Subcategory	Definition	Screening criteria questions – Yes/No		
			Is the ecosystem services present	**Will the project likely have an impact on the service**	**Does the project have management control or significant influence over the service**
Biochemicals, natural medicines, and pharmaceuticals		Medicines, biocides, food additives, and other biological materials derived from ecosystems for commercial or domestic use	No	No	NA
Regulating services: The contributions to human well-being arising from an ecosystem's control of natural processes					
Regulation of air quality		Influence ecosystems have on air quality by emitting chemicals to the atmosphere (i.e., serving as a "source") or extracting chemicals from the atmosphere (i.e., serving as a "sink")	No	No	NA
Regulation of climate	Global	Influence ecosystems have on the global climate by emitting greenhouse gases or aerosols to the atmosphere or by absorbing greenhouse gases or aerosols from the atmosphere	No	No	NA
	Regional and local	Influence ecosystems have on local or regional temperature, precipitation, and other climatic factors	No	No	NA

Service	Subcategory	Definition	Screening criteria questions – Yes/No		
			Is the ecosystem services present	**Will the project likely have an impact on the service**	**Does the project have management control or significant influence over the service**
Regulation of water timing and flows		Influence ecosystems have on the timing and magnitude of water runoff, flooding, and aquifer recharge, particularly in terms of the water storage potential of the ecosystem or landscape	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment
Erosion control		Role ecosystems play in retaining and replenishing soil and sand/aggregate deposits	No	No	NA
Water purification and waste treatment		Role ecosystems play in the filtration and decomposition of organic wastes and pollutants in water; assimilation and detoxification of compounds through soil and subsoil processes	No	No	NA
Regulation of diseases		Influence that ecosystems have on the incidence and abundance of human pathogens	No	No	NA
Regulation of soil quality		Role ecosystems play in sustaining soil's biological activity, diversity, and productivity; regulating and partitioning water and solute flow; storing	No	No	NA

Service	Subcategory	Definition	Screening criteria questions – Yes/No		
			Is the ecosystem services present	**Will the project likely have an impact on the service**	**Does the project have management control or significant influence over the service**
		and recycling nutrients and gases; among other functions			
Regulation of pests		Influence ecosystems have on the prevalence of crop and livestock pests and diseases	No	No	NA
Pollination		Role ecosystems play in transferring pollen from male to female flower parts	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment
Regulation of natural hazards		Capacity for ecosystems to reduce the damage caused by natural disasters such as hurricanes and tsunamis and to maintain natural fire frequency and intensity	No	No	NA
Cultural services: The nonmaterial contributions of ecosystems to human well-being					
Recreation and ecotourism		Recreational pleasure people derive from natural or cultivated ecosystems	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment
Ethical and spiritual values		Spiritual, religious, aesthetic, intrinsic, “existence” or similar values people attach to ecosystems	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment

Service	Subcategory	Definition	Screening criteria questions – Yes/No		
			Is the ecosystem services present	**Will the project likely have an impact on the service**	**Does the project have management control or significant influence over the service**
		landscapes, or species			
Educational and inspirational values		Information derived from ecosystems used for intellectual development, culture, art, design, and innovation	No	No	NA
Supporting services: The natural processes that maintain the other ecosystem services					
Semi/Natural Habitat		Natural or semi-natural spaces that maintain species populations and protect the capacity of ecological communities to recover from disturbances	Yes	Yes – see section 7 for assessment	Yes partially – see section 7 for assessment
Nutrient cycling		Flow of nutrients (e.g., nitrogen, sulphur, phosphorus, carbon) through ecosystems	No	No	NA
Primary production		Formation of biological material by plants through photosynthesis and nutrient assimilation	No	No	NA

Appendix 6. Critical Habitat Assesmant

Critical Habitat Assessment for the Voltalia 140 MW Karavasta Solar park, Albania

Final version: March 2022

Prepared by "The Biodiversity Consultant"

1. Executive Summary

This Critical Habitat Assessment (CHA) for the Voltalia 140 MW Karavasta Solar Park, Albania, was completed to provide a better understanding of the biodiversity features which potentially trigger IFC's Performance Standard 6 (PS6) and EBRD's Performance Requirement 6 (PR6). The analysis is based on interpretation of global and regional datasets, available literature and field data from Project Environmental and Social Impact Assessments (Abkons 2021). Criteria and thresholds for Critical Habitat (CH) determination were applied separately for terrestrial and aquatic scoping areas.

This assessment confirms:

- PS6 / PR6 are applicable to species that meet the CH thresholds for Criteria 1-3 / Criteria ii-iv (Table 1).
- Wetland and aquatic habitats within the PV plant and along the transmission line route are CH for four fish species and the Albanian Water Frog.
- The remainder of the Project area meets the IFC definition of modified habitat – with the exception of a small area of *Salix alba* and *Populus alba* galleries along the Semani River between pylons 10-15 of the transmission line.
- Two habitats and 49 species are identified as Priority Biodiversity Features (PBFs), as defined by EBRD PR6; and,
- The Project footprint overlaps with an internationally-recognised area (Karavasta KBA). The KBA also meets the EBRD definition of PBF.

These findings mean that the Project will need to implement appropriate mitigation and demonstrate net gain (NG) for species which qualify as CH for the Project, and no net loss for PBFs.

For aquatic species, available data suggests that drainage ditches in the Project area have suitable habitat for the Albanian Water Frog, and the four CH fish species. It is therefore recommended that the Project develops:

A Biodiversity Management Plan (BMP) that details the mitigation and monitoring measures that will be implemented during construction and operation phases of the Project to avoid, minimise and restore biodiversity values on-site and verify the levels of impacts occurring; and,

A Biodiversity Action Plan (BAP) that quantifies the residual impacts to identified priority species and proposes conservation actions that would support the Project meet its NG commitments for CH-qualifying species and NNL commitments for PBFs, and promotes the conservation aims and effective management of the Karavasta KBA.

2. Introduction

2.1 Purpose of this document

This report is the Critical Habitat Assessment (CHA) for the Voltalia 140 MW Karavasta Solar Park (the Project) in Albania. In order to manage risk and meet lender requirements, the Project intends to implement good international practices by aligning with International Finance Corporation (IFC) Performance Standards (PS), including PS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012, 2019) and European Bank for Reconstruction and Development (EBRD) Performance Requirements (PR), including PR6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (EBRD 2014a, 2014b).

The Project has completed an Environmental and Social Impact Assessment (ESIA) (Abkons 2021) that was informed by a suite of baseline field surveys, including surveys in August 2020, November 2020 and May 2021 for bats and other mammals, reptiles and amphibians and flora. Following comments from the IFC, Voltalia Ltd. commissioned The Biodiversity Consultancy to update the previous Critical Habitat Assessment completed by Abkons in July 2021.

The CHA is a key component of full alignment with both IFC PS6 and EBRD PR6 and forms an integral part of the Project's overall framework for managing biodiversity risk. This report:

- Identifies Critical Habitat as defined by IFC PS6 and EBRD PR6;
- Identifies Priority Biodiversity Features (PBF) as defined by EBRD PR6;
- Identifies natural and modified habitats as defined by IFC PS6;
- Outlines the implications of the findings of the CHA for the Project; and
- Identifies the recommended next steps for the Project.

2.2 Project overview

The Project consists of the 140 MW Solar Power Plant (SPP), located in the Divjaka and Fier municipalities of Albania, and a 220 kV overhead transmission line (Figure 198). The footprint of the solar power plant will cover 185 ha of land between the villages of Adriatik and Metaj to the southeast and Ndërmenas and Hasturkas to the east. An overhead transmission line will connect the SPP to the national grid via a 20 km route running south-east from the SPP to a substation near the town of Fier.

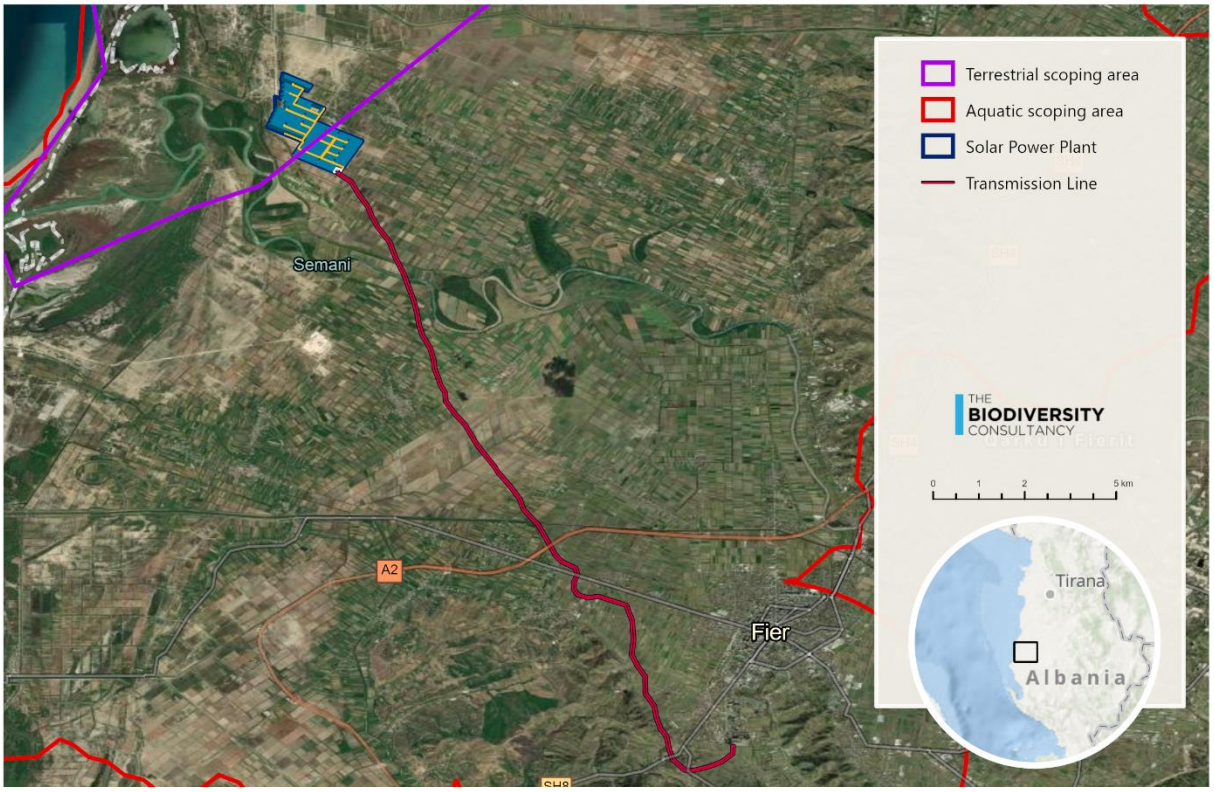


Figure 198. Project infrastructure and location within Albania.

2.3 Definition of habitats and PBFs

PS6 identifies three categories of habitat: critical habitat (CH), natural habitat (NH) and modified habitat (MH). These categories areas based on (i) habitat condition (or 'quality' or 'state') and (ii) significance for biodiversity. PS6 purposely provides a broad definition of habitats as geographical units (that include marine and freshwater aquatic areas, as well as airway passages). Modified, natural and critical habitat refers to the biodiversity value of the area as determined by species, ecosystems, and ecological processes. (PS6 Guidance Note (GN) 26: IFC 2019). PR6 further identifies Priority Biodiversity Features (PBFs) as those features which require consideration during project impact assessment and mitigation, but of lower sensitivity than features which are CH-qualifying (EBRD 2014b, 2014a).

2.3.1 Critical Habitat

Areas of "high biodiversity value" are termed CH by both the IFC and EBRD. There are five main criteria by which CH is defined (IFC / EBRD):

- Criterion 1 / Criterion ii: Areas of importance to Critically Endangered and/or Endangered species;
- Criterion 2 / Criterion iii: Areas of significant importance to endemic and/or restricted-range species;
- Criterion 3 / Criterion iv: Area supporting globally significant concentrations of migratory species and/or congregatory species;
- Criterion 4 / Criterion i: Highly threatened and/or unique ecosystems; and
- Criterion 5 / Criterion v: Areas associated with key evolutionary processes.

Criteria 1-3 (IFC) are species-specific and assessed against quantitative thresholds, further details of which are provided in Appendix 1. EBRD has not defined thresholds for Criteria ii-iv, and in practice the

equivalent PS6 criterion threshold is usually applied. For this assessment the same criteria have be used to identify CH according to both IFC PS6 and EBRD PR6. Criteria 4 and 5 / Criterion i and v are assessed qualitatively based on expert opinion, though quantitative criteria for ecosystems (Keith *et al.* 2013) can be used as a guide for Criterion 4 / Criterion i. EBRD also define CH with a sixth criteria - (vi) Ecological functions that are vital to maintaining the viability of biodiversity features described as critical habitat features (e.g. riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat-forming species). For the purposes of this CHA, this criterion has been combined within the assessment under Criteria 1-3 / ii-iv).

2.3.2 Natural and Modified Habitat

Natural and modified habitats exist on a continuum that ranges from largely untouched, pristine natural habitats to intensively managed, modified habitats. IFC's classification of areas as either natural or modified habitat is based on the extent of human modification. The threshold for classifying a habitat as modified rather than natural is high – only the most heavily disturbed and converted ecosystems would be classified as modified, as opposed to degraded natural habitat. Monoculture forestry plantations, agricultural areas and urban areas showing "substantial modification" would be classed as modified; whereas selectively logged forests or pasture usually retain most of the original species and ecological processes and so would in most cases still be considered natural habitat. EBRD has replaced the concept of natural habitat definition with Priority Biodiversity Features (PBFs) – See Section 2.3.3.

2.3.3 Priority Biodiversity Features

In addition to CH values, EBRD also considers a suite of PBFs which are of lower concern, but still important for a project to consider. PBFs include: (i) threatened habitats (e.g. natural and priority habitats identified under the EU Habitats Directive - Annex 1); (ii) vulnerable species; (iii) significant biodiversity features identified by a broad set of stakeholders or governments (such as Key Biodiversity Areas or Important Bird Areas); and (iv) ecological structure and functions needed to maintain the viability of priority biodiversity features (EBRD 2014a, paragraph 12). EBRD have not defined thresholds for these categories.

2.4 Scope and limitations of this Critical Habitat Assessment

The scope of the CHA is focused on determining the biodiversity values for which the area within which the Project is located qualifies as CH, as well as providing additional information on PBFs. The CHA does not assess impacts to biodiversity, as this is provided by the Project ESIA. However, guidance on the next steps needed to meet IFC PS6 and EBRD PR6 requirements for biodiversity risk management, including addressing any significant impacts, are presented in Section 5.

The CHA has been completed using data from previous baseline surveys undertaken for the Project as part of its ESIA (Abkons 2021), supported by global biodiversity datasets and published literature to determine biodiversity significance. The ESIA field surveys covered the Project area and its immediate surrounds. There is limited field-derived information available beyond the ESIA surveys completed within Project footprint. Therefore, additional secondary data has been obtained from scientific literature and consultation with biodiversity specialists[159] on plants and invertebrates to interpret the results and provide expert opinions.

3. Assessment approach

CH determination was based on the following steps:

1. Identification of appropriate scoping areas which contain the entire Project;
2. Collection and verification of available biodiversity information from Project reports, literature review, and expert opinion;

[159] Zoltán Barina (plants) and Tamás Németh (invertebrates) from the Hungarian Natural History Museum.

3. Identification of appropriate ecologically appropriate areas for analysis (EAAAs); and
4. Completion of assessments against PS6 and PR6 criteria for species and ecosystems to identify which biodiversity features meet the relevant thresholds for CH.

The methodology of each of these steps is presented in more detail below.

3.1 Identify the scoping area for the Project

Relatively broad landscape and seascape units may be initially scoped to determine if they are likely to support species or habitats that qualify as critical habitat. However, the scoping area does not necessarily represent the spatial scope for the assessment of impacts to biodiversity, nor the application of mitigation or offset measures. For this CHA, two initial scoping areas were defined, one for terrestrial species (all mammals, birds, reptiles, insects and plants) and one for aquatic species (all fish and amphibians).



Figure 199. Project layout and scoping areas used in the assessment.

3.1.1 Terrestrial scoping area

The terrestrial scoping area included the Karavasta Key Biodiversity Area (KBA)[160] (as shown in Figure 199). This area constitutes a common area with overlapping distribution of multiple biodiversity features, including a congregatory area supporting populations of each species during a particular period in their life-cycle that is associated with the KBA.

3.1.2 Aquatic scoping area

The aquatic scoping area (shown in Figure 199) for this assessment comprises:

- The full extent of three main catchments within which most of the Project infrastructure occurs;

[160] The selection of the KBA as the scoping area for terrestrial species followed direction from the IFC biodiversity specialist.

- A 5 km buffer around the small portion of transmission line which extends beyond the southernmost of the three main catchments; and,
- The Divjaka-Karavasta National Park, where this extends north beyond the northern catchment.

This area is justified on the basis that it represents a series of ecological units (catchments) relevant to the scale of the Project and supports multiple aquatic species relevant to this CHA.

3.2 Collect and verify available biodiversity information

A long-list of species predicted to occur within each of the terrestrial and aquatic scoping areas was compiled from a spatial analysis of the IUCN Red List[161], global distribution data on biodiversity, Project reports and additional scientific literature.

Previous evaluations of the potential presence of critical habitat for this Project were referred to for this assessment, as were baseline surveys of biodiversity carried out as part of the Project's ESIA, which have made a significant contribution to biodiversity knowledge for the Project area.

3.3 Assess candidate biodiversity against PS6 and PR6 criteria

An initial screening of the species identified as present in the relevant scoping areas was completed to identify a list of candidate species (Appendix 2) for assessment against IFC PS6 criteria for CH. This initial screening discounted Least Concern and Near Threatened species (for Criterion 1), non range-restricted species (for Criterion 2) and non-migratory / congregatory species (for Criterion 3). PBFs identified during the previous CHA (completed as part of the ESIA) were cross-checked against this biodiversity list to confirm their presence in the relevant scoping area.

3.3.1 IFC PS6 criteria

3.3.1.1 IFC Criteria 1, 2 and 3 (EBRD Criteria ii, iii and iv): threatened, restricted-range and migratory/congregatory species

The steps taken to determine if the respective scoping area contained features which would qualify as CH based on Criteria 1-3 / Criteria ii-iv for species were:

1. Determine whether CH thresholds are exceeded for each species (Appendix 1), based on a combination of their threat status, size of population, percent of species global/national range within the relevant scoping area, or the estimated known number of sites; and
2. Use of expert opinion and professional knowledge, where necessary, to interpret the results.

3.3.1.2 IFC Criterion 1c – Species of national importance:

Although CH is largely based on global conservation priorities, IFC sub-Criterion 1c considers important populations of nationally or regionally-listed Endangered and Critically Endangered species. Species identified as present in field surveys were compared against the 2013 national Albanian Red List assessment (Government of Albania 2013) to develop a final list for consideration under this criterion.

3.3.1.3 IFC Criterion 4 (EBRD Criterion i) – Highly threatened and/or unique ecosystems

Ecosystems present in the relevant scoping areas were identified using Copernicus (2018) and the descriptions of habitat provided in the ESIA (Abkons 2021), which were compared with information and threat status in the Red List of Ecosystems assessment for Europe (European Commission 2016). Note

[161] IUCN range maps are not available for all species, subspecies and populations (especially plants), and the IUCN Red List is not an exhaustive list; many species, subspecies and populations have not been assessed under IUCN Red List criteria.

that this was done qualitatively, as the categories used in the three habitat-classification systems differ (See Table 102 for a comparison of habitat classification).

3.3.1.4 IFC Criterion 5 (EBRD Criterion v) – Areas associated with key evolutionary processes

Guidance Note 82 (IFC 2019) offers a number of examples of areas associated with key evolutionary processes. Landcover, habitat mapping and geographical features were considered for this Criteria. No quantitative significance thresholds exist for this Criterion.

3.4 Defining an Ecologically Appropriate Areas of Analysis

The assessment of critical habitat under IFC PS6 criteria 1-3 relies on defining appropriate EAAAs, taking into account the distribution of species or ecosystems (within and sometimes extending beyond the project's area of influence) and the ecological patterns, processes, features, and functions that are necessary for maintaining them. For species which were determined likely to exceed the relevant CH threshold(s) (Criteria 1-3) within the scoping area, their key habitat associations were identified. These habitats were then used to define the EAAA for each species within each scoping area. Where the relevant CH thresholds are exceeded, the EAAA is confirmed as CH.

Where there was insufficient information available to make a definitive conclusion, a precautionary approach was taken whereby a species was assumed present in numbers to qualify the relevant scoping area as CH. Three levels of certainty are used when determining CH-status of a species in the relevant EAAA:

- **Confirmed**, when the species has been recorded in sufficient numbers to exceed the relevant threshold;
- **Likely,** when the balance of evidence suggests threshold exceedance – however population counts or estimates are not available;
- **Possible**, when there is an indication that a threshold may be exceeded, however more evidence is required to make a determination.

For many species, population estimates were not available at either the global or local level. In this case, species-range was used as a proxy for population (i.e. 10% of the range would contain 10% of the population).

3. CHA findings

4.1 Critical Habitat-qualifying biodiversity

4.1.1 Criteria 1-3 / Criteria ii-iv

In total, seven species qualify, or potentially qualify, as CH under IFC PS6 Criteria 1, 2 or 3, with some species qualifying under more than one Criterion. These species consist of one amphibian, two birds and four fish (Table 101). Wetland habitats within the Karavasta KBA are CH for Dalmatian Pelican and Pygmy Cormorant, as they likely support ≥1.5% of the species' global populations. However, there is no overlap between the Project area and the EAAA for these species and therefore PS6 / PR6 CH requirements are not applicable for either Dalmatian Pelican or Pygmy Cormorant. However, the wetland

and aquatic habitats that support the Albanian Water Frog and the four fish species do overlap the Project area and therefore PS6 / PR6 CH requirements apply to these species.

Table 101 CH-qualifying species

Scientific name	English name	IUCN / National status [1]	IFC PS6 Criteria [2]	CH qualification [162]	Habitats	Critical Habitat	Justification
Amphibians							
Pelophylax shqipericus	Albanian Water Frog / Albanian Pool Frog	VU / -	1c, 2a	Confirmed	Vegetated aquatic areas, temporary and permanent water bodies, edges of lakes and slow-flowing rivers	Wetland and aquatic habitats	This IUCN Vulnerable restricted-range species (estimated extent of occurrence: 10,387 km^2) occurs in western Albania and southern Montenegro at elevations below 500 m asl (IUCN 2019). Almost 10% of its global range overlaps with the aquatic scoping area and the ESIA noted that drainage channels intersecting the OHL route were important breeding and feeding grounds for this species (Abkons 2021). Thus, it is likely that the aquatic EAAA supports ≥10% of the global population of this species, and contains a nationally-important population, and therefore qualifies the aquatic EAAA as CH under Criteria 1c and 2a.
Birds							
Pelecanus crispus	Dalmatian Pelican	NT / CR	1c, 3a	Confirmed	Freshwater and brackish wetlands. Breeds on islands in freshwater lakes or in thick aquatic vegetation	Wetland and aquatic habitats	This nationally Critically Endangered (Government of Albania 2013) and globally Near Threatened congregatory species is a trigger species for the Karavasta Lagoon KBA, where 85 breeding pairs (170 individuals) were reported in 2020 (Abkons 2021). With an estimated global population of 11,400-13,400 (BirdLife International 2022a) this count represents ≥1.5% of the global population, and qualifies the terrestrial EAAA as CH under both Criteria 1c and 3a.
Microcarbo pygmaeus	Pygmy Cormorant	LC / CR	1c, 3a	Confirmed	Reedbeds and the shorelines along rivers, freshwater lakes	Wetland and aquatic habitats	This nationally Critically Endangered (Government of Albania 2013) and globally Least Concern congregatory and partial migratory species is a trigger species for the Karavasta Lagoon KBA, where ≥700 breeding pairs (1400 mature individuals) have been reported (Abkons 2021). With an estimated global population of 45,000-

[162] **Confirmed**, when the species has been recorded in the relevant EAAA in sufficient numbers to exceed the relevant threshold; **Likely**, when the balance of evidence suggests that threshold exceedance – either due to the area of overlap between a species range and the relevant EAAA or due to the species being recorded on site – however counts or population estimates are not available; **Possible**, when there is an indication that a threshold may be exceeded, however more evidence is required to make a determination.

Scientific name	English name	IUCN / National status [1]	IFC PS6 Criteria [2]	CH qualification [162]	Habitats	Critical Habitat	Justification
					and coastal wetlands		139,999 (BirdLife International 2022b), the terrestrial EAAA supports ≥1.5% of the global population and qualifies as CH under Criteria 1c and 3a.
Fish							
Barbus prespensis	Prespa barbel	LC / LR	3a	Confirmed	Freshwater and brackish lakes and streams	Wetland and aquatic habitats	This is a small size barbel (<300 mm) that spends most of its life in lakes except during reproduction (late April-July) when it migrates into tributaries to spawn. It has a range overlap of 2.5% with the aquatic scoping area and was recorded at multiple survey locations in both the SPP area and along the OHL route in May 2021. Given the species' confirmed presence and level of range overlap with the aquatic EAAA, the aquatic EAAA is considered likely to support >1% of the global population and therefore qualifies the EAAA as CH under criterion 3a.
Acipenser naccarii	Adriatic sturgeon	CR / EN	1a, 1c	Possible	Large freshwater rivers, after a juvenile period in nearshore marine habitats	Wetland and aquatic habitats	This globally Critically Endangered migratory species has a range overlap of 0.47% with the aquatic scoping area. The species is restricted to the Adriatic Sea area where it occurs from the Po River, Italy, to the Buna River, Albania, but previously occurred further south along the Adriatic coast into Greece. It was last recorded from Albania in 1997 in the Buna River, however due to its rarity and lack of focused surveys, it is possible low numbers are present in the aquatic EAAA – in which case the aquatic EAAA would qualify as CH under both criteria 1a and 1c.
Anguilla anguilla	European Eel	CR / -	1a, 1c, 3a	Confirmed	Small streams to large rivers and lakes, in estuaries, lagoons and coastal waters	Wetland and aquatic habitats	This globally critically Endangered migratory species has a range overlap of 0.01% with the aquatic scoping area, but has been recorded at multiple survey locations in both the SPP area and along the OHL route, and the Karavasta lagoon is important habitat at a National level for the species (Government of Albania 2019). The species is therefore confirmed to qualify under Criterion 1c and may also qualify under 1a and 3a.

Scientific name	English name	IUCN / National status [1]	IFC PS6 Criteria[2]	CH qualification[162]	Habitats	Critical Habitat	Justification
Alburnus scoranza	Bleak	LC / -	3a	Confirmed	Freshwater lakes and streams	Wetland and aquatic habitats	This migratory species is not mapped as present in the aquatic scoping area according to IUCN Red List data, however was historically present in the Vjosë river (Bogutskaya & Ahnelt 2019, record from 1894) and was reported at three ESIA survey locations in both the SPP area and along the OHL route. Assuming that the species identification of the ESIA surveys is correct, the aquatic EAAA would likely contain >1% of the global population, and the aquatic EAAA would qualify as CH under Criterion 3a.

[1]**CR** = Critically Endangered, **EN** = Endangered, **NT** = Near Threatened, **VU** = Vulnerable, **LC** = Least Concern, **NE** = Not Evaluated

[2]IFC PS6 species **Criterion 1**: Critically Endangered and/or Endangered species, **Criterion 2**: Endemic and/or Restricted-range species, **Criterion 3**: Migratory and/or congregatory species. See Appendix 1 for further details on PS6 criteria.

4.1.2 Criterion 4 / Criteria i: Highly threatened and/or unique ecosystems

No ecosystem or habitat identified as present in the immediate Project area meets the threshold for this criterion (Table 102).

Determination under Criterion 4 was made by comparing the habitat descriptions from the ESIA (Abkons 2021) with the habitat descriptions in the IUCN Red List of Ecosystems Assessment for Europe (European Commission 2016). Consideration of this criterion outside of the area covered by the ESIA was not possible, as the only available spatial land cover layer for either scoping area does not use the same classifications as either the ESIA or European Red List Assessment (Table 102).

4.1.3 Criterion 5 / Criteria v: Areas associated with key evolutionary processes

Review of existing information did not identify spatial features likely to be associated with key evolutionary processes, and along with the general lack of restricted range species occurring within either scoping area, suggests neither scoping area would qualify as CH under Criterion 5.

4.2 Priority Biodiversity Features

The ESIA Critical Habitat Assessment (Abkons 2021) determined the following species as PBFs for the Project (for full details see Appendix 3):

- Seven species of plants;
- Two species of mammal;
- Thirty-five species of bird; and,
- Five aquatic species.

None of these species have been determined as CH values.

The ESIA identified two habitats as present in the immediate Project area that are listed on Annex I of the EU Habitats Directive: '1310 *Salicornia* and other annuals colonizing mud and sand', and '92A0. *Salix alba* and *Populus alba* galleries'[163]. Small areas of the former saltmarsh habitat are naturally rehabilitating within the PV plant, following abandonment of agricultural cultivation. The '92A0. *Salix alba* and *Populus alba* galleries occur between pylons 10-15. As Annex I habitats, these habitats also meet EBRD's definition of 'threatened habitat' and are considered PBFs.

However, neither of these habitats have been determined to be threatened by the IUCN Red List of Ecosystems Assessment for Europe and therefore do not meet the IFC / EBRD definition of CH. Additional Annex I habitats have not been identified as present in the scoping areas, in part as there is not full alignment between the available landcover spatial layers and Annex I categories (Table 102). Therefore, it is possible that further habitats listed on Annex I may be present in either scoping area beyond the Project area.

In addition, EBRD includes significant biodiversity features identified by a broad set of stakeholders and governments (e.g. KBA / IBA) as PBFs. These are identified in Section 4.2.1 below.

4.2.1 Protected Areas / Internationally Recognized Areas of high biodiversity value

A number of Protected Areas (PA) or otherwise Internationally-Recognised Area (IRA) occur within the two scoping areas (Figure 200, Figure 201, Figure 202). There is overlap between Project infrastructure and the Karavasta Lagoon KBA / IBA and therefore Paragraph 20 of IFC PS6 is triggered. PAs and IRAs in the scoping areas include:

[163] The ESIA identifies a third habitat, 1150 Coastal Lagoons, listed on Annex 1 as present in the wider area, but with its closest extent c. 2.2 km from the Project footprint.

- Divjaka-Karavasta National Park, which spans an area of 22,230 ha between the Adriatic coast, Shkumbini River in the north and Semani River in the south. The Park consists of four lagoons, the largest being the Karavasta Lagoon which is separated from the Adriatic Sea by a large sand bar which is covered with planted coastal coniferous forests. As the largest lagoon of its kind in the Mediterranean Sea, it has been recognised as a wetland of international importance under the Ramsar Convention. The area is designated as a KBA/IBA (as the Karavasta Lagoon KBA) due to its outstanding value for globally threatened bird species, wintering and breeding waterbirds (BirdLife International 2022c), as well as the Albanian Water Frog. Two of these avian trigger species, Dalmatian Pelican and Pygmy Cormorant, also qualify wetlands within this area as Critical Habitat (Table 1). The area is also a candidate Emerald site. The boundaries for each of these designations are slightly different. The proposed Project footprint overlaps with the KBA, but not the National Park, Ramsar or candidate Emerald site (Figures 3-5);
- Levan Managed Nature Reserve (IUCN Category IV), to the south-west of Fier and the proposed OHL alignment, which is a remnant of previously more widespread oak forests;
- Kurora E Lumit Te Vjeter, Seman (Libofshe-Adriatik) Nature Monument (IUCN Category III), to the east of the OHL alignment. This area represents a remnant of old riparian forest along Semani River. The proposed Project footprint does not overlap with the PA;
- Pishe Poro Nature Monument (IUCN Category IV), which is a coastal wetland area containing primarily salt marshes, sand dunes, and planted coastal coniferous forest in the far south-west of the aquatic scoping area. The proposed Project footprint does not overlap with the PA; and,
- Vjose-Narta Protected Landscape (IUCN Category V), also in the far south-west of the aquatic scoping area, designated for its wetlands and relic habitats. This area is also a candidate Emerald site and a Key Biodiversity Area. The proposed Project footprint does not overlap with the PA / IRA.

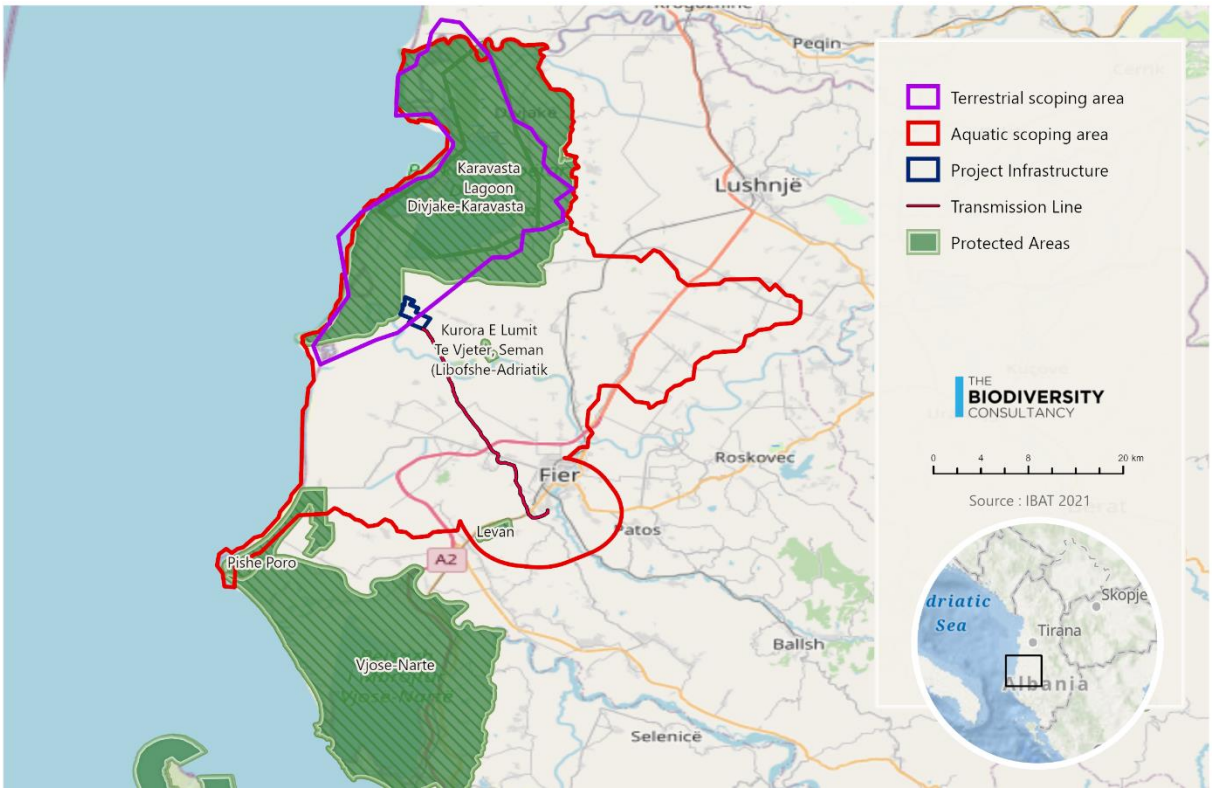


Figure 200. Overlap between Protected Area, the two scoping areas and Project infrastructure.

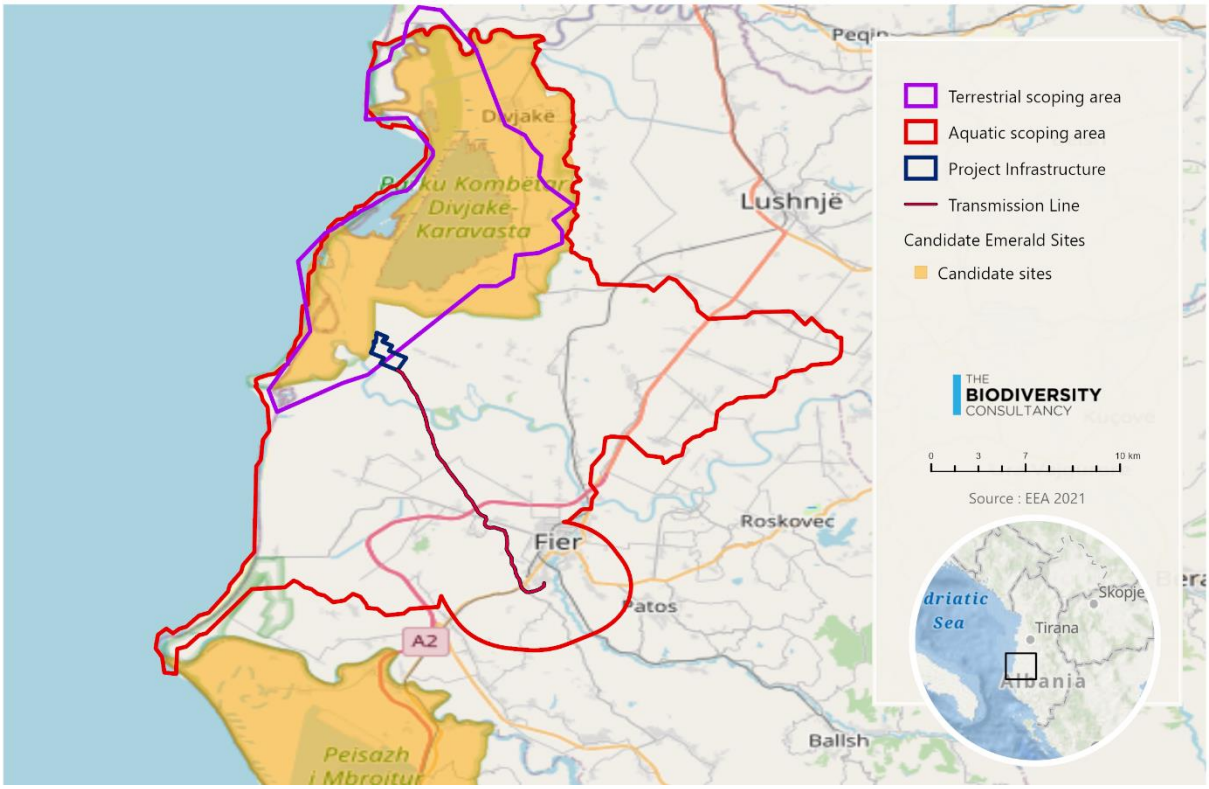


Figure 201. Overlap between the Candidate Emerald Sites, the two scoping areas and Project infrastructure.

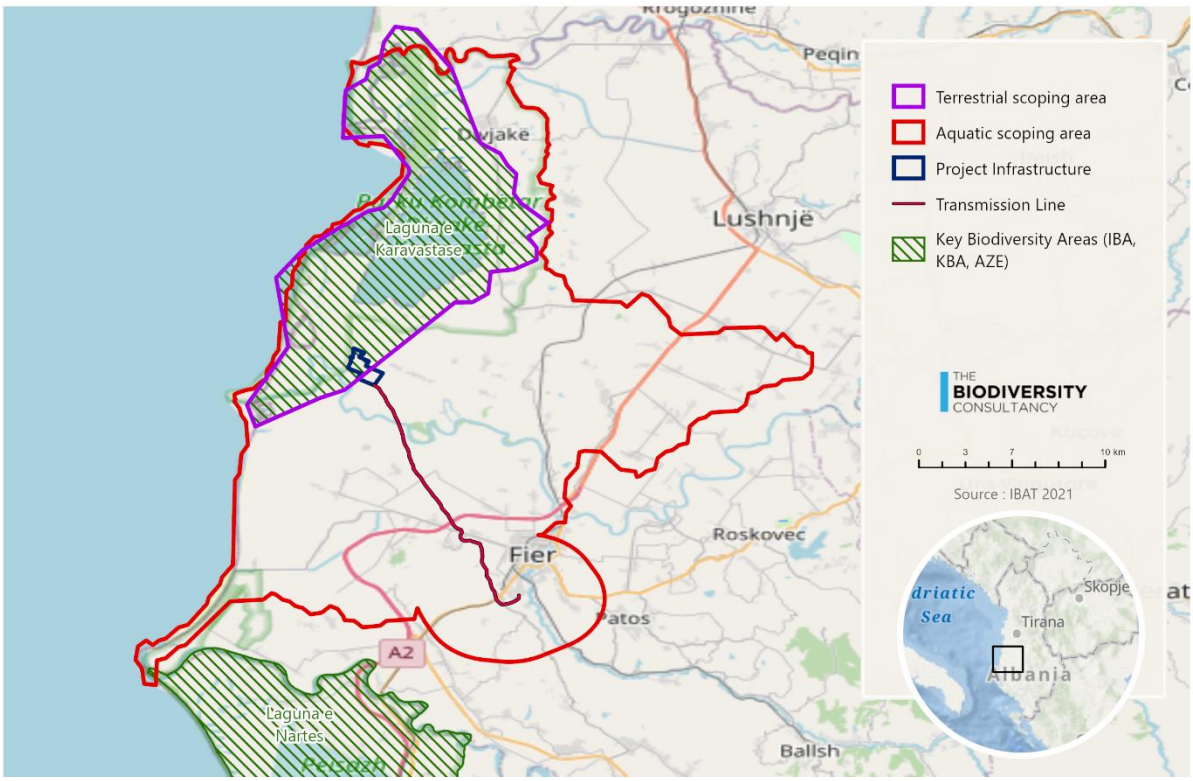


Figure 202. Overlap between Key Biodiversity Areas, the two scoping areas and Project infrastructure.

4.3 Natural and Modified Habitats

Classification of natural and modified habitats (as defined by the IFC) within the aquatic and terrestrial scoping areas is complicated by the different habitats classification systems used by different data sources. This section attempts to align these classification systems and determine which habitat types meet the IFC definition of natural and modified habitats – as summarised in Table 102.

Within the Karavasta KBA, four broad habitat categories (as defined by the IUCN[164]) have been recorded as present (Key Biodiversity Areas Partnership 2022):

- forest (alluvial and very wet forest, broadleaved deciduous woodland, mixed woodland and native coniferous woodland);
- shrubland (scrub);
- wetlands (rivers and streams, standing brackish and salt water, water fringe vegetation); and
- artificial areas (arable land, other urban and industrial areas).

Of these, CH-qualifying species are supported by 'wetlands' habitats, which has been to define the EAAA and represent CH (Table 101). Forests and shrublands should be considered natural habitat and artificial areas as modified habitat, as defined by the IFC.

For the aquatic scoping area, CH-qualifying species are known, or predicted, to occur in all flowing or standing water bodies, including the Semani River, wetlands and lagoons, drainage channels and temporary pools which exist after rains plus adjacent riparian areas (Table 101). All wetlands and aquatic areas should therefore be considered as the aquatic EAAA and qualify as CH.

Almost all other habitats in the vicinity of the project are likely to have been degraded to some extent through human modification. This is indicated by the Corine landcover mapping available for the scoping areas (Copernicus 2018) (Figure 6), which show the majority of the area overlapping the Project infrastructure as cultivated areas. The ESIA describes the majority of the site of the PV plant as well as the route of the transmission line as agricultural. Attempts to cultivate the PV plant appears to have ceased some years ago, leading to a heterogenous mixture of degraded habitats including areas that are starting to naturally rehabilitate to Mediterranean and thermo-Atlantic salt marshes and salt meadows. However, due to the isolation of the area from influence from the sea and the extensive drainage that has been installed, the area is not functioning as a natural saltmarsh habitat.

The only natural habitat (as defined by IFC) within the project area is the area of 92A0: *Salix alba* and *Populus alba* galleries along the Semani river between pylons 10-15 (Abkons 2021) (Table 2).

[164] Habitats Classification Scheme (Version 3.1)

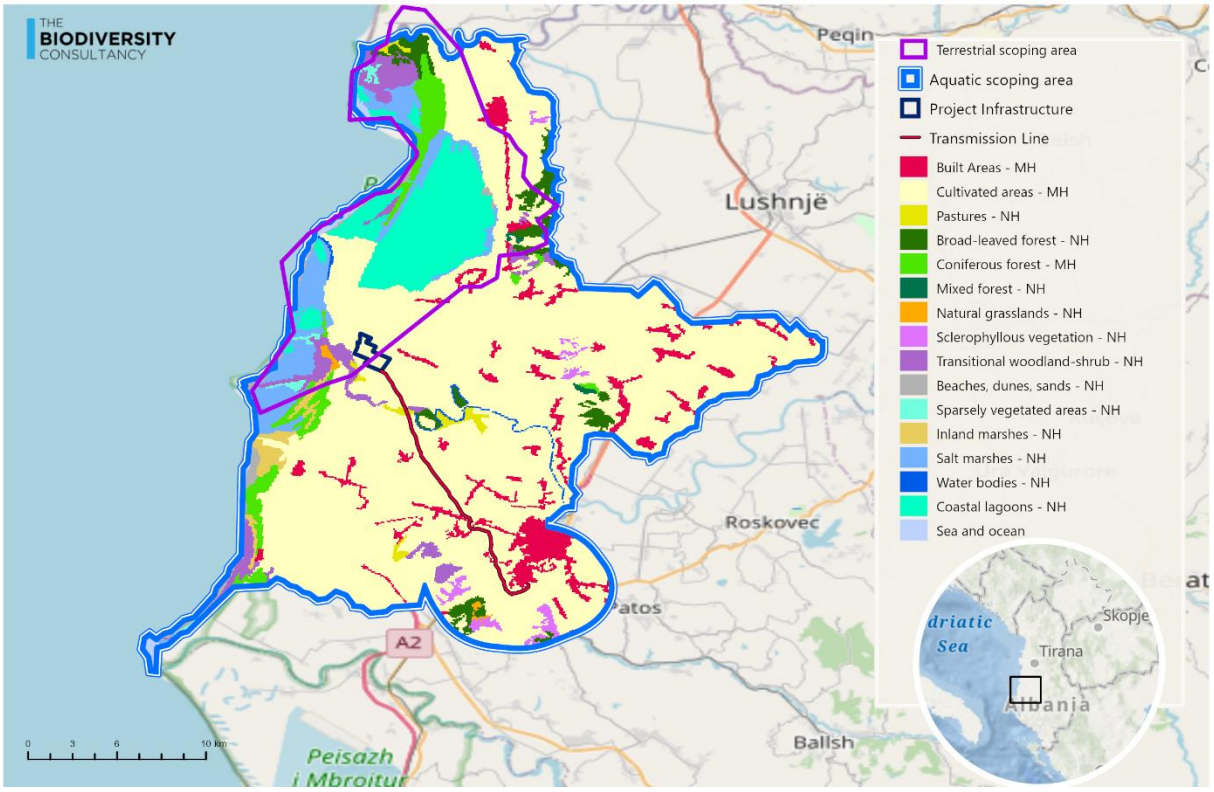


Figure 203. Habitats in the Project terrestrial and aquatic scoping areas, based on Corine landcover layers (Copernicus 2018).

Table 102. Details of habitats, or likely to be present, in the aquatic scoping area.

Habitat Classification						Overlap with Project infrastructure
IUCN Habitats Classification Scheme	**Corine (Copernicus 2018)**	**European Commission 2016 – threat status**	**ESIA habitat (Abkons 2021)**	**EU Habitats Directive (European Union 1992) Annex I habitats**	**IFC PS6**	
Artificial	Built areas	-	-	-	MH	Yes
	Cultivated areas	-	Mixed mosaic agriculture, olive groves	Includes small areas of 1310: *Salicornia* and other annuals colonising mud and sand. [Also present, but not in listed in Annex 1 - 1410: Salted Mediterranean meadows (*Juncetalia maritimi*)	MH	Yes, the majority of the project footprint (Abkons 2021)
	Pastures	-	-	-	MH	Yes
Forest	Broad-leaved forest		-		NH	No
	Transitional woodland	G1.3 Mediterranean and Macaronesian riparian woodland - VU	92A0: *Salix alba* and *Populus alba* galleries		NH	Yes, along the Semani river between pylons 10-15 (Abkons 2021)
	Coniferous forest	B1.7d Mediterranean coniferous coastal dune woodland - LC	Coastal coniferous forest	2270: Wooded dunes with *Pinus pinea* and/or *Pinus pinaster*	NH	No
	Mixed forest	-	-	-	NH	No
Grasslands	Natural grasslands	-	Natural and semi natural grasslands	Includes areas of 6510: Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)	NH	No
Shrubland	Sclerophyllous vegetation		Sclerophyllous grazed forests	6310 Dehesas with evergreen Quercus spp.	NH	No
	Transitional woodland-shrub			-	NH	No

Habitat Classification						Overlap with Project infrastructure
IUCN Habitats Classification Scheme	**Corine (Copernicus 2018)**	**European Commission 2016 – threat status**	**ESIA habitat (Abkons 2021)**	**EU Habitats Directive (European Union 1992) Annex I habitats**	**IFC PS6**	
Marine	Beaches, dunes, sands	B1.3b Mediterranean and Black Sea shifting coastal dune - VU	Sea dunes of the Mediterranean coast	2110 embryonic shifting dunes	NH	No
Wetlands	Coastal lagoons		Coastal wetlands / lagoons	[Not listed on Annex 1 – 1150 Coastal lagoons]	CH	No
	Water bodies	-	Drainage channels/reedbeds	-	CH	Yes

5 Summary

In summary, the assessment confirms:

- Five species meet the Critical Habitat (CH) thresholds for Criteria 1-3 / Criteria ii-iv (Table 1) in wetland and aquatic habitats within the PV plant and along the transmission line route: four fish species and the Albanian Water Frog.
- The remainder of the Project area meets the IFC definition of modified habitat – with the exception of a small area of *Salix alba* and *Populus alba* galleries along the Semani river between pylons 10-15 of the transmission line.
- Two habitats and 49 species are identified as PBFs, as defined by EBRD PR6
- The Project footprint overlaps with an internationally-recognised area (Karavasta KBA). The KBA also meets the EBRD definition of PBF. The wetland habitats within the Karavsta KBA are CH for two bird species, however these habitats do not overlap with the Project area and PS6 / PR6 CH requirements do not apply to either Dalmatian Pelican or Pygmy Cormorant.

The implications of these findings and recommended next steps for managing biodiversity risks and aligning with IFC PS6 requirements for operating in CH are presented below.

5.1 Implications and next steps

CH designation is purely an assessment of biodiversity importance of an area, based on the biodiversity values and not the potential Project impacts. For Projects operating in CH, IFC PS6 requires project proponents to 'fully exercise the mitigation hierarchy', with an emphasis on measures aimed at avoiding and minimizing impacts. Where significant residual impacts remain, additional remediation and offset measures may be required to deliver a net gain for all CH-qualifying features.

The presence of species that qualify areas as CH does not necessarily mean that a project will significantly impact these species. Several scenarios are possible, from impacts that are negligible, readily avoided or temporary, to those that are significant, long-term and challenging to mitigate. It is also important to consider whether any features need a species-specific focus or if they can be collectively addressed through broader consideration of habitat management and taking a landscape-level perspective (e.g. using particular habitats as a proxy for a suite of similar species).

Even where no measurable impacts are anticipated to CH-qualifying biodiversity after mitigation, projects need to undertake monitoring to verify this, which can either be described in a Project-specific Biodiversity Monitoring and Evaluation Plan (BMEP) or within other documents. Where monitoring indicates that there are unforeseen impacts, adaptive management measures should be in place to address these.

The PV plant is located in an area with a mixture of critical and modified habitat and therefore PS6 paragraphs 12 and 17-19 are applicable (IFC 2012). In areas of modified habitat, a project should minimize impacts to biodiversity and implement mitigation measures as appropriate. In areas of CH, projects are required to demonstrate:

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the CH was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and,
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

Where the Project could have significant, adverse and irreversible impacts to PBFs, the Project should (EBRD 2014a, paragraph 13) not implement any project-related activities unless:

- There are no technically and economically feasible alternatives;
- The overall benefits outweigh the project impacts on biodiversity;
- Stakeholders are consulted in accordance with PR 10;
- The project is permitted under applicable environmental laws, recognising the priority biodiversity features; and,
- Appropriate mitigation measures are put in place, in accordance with the mitigation hierarchy, to ensure no net loss and preferably a net gain of priority biodiversity features over the long term, to achieve measurable conservation outcomes.

As the Project is situated within an Internationally Recognised Area, it must also comply with PS6 paragraph 20 (IFC 2012), and Guidance Note 6 paragraph GN93 to GN98 (IFC 2019) by:

- Demonstrating that Project's operations within the protected area are in line with national law;
- Developing the Project in a manner which is consistent with any management plans that exist for the area;
- Consulting with protected area staff, or officials responsible for management of the area; and
- Developing, and implementing, additional programmes to 'promote and enhance the conservation aims of the area'.

Next steps

While this CHA has identified CH-qualifying species and PBFs for the Project, available information (known habitat associations and field records in the Project ESIA and CHA: Abkons 2021) suggests that areas of temporary or permanent water in the Project site have suitable habitat for the Albanian Water Frog and the four CH fish species.

It is therefore recommended that the Project develops:

- A Biodiversity Management Plan (BMP) that details the mitigation and monitoring measures that will be implemented during construction and operation phases of the Project to avoid and minimise impacts to CH-qualifying features and PBFs, and restore habitat for these features on-site and verify the levels of impacts occurring; and,
- A Biodiversity Action Plan (BAP) that quantifies the residual impacts to identified priority species and proposes conservation actions that would support the Project meet its NG commitments for CH-qualifying species and NNL commitments for PBFs, and promotes the conservation aims and effective management of the Karavasta KBA.

Appendix 1: Application of Critical Habitat thresholds

Criterion 1: Critically Endangered and Endangered species

Areas qualifying for this criterion support:

- Globally-important concentrations of IUCN Red-listed Critically Endangered or Endangered species (>0.5% of the global population and >5 reproductive units of a CR or EN species);
- b. Globally-important concentrations of an IUCN Red-listed VU species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds under (a); or
- c. As appropriate, areas containing important concentrations of a nationally/regionally-listed EN or CR species

Quantitative data for the list of candidate species in each scoping area were screened against PS6 thresholds (IFC 2019). In the absence of information on species' populations, the screening was based on the proportion of a species' distribution in that scoping area. When information was unclear, a precautionary approach was taken. This assessment also considered any subspecies and sub-populations that have been individually assessed on the IUCN Red List.

Criterion 2: Restricted-range species

Areas qualifying for this criterion hold ≥10% of the global population size and ≥10 reproductive units of a restricted-range species. "Restricted-range" refers to a species' extent of occurrence (EOO), and for terrestrial vertebrates, dragonflies and damselflies, and plants, is a defined as those that have an EOO of less than 50,000 km^2. For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range was defined as a global range <500 km maximum linear geographic span. Each scoping area was screened for overlap with restricted-range species' maps from the IUCN Red List. Any such species were compared with the recommended thresholds for Criterion 2 (IFC 2019). As for Criterion 1 species, the screening was preferentially based on the proportion of a species' population in a given area, but often – owing to limited data – on the proportion of a species' global distribution.

Criterion 3: Migratory and congregatory species

Areas qualifying for this criterion support either:

- ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle and on a cyclical or otherwise regular basis; or
- ≥10 percent of the global population of a species during periods of environmental stress.

Data for the list of candidate species in each scoping area was screened against PS6 thresholds (IFC 2019), based on the proportion of a species' population in a given area.

Criterion 4: Highly threatened and/or unique ecosystems

IUCN maintains a Red List of Ecosystems (IUCN 2020) and ecosystems are progressively being assessed against the Red List criteria. Areas qualifying under this criterion hold ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN, or other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.

Criterion 5: Areas associated with key evolutionary processes

The key factor defining this criterion is 'the structural attributes of a landscape'. Although key evolutionary processes may operate at various spatial scales, in the sense of PS6 these are usually considered at a relatively fine scale rather than broad biogeographic regions (e.g. an unusual outcrop of a rock type that holds unique and endemic plant assemblages). No quantitative thresholds exist for this criterion, so there is a reliance on expert opinion and qualitative value judgement.

Appendix 2: Candidate species

Table 103. List of candidate species for the Project scoping areas assessed against Critical Habitat thresholds for Criteria 1-3 (IFC 2019).

Group	Scientific name	English Name
Mammalia	*Myotis mystacinus*	Whiskered Myotis
Mammalia	*Myotis capaccinii*	Long-fingered Bat
Mammalia	*Miniopterus schreibersii*	Schreiber's Bent-winged Bat
Mammalia	*Canis aureus*	Golden Jackal
Mammalia	*Meles meles*	Badger
Amphibia	*Pelophylax shqipericus*	Albanian Water Frog / Albanian Pool Frog
Aves	*Oxyura leucocephala*	White-headed Duck
Aves	*Neophron percnopterus*	Egyptian Vulture
Aves	*Puffinus mauretanicus*	Balearic Shearwater
Aves	*Anser erythropus*	Lesser White-fronted Goose
Aves	*Podiceps auritus*	Horned Grebe
Aves	*Clanga clanga*	Greater Spotted Eagle
Aves	*Puffinus yelkouan*	Yelkouan Shearwater
Aves	*Streptopelia turtur*	European Turtle-dove
Aves	*Aythya ferina*	Common Pochard
Aves	*Pelecanus crispus*	Dalmatian Pelican
Aves	*Microcarbo pygmaeus*	Pygmy Cormorant
Aves	*Accipiter nisus*	Eurasian Sparrowhawk
Aves	*Circus cyaneus*	Hen Harrier
Aves	*Circus pygargus*	Montagu's Harrier
Aves	*Himantopus himantopus*	Black-winged Stilt
Aves	*Merops apiaster*	European Bee-eater
Aves	*Recurvirostra avosetta*	Pied Avocet
Aves	*Glareola pratincola*	Collared Pratincole
Aves	*Anas crecca*	Common Teal
Aves	*Ardea alba*	Great White Egret
Aves	*Phalacrocorax carbo*	Great Cormorant
Aves	*Spatula clypeata*	Northern Shoveler
Aves	*Sternula albifrons*	Little Tern
Aves	*Alauda arvensis*	Eurasian Skylark
Aves	*Alcedo atthis*	Common Kingfisher
Aves	*Anthus campestris*	Tawny Pipit
Aves	*Anthus pratensis*	Meadow Pipit
Aves	*Ardea cinerea*	Grey Heron
Aves	*Ardeola ralloides*	Squacco Heron
Aves	*Burhinus oedicnemus*	Eurasian Stone-curlew
Aves	*Calandrella brachydactyla*	Greater Short-toed Lark
Aves	*Charadrius alexandrinus*	Kentish Plover
Aves	*Circus aeruginosus*	Western Marsh Harrier
Aves	*Egretta garzetta*	Little Egret
Aves	*Falco naumanni*	Lesser Kestrel

Group	Scientific name	English Name
Aves	*Falco tinnunculus*	Common Kestrel
Aves	*Glareola pratincola*	Collared Pratincole
Aves	*Hippolais olivetorum*	Olive-tree Warbler
Aves	*Ixobrychus minutus*	Little Bittern
Aves	*Lanius collurio*	Red-backed Shrike
Aves	*Lullula arborea*	Woodlark
Aves	*Melanocorypha calandra*	Calandra Lark
Aves	*Sterna hirundo*	Common Tern
Gnetopsida	*Ephedra distachya L.*	Joint Pine
Liliopsida	*Ammophila arenaria (L.) Link*	Marram Grass
Liliopsida	*Baldellia ranunculoides*	The lesser water plantain
Liliopsida	*Crocus dalmaticus*	Dalmatian saffron
Liliopsida	*Eleocharis acicularis*	Scirpe Épingle
Liliopsida	*Gymnadenia frivaldii*	Frivald's Gymnadenia
Magnoliopsida	*Glaucium flavum Crantz*	Horned Poppy
Magnoliopsida	*Hypericum perforatum L.*	Perforate St. John’s wort
Magnoliopsida	*Matthiola tricuspidata (L.) R. Br.*	Three-horned Stock
Magnoliopsida	*Pancratium maritimum L.*	Azucena de Mar
Magnoliopsida	*Tanacetum cinerariifolium*	Dalmatian Pyrethrum
Magnoliopsida	*Tamarix dalmatica*	-
Polypodiopsida	*Pilularia minuta*	Dwarf Pillwort
Actinopterygii	*Squalius sp. nov. 'Aoos'*	-
Actinopterygii	*Barbus prespensis*	Prespa barbel
Actinopterygii	*Acipenser naccarii*	Adriatic sturgeon
Actinopterygii	*Anguilla anguilla*	European Eel
Actinopterygii	*Oxynoemacheilus pindus*	Pindus stone loach
Actinopterygii	*Cyprinus carpio*	Common Carp
Actinopterygii	*Salmo dentex*	-
Actinopterygii	*Aphanius fasciatus*	Mediterranean killifish
Actinopterygii	*Alburnus scoranza*	-
Actinopterygii	*Dicentrarchus labrax*	European Sea Bass
Actinopterygii	*Chelon ramada*	Thinlip Grey Mullet
Actinopterygii	*Gobio skadarensis*	Scdar gudgeon
Malacostraca	*Austropotamobius pallipes*	White clawed Crayfish
Malacostraca	*Astacus astacus*	Noble Crayfish
Gastropoda	*Chondrula lugorensis*	-
Gastropoda	*Chilostoma fuchsi*	-
Gastropoda	*Poiretia delesserti*	-
Gastropoda	*Gyralina circumlineata*	-
Gastropoda	*Monacha microtricha*	-
Gastropoda	*Chilostoma dunjana*	-
Gastropoda	*Gyralina candida*	-
Gastropoda	*Chilostoma albanograeca*	-
Gastropoda	*Codringtonia neocrassa*	-
Gastropoda	*Cochlostoma kleciaki*	-

Group	Scientific name	English Name
Gastropoda	*Agardhiella skipetarica*	-
Gastropoda	*Charpentieria stigmatica*	-
Insecta	*Buprestis splendens*	Goldstreifiger
Insecta	*Agrilinus ibericus*	-
Insecta	*Thorectes intermedius*	-
Insecta	*Eupholidoptera garganica*	Gargano Marbled Bush-cricket
Insecta	*Myrmecophilus hirticaudus*	Rough-tailed Ant-cricket

Appendix 3: Priority Biodiversity Features – species and habitats

Priority Biodiversity Features – species and habitats, as identified in the Project ESIA and supporting documents (Abkons 2021)

	Name
Habitats	
	Salix alba and *Populus alba* galleries (92A0)
	Salicornia and other annuals colonizing mud and sand (1310)
Plants	
	Marram grass *Ammophila arenaria*
	Joint Pine *Ephedra distachya*
	Sea-poppy *Glaucium flavum*
	Perforate St. John's wort *Hypericum perforatum*
	The lesser water plantain *Baldellia ranunculoides*
	Three-Horned Stock *Matthiola tricuspidata*
	Sea Daffodil *Pancratium maritimum*
Mammals	
	Badger *Meles meles,*
	Western Polecat *Mustela putorius*
Birds	
	Eurasian Sparrowhawk *Accipiter nisus*
	Eurasian Skylark *Alauda arvensis*
	Common Kingfisher *Alcedo atthis*
	Tawny Pipit *Anthus campestris*
	Meadow Pipit *Anthus pratensis*
	Great Egret *Ardea alba*
	Grey Heron *Ardea cinerea*
	Squacco Heron *Ardeola ralloides*
	Common Pochard *Aythya ferina*
	Eurasian Stone-curlew *Burhinus oedicnemus*
	Greater Short-toed Lark *Calandrella brachydactyla*
	Kentish Plover *Charadrius alexandrinus*
	Western Marsh Harrier *Circus aeruginosus*
	Hen Harrier *Circus cyaneus*
	Montagu's Harrier *Circus pygargus*
	Greater Spotted Eagle *Clanga clanga*
	Syrian Woodpecker *Dendrocopos syriacus*
	Little Egret *Egretta garzetta*
	Lesser Kestrel *Falco naumanni*
	Common Kestrel *Falco tinnunculus*
	Collared Pratincole *Glareola pratincola*
	Black-winged Stilt *Himantopus himantopus*
	Olive-tree Warbler *Hippolais olivetorum*
	Little Bittern *Ixobrychus minutus*
	Red-backed Shrike *Lanius collurio*
	Lesser Grey Shrike *Lanius minor*

	Name
Habitats	
	Woodlark *Lullula arborea*
	Calandra Lark *Melanocorypha calandra*
	European Bee-eater *Merops apiaster*
	Night Heron *Nycticorax nycticorax*
	Greater Flamingo *Phoenicopterus roseus*
	Golden Plover *Pluvialis apricaria*
	Common Tern *Sterna hirundo*
	Little Tern *Sternula albifrons*
	European Turtle Dove *Streptopelia turtur*
Aquatic species	
	White-clawed crayfish *Austropotamobius pallipes*
	European crayfish *Astacus astacus*
	Ohrid loach *Cobitis ohridana*
	Scadar gudgeon *Gobio skadarensis*
	Pindus stone loach *Oxynoemacheilus pindus*

Appendix 7. Flora Database and Flora Data sheet

Field notes summary datasheets (5, 6, July, 2020)/ Karavasta Photovoltaic Power Plant;

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic Power Plant; Connection to the grid of the power system	Project Feature Investigated: Environment/Ecology
Specialist: Prof. Dr. Arsen Proko	Date: 5, 6, July, 2020
Habitats: WP-1: 1410 Mediterranean salt marsh and meadows habitat. WP 2: 1410 Mediterranean salt marsh and meadows habitat. WP 3: 1410 Mediterranean salt marsh and meadows habitat. WP 4: 1410 Mediterranean salt marsh and meadows habitat. WP 7: 1410 Mediterranean salt marsh and meadows habitat. WP 8: 1410 Mediterranean salt marsh and meadows habitat. WP 9: 1410 Mediterranean salt marsh and meadows habitat. WP 10: 1410 Mediterranean salt marsh and meadows habitat. WP 18: 1410 Mediterranean salt marsh and meadows habitat. WP 19: 1410 Mediterranean salt marsh and meadows habitat. WP 20: 1410 Mediterranean salt marsh and meadows habitat. WP 21: 1410 Mediterranean salt marsh and meadows habitat.	Observations: It is a very heterogeneous landscape. Within this landscape can be identified several plant communities, in depending of species composition and human practices, which change from 1310 Salicornia and other annuals colonizing mud and sand (in the western part of the transect) to 1410 Mediterranean salt meadows habitat (Juncetalia) and to Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi). Because the high level of the fragmentation the mapping is difficult. There are salt soils cultivated years ago, but abandoned and overgrazed nowadays. The vegetation is damaged drastically by the intensive humen intervention and ususstainable practices
Key Fauna Species (Latin/English):	Observations:
Key Flora Species (English/Latin):	Observations: Vegetation dominated by: Shrub-Like Glasswort (Salicornia fruticosa L.), Sea Rush (Juncus maritimus Lam.), Common Sea-Lavender (Limonium vulgare Miller.), Distant Sedge (Carex distans L.), Bicoloured Carrot (Daucus guttatus Sibth & Sm.), Sea Aster, (Aster tripolium L.), Sea Purslane (Halimione portulacoides (L.) Aellen), Dalmatian Tamarix (Tamarix dalmatica Baurn.), Golden samphire (Inula crithmoides L.), Ravenna cane (Saccharum ravennae (L.) Murray),

	Club rush (Scirpus holoschoenus Vahl.) and Water plantain (Plantago crassifolia Forskal),
Hydrobiology:	Observations: Salt marshes are one of the most prevalent habitats in coastal area, in the low-lying alluvial plain behind sandy dunes. These are submerged in winter and dry (partly or totally) in summer. Often within this habitat type, plant cover alternates with bare ground that, in areas of high salinity, is covered with crystallized salt. Glasswort is often the first plant to take hold in a mudflat and begin its ecological succession into a salt marsh.
Designated Areas: NP of Divjake-Karavasta	
Area in need of a Construction Restriction Period	
Conclusions and key aspects: Salt marshes provide many habitats for species uniquely adapted to changes in salinity and water levels. They are important storehouses of biodiversity and extremely productive habitats. They serve as depositories for a large amount of organic matter, which feeds a broad food chain of organisms from bacteria to mammals as it decomposes. The botanical and ecological value of this type of habitat is generally high. In our case the habitat don't fulfil properly these functions. It is very damaged because the unsustainable practices, years before using for agriculture practices and nowadays for intensive greasing.	
Photos: Wp-1, WP-2, WP-3, WP 4, WP-7; WP-8; WP-9; WP-10; WP-18; Wp-19; WP-20	
	









Field notes summary datasheets (5, 6, July, 2020)/ OHL;

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic Power Plant; Connection to the grid of the power system	Project Feature Investigated: Environment/Ecology
Specialist: Prof. Dr. Arsen Proko	Date: 5, 6, July, 2020
Habitats: WP 5 2270 Wooded dunes with Maritime pine (Pinus pinea) and/or Pinus pinaster. Coastal Coniferous Forest WP 6: 2110 Embryonic shifting dunes, 2210 Annual vegetation of drift lines habitat.	Observations: European Habitats include 2270 Wooded dunes with Maritime pine (Pinus pinea) and Pinus halepensi. Coastal Coniferous Forest - dominated by Aleppo pine (Pinus halepensis) extends in south-western part of surrounding. Pine trees generated from artificial plantations, more than 50 years ago. Represent a small area on the study area. 2110 Embryonic shifting dunes (Cakiletea maritimae & Ammophiletea). This habitat type includes the low sand dunes of the shoreline. These dunes are the first elevations (foredunes) of loose sandy substrate found near the lagoon (Godulla e Ushatrit). It is characterized by the presence of organic material and plant remains washed up by the sea and also by incessant mobility and changing of the shape, which ensure their low height (<1 m) and sparse vegetation cover.
Key Fauna Species (Latin/English):	Observations:
Key Flora Species (English/Latin):	Observations: This habitat is dominated by: Aleppo pine (Pinus halepensis Mill.), Common Myrtle (Myrtus communis L.), Heath (Erica manipuliflora Salisb.) Rabit-Tail (Lagurus ovatus L.), (Phalaris arundinacea The floristic composition of sand done includes typical psammophytes1 such as Sea holly (Eryngium maritimum L.), Searocket (Cakile maritime Scop.), (Prickly Parsnip (Echinophora spinosa L.), Purple spurge (Euphorbia peplis L.), Marram grass (Ammophila arenaria (L.) Link), Prickly saltwort (Salsola kali L.), Golden samphire (Inula crithmoides L.), Prickly drop-seed grass (Sporobolus pungens (Schreber).L.), Cocklebur (Xanthium strumarium L.), and others. Most common species in the sund dune habitat are: Blue Pimpernel (Anagallis foemina Miller.), Narrow-leaved clover (Trifolium angustifolium L.), Animated Oat (Avena sterilis L.), lop-grass (Bromus hordeaceus L.), Wall barley (Hordeum murinum), Compact Rush (Juncus conglomerates L.), Rabit-Tail (Lagurus ovatus

	L.), Coloured campion (Silene colorata Poiret.), Rough dogstail (Cynosurus echinatus L.), greater quaking grass (Briza maxima L.), Heron's Bill (Erodium cicutarium (L.) L'Hér. ex Aiton,) and Chaste tree (Vitex agnus-castus L.).
Hydrobiology:	Observations:
Designated Areas:	
Area in need of a Construction Restriction Period	
Conclusions and key aspects: It is not so used by the people, having an obvious result of human impact is the extensive distribution of Cocklebur (Xanthium strumarium) (the species was introduced from America and is perfectly adapted in these areas) and many invaders from neighboring disturbed grounds or cultivated habitats.	
Photos: Wp-5, WP-6,	
	
	

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic Power Plant; Connection to the grid of the power system	Project Feature Investigated: Environment/Ecology
Specialist: Prof. Dr. Arsen Proko	Date: 5, 6, July, 2020
Habitats: WP-11: Natural Grasslands - Lowlands Grasslands (below 1.500 masl) – Semi-Natural (Recently Abandoned Agricultural Areas). WP 12: Natural Grasslands - Lowlands Grasslands (below 1.500 masl) – Semi-Natural (Recently Abandoned Agricultural Areas) WP 13: Natural Grasslands - Lowlands Grasslands (below 1.500 masl) – Semi-Natural (Recently Abandoned Agricultural Areas)	Observations: Some areas of former agriculture land mainly on Rreth Libofsha hills, which have been abandoned for several years, now support a semi-natural assemblage of species. This area are used mainly for greasing mostly sheep, caws and gobbler. This habitat type also occurs in scattered inland sites, in low areas behind the salt marshes and often flooded in winter or spring, but the water table remains close to the surface all year long. Regarding salinity, this habitat forms a transitional stage between saltpans with exclusive halophytes and habitat slacking halophytic vegetation. This is because it develops on lighter soils compared to the heavy, loamy clays of the halophilous scrubs, and as such is less influenced by the underground sea water level and more influenced by the fresh groundwater of winter rains and floods
Key Fauna Species (Latin/English):	Observations:
Key Flora Species (English/Latin):	Observations: The participation of these species is more constant: False yellow head (Ditrichia viscose L.), Soft brome (Bromus hordeaceus L.), Cornflower (Centaurea cyanus L.), Common corncockle (Agrostemma githago L.), Corn buttercup (Ranunculus arvensis L.), Corn poppy (Papaver rhoeas L.), Common mallow (Malva sylvestris L.), Spear thistle (Cirsium vulgare (Savi) Ten.), European heliotrope (Heliotropium europaeum L.), Shepherd's-purse (Capsella bursa-pastoris L.), Squirrel tail-grass (Hordeum murinum L.), Soft brome (Bromus hordeaceus L.), Rabit-tail (Lagurus ovatus L.), Sunolgrass (Phalaris coerulescens L.), Mediterranean rabbitsfoot grass (Polypogon maritimus L.). Close to the fringes several introduced invasive alien species, such as giant reed (Arundo donax L.), false yellowhead (Dittrichia Viscose L) are present too,
Hydrobiology:	Observations:
Designated Areas:	

Area in need of a Construction Restriction Period
Conclusions and key aspects: This type of habitat is the result of poor or infertile agricultural land abandonment some 15 to 20 years ago. They are characterized by biodiversity lower values and are often subject to intensive grazing or mowing pressure for livestock fodder.
Photos: Wp-11, WP-12, WP-13,








Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic Power Plant; Connection to the grid of the power system	Project Feature Investigated: Environment/Ecology
Specialist: Prof. Dr. Arsen Proko	Date: 5, 6, July, 2020
Habitats: WP-15: 92A0 Salix alba and Populus alba galleries. WP-WP-17: 92A0 Salix alba and Populus alba galleries. WP-28: 92A0 Salix alba and Populus alba galleries. (Kurora e Semanit-Protected area)	Observations: This type of habitat is found growing along the Semani riverbed. Mediterranean multi-layered riverine forests with Populus alba, Ulmus minor, Salix alba, Alnus glutinosa, Tamarix parvoflora, Hedera helix. (44.6).
Key Fauna Species (Latin/English):	Observations:
Key Flora Species (English/Latin):	Observations: In these habitats they can form species-rich communities with the accompanying flora, including White willow (Salix alba L.), Gray willow (Salix elaeagnos Scop), Purple willow (Salix purpurea L.), Common alder (Alnus glutinosa (L.) Gaertner), Judas tree (Cercis siliquastrum L.), White poplar (Populus alba L.),Black poplar (Populus nigra L.), Flowering ash (Fraxinus ornus L.), Hawthorn (Crataegus monogyna Jacq.), Dogwood (Cornus sanguine L.), Chaste tree (Vitex agnus-castus L.), Elm (Rubus idaeus L.), Evergreen rose (Rosa sempervirens L.), Ivy (Hedera helix L.), Traveller's joy (Clematis vitalba L.), Wild grape (Vitis vinifera ssp. sylvestris), Pilewort (Ranunculus ficaria L.), Round-leaved birthwort (Aristolochia rotunda L.), Soapwort (Saponaria officinalis L.), Bulbous comfrey (Symphytum bulbosum C.Schimpt), Perforate St. John's wort (Hypericum perforatum L.), Large-flowered calamint (Calamintha grandiflora L.), Lemon balm (Melissa officinalis L.), Odorous hellsbore (Helleborus odorus Waldst.& Kit.), Sowbread (Cyclamen hederifolium Aiton), Italian arum (Arum italicum Mill), Annual false-brome (Brachypodium sylvaticum (Hudson) P. Beauv.), Cocksfoot (Dactylis glomerata).
Hydrobiology:	Observations:
Designated Areas: Kurora e Semanit – Protected area	
Area in need of a Construction Restriction Period	

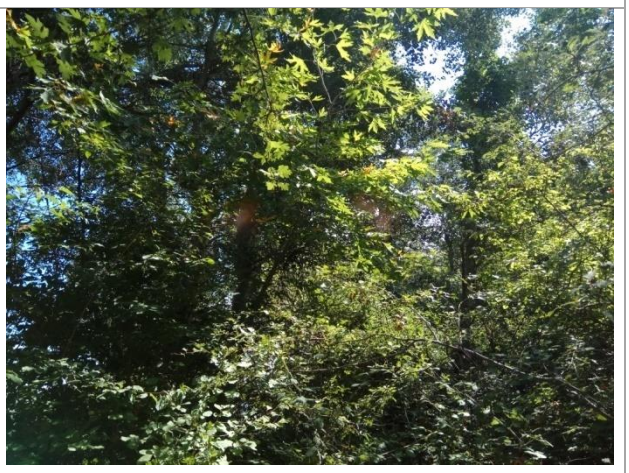
Conclusions and key aspects:

The Semani River and its associated aquatic habitats, freshwater marshes and riparian forests, which support a high floral biodiversity, are important habitats within the study area. These species-rich habitats add much to the botanical diversity of the study area. The river and stream vegetation and habitats are, by nature, much more limited in extension than most of the vegetation types. Consequently, river and stream habitats are considered high value environments.

These habitats also support a range of mosses, lichens and ferns, often dominated by Bracken (Pteridium aquilinum).

Photos:











Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic Power Plant; Connection to the grid of the power system	Project Feature Investigated: Environment/Ecology
Specialist: Prof. Dr. Arsen Proko	Date: 5, 6, July, 2020
Habitats: WP-26: 934A, Mediterranean sclerophylous shrublands (maquis). Paliurus spina-christi-Quercus coccifera community WP-27: 934A, Mediterranean sclerophylous shrublands (maquis). Paliurus spina-christi-Quercus coccifera community WP-29: 934A, Mediterranean sclerophylous shrublands (maquis). Paliurus spina-christi-Quercus coccifera community	Observations: This vegetation types represents the advanced degraded stage of Mediterranean sclerophyllous evergreen forests and shrubs. Most popularly are known as “shibljak” or “garrigues”. This kind of habitat is found on the hilly zones or o the extremity of Power lines
Key Fauna Species (Latin/English):	Observations:
Key Flora Species (English/Latin):	Observations: The most important species who give the physiognomy to this formation are the evergreen shrubs such as: Narrow-leaved phyllyrea (Phillyrea angustifolia L.), Prickly juniper (Juniperus oxycedrus L.), Lesser sea spurrey (Spartium junceum L.), Judas tree (Cercis siliquastrum L.), Christ’s thorn (Paliurus spina-christi Mill.), Caraceous spurge (Euphorbia characias L.), Knee-holly (Ruscus aculeatus L.), Narrow-leaved asparagus (Asparagus acutifolius L.), White-felted germander (Teucrium polium L.), Grey sun-rose (Cistus incanus L.), Sage-leaved sun-rose (Cistus salviafolius L.), Daisy (Bellis perennis L.), Thorny smilax (Smilax aspera L.), Cocksfoot (Dactylis glomerata L.), Italian arum (Arum italicum Mill.), Blue Lanemone (Anemone hortensis L.), Bermuda grass (Cynodon dactylon (L.) Pers.), Scented vernal grass (Anthoxanthum odoratum L.), Greater quaking grass (Briza maxima L.), Brush grass (Chrysopogon gryllus (L.) Trin.), Bulbous meadow-grass (Poa bulbosa L.), Mountain micromeria (Micromeria juliana (L.) Bentham.)), Rough dogtail (Cynosurus echinatus L.), Wall germander (Teucrium chamaedrys L.), Betony (Stachys officinalis (L.) Trev.), Wild maddesr (Rubia peregrine L.), Black spleen-wort (Asplenium adianthum-nigrum L.), Tuberous comfrey (Symphytum tuberosum L.), Five-folioles dorycnium (Dorycnium hirsutum L.), Greater honeywort (Cerinthe major L.) etc.

Hydrobiology:	Observations:
Designated Areas: Kurora e Semanit – Protected area	
Area in need of a Construction Restriction Period	
Conclusions and key aspects: The Semani River and its associated aquatic habitats, freshwater marshes and riparian forests, which support a high floral biodiversity, are important habitats within the study area. These species-rich habitats add much to the botanical diversity of the study area. The river and stream vegetation and habitats are, by nature, much more limited in extension than most of the vegetation types. Consequently, river and stream habitats are considered high value environments. Actually along this vegetation belt has a strong human impact: intensive cuttings, over grazing, and wild fire. The effects of above damages, a very big impact is caused by the land erosion. In some areas the soil is eroded so much as bed rock is almost visible. Therefore, the degradation process had started quite a long time ago, as featured by various types of vegetation that appear on the original habitats of the thermophilic evergreen sclerophyllous broad-leaved oaks forest: Maquis, Garigue and Phrygana. In some areas, on rocky hill slopes and limestone soils, there is typical vegetation derived from the strong human (intensive cutting, over grazing) degradation of the maquis vegetation called garrigue. These habitats also support a range of mosses, lichens and ferns, often dominated by Bracken (Pteridium aquilinum).	
Photos:	
	
	

Field Survey Notes/ Coordinates of way points and finding

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
AWP-1	Botanical survey	Surrounding area	05.07.2020	Flora and vegetation, CH	40°51'20.0"N	19°26'53.1"E	Salt marsh and medows, Former drainage channel	1310 Salicornia and other annuals colonising mud and sand,	Salicornia europaea, Athrocnemum fruticosum, Limonium vulgare, Juncus acutus, Juncus maritimus, Halimione portulacoides, Tamarix dalmatica, Carex extensa, Hordeum marinum, Inula crithmoides, Saccharum ravennae, Scirpus holoschoenus, Plantago crassifolia
AWP-2	Botanical survey	Surrounding area	05.07.2020	Flora and vegetation, CH	40°51'28.9"N	19°26'27.9"E	Salt marsh and medows, reclamation from salt marsh, cultivated and now abandoned, intensive greazing. Juncetalia maritimi	1310 Salicornia and other annuals colonising mud and sand,	Salicornia europaea, Athrocnemum fruticosum, Limonium vulgare, Juncus acutus, Juncus maritimus, Halimione portulacoides, Tamarix dalmatica, Carex extensa, Hordeum marinum, Inula crithmoides, Saccharum ravennae, Scirpus holoschoenus,

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									Plantago crassifolia
AWP-3	Botanical survey	Surrounding area	05.07.2020	Flora and vegetation, CH	40°51'36.4"N	19°26'12.6"E	Salt marsh and medows, Former drainage channel	1310 Salicornia and other annuals colonising mud and sand,	Salicornia europaea, Athrocnemum fruticosum, Limonium vulgare, Juncus acutus, Juncus maritimus, Halimione portulacoides, Tamarix dalmatica, Carex extensa, Hordeum marinum, Inula crithmoides, Saccharum ravennae, Scirpus holoschoenus, Plantago crassifolia
AWP-4	Botanical survey	PV plant area	05.07.2020	Flora and vegetation, CH	40°50'53.3"N	19°26'51.4"E	Salt marsh and medows, Former drainage channel. Juncetalia maritimi	1410 Mediterranean salt meadows habitat PAL.CLASS.: 15.5. Various Mediterranean communities of the Juncetalia	Juncus maritimus, Aster tripolium, Samolus valerandi, Hordeum nodosum, H. maritimum, Alopecurus bulbosus, Carex divisa,

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								maritimi with different associations.	
AWP-5	Botanical survey	Surrounding area	05.07.2020	Flora and vegetation, CH	40°51'12.8"N	19°25'14.9"E	Mediterranean Coniferous forests	2270 Wooded dunes with Maritime pine (Pinus pinea) and/or Pinus pinaster. Coastal Coniferous Forest	Pinus halepensis, Asparagus acutifolius, Myrtus communis, Cistus salviefolius, Erica manipuliflora, Lagurus ovatus, Phalaris arundinacea,
AWP-6	Botanical survey	Out of AOI, sensitive zone	05.07.2020	Flora and vegetation, CH	40°51'26.6"N	19°24'21.6"E	Coast vegetation (Soldier's Lagoon-Godullae ushtarit). Beaches, dunes, and sand plains, Cakileta maritimae & Ammophiletea	2110 Embryonic shifting dunes, 2210 Annual vegetation of drift lines habitat.	Cakile maritima, Salsola kali, Euphorbia peplis, Lagurus ovatus, Eryngium maritimum, Echinophora spinosa, Ammophila arenaria

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
AWP-7	Botanical survey	PV plant area	05.07.2020	Flora and vegetation, CH	40°50'59.3"N	19°26'46.2"E	Salt marsh and medows, Former drainage channel	1310 Salicornia and other annuals colonising mud and sand, 1410 Mediterranean salt meadows (Juncetalia maritimi)	Salicornia europaea, Athrocnemum fruticosum, Limonium vulgare, Juncus acutus, Juncus maritimus, Halimione portulacoides, Tamarix dalmatica, Carex extensa, Hordeum marinum, Inula crithmoides, Saccharum ravennae, Scirpus holoschoenus, Plantago crassifolia
AWP-8	Botanical survey	Surrounding area	05.07.2020	Flora and vegetation, CH	40°50'44.3"N	19°27'09.1"E	Salt marsh and medows, Former drainage channel. Juncetalia maritimi	1410 Mediterranean salt meadows habitat PAL.CLASS.: 15.5. Various Mediterranean communities of the Juncetalia maritimi with different associations.	Juncus maritimus, Aster tripolium, Samolus valerandi, Hordeum nodosum, H. maritimum, Alopecurus bulbosus, Carex divisa,

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
AWP-9	Botanical survey	PV plant area	05.07.2020	Flora and vegetation, CH	40°50'41.9"N	19°27'03.3"E	Salt marsh and medows, Former drainage channel	1310 Salicornia and other annuals colonising mud and sand, 1410 Mediterranean salt meadows (Juncetalia maritimi)	Salicornia europaea, Athrocnemum fruticosum, Limonium vulgare, Juncus acutus, Juncus maritimus, Halimione portulacoides, Tamarix dalmatica, Carex extensa, Hordeum marinum, Inula crithmoides, Saccharum ravennae, Scirpus holoschoenus, Plantago crassifolia
AWP-10	Botanical survey	PV plant area	05.07.2020	Flora and vegetation, CH	40°50'40.6"N	19°27'09.7"E	Salt marsh and medows, Former drainage channel	1410 Mediterranean salt meadows (Juncetalia maritimi) PAL.CLASS.: 15.5. Various Mediterranean communities of the Juncetalia maritimi with	Juncus maritimus, Aster tripolium, Samolus valerandi, Hordeum nodosum, H. maritimum, Alopecurus bulbosus, Carex divisa,

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								different associations.	
AWP-18	Botanical survey	PV plant area	06.07.2020	Flora and vegetation, CH	40°50'38.1"N	19°26'57.1"E	Salt marsh and medows,	1410 Salicornia and other annuals colonising mud and sand, 1410 Mediterranean salt meadows (Juncetalia maritimi)	Juncus maritimus, Aster tripolium, Samolus valerandi, Hordeum nodosum, H. maritimum, Alopecurus bulbosus, Carex divisa,
AWP-.19	Botanical survey	PV plant area	06.07.2020	Flora and vegetation, CH	40°51'03.5"N	19°26'37.3"E	Salt marsh and medows,	1410 Mediterranean salt meadows (Juncetalia maritimi) PAL.CLASS.: 15.5. Various Mediterranean communities of the Juncetalia	Juncus maritimus, Aster tripolium, Samolus valerandi, Hordeum nodosum, H. maritimum, Alopecurus bulbosus, Carex divisa,

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								maritimi with different associations.	
AWP-20	Botanical survey	PV plant area	06.07.2020	Flora and vegetation, CH	40°50'21.5"N	19°26'46.9"E	Salt marsh and medows,	1312 Salicornia and other annuals colonising mud and sand, 1410 Mediterranean salt meadows (Juncetalia maritimi)	Juncus maritimus, Aster tripolium, Samolus valerandi, Hordeum nodosum, H. maritimum, Alopecurus bulbosus, Carex divisa,
AWP-21	Botanical survey	Surrounding area	06.07.2019	Flora and vegetation, CH	40°50'12.7"N	19°27'17.6"E	Salt marsh and medows,	1410 Mediterranean salt meadows (Juncetalia maritimi) PAL.CLASS.: 15.5. Various Mediterranean communities of the Juncetalia	Juncus maritimus, Aster tripolium, Samolus valerandi, Hordeum nodosum, H. maritimum, Alopecurus bulbosus, Carex divisa,

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								maritimi with different associations.	
AWP-22	Botanical survey	Surrounding area	06.07.2020	Flora and vegetation, CH	40°49'37.2"N	19°28'09.1"E	Mixed Mosaic Agricultural Areas		
AWP-23	Botanical survey	Power line 22220 kV	06.07.2020	Flora and vegetation, CH	40°41'14.4"N	19°33'05.4"E	Mixed Mosaic Agricultural Areas	Olive grove	
AWP-25	Botanical survey	Power line 220 Kv	06.07.2020	Flora and vegetation, CH	40°48'52.9"N	19°28'54.0"E	Stream/ River Habitat (Running Water), Alluvial forests, Populus alba community. Semanibed river	92A0 Salix alba and Populus alba galleries. Mediterranean multi-layered riverine forests with Populus alba, Ulmus minor, Salix alba, Alnus glutinosa, Tamarix parvoflora, Hedera	Populus alba. Salix alba, Ulmus minor, Salix fragilis, Alnus glutinosa, Fraxinus ornus, Crataegus monogyna, Cornus sanguinea, Vitex agnus-castus, Rubus ulmifolius, Rosa sempervirens, Hedera helix, Clematis vitalba, Ranunculus ficaria, Aristolochia rotunda,Calamintha grandiflora, Arum italicum, Dactylus glomerata, Pteridium aquilinum

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								helix. (44.6).	
AWP-26	Botanical survey	Power line 220 kV	06.07.2020	Flora and vegetation, CH	40°42'13.1"N	19°31'32.8"E	Evergreen shrubs, mostly Garrigues or Friganes	934A, Mediterranean sclerophylous shrublands (maquis). Paliurus spina-christi-Quercus coccifera community	Paliurus spina christi, Rubus ulmifolius, Spartium junceum, Dittrichia viscosa, Ononis spüinosa,
AWP-27	Botanical survey	Power line 22220 kV	06.07.2020	Flora and vegetation, CH	40°41'31.1"N	19°32'20.1"E	Evergreen shrubs, mostly Garrigues or Friganes	934A, Mediterranean sclerophylous shrublands (maquis). Paliurus spina-christi-Quercus coccifera community	Paliurus spina christi, Rubus ulmifolius, Spartium junceum, Dittrichia viscosa, Ononis spüinosa,

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
AWP-28	Botanical survey	Out of AOI Kurrorae Semanit (Protected area(	06.07.2020	Flora and vegetation, CH	40°48'52.3"N	19°30'22.6"E	Stream/ River Habitat (Running Water), Alluvial forests, Populus alba community, Semani bed river	92A0 Salix alba and Populus alba galleries.	Populus alba. Salix alba, Ulmus minor, Salix fragilis, Alnus glutinosa, Fraxinus ornus, Crataegus monogyna, Cornus sanguinea, Vitex agnus-castus, Rubus ulmifolius, Rosa sempervirens, Hedera helix, Clematis vitalba, Ranunculus ficaria, Aristolochia rotunda,Calamintha grandiflora, Arum italicum, Dactylus glomerata, Pteridium aquilinum
AWP-29	Botanical survey	Power line 22220 kV	06.07.2020	Flora and vegetation, CH	40°42'45.0"N	19°31'24.9"E	Mixed Mosaic Agricultural Areas		
AWP-30	Botanical survey	Power line 22220 kV	06.07.2020	Flora and vegetation, CH	40°44'15.6"N	19°31'00.8"E	Ruderal area		
NWP-1	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	369915.22 m E;	4521314.73 m N	Salt marshes the most prevalent habitats in coastal area, in	1410 Mediterranean salt meadows habitat	Vegetation dominated by: Shrub-Like Glasswort (Salicornia fruticosa L.), Sea Rush (Juncus maritimus Lam.), Common Sea-

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
							the low-lying alluvial plain behind sandy dunes. Glasswort is often the first plant to take hold in a mudflat and begin its ecological succession into a salt marsh.	(Juncetalia)	Lavender (Limonium vulgare Miller.), Distant Sedge (Carex distans L.), Bicoloured Carrot (Daucus guttatus Sibth & Sm.),
NWP-2	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	370918.61 m E	4520680.21 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens of	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus‘ looking glass (Legousia speculum-veneris), Southern shepherd’s

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								villages and urban peripheries)	needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-3	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371045.69 m E	4519234.00 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens of villages	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia speculum-veneris), Southern shepherd's needle (Scandix

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								and urban peripheries)	australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-4	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371000.77 m E	4519077.87 m N	Wind bracking forest belt with Eucalyptus globulus	Plantations (Forest wind break belt)	Eucalyptus globulus as introduced (invasive) specie
NWP-5	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371182.54 m E	4518615.09 m N	Riparian forests - River bed forests	92A0 Salix alba and Populus alba galleries	White willow (Salix alba L.), White poplar (Populus alba L.),Black poplar (Populus nigra L.), Chaste tree (Vitex agnus-castus L.), Elm (Rubus idaeus L.), Ivy (Hedera helix L.), Traveller's joy (Clematis vitalba L.), Pilewort (Ranunculus ficaria L.), L.),

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									Soapwort (Saponaria officinalis L.), Italian arum (Arum italicum Mill), Annual false-brome (Brachypodium sylvaticum (Hudson) P. Beauv.), Cocksfoot (Dactylis glomerata).
NWP-6	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371567.34 m E	4518235.16 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens of villages and urban peripheries)	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus‘ looking glass (Legousia speculum-veneris), Southern shepherd’s needle (Scandix australis), Shepherd’s purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria),

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-7	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371759.03 m E	4517935.72 m N	Riparian forest - River bed forests	92A0 Salix alba and Populus alba galleries	White willow (Salix alba L.), White poplar (Populus alba L.),Black poplar (Populus nigra L.),
NWP-8	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371759.03 m E	4517935.72 m N	Riparian forest - River bed forests	92A0 Salix alba and Populus alba galleries	White willow (Salix alba L.), White poplar (Populus alba L.),Black poplar (Populus nigra L.),
NWP-9	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371759.03 m E	4517935.72 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus‘

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								construction, domestic gardens of villages and urban peripheries)	looking glass (Legousia speculum-veneris), Southern shepherd's needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-10	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	372275.29 m E	4516748.48 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban constru	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								ction, domestic gardens of villages and urban peripheries)	(Legousia speculum-veneris), Southern shepherd's needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-11	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	372247.81 m E	4516378.80 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction,	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								domestic gardens of villages and urban peripheries)	speculum-veneris), Southern shepherd's needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-12	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371533.46 m E	4514528.09 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domesti	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia speculum-

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								c gardens of villages and urban peripheries)	veneris), Southern shepherd's needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-13	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371371.06 m E	4513954.10 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia speculum-veneris),

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								gardens of villages and urban peripheries)	Southern shepherd's needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-14	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371186.65 m E	4513599.49 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia speculum-veneris), Southern

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								of villages and urban peripheries)	shepherd's needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-15	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	370815.99 m E	4512652.82 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens of	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia speculum-veneris), Southern shepherd's

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								villages and urban peripheries)	needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-16	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	370818.34 m E	4512276.46 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens of villages	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia speculum-veneris), Southern shepherd's needle (Scandix

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								and urban peripheries)	australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-17	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371721.73 m E	4511316.89 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens of villages and	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia speculum-veneris), Southern shepherd's needle (Scandix australis),

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								urban peripheries)	Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-18	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	371937.88 m E	4511063.30 m N	Road site		Dioecious (Bryony Bryonia cretica L.,) Nettle (Urtica dioica L.)
NWP-19	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	40°44'11.40"N	19°30'43.80"E	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia speculum-veneris), Southern

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								of villages and urban peripheries)	shepherd's needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-20	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	40°44'15.60"N	19°31'0.80"E	Rural area		
NWP-21	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	375535.51 m E	4508472.74 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction,	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus' looking glass (Legousia

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
								domestic gardens of villages and urban peripheries)	speculum-veneris), Southern shepherd's needle (Scandix australis), Shepherd's purse (Capsella bursa-pastoris), Lesser red knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-22	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	375291.04 m E	4507890.80 m N	Olive grove	Olive grove	Elm leaf blackberry (Rubus ulmifolius Schott.), False yellowhead (Dittrichia viscosa L.) (invasive plant species), Burdock clover (Trifolium lappaceum L.), Narrowleaf crimson clover (Trifolium angustifolium L.), Annual false-brome (Brachypodium

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									distachyom (L.) P.Beauv.), Lesser sea spurrey (Spartium junceum L.), Mountain micromeria (Micromeria juliana L.), Grey sun-rose (Cistus incanus L.) Annual false-brome (Brachypodium distachyum), Narrowleaf crimson clover (Trifolium angustifolium), etc.
NWP-23	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	375459.89 m E	4506904.02 m N	Olive grove	Olive grove	Elm leaf blackberry (Rubus ulmifolius Schott.), False yellowhead (Dittrichia viscosa L.) (invasive plant species), Burdock clover (Trifolium lappaceum L.), Narrowleaf crimson clover (Trifolium angustifolium L.), Annual false-brome (Brachypodium distachyom (L.) P.Beauv.), Lesser sea spurrey (Spartium

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									junceum L.), Mountain micromeria (Micromeria juliana L.), Grey sun-rose (Cistus incanus L.) Annual false-brome (Brachypodium distachyum), Narrowleaf crimson clover (Trifolium angustifolium), etc.
NWP-24	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	376548.34 m E	4505590.36 m N	Rural area		Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus‘ looking glass (Legousia speculum-veneris), Southern shepherd’s needle (Scandix australis), Shepherd’s purse (Capsella bursa-pastoris), Lesser red knotgrass

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									(Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)
NWP-25	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	40°41'37.40"N	19°32'24.10"E	Evergreen Sclerophyllous Mediterranean Shrub (Garrigues)	European Habitats include 5210 Arborescent matorral with Juniper (Juniperus spp.) and 9340 Holm oak	Christ's thorn (*Paliurus spina-christi* Mill.), elmleaf blackberry (Rubus ulmifolius Schott.), Caraceous spurge (Euphorbia characias L.), White-felted germander (Teucrium polium L.), Grey sun-rose (Cistus incanus L.), Cocksfoot (Dactylis glomerata L.), Italian arum (Arum italicum Mill.), Blue Lanemone (Anemone hortensis L.), Bermuda grass (Cynodon dactylon (L.) Pers.), Brush

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									grass (Chrysopogon gryllus (L.) Trin.), Bulbous meadow-grass (Poa bulbosa L.), Mountain micromeria (Micromeria juliana (L.) Bentham.), Rough dogtail (Cynosurus echinatus L.), Betony (Stachys officinalis (L.) Trev.), Wild maddesr (Rubia peregrine L.), Five-folioles dorycnium (Dorycnium hirsutum L.), Greater honeywort (Cerinthe major L.) etc.
NWP-26	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	377603.10 m E	4505057.80 m N	Olive grove	Olive grove	Elm leaf blackberry (Rubus ulmifolius Schott.), False yellowhead (Dittrichia viscosa L.) (invasive plant species), and the presence of a large number of typical Mediterranean plants, Burdock clover (Trifolium lappaceum L.), Narrowleaf crimson clover

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									(Trifolium angustifolium L.), Annual false-brome (Brachypodium distachyom (L.) P.Beauv.), Lesser sea spurrey (Spartium junceum L.), Mountain micromeria (Micromeria juliana L.), Grey sun-rose (Cistus incanus L.) etc.
NWP-27	Botanical survey	New Transmission line	06.11.2020	Flora and Vegetation	377330.48 m E	4506036.98 m N	Agricultural land	Mixed Mosaic Agricultural Areas (including recently abandoned arable land, urban and suburban construction, domestic gardens of villages and urban peripheries)	Chicory (Cichorium intybus), Cornflower (Centaurea cyanus), Common corncockle (Agrostemma githago), Corn buttercup (Ranunculus arvensis), Corn poppy (Papaver rhoeas), European Venus‘ looking glass (Legousia speculum-veneris), Southern shepherd’s needle (Scandix australis), Shepherd’s purse (Capsella bursa-pastoris), Lesser red

Way Point Code (Survey)	Discipline	Way Point (WP) #	Date	Project Component	Coordinates (Pulkovo_1942_GK_Zone_4)		Observations / Remarks		
					X_GK_Z_4	Y_GK_Z_4	Habitat	EU-Habitats	Species
									knotgrass (Polygonum arenaria), Smooth amaranth (Amaranthus hybridus), Spear saltbush (Atriplex patula), German chamomile (Chamomilla recutita), and Stinking goosefoot (Chenopodium vulgaria)

Botanical inventory during the field survey and secondary data

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt Marshes	Salt Coastal Coniferous	Stream/River Habitat	Natural and semi Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Aegilops geniculata Roth.	Egg-Shaped Goat Grass	Poaceae	T	StenMedit			x	x						11	10	x	5	5	4	0
Aeluropus litoralis (Gouan) Parl	Aleurop us	Poaceae	G	EuMedit	x	x					x			11	10	4	4	8	1	3
Aetheorhiza bulbosa L.	Bulbous Hawk's Beard	Asteracea e	T	StenMedit					x	x	x			11	7	4	3	7	2	0
Agrostemma githago L.	Commo n corncoc kle	Caryophyllacea e	T	EuCauc					x	x				7	x	x	x	4	3	0
Agrostis stolonifera L.	Creepin g Bent, Spreadi ng	Poaceae	Ch	CircumBor			x	x						8	x	x	6	x	5	0
Alisma plantago-aquatica L.	Water Plantain	Alismataceae	I	SubCosm								x		7	x	x	10	x	8	0
Alkanna tinctoria L.	Dyers' Alkanet,	Boraginaceae	H	StenMedit		x					x			8	9	4	2	4	2	0
Alnus glutinosa L.	Commo n alder	Betulacea e	P	PaleTemp			x					x		5	5	5	9	6	8	0
Althaea officinalis L.	Rough Mallow	Malvacea e	H	SEEu				x						7	6	6	7	7	6	0
Amaranthus albus L.,	Ghostpl ant, Tumble weed	Amaranthacea e	T	Avv					x	x				9	9	6	3	x	7	0

Latin name	English name	Family	Bio Form	Choro Phorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Ambrosia maritima L.	Sea Ragweed	Asteraceae	T	EuMedit									x			11	8	5	1	x	1	0
Ammophila arenaria (L.) Link	Marram grass	Poaceae	G	EuMedit									x			12	6	5	4	7	5	2
Anagallis arvensis L.	Scarlet Pimpernel	Primulaceae	G	EuMedit							x	x				6	6	5	5	x	6	0
Anagallis foemina (Mill.) Manns & Anderb	Blue pimpernel	Primulaceae	T	SubCosm							x	x				8	7	5	4	9	5	0
Anchuza azurea Miller.	Large Blue Alkanet	Boraginaceae	H	EuMedit							x	x				11	10	4	1	2	1	0
Anemone hortensis L	Blue Lanemone	Ranunculaceae	G	EuMedit					x	x						8	8	5	4	4	3	0
Anthoxanthum odoratum L.	Scented vernal grass	Poaceae	H	EuAsi					x	x						x	x	5	x	5	3	0
Arctium lappa L.	Great Burdock	Asteraceae	H	EuAsi							x	x				9	5	5	5	7	9	0
Aristolochia clematis L.	Aristolochia	Aristolochiaceae	G	EuMedit					x							6	7	5	4	8	8	0
Aristolochia pallida Willd.	Pallid Birthwort	Aristolochiaceae	G	EuMedit					x	x						8	8	5	3	6	3	0
Aristolochia rotunda L.	Round-leaved birthwort	Aristolochiaceae	G	EuMedit					x							6	7	5	4	6	3	0
Artemisia annua L.	Sweet Wormwood	Asteraceae	T	EuAsi					x				x			7	7	7	3	5	1	0

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Artemisia coerulescens L.	Mugwort	Asteraceae	Ch	EuMedit		x										11	7	5	5	9	2	3
Artemisia vulgaris L.	Mugwort	Asteraceae	H	CircumBor					x		x	x		x		9	7	8	4	x	5	0
Arum italicum Mill	Italian arum	Araceae	G	StenMedit						x	x					6	8	4	4	5	5	0
Arundo donax L.,	Giant reed	Poaceae	G	SubCosm				x						x		8	9	5	5	5	6	0
Asparagus acutifolius L.	Narrow-leaved asparagus	Asparagaceae	Np	StenMedit			x	x		x						6	9	4	2	5	5	0
Asphodelus aestivus Bot.	Summer Asphodel	Asphidelaceae	G	Medit							x	x	x			8	4	4	3	4	6	0
Aster albanicus Degen.	Albanian aster	Asteraceae	G	SubEnd			x									8	4	4	3	4	6	2
Aster tripolium L.	Sea aster	Asteraceae	H	EuAsi	x	x										8	7	x	9	7	7	3
Atriplex littoralis L.	Orache	Chenopodiaceae	T	EuAsi	x											9	7	8	3	x	9	2
Avena fatua	Spring Wild Oats	Poaceae	T	EuAsi					x		x	x				6	x	6	6	7	x	0
Avena sterilis L.	Terile oat	Poaceae	T	EuMedit					x			x				8	9	5	3	6	4	0
Ballota nigra L.	Ballota	Lamiaceae	H	EuMedit					x		x	x				8	6	5	5	x	8	0

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Bellis annua	Annual Daisy	Asteraceae	T	StenMedit					x							6	9	4	7	2	2	0
Bellis peremis L.	Daisy	Asteraceae	H	EuCauc					x	x						9	5	4	x	x	5	0
Blackstonia perfoliata (L.) Hudson	Yellow-Wort	Gentianaceae	T	EuMedit					x							8	7	5	x	9	4	0
Bolboschoenus maritimus (L.) Palla	Sea clubrush	Cyperaceae	G	Cosmopol	x	x										8	x	4	10	8	5	2
Borago officinalis L.	Borage	Boraginaceae	T	EuMedit							x	x				7	8	5	3	5	5	0
Brachypodium distachyon (L.) P.Beauv.	Annual false-brome	Poaceae	T	StenMedit				x		x						11	9	3	1	3	2	0
Brachypodium retusum (Pers.) Beauv.	Ramose False-Brome	Poaceae	H	StenMedit						x						11	10	3	2	5	2	0
Brachypodium sylvaticum (Hudson) P. Beauv	Annual false-brome	Poaceae	H	PaleTemp				x		x						4	5	5	5	6	6	0
Briza maxima L.	Greater quaking grass	Poaceae	T	SubTrop					x	x						8	10	5	2	4	1	0
Briza minor L.	Lesser Quaking Grass	Poaceae	T	SubCosm					x							8	9	5	2	4	1	0
Bromus erectus Hudson	Erect Brome	Poaceae	H	PaleTemp					x		x	x				8	5	7	3	8	3	0

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Bromus hordeaceus L.	Soft brome	Poaceae	T	SubCosm				x	x					7	6	5	x	x	x	0
Bromus sterilis L.	Barren Brome	Poaceae	T	EuMedit			x			x	x		x	7	7	5	4	x	7	0
Bromus tectorum L.	Drooping Brome	Poaceae	T	PaleTemp		x		x						8	6	7	3	8	4	0
Bryonia dioica Jacq.	Bryony	Cucurbitaceae	G	EuMedit					x	x				8	7	5	5	8	6	0
Butomus umbellatus L.	Flowering Rush	Butomaceae	I	EuAsi								x		6	0	5	10	0	8	0
Cakile maritima Scop.	Searocket	Brassicaceae	T	EuMedit							x			9	8	2	6	x	8	2
Calepina irregularis (Asso) Thell.	White Ball Mustard	Brassicaceae	T	EuMedit				x		x	x			8	8	4	3	5	3	0
Calicotome villosa (Poiret) Link	Broom Spiny	Faboceae	P	StenMedit					x					12	10	4	2	5	2	0
Callitriche stagnalis Scop.	Common Water-Starwort	Callitrichaceae	I	EuAsi								x		9	8	5	12	5	1	0
Calystegia sepium (L.) R. BR.	Hedge Bindweed	Convolvulaceae	H	PaleTemp				x	x		x			8	6	5	6	7	9	0
Calystegia soldanella (L.) R.Br.	Sea Bindweed	Convolvulaceae	G	Cosmopol							x			11	8	4	1	x	1	1
Campanula trichocalycina Ten.	Beech-Wood	Campanu	H	EuMedit			x	x	x					4	4	5	4	5	4	0

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	Bellflower	laceae																				
Capsella bursa-pastoris L.	Shepherd's-purse	Brassicaceae	H	Cosmopol					x							7	x	5	5	5	4	0
Carex divisa Huds.	Divided sedge	Cyperaceae	G	EuMedit	x											8	8	2	3	5	3	0
Carex extensa Good	Long-bracted sedge	Cyperaceae	H	EuMedit	x	x										9	5	3	7	0	4	3
Carpinus orientalis Miller	Oriental Hornbeam	Betulaceae	P	Pont			x			x						4	7	6	3	4	5	0
Centaurea cyanus L	Cornflower	Asteraceae	T	StenMedit					x		x	x				7	x	4	x	4	3	0
Centaurium erythraea Rafn.	Common Centaury	Gentianaceae	H	PaleTemp					x	x						8	6	5	5	6	x	0
Centaurium spicatum G. Mans.	Schenkia spicata	Gentianaceae	T	EuMedit	x	x							x			11	9	5	3	7	3	1
Centaurium tenuiflorum (Hoffm. & Link) Fritsch	Centaury	Gentianaceae	T	PaleTemp					x							9	8	5	7	7	2	0
Cerastium brachypetalum Desportes et Pers.	Grey Mouse-Ear	Caryophyllaceae	T	EuMedit							x	x				11	7	5	3	7	2	0
Cercis siliquastrum L.	Judas tree	Caesalpinaceae	P	SEu						x						8	7	6	4	7	4	0
Cerinthe major L.	Greater honeywort	Boraginaceae	T	StenM					x		x	x				7	8	4	4	5	9	0

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				edit																		
Chenopodium album L.	Fat Hen	Chenopodiaceae	T	SubCosm							x	x				7	7	5	4	5	7	0
Chrozophora tinctoria (L.) Juss.	Dyer's Croton	Euphorbiaceae	T	EuMedit							x	x				8	12	6	2	7	7	0
Chrysopogon gryllus (L.) Trin.	Brush grass	Poaceae	H	SEu					x							9	7	8	3	7	3	0
Cichorium intybus L.	Chicory	Asteraceae	H	PaleTemp	x				x		x	x				9	6	5	3	8	5	0
Cirsium arvense (L.) Scop.	Creeping Thistle	Asteraceae	G	EuAsi							x	x				8	x	x	4	x	7	0
Cirsium vulgare L.	Spear thistle	Asteraceae	H	PaleTemp							x	x				8	5	5	5	x	8	0
Cistus incanus L.	Grey sun-rose	Cistaceae	Np	SteMedit						x						11	9	4	2	3	2	0
Cladium mariscus (L.) Pohl	Elk Sedge	Cyperaceae	G	SubCosm		x								x		9	x	5	10	9	3	1
Clematis vitalba L.	Traveller's joy	Ranunculaceae	P	EuCauc				x		x						7	7	4	5	7	7	0
Clematis viticella L.	Vine Bower	Ranunculaceae	P	SEu				x		x						7	7	7	4	6	3	0
Clinopodium vulgare L.	Wild Basil	Lamiaceae	H	CircumBor				x		x						7	5	4	4	7	3	0

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Colutea arborescens L.	Bladdersenna	Fabaceae	P	EuMedit					x					5	8	5	3	8	2	0
Convolvulus arvensis L.	Field Bindweed	Convolvulaceae	G	PaleTemp				x		x	x			7	7	5	4	5	5	0
Convolvulus elegantissimus Miller		Convolvulaceae	H	SteMedit				x	x					8	10	5	3	5	2	0
Cornus mas L.	Cornelian Cherry	Cornaceae	P	SEu			x		x					6	7	6	5	8	4	0
Cornus sanguinea L.	Dogwood	Cornaceae	P	EuAsi		x	x							7	5	5	7	8	x	0
Coronilla emerus L.	Scorpion Senna	Fabaceae	Np	EuCent					x					7	6	4	3	9	2	0
Corylus colurna L.	Turkish hazel	Corylaceae	P	EuCauc		x	x							3	6	5	5	7	7	0
Crataegus monogyna Jacq.	Hawthorn	Rosaceae	P	PaleTemp		x	x		x					6	7	5	4	6	3	0
Crepis foetida L.	Stinking Hawk's-Beard	Asteraceae	T	EuMedit				x		x	x			11	9	5	2	x	2	0
Crepis neglecta	Neglected Hawk's-Beard	Asteraceae	T	EuMedit				x						7	6	3	4	6	3	0
Crithmum maritimum L.	Rock Samphire	Apiaceae	Ch	EuMedit	x							x		11	8	2	1	x	1	3
Cupressus sempervirens L.	Italian Cypress	Cupressaceae	P	EuMedit									x	7	7	6	3	x	3	0

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Cuscuta campestris Juncher.	Field Dodder	Convolvulaceae	T	Av.nat							x	x				8	7	5	x	x	x	0
Cyclamen hederifolium Aiton.	Sowbread	Primulaceae	G	StenMedit				x		x						4	8	5	5	5	5	0
Cynanchum acutum L.	Acute Swallow-Wort	Asclepidaceae	P	PalSubTrop							x	x				7	7	4	7	5	5	0
Cynodon dactylon (L.) Pers.	Bermuda grass	Poaceae	G	Cosmopol					x		x	x				8	8	5	4	x	4	0
Cynosurus cristatus L.	Crested Dogstail	Poaceae	H	EuCauc					x							8	5	4	5	5	4	0
Cynosurus echinatus L.	Rough dogtail	Poaceae	T	EuMedit					x		x	x				11	9	5	2	4	2	0
Cyperus capitatus	Galingale	Cyperaceae	T	Medit									x			11	9	4	2	4	2	0
Dactylis glomerata L.	Cocksfoot	Poaceae	H	PaleTemp			x	x	x	x					x	7	6	5	4	5	6	0
Datura stramonium L.,	Thorn Apple	Solanaceae	T	Av.nat											x	9	8	5	3	5	7	0
Daucus guttatus S. et S.	Bicoloured carrot	Apiaceae	T	StenMedit	x		x				x	x			x	7	9	5	3	5	2	0
Desmazeria rigida (L). Tutin	Hard Poa, Fern Grass	Poaceae	T	EuMedit					x						x	8	8	5	2	5	4	0

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Dittrichia viscosa L.	False yellowhead	Asteraceae	H	EuMedit	x		x		x		x	x			x	11	8	5	3	7	9	0
Dorycnium hirsutum L.	Five-folioles dorycnium	Fabaceae	Ch	EuMedit						x						7	8	5	3	7	2	0
Echinophora spinosa L.	Prickly parsnip	Apiaceae	H	EuMedit	x								x			12	8	5	4	7	1	1
Echium italicum L.	Italian Viper's Bugloss	Boraginaceae	H	EuMedit					x		x	x			x	11	8	5	3	3	4	0
Echium plantagineum L.	Bugloss	Boraginaceae	T	EuMedit							x	x			x	11	8	5	3	5	5	0
Eleocharis palustris (L.) Roem. & Schult.	Common spike-rush	Cyperaceae	G	SubCosm										x		8	6	5	10	3	3	0
Elymus farctus (L.) P.Beauv.	Sand Couch Grass	Poaceae	G	EuMedit									x									
Ephedra distachya L.	Joint Pine	Ephedraceae	Np	StenMedit									x			11	10	5	3	0	2	0
Equisetum palustris L.	Marsh Horsetail	Equisetaceae	G	CircumBor										x		7	x	5	7	x	3	0
Equisetum ramosissimum Desf.	Branched Horsetail	Equisetaceae	G	CircumBor				x						x	x	7	7	6	3	7	1	0
Erianthus ravennae (L.) Beauv.	Ravenna cane	Poaceae	H	EuMedit			x							x		11	8	5	6	8	8	0
Erica manipuliflora Salibs.	Heath	Ericaceae	Ch	StenM			x			x						11	9	4	3	7	1	0

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				edit																		
Erigeron canadensis (L.) Conquist	Canadian Fleabane	Asteraceae	I	Avv.nat					x							6	7	5	12	7	8	0
Erodium cicutarium (L.) L'Hér. ex Aiton	Redstem filaree	Geraniaceae	T	SubCosm					x						x	8	7	5	3	5	3	0
Erodium malacoides (L.) L'Her.	Mallow Like Storksbill	Geraniaceae	T	StenMedit					x						x	11	9	4	2	5	2	0
Eryngium campestre L.	field eryngo	Apiaceae	H	EuMedit					x		x				x	9	7	5	3	8	3	0
Eryngium maritimum L.	Sea holly	Apiaceae	G	EuMedit									x			11	8	3	4	7	1	1
Erysimum repandum L.	spreading wallflower	Brassicaceae	T	EuMedit											x	11	6	5	2	7	3	0
Euphorbia chamaesyce L.	Fig Tree Spurge	Euphorbiaceae	T	EuMedit											x	7	8	5	2	5	4	0
Euphorbia characias L.	Caraceous spurge	Euphorbiaceae	Np	StenMedit					x						x	8	10	4	2	x	1	0
Euphorbia helioscopia L.	Sun Spurge	Euphorbiaceae	T	Cosmopol					x						x	9	7	5	3	5	6	0
Euphorbia paralias L.	Sea Spurge	Euphorbiaceae	Ch	EuMedit	x								x			11	8	5	1	x	1	1
Euphorbia peplis L.	Purple spurge	Euphorbiaceae	T	EuMedit	x								x			11	7	2	1	x	1	1

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Ficus carica L.	Fig tree	Moraceae	P	Eu Medit								x			x	7	8	6	x	5	x	0
Foeniculum vulgare Miller	Fennel	Apiaceae	H	Eu Medit					x		x	x				9	8	5	3	7	7	0
Fraxinus angustifolia Vahl.	Narrow Leaved Ash	Oleaceae	P	Eu P			x	x														
Fraxinus ornus L.	Flowering ash	Oleaceae	P	SEu						x						5	8	6	3	5	3	0
Fumana procumbens (Dunal) G. et G.	Common Fumana	Cistaceae	Ch	Eu Medit					x							9	6	7	3	7	1	0
Galega officinalis L.	Goat's Rue	Fabaceae	H	SEEu										x	x	7	8	7	6	5	6	0
Galium divaricatum Lam.	Lamarck's bedstraw	Rubiaceae	T	StenMedit				x						x		11	9	4	2	x	1	0
Galium mollugo L.	Hedge bedstraw	Rubiaceae	H	Eu Medit				x		x						6	5	5	5	5	4	0
Galium palustre L.	Water Bedstraw	Rubiaceae	H	Eu Cent										x	x	7	5	4	8	5	3	0
Geranium columbinum L.	Dove's Foot Cransbill	Geraniaceae	T	Eu Sib					x						x	7	9	6	2	5	2	0
Geranium lucidum L.	Shining cranesbill	Geraniaceae	T	Eu Medit				x								6	8	5	3	5	3	0
Geranium molle L.	Dove's-foot Crane's-bill	Geraniaceae	T	Eu Asi					x						x	7	6	5	3	5	4	0
Glaucium flavum Crantz	sea-poppy	Geraniaceae	H	Eu Medit									x			11	9	5	1	4	1	1

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Gratiola officinalis	Gratiola	Scrophulariaceae	H	CircumBor				x						x	x	7	7	5	9	5	5	0
Halimione portulacoides L.	Sea purslane	Chenopodiaceae	Ch	CircumBor	x								x			11	9	4	2	6	7	3
Hedera helix L.	Ivy	Araliaceae	P	EuMedit				x		x						4	5	4	5	x	x	0
Helianthemum nummularium (L.) Miller	Common rock-rose	Malvaceae	Ch	EuCent						x						9	x	6	4	7	2	0
Heliotropum europaeum L.	European heliotrope	Boraginaceae	T	EuMedit							x	x				11	8	5	3	7	2	1
Hordeum marinum L.	Squirrel tail-grass	Poaceae	T	EuMedit					x						x	11	9	3	3	6	3	2
Hordeum murinum L.	Squirrel tail-grass	Poaceae	T	CircumBor					x	x					x	8	8	4	5	5	3	0
Hyosciamus albus L.	Round-Fruited Rush	Juncaceae	G	EuAsi					x			x			x	8	7	5	5	7	5	1
Hypericum perforatum L.	Perforate St. John's wort	Hypericaceae	H	StenMedit					x		x	x			x	6	8	4	4	3	4	0
Imperata cylindrica L	Wolly Grass	Poaceae	G	Cosmopol	x	x		x					x	x		11	11	0	6	8	3	0
Inula crithmoides L.	Golden samphire	Asteraceae	Ch	StenMedit	x	x										11	8	4	7	9	5	3

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Iris pseudacorus L.	Yellow iris	Iridaceae	G	EuAsi				x						x		7	7	5	10	6	7	0
Juncus acutus L.	Spiny rush	Juncaceae	H	EuMedit		x										11	8	3	8	8	3	3
Juncus conglomeratus L.	Compact rush	Juncaceae	H	EuSib										x		7	7	4	8	6	5	0
Juncus effusus L.	Soft Rush	Juncaceae	H	Cosmopol										x	x	7	7	5	9	6	5	0
Juncus maritimus Lam.	Sea rush	Juncaceae	G	SubCosm	x	x										2	7	3	8	8	3	3
Juncus subulatus Forssk	Multiflowered Rush	Juncaceae	G	StenMedit										x		11	11	5	9	8	3	3
Juniperus oxycedrus L.	Prickly juniper	Cupressus	P	EuMedit						x						8	8	0	3	0	2	0
juniperus oxycedrus L. Ssp macrocarpae	Prickly juniper	Cupressus	P	EuMedit									x			8	8	0	3	0	2	0
Knautia arvensis (L.) Coulter	Field scabious	Dipsacaceae	H	EuAsi							x	x			x	7	5	5	4	5	3	0
Knautia drymeia Heuffel	Knautia	Dipsacaceae	H	SEEu				x		x						6	7	6	4	7	5	0
Lagurus ovata L.	Rabit-tail	Poaceae	T	EuMedit	x		x						x			8	9	5	3	x	2	1
Lamium purpureum L.	Red dead-nettle	Lamiacea	T	EuAsi					x		x	x			x	7	7	5	4	5	5	0

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Lathyrus aphaca L.	Yellow pea	Fabaceae	T	EuMedit							x	x				6	6	5	3	x	x	0
Lathyrus grandiflorus S. et S.	Two-flowered everlasting pea	Fabaceae	G	StenMedit					x						x	7	7	6	4	5	5	0
Lemna minor L.	Lentile Water	Lemnaceae	I	SubCosm										x		7	x	5	12	x	x	0
Leucanthemum vulgare Lam.	Ox-eye daisy	Asteraceae	H	EuSib					x	x	x	x				7	x	4	4	x	3	0
Limonium vulgare Mill.	Common sea lavender	Plumbaginaceae	H	StenMedit	x	x										11	11	4	1	7	2	1
Linum maritimum L.	Sea flax	Linaceae	H	StenMedit	x											11	8	4	2	7	2	1
Lolium multiflorum Lam.	Italian Rye-Grass	Poaceae	T	EuMedit					x						x	7	7	5	4	x	6	0
Lotus corniculatus L.	Birdsfoot Trefoil	Fabaceae	H	PaleTemp					x						x	7	x	5	4	7	2	0
Lotus preslii Ten.	Decumbent Birdsfoot Trefoil	Fabaceae	H	EuMedit	x			x								11	8	5	6	7	4	1
Lycopus europaeus L.	Gipsy-Wort	Lamiaceae	H	PaleTemp				x						x		7	6	5	9	x	7	0
Lythrum salicaria L.	Purple Loosestrife	Lythraceae	H	Cosmopol								x		x		7	5	5	8	7	x	0

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Malva sylvestris L	Common mallow	Malvaceae	H	EuSib					x						x	8	6	4	4	x	8	0
Matricaria chamomilla L.	Maywead	Asteraceae	T	SubCosm					x						x	7	5	5	6	5	5	0
Matthiola sinuata (L.) R. Br.	Sea Stock	Brassicaceae	H	StenMedit	x								x			11	10	4	2	x	1	2
Matthiola tricuspidata (L.) R. Br.	Three-Horned Stock	Brassicaceae	T	StenMedit	x								x			11	10	4	1	3	1	1
Medicago litoralis Rohde ex Loisel	Shore medick	Fabaceae	T	EuMedit									x			11	9	5	2	x	2	0
Medicago lupulina L.	Black Medick	Fabaceae	T	PaleTemp					x		x					7	5	x	4	8	7	0
Medicago marina L.	Sea Medick	Fabaceae	Ch	EuMedit			x						x			12	8	5	1	x	1	2
Medicago sativa L	Alfalfa	Fabaceae	H	EuAsi								x				8	5	7	3	9	3	0
Melissa officinalis L.	Lemon balm	Lamiaceae	H	EuMedit					x	x						6	7	5	4	6	4	0
Mentha aquatica L.	Water Mint	Lamiaceae	H	PaleTemp										x		7	5	5	9	7	4	0
Micromeria juliana (L.) Bentham.	Mountain micromeria	Lamiaceae	Ch	StenMedit						x						8	8	4	2	1	1	0

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Myriophyllum spicatum	Spiked Water Milfoil	Haloragaceae	I	SubCosm										x		5	x	x	12	8	5	0
Myrtus communis L.	Common myrtle	Myrtaceae	P	StenMedit			x									8	9	4	3	5	2	0
Nasturtium officinale R. Br.	Watercress	Brassicaceae	H	Cosmopol							x	x			x	7	4	5	11	7	5	0
Oenothera biennis L.	Common Evening Primrose	Onagraceae	H	SubCosm			x						x			9	7	5	3	x	4	0
Olea europea L.	Olive tree	Oleaceae	P	StenMedit							x				x	11	10	4	1	x	2	0
Ononis spinosa L.,	Spring Rest-Harrow	Fabaceae	Ch	Medit					x						x	8	6	5	x	x	3	0
Oxalis corniculata L.	Procumbent yellow sorrel	Oxalidaceae	Ch	EuMedit											x	7	7	0	4	x	6	0
Paliurus spina-christi Mill.	Christ's thorn	Rhamnaceae	P	SEEu						x						5	6	6	3	4	5	0
Pancratium maritimum L.	Sea Dalfodil	Amaryllidaceae	G	StenMedit			x						x			11	10	3	1	x	1	0
Papaver rhoeas L.	Corn poppy	Papaveraceae	T	Medit					x		x	x			x	6	6	5	5	7	x	0
Parapholis incurve (L.) C.E.Hubb.	Incurved hard-grass	Poaceae	T	StenMedit	x								x			11	7	4	5	7	2	3

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Periploca graeca L.	Silkvine	Asclepidaceae	P	StenMedit			x			x						8	9	6	7	4	4	0
Persicaria hydropiper (L.) Delabre	Water-Pepper	Polygonaceae	T	CircumBor										x		7	5	x	8	4	5	0
Petrorhagia prolifera (L.) Ball et Heyw.	Proliferous pink	Caryophyllaceae	H	EuMedit					x						x	8	5	5	2	x	2	0
Phalaris arundinacea L.	Reed Grass	Poaceae	T	CircumBor										x	x							
Phalaris coerulescens Desf	Sunolgrass	Poaceae	H	StenMedit							x	x			x	7	6	x	5	6	6	0
Phillyrea latifolia L.	Broa-Leaved Phillyrea	Oleaceae	P	StenMedit						x						5	8	4	4	x	5	0
Phleum subulatum (Savi) Asch. et Gr.	Thin Cat's Tail	Poaceae	T	StenMedit					x		x					8	3	4	5	8	7	0
Phragmites australis (Cav). Trin.	Common Reed	Poaceae	G	SubCosm		x								x		7	5	x	10	7	5	1
Pinus halepensis Mill.	Aleppo pine	Pinaceae	P	StenMedit			x									11	10	4	2	0	2	0
Pinus pinaster Aiton.	Maritime pine	Pinaceae	P	StenMedit			x									11	8	4	2	4	3	0

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Pinus pinea L.	Maritime pine	Pinaceae	P	EuMedit			x									11	8	5	2	4	3	0
Pistacia lentiscus L.	Mastic Tree	Anacardiaceae	P	StenMedit						x						11	10	5	2	x	2	0
Plantago coronopus L.	Buck's-Horn Plantain	Plantaginaceae	T	EuMedit									x	x		8	7	5	7	7	4	0
Plantago crassifolia Forskal.	Water plantain	Plantaginaceae	H	StenMedit		x										11	8	4	3	9	4	1
Plantago lanceolata L	Ribwort Plantain	Plantaginaceae	H	StenMedit					x		x	x			x	6	7	5	x	x	x	0
Plantago major L.	Greater Plantain	Plantaginaceae	H	EuAsi					x						x	8	x	x	5	x	7	0
Plantago maritima L.	Sea Plantain	Plantaginaceae	H	SEu									x			8	7	7	7	8	x	0
Poa bulbosa L.	Bulbous meadow-grass	Poaceae	H	PaleTemp					x	x						8	8	7	2	4	1	0
Poa nemoralis L.	Wood Meadow-Grass	Poaceae	H	CircumBor			x	x		x						5	x	5	5	5	3	0
Poa pratensis L.	Smooth-Stalked Meadow-Grass	Poaceae	H	CircumBor					x							6	x	x	5	x	x	0
Poa trivialis L.	Rough Meadow-Grass	Poaceae	H	EuAsi										x		6	x	5	7	x	7	0

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Polygonum lapathifolium L.	Pale Persicaria	Polygonaceae	T	PaleTemp										x		6	6	5	7	x	8	0
Polypogon maritimus Willd.	Mediterranean rabbitsfoot grass	Poaceae	T	StenMedit									x			8	8	4	7	9	6	1
Populus alba L.	White poplar	Salicaceae	P	PaleTemp				x								5	8	7	5	8	6	0
Populus nigra L.	Black poplar	Salicaceae	P	PaleTemp				x							x	5	7	6	8	7	7	0
Potamogeton pectinatus (L.)	Fennel Pondweed	Potamogetonaceae	I	SubCosm		x										6	0	5	12	7	5	1
Potentilla micrantha Ramond	Pink Barren Strawberry	Rosaceae	H	EuMedit				x		x						5	6	5	4	8	4	0
Potentilla reptans L.	Creeping Cinquefoil	Rosaceae	H	PaleTemp										x		6	6	5	6	7	5	0
Prunella vulgaris L.	Self-Heal	Lamiaceae	H	CircumBor				x	x	x						7	6	4	6	4	x	0
Pseudorlaya pumila (L.) Grande	Pseudorlaya	Apiaceae	T	StenMedit									x			11	10	4	2	2	1	1
Psoralea bituminosa L.	Bituminosus Psoralea	Fabaceae	H	EuMedit						x						9	9	5	2	x	4	0

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Pteridium aquilinum L. Kunth	Bracken	Hypolepidaceae	G	Cosmopol				x		x						6	5	4	6	3	3	0
Putoria calabrica (L. fil.) Pers.		Rubiaceae	Np	SteNMedit						x						5	8	5	2	3	2	0
Pyracantha coccinea Roemer	Fierthorn	Rosaceae	P	SteNMedit						x						5	8	4	3	5	3	0
Pyrus amygdaliformis L.	Almond pear tree	Rosaceae	P	SteNMedit						x						7	8	4	4	7	3	0
Quercus cerris L.	Turkey oak	Fabaceae	P	EuMedit						x						6	8	5	4	4	4	0
Quercus frainetto Ten.	Hungarian oak	Fagaceae	P	SEEu						x						7	6	6	6	5	6	0
Ranunculus aquatilis L.	Common Water Crowfoot	Ranunculaceae	I	SubCosm										x		7	5	5	12	5	6	0
Ranunculus arvensis L	Corn buttercup	Ranunculaceae	T	PaleTemp					x		x	x				6	6	5	4	8	x	0
Ranunculus ficaria L.	Pilewort	Ranunculaceae	G	EuAsi				x	x						x	4	5	5	6	7	7	0
Ranunculus sardous Crantz	Hairy Buttercup	Ranunculaceae	T	EuMedit											x	8	7	5	8	x	7	0
Raphanus raphanistrum L.	Wild Radish	Brassicaceae	T	EuMedit							x	x			x	11	5	5	x	4	5	0

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt Marshes	Salt Coastal Coniferous	Stream/River Habitat	Natural and semi Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the Cannals/water env.	Urbane	L	T	C	H	R	N	S
Rhamnus alaternus L.	Alatern	Rhamnaceae	P	EuMedit						x						4	9	5	2	4	4	0
Robinia pseudoacacia L.	False acacia	Fabaceae	P	Av.nat											x	5	7	5	4	x	8	0
Rorippa amphibia (L.) Besser	Iceland Yellowcress	Brassicaceae	H	EuSib		x								x		7	5	7	10	7	8	0
Rorippa sylvestris Besser	Creeping Yellowcress	Brassicaceae	H	EuAsi			x	x						x		6	6	5	8	6	6	0
Rosa sempervirens L.	Evergreen rose	Rosaceae	Np	StenMedit						x	x					6	8	4	3	4	6	0
Rubia peregrina L.	Wild maddesr	Rubiacea e	P	StenMedit				x		x						5	9	4	4	5	3	0
Rubus ulmifolius Schot.,	Elmleaf blackberry	Rosaceae	Np	EuMedit	x		x	x			x	x			x	5	8	5	4	5	8	0
Rumex crispus L.	Curled Dock	Poligonaceae	H	SubCosm					x						x	7	5	5	6	x	5	0
Rumex hydrolapathum Hudson	Sorrel	Poligonaceae	H	EuCent				x						x		7	7	5	10	7	7	0
Rumex maritimus L.	Golden Dock	Poligonaceae	T	EuAsi	x	x										8	7	7	9	8	9	0
Ruscus aculeatus L.	Knee-holly	Liliaceae	Ch	EuMedit			x	x		x						4	8	5	4	5	5	0
Saccharum ravennae (L.) Murray	Ravenna cane	Poaceae	H	MedTur				x						x	x							

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt Marshes	Salt Coastal Coniferous	Stream/River Habitat	Natural and semi Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Sagittaria sagittaefolia L.	Arrow-Head	Alismataceae	I	EuAsi									x		7	0	5	10	7	6	0
Salicornia europaea L.	Annual glasswort	Chenopodiaceae	T	Weu	x	x									11	7	x	8	8	7	3
Salix alba L.	White willow	Salicaceae	P	PaleTemp				x							5	6	6	7	7	8	0
Salix elaeagnos Scop	Gray willow	Salicaceae	P	SEu				x					x		7	5	5	7	8	4	0
Salix fragilis	Crack willow	Salicaceae	P	EuSib				x					x		5	5	4	8	5	6	0
Salix purpurea L	Purple willow	Salicaceae	P	EuAsi				x					x		8	5	5	x	8	x	0
Salsola kali L	Prickly saltwort	Chenopodiaceae	T	PaleTemp							x				9	7	8	8	7	8	2
Sambucus ebulus L.	Dwarf elder	Caprifoliaceae	G	EuMedit					x	x		x	x		8	6	5	5	8	7	0
Samolus valerandi L.	Seaside brookweed	Primulaceae	H	Cosmopol				x				x			7	6	4	8	x	6	0
Saponaria calabrica Guss.	Soapwort	Caryophyllaceae	T	SEEu						x					7	8	6	2	3	2	0
Saponaria officinalis L	Soapwort	Caryophyllaceae	H	EuSib				x		x			x		7	6	4	5	7	5	0

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt Marshes	Salt Coastal Coniferous	Stream/River Habitat	Natural and semi Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the Cannals/water env.	Urbane	L	T	C	H	R	N	S
Scabiosa argentea L.	Silver-Leaved Scabious	Dipsacaceae	H	EuSib							x			9	8	6	2	7	2	0
Schoenus nigricans L.	Bog-Rush	Cyperaceae	H	SubCosm		x		x				x		9	7	5	9	9	2	1
Scirpus holoschoenus L	Club rush	Cyperaceae	G	Medit		x		x			x									
Scirpus maritimus L.	Maritime club-rush	Cyperaceae	G	Cosmopol		x		x				x								
Silene alba (Miller) Krause	Whitecampion	Caryophyllaceae	H	PaleTemp				x		x	x				x	x	4	x	7	0
Silene colorata Pioret	Coloured Campion	Caryophyllaceae	T	StenMedit	x		x						x		11	9	3	1	x	1	2
Silene vulgaris (Moench) Garcke	Bladder Campion	Caryophyllaceae	H	PaleTemp				x		x	x			x	8	x	x	4	7	2	0
Sinapis arvensis L.	Charlock	Brassicaceae	T	StenMedit							x	x		x	7	5	4	x	8	6	0
Sisymbrium officinale (L.) Scop.	Medical Rocket	Brassicaceae	T	PaleTemp							x	x		x	8	6	5	4	x	7	0
Smilax aspera L.	Thorny smilax	Liliaceae	Np	SubTrop			x	x							6	10	4	2	5	3	0
Solanum nigrum L.	Black Nightshade	Solanaceae	T	Cosmopol					x		x			x	7	6	5	3	5	7	0

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt Marshes	Salt Coastal Coniferous	Stream/River Habitat	Natural and semi Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the Cannals/water env.	Urbane	L	T	C	H	R	N	S
Sonchus arvensis L.	Perennial Sow-Thistle	Asteraceae	H	EuSib				x		x	x				7	5	x	5	7	x	0
Sonchus maritimus L.	Sea Sow-Thistle	Asteraceae	H	EuMedit								x			11	8	5	5	9	3	0
Spartium junceum L.	Lesser sea spurrey	Fabaceae	P	EuMedit					x						7	7	5	4	7	2	0
Spergularia marina Besser.	Spergularia salina	Caryophyllaceae	T	SubCosm	x	x									7	7	5	6	8	0	3
Sporobolus pungens (Schreber).L.	Prickly drop-seed grass	Poaceae	G	SubTrop		x							x		11	11	4	1	0	1	3
Stachys germanica L.	Downy Woundwort	Lamiaceae	H	EuMedit				x	x	x				x	7	6	5	3	8	8	0
Stachys officinalis (L.) Trev.	Betony	Lamiaceae	H	EuCauc				x	x						6	5	4	6	4	3	0
Stellaria media (L.) Vill.	Common Chickweed	Caryophyllaceae	T	Cosmopol						x	x			x	6	x	x	4	7	8	0
Suaeda maritima (L.) Dumort	Seepweed	Chenopodiaceae	T	Cosmopol	x	x						x			9	6	2	8	7	7	3
Sylybum marianum (L.) Gaertn.	Milk Thistle	Asteraceae	H	EuMedit						x	x			x	11	10	6	3	5	7	0
Symphytum bulbosum C.Schimpt	Bulbous comfrey	Brassicaceae	G	SEEu			x		x						4	7	6	4	5	3	0
Tamarix dalmatica Baum.	Tamarix	Tamaricaceae	P	StenMedit	x	x									11	7	5	6	5	3	1

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt Marshes	Salt Coastal Coniferous	Stream/River Habitat	Natural and semi Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the Cannals/water env.	Urbane	L	T	C	H	R	N	S
Tamarix parviflora DC	Small-Flowered Tamarisk	Tamaricaceae	P	StenMedit	x	x								x	11	7	5	6	5	3	1
Taraxacum officinale Weber	Common Dandelion	Asteraceae	H	CircumBor					x					x	7	x	x	5	x	7	0
Teucrium polium L.	White-felted germander	Lamiaceae	Ch	StenMedit						x	x				11	8	4	2	x	1	0
Thymus capitatus (L.) Hofmgg. et Lk.	Bushy Thyme	Lamiaceae	Ch	StenMedit						x					10	10	5	2	x	1	0
Thymus vulgaris	Common thyme	Lamiaceae	Ch	StenMedit					x		x				8	8	4	2	7	1	0
Trifolium angustifolium L.	Narrowleaf crimson clover	Fabaceae	T	EuMedit					x				x		11	9	5	2	3	2	0
Trifolium arvense L.	Hare's Foot	Fabaceae	T	PaleTemp							x	x			8	5	5	2	2	1	0
Trifolium campestre Schreber	Hop Trefoil	Fabaceae	T	PaleTemp					x						8	5	5	4	x	3	0
Trifolium lappaceum L.	Burdock clover	Fabaceae	T	EuMedit					x						8	9	5	2	2	1	0
Trifolium subterraneum L.	Burrowing Clover	Fabaceae	T	EuMedit					x						11	9	5	2	2	2	0
Triglochin bulbosa	Barrelier's Arrow-Grass	Juncagin	G	StenM	x	x									8	8	4	8	7	7	3

Latin name	English name	Family	BioForm	ChoroPhorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
		aceae		edit																		
Triglochin maritima L	Marsh Arrow-Grass	Juncaginaceae	H	SubCosm	x	x										9	0	4	6	7	8	2
Tussilago farfara	Coltsfoot, Bull's Foot	Asteraceae	G	PaleTemp		x		x						x		8	x	5	6	8	7	0
Typha latifolia L.	Lesser Bulrus	Typhaceae	G	Cosmopol										x		6	6	5	10	x	8	0
Ulmus minor Miller	Common Elm	Ulmaceae	P	EuCauc	x				x						x	5	7	5	x	8	x	0
Urtica dioica L.	Nettle	Urticaceae	H	SubCosm				x							x	x	x	x	6	x	8	0
Verbascum sinuatum L.	Tortuous Mullein	Scrophulariaceae	H	EuMedit						x						9	8	5	3	7	7	0
Verbena officinalis L.	Vervain	Verbenaceae	H	PaleTemp					x						x	9	5	5	4	x	6	0
Veronica anagallis-aquatica	Water Speedwell	Scrophulariaceae	H	Cosmopol							x	x				7	6	5	9	7	6	0
Veronica persica Poiret	Common Field Speedwell	Scrophulariaceae	T	Avv.nat					x						x	8	7	5	5	5	6	0
Vicia villosa Roth	Fodder Vetch	Fabaceae	T	EuMedit				x	x		x	x			x	7	6	5	4	4	5	0

Latin name	English name	Family	Bio Form	Choro Phorm	Mediterranean salt	Salt Marshes	Coastal Coniferous	Stream/River Habitat	Natural and semi	Sclerophillous grazed	Olive grove	Agricultural land	Sea dunes of the	Cannals/water env.	Urbane	L	T	C	H	R	N	S
Vinca major L.	Greater Periwinkle	Apocynaceae	Ch	Eu Medit					x						x	6	7	5	4	5	3	0
Vitex agnus-castus L.	Chaste tree	Verbenaceae	P	Eu Medit			x						x			11	11	4	7	x	2	0
Vulpia ciliata (Danth.) Link	Bearded Fescue	Poaceae	T	Eu Medit					x							8	9	5	2	4	2	0
Vulpia fasciculata	Bundled Fescue	Poaceae	T	Eu Medit									x			11	10	3	1	x	1	1
Xanthium italicum Mor.	Cocklebur	Asteraceae	T	Eu Medit									x			8	8	5	5	x	1	0
Xanthium strumarium L.	Cocklebur	Asteraceae	T	Av.nat			x						x			8	7	5	5	x	6	0
Zea mays L	Mais	Poaceae	T	Cult								x				8	8	5	7	5	9	0

Appendix 8. Terrestrial Fauna

Mammal Amphibian and Reptile species occurring in the wider study area of Karavasta PV area and OHL

Table 104. Mammal species occurring in the wider study area of Karavasta PV area and OHL

Mammal Species		Habitat (Atlas, 1997)	Protection status (IUCN, 92/43/EU)	Atlas of European Mammals, 1997	Prigioni, (1996)	Bego, et. Al, (2018)	Benda et al. (2019)	Albania Red List (2013)
Latin Name	Common name							
Erinaceus roumanicus	Eastern hedgehog	Agriculture land and hedges	none	X	X	X		
Crocidura leucodon	Bi-coloured white-toothed shrew	Agricultural landscapes	Bern Convention (III)	X				
Crocidura suaveolens	Lesser white-toothed shrew	Wide variety of habitats. Avoids dense forests	Bern Convention (III)	X	X	X		
Suncus etruscus	Pygmy white-toothed shrew	Olive groves and vineyards with old dry stone, low maquis and open forests	Bern Convention (III)	X	X			DD
Talpa stankovici	Balkan mole	Open habitats	none	X		X		
Rhinolophus euryale	Mediterranean horseshoe bat	Caves and artificial shelters	Annex II & IV, VU	X	X		X	VU
Rhinolophus ferrumequinum	Greater horseshoe bat	Warm caves, mines, permanent pastures and deciduous woodlands	Annex II & IV	X	X		X	LRcd
Rhinolophus hipposideros	Lesser horseshoe bat	Caves, riparian vegetation	Annex II & IV, NT	X	X		X	LRnt
Myotis capaccinii	Long-fingered bat	Caves not far from water bodies	Annex II & IV, VU	X	X		X	LRcd
Myotis myotis	Greater mouse - eared bat	Caves and mines	Annex II & IV	X	X		X	
Pipistrellus kuhlii	Kuhl's pipistrelle	Urban, lowland basins	Annex IV	X			X	

Mammal Species		Habitat (Atlas, 1997)	Protection status (IUCN, 92/43/EU)	Atlas of European Mammals, 1997	Prigioni, (1996)	Bego, et. Al, (2018)	Benda et al. (2019)	Albania Red List (2013)
Latin Name	Common name							
Pipistrellus nathusii	Nathusius Pipistrelle	Mixed and pine forests, riparian	Annex IV	X	X		X	
Pipistrellus pipistrellus	Common pipistrelle	Farmland, woodland, lakes	Annex IV	X	X		X	
Pipistrellus pygmaeus	Soprano pipistrelle	Forest, Wetlands (inland), Artificial / Terrestrial					X	
Lepus europaeus	Brown hare	Open woodland, farmland, steppes	Bern Convention (III)	X	X			
Sciurus vulgaris	Red squirrel	forests	Bern Convention (III)	X	X		X	LRnt
Micromys minutus	Harvest mouse	reedbeds	LC	X				
Apodemus flavicollis	Yellow-necked mouse	woodlands	none	X	X	X		
Apodemus sylvaticus	Wood mouse	Extremely variable	none	X	X	X		
Rattus norvegicus	Brown rat	River banks	none	X	X			
Rattus rattus	Black rat	Farmland, islands, human settlements	none	X	X			
Mus domesticus	Western house mouse	Commensal, wide range of habitats	none	X				
Mus macedonicus	Balkan short-tailed mouse	Wide range of habitats	none			X		
Mus musculus	Eastern house mouse	Agriculture, meadows, shrublands, buildings	none		X	X		
Mus spicilegus	Steppe mouse	Steppe grasslands, grain fields, open habitats	LC	X				DD

Mammal Species		Habitat (Atlas, 1997)	Protection status (IUCN, 92/43/EU)	Atlas of European Mammals, 1997	Prigioni, (1996)	Bego, et. Al, (2018)	Benda et al. (2019)	Albania Red List (2013)
Latin Name	Common name							
		along river courses orchards, thin pine woods, sandy steppes						
Glis glis	Fat dormouse	Forests of beech, oak and chestnut	Bern Convention (III), LC	X	X	X		LRlc
Muscardinius avellanarius	Common dormouse	Mixed deciduous forests	Annex IV	X	X	X		DD
Canis aureus	Golden jackal	Maquis and shrubland, shrubs on the coast, woods and reeds inland	Annex V	X	X			VU
Vulpes vulpes	Red fox	All types of forests and open landscapes	none	X	X			
Martes foina	Beech Marten	Mountains, farmlands, woodlots, suburban areas	Bern Convention (III)	X	X			LRnt
Mustela nivalis	Weasel	Wide range of habitats	Bern Convention (III)	X	X			
Mustela putorius	Western polecat	Lowland habitats, sand dunes, forest fringes and river valleys	Bern Convention (III)	X	X			EN
Meles meles	Badger	Deciduous and mixed woods, coniferous, hedges, scrub, agriculture, suburban areas	Bern Convention (III)	X	X			EN
Lutra lutra	Otter	Rivers, streams, lakes wetlands and coasts	Annex II & IV	X	X			VU

Table 105. Amphibian and reptile species occurring in the wider study area of Karavasta PV area and OHL

Amphibian and Reptile Species		Habitat (IUCN)	Protection status (IUCN Red List, 92/43/EU)	Szabolcs et.al. (2017)	Mizsei et. al. (2017)	Albania Red List (2013)
Latin Name	Common name					
Amphibians						
Pelophylax shqipericus	Albanian water frog	Wetlands (inland)	EN (Native of Albania and Montenegro)	X		
Pelophylax kurtmuelleri	Balkan frog	Terrestrial, Freshwater (=Inland waters)	LC	X		
Bufo bufo	Common toad	Terrestrial, Freshwater (=Inland waters)	LC	X		LRnt
Bufotes viridis/variabilis	European green toad	Terrestrial, Freshwater (=Inland waters)	LC	X		LRnt
Rana dalmatina	Agile frog	Terrestrial, Freshwater (=Inland waters)	Annex IV, LC	X		LRlc
Hyla arborea	European tree frog	Terrestrial, Freshwater (=Inland waters)	Annex IV, LC	X		LRcd
Reptiles						
Ablepharus kitaibelli	European copper skink	Forest, Grassland, Shrubland, Artificial/Terrestrial	Annex IV, LC		X	
Anguis fragilis/graeca	Slow worm	Shrubland, Artificial/Terrestrial, Forest, Grassland	LC		X	NE
Dolichophis caspius	Caspian whipsnake	Shrubland, Artificial/Terrestrial, Rocky areas (eg. inland cliffs, mountain peaks), Forest, Grassland	Annex IV, LC		X	
Elaphe quatuorlineata	Four-lined snake	Shrubland, Wetlands (inland), Artificial/Terrestrial, Forest	Annex II & IV, NT		X	CR
Emys orbicularis	European pond turtle	Terrestrial, Freshwater (=Inland waters)	Annex II & IV, NT		X	LRnt

Hemidactylus turcicus	Mediterranean house gecko	Artificial/Terrestrial, Shrubland, Marine Intertidal, Rocky areas, Caves and Subterranean Habitats (non-aquatic)	LC		X	LRcd
Hierophis gemonensis	Balkan whip snake	Artificial/Terrestrial, Shrubland	LC		X	
Lacerta trilineata	Balkan green lizard	Artificial/Terrestrial, Shrubland	Annex IV, LC		X	LRcd
Lacerta viridis	European green lizard	Shrubland, Artificial/Terrestrial, Forest, Grassland	Annex IV, LC		X	LRcd
Malpolon insignitus	Eastern Montpellier snake	Shrubland, Artificial/Terrestrial, Rocky areas (eg. inland cliffs, mountain peaks), Forest, Grassland, Desert	LC		X	
Mauremys rivulata	The Balkan terrapin	Wetlands (inland), Marine Coastal/Supratidal, Artificial/Aquatic & Marine	Annex II & IV, LC		X	VU
Mediodactylus kotschyi	Kotschy's gecko	Artificial/Terrestrial, Shrubland, Rocky areas (eg. inland cliffs, mountain peaks)	Annex IV, LC		X	
Natrix natrix	Grass snake	Terrestrial	LC		X	NE
Natrix tessellata	Dice snake	Artificial/Aquatic & Marine, Artificial/Terrestrial, Wetlands (inland), Grassland, Marine Coastal/Supratidal, Marine Neritic	Annex IV, LC		X	NE
Platyceps najadum	Dahl's whip snake	Shrubland, Artificial/Terrestrial, Rocky areas (eg. inland cliffs, mountain peaks), Forest, Grassland	Annex IV, LC		X	LRcd
Podarcis muralis	Common wall lizard	Shrubland, Artificial/Terrestrial, Forest, Rocky areas (eg. inland	Annex IV, LC		X	NE

		cliffs, mountain peaks), Grassland				
Podarcis tauricus/ionicus	Balkan wall lizard	Artificial/Terrestrial, Shrubland, Grassland	Annex IV, LC		X	LRnt
Pseudopus apodus	Giant glass lizard	Shrubland, Artificial/Terrestrial, Forest, Grassland	Annex IV, LC		X	LRnt
Telescopus fallax	European cat snake	Heathland and shrub, sparsely vegetated land	Annex II & IV, LC		X	LRlc
Testudo hermanni	Hermann's tortoise	Artificial/Terrestrial, Shrubland, Forest	Annex II & IV, NT		X	LRnt
Vipera ammodytes	Horned viper	Shrubland, Artificial/Terrestrial, Rocky areas (eg. inland cliffs, mountain peaks), Forest	Annex IV, LC		X	LRnt
Zamenis longissimus	Aesculapian Rat snake	Shrubland, Artificial/Terrestrial, Forest, Rocky areas (eg. inland cliffs, mountain peaks), Grassland	Annex IV, LC		X	EN
Zamenis situla	Leopard snake	Artificial/Terrestrial, Shrubland	Annex II & IV, LC		X	CR

Field notes summary datasheets (August 2020)

Table 106. Field notes summary datasheets (November 2020)

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	Project Feature Investigated: Project Development Area (PDA)
Specialist: Ferdinand Bego	**Date:** 01.08.2020
Habitats: WP001-WP012, and WP020-WP023: The site where Karavasta Photovoltaic will be constructed represent an abandoned agriculture land with natural successions towards former salt marsh, as the area used to be before being reclaimed during the communist regime in early "60s of the last century. While irrigation channel system of the site is destroyed the drainage channels (ditches) are in majority maintained and regularly cleaned up from sediments and vegetation removed from the drainage system. There are three bunkers inside the site and several bridges there were checked for Bats presence signs. WP005: Temporary pond created from sand extraction/excavation work with vegetation dominated by *Typha angustifolia, Tamarix parviflora* and *Juncus sp.*	Observations: There are no important roosting sites for bats in the PDA area. In one of the bunkers the presence bats was recorded. During night few individuals of Pipistrelle bats (*Pipistrellus kuhlii and P. pipistrellus*) were recorded, indicating that the PDA is used as forage ground by pipistrelle bats. The temporary pond is a potential breeding site for Amphibians (presence of *Pelophylax kurtmuelleri* and *Rana dalmatina* was recorded). Nests of *Merops apiaster* on the steep banks of the pond. In one of the bridges along the drainage channels (WP012), otter presence signed were recorded. Drainage channels with fresh and brackish water provide breeding and feeding grounds for frogs, terrapin and otters.
Key Fauna Species (Latin/English): Pipistrellus kuhlii, Pipistrellus pipistrellus, Lutra lutra, Canis aureus, Vulpes vulpes, Lepus europaeus, Emys orbicularis, Pelophylax kurtmuelleri, Rana dalmatina, Merops apiaster	Observations: The site is part of the forage area for bats, otter (*Lutra lutra*) and jackal (*Canis aureus*). The bunkers should be checked again to confirm their importance for bats, especially during spring time (2021). The presence of terrapin (*Emys orbicularis*) was recorded in two sites (WP012 and WP023), while presence of frogs was recorded along the drainage channels with presence of fresh and brackish waters.
Key Flora Species (English/Latin): Salicornia europaea, Juncus maritimus Tamarix parviflora, Phragmites australis, Ditrichia viscosa, Rubus ulmifolius, Saccharum ravennae, Typha angustifolia.	Observations: Main species in the abandoned salty agriculture land were: Salicornia europaea, Juncus maritimus Tamarix parviflora, Phragmites australis, Ditrichia viscosa, Rubus ulmifolius, Saccharum ravennae. Along the drainage channels most common species were: Phragmites australis, Typha angustifolia, Tamarix parviflora.
Hydrobiology:	Observations:

	Drainage channels are potential breeding sites for frogs and important feeding grounds for amphibians, terrapin and otter.

Designated Areas: There is not any protected area within the PDA, but the National park Divjake-Karavasta is situated north of the site where Karavasta Photovoltaic will be constructed

Area in need of a Construction Restriction Period:

Avoid construction work during the breeding season for bats and amphibians (March-June).

Conclusions and key aspects:

There are no important roosting sites for bats in the PDA area. In one of the bunkers the presence of bats was recorded. During night few individuals of Pipistrelle bats (*Pipistrellus kuhlii and P. pipistrellus*) were recorded, indicating that the PDA is used as forage ground by pipistrelle bats. Importance of the bunkers for Bats should be confirmed by other field investigations to be conducted in autumn 2020 and spring 2021.

Drainage channels and temporary pond with fresh and brackish water provide breeding and feeding grounds for frogs, terrapin and otters.

Photos: WP001-WP0012 and WP020-WP023



Picture 8455. View over the PDA from the intersection of the Southern and Western borderlines of the PDA area (WP001, heading East).



Picture 8456. View over the PDA from the intersection of the Southern and Western borderlines of the PDA area (WP001, heading North).



Picture 8458. Bunker, checked for bats presence (WP001)



Picture 8467. *Salicornia europea*, main plant species inside the PDA, indicator of natural successions of the site towards former salt march



Picture 8492. View of the PDA from WP004 (heading West)



Picture 8490. A dead individual of *Rana dalmatina* along the irrigation channel (dry). WP004



Picture 8495. Temporary pond created by sand extraction work inside the PDA. WP005 (heading North)



Picture 8502. Nests of *Merops apiaster* on the bank of the temporary pond (WP005)



Picture 8517. Drainage channel inside the PDA area, recently maintained with removal of vegetation along the bank. (WP007, heading South)



Picture 8523. Tracks of Canis aureus along the drainage channel (WP008)



Picture 8526. Bunker along the drainage channel (WP009. Heading North)



Picture 8531. Bats' droppings on the ground inside the bunker (WP009)



Picture 8537. Bridge over a drainage channel inside the PDA. WP010 (heading NE)



Picture 8555. Otter presence signs under the bridge (WP012)



Picture 8558. *Emys orbicularis* (WP012)



Picture 8561. View over the biotope next to the bridge (WP012) where frogs and terrapin were recorded (Heading SW)



Picture 8608. View of the intersection of the SE and SW borderlines of the PDA. WP020, heading South



Picture 8620. Drainage channel (WP023, heading East)



Picture 8624. *Emys orbicularis* in the drainage channel (WP023)



Picture 8623. Drainage channel along the eastern borderline of the PDA, with freshwater presence (WP023, heading South)

Table 107. Field notes summary datasheets (November 2020)

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated:** Transmission Line 220 kV Fier-Hoxhare
Specialist: Ferdinand Bego	**Date:** 07.11.2020
Habitats: WP 025 - WP038 Transmission Line 220 kV starts at the eastern border of the PDA (WP 021) and ends up at Fieri Sub-Station, South of Fieri city. During most of its alignment it passes through agriculture land of mosaic crop fields, with hedges of remaining riparian vegetation and reeds among the big parcels, drainage and irrigation channels. The most sensitive site along the alignment of the TL Fier-Hoxhare is Semani river, where the well-preserved riparian vegetation (92A0 White willow (Salix alba) and White poplar (*Populus alba*) galleries) is intersected by the TL (WP025-026). In the hilly area south and Southwest of Fieri and around Peshtan olive groves and crop fields with annual and perennial crops are located (WP033-WP036). Patches of degraded woodland/shrubs dominated by *Paliurus spina-christi, Carpinus orientalis, Spartium junceum, Rubus ulmifolius, Quercus sp.div*. (WP037-038).	**Observations:** The sensitive habitats intersected by the TL 220 kV Fier-Hoxhare are the well-preserved riparian vegetation along Semani river (92A0 White willow (Salix alba) and White poplar (*Populus alba*) galleries), drainage channels, big irrigation channel at proximity of Baltez village, the drainage channels among the big parcels of arable land especially those close to Kavalli village.
Key Fauna Species (Latin/English): *Rhinolophus ferrumequinum?, Myotis myotis?, Pipistrellus kuhlii, Pipistrellus pipistrellus, Lutra lutra, Meles meles, Canis aureus, Vulpes vulpes, Lepus europaeus, Erinaceus roumanicus, Emys orbicularis, Testudo hermanni?, Natrix tessellate?, Pelophylax kurtmuelleri, Gallinula chloropus*	**Observations:** The TL 220 kV Fier-Hoxhare corridor is part of the forage area for bats (*Rhinolophus ferrumequinum, Myotis myotis, Pipistrellus pipistrellus and P. kuhlii*), otter (*Lutra lutra*) and jackal (*Canis aureus*). The presence of frogs (*Pelophylax kurtmuelleri*) and potential presence of terrapin (*Emys orbicularis*) was noted along the drainage and irrigation channels. The well-preserved riparian vegetation along Semani river intersected by TL220 kV is a refuge for badger, jackal and otter. In this section (WP026) a big flock of about 50 individuals of grey heron (Ardea cinerea) was observed. *Podarcis muralis* and *Podarcis tauricus* were recorded on hilly areas with olive groves and patches of degraded woodland/shrubs (WP 033-WP 036). Few *Gallinula chloropus* were observed along the primary drainage channel of Hoxhara (WP029-WP030).

Key Flora Species (English/Latin): *Salicornia europea, Juncus maritimus Tamarix parviflora, Phragmites australis, Arundo donax, Populus alba, Salix alba, Ulmus minor, Ditrichia viscosa, Rubus ulmifolius, Saccharum ravennae, Typha angustifolia, Paliurus spina-christi, Spartium junceum, Carpinus orientalis, Quercus sp.div.*	**Observations:** Main species in the abandoned salty agriculture land at the start of the TL 220 kV was: Salicornia europea, Juncus maritimus Tamarix parviflora, Phragmites australis, Ditrichia viscosa. Along the drainage channels most common species were: *Populus alba, Salix alba*, *Ulmus minor, Phragmites australis, Arundo donax.* The riparian vegetation along the Semani river and is dominated by *Populus alba* and *Salix alba.* Patches of degraded woodlan/shrubs on the hillside south of Fieri and around Peshtan are dominated by *Paliurus spina-christi, Spartium junceum, Carpinus orientalis, Rubus ulmifolius* and *Ulmus minor.*
Hydrobiology:	**Observations:** Semani river is intersected by TL 220 kV Fier-Hoxhare. Drainage and irrigation channels are potential breeding sites for frogs and toads and important feeding grounds for amphibians, terrapin and possible used by otter.
Designated Areas: There is a nature monument “Kurora e Semanit” in proximity, but not intersected by TL Fier-Hoxhare and its 500 m wide buffer	
Area in need of a Construction Restriction Period: Avoid disturbance of drainage and irrigation channels during the breeding season for amphibians (March-June).	
Conclusions and key aspects: There are no important roosting sites for bats along the TL 220 kV Fier-Hoxhare buffer area. Pipistrelle bats and possible *Rhinolophus ferrumequinum* and *Myotis myotis* (in area between WP033-WP036) are using the TL 220 kV corridor as part of their foraging area. Drainage and irrigation channels with fresh waters provide breeding and feeding grounds for frogs, toads, pond turtle, terrapin and possibly for otters. The well-preserved riparian vegetation along the Semani river intersected by the TL 220 kV (WP025-WP026) is a sensitive habitat used as refuge for badger, otter and jackal. This forest is also used as resting site (dormitory) for herons (*Ardea cinerea*)	

Photos: WP025-WP038



Picture 565. Riparian vegetation on both sides od's riverbanks of Semani river (WP025, heading NW)



Picture 572. Riparian vegetation dominated by Populus alba and Salix alba (WP026, heading North)



Picture 569. Otter (*Lutra lutra*) footprint on muddy bank of the Semani river, left side of riverbank (WP025)



Picture 580. Few individuals of grey heron (*Ardea cinerea*) on fly above the riparian forests, Semani river (WP026, heading N)



Picture 586. View of the embankment along the Semani river, covered by thickets of *Phragmites australis* (WP027, heading NE)



Picture 582. View over the alignment of TL 110kV Fier-Hoxhare intersected with Semani river (WP027, heading NW)



Picture 588. Presence signs of voles (*Microtus thomasi*) at WP027



Picture 594. TL 220 kV Fier-Hoxhare alignment passing through arable land (WP028, heading North)



Picture 593. TL 220 kV Fier-Hoxhare alignment passing through arable land (WP028, heading South)



Picture 596. 220 kV Fier-Hoxhare alignment passing through arable land at intersection with access road to Semani i Ri; drainage channel with *Phragmites australis* (WP029, heading NE)



Picture 611. Hoxhara drainage channel intersected by TL; thicket of reeds (*Phragmites australis*) on both sides (WP031, heading West)



Picture 612. Hoxhara drainage channel intersected by TL; thicket of reeds (*Phragmites australis*) on both sides (WP031, heading East)



Picture 610. *Pelophylax kurtmuelleri* in a small temporary rain-fed pond along the Hoxhara channel (WP030)



Picture 621. Gallinula chloropus in the Hoxhara drainage channel (WP031)



Picture 617. TL220 kV heading towards Fieri Sub Station, passing through arable lands (WP031, heading E)



Picture 623. TL220 kV heading towards Fieri Sub Station, passing through arable lands, with hedges of *Arundo donax* (WP032, heading E)



Picture 629. Tracks of Erinaceus roumanicus on muddy terrain close to hedges with Arundo donax (WP032)



Picture 647. TL220 kV towards Fieri Sub Station, passing through arable lands, (WP034, heading N)



Picture 648. TL220 kV heading towards Fieri Sub Station, passing through arable lands and gentle hills covered with oive groves (WP034, heading South)



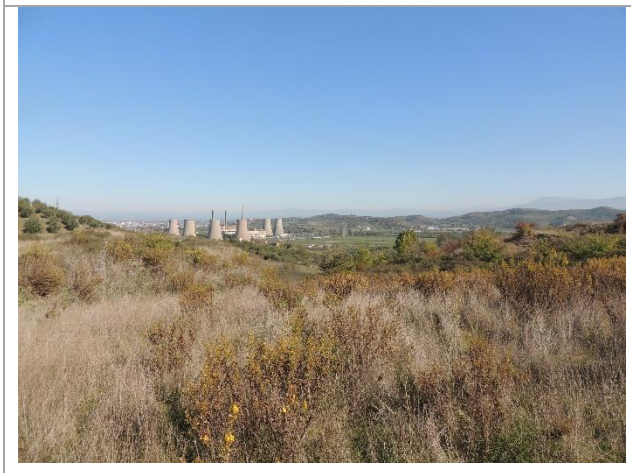
Picture 649. TL220 kV towards Fieri Sub Station, passing through olive groves, (WP035, heading N)



Picture 659. *Podarcis tauricus* (WP035)



Picture 661. TL220 kV heading towards Fieri Sub Station, passing through gentle hills covered with olive groves (WP036, heading North)



Picture 674. TL220 kV heading towards Fieri Sub Station, passing through gentle hill slopes covered with small patch of degraded natural vegetation, shrubs, and olive groves (WP037, heading East)



Picture 678. TL220 kV heading towards Fieri Sub Station, passing through gentle hill slopes covered with small patch of degraded natural vegetation, shrubs, and olive groves (WP038, heading West)



Picture 685. *Podarcis tauricus* (WP038)



Picture 681. TL220 kV heading towards Fieri Sub Station, intersection with access road to Peshtan (WP038, heading SE)

Appendix 9. Aquatic Environment

Biological Environment Findings Summary Datasheet Date: 05.08.2020

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	Project Feature Investigated: Environment/Ecology
Specialist: Spase Shumka	**Date:** 05.08.2020
Habitats: WP1: Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea); WP2: Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea); WP3: Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea WP4: Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea	Observations: Habitat, aquatic vegetation (including submersed vegetation), riparian vegetation, Macro-invertebrate dominant species and fish species
Key Fauna Species (Latin/English):	Observations: Macrionvertebrate species: The widest spread species were: Cerastoderma glaucum, Loripes lacteus, Abra segmentum, Cyclope neritea, Cerithium vulgatum, Pirinela conica, Crangon crangon and Idotea baltica. Fish species: European eel (*Anguilla anguilla*), Mediterranean killifish (*Aphanius fasciatus*), the flathead grey mullet (Mugil cephalus), the thinlip mullet (*Liza ramada*) Mosquitofish (*Gambussia affinis*), etc.
Key Flora Species (English/Latin):	Observations: The vegetation of the drainage channels in the project area is composed by both emergent and submersed plant species. The most dominant species of emergent type were: Lesser bulrush (*Typha angustifolia),* Common reed (*Phragmites australis*), Club-rush/bulrush (*Schoenoplechtus lacustris*) and floating plant of Common duckweed (*Lemna minor*). Out of several submesed plants the most dominat were Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*) and Curled pondweed (*Potamogeton crispus*).
Hydrobiology:	Observations: Large permanent drainage channels/numerous intermittent drainage channels mostly within project site
Designated Areas: Divjake- Karavasta NP	

Area in need of a Construction Restriction Period

Conclusions and key aspects:

Stream/River Habitat (Running Water)/Large running channel

The riparian vegetation is composed by White willow (*Salix alba),* white poplar *(Populus alba)*. In these habitats they can form species-rich communities with the accompanying flora, including grey willow (*Salix elaeagnos*), Purple willow (*S. purpurea*), *Rubus* spp., Evergreen rose (*Rosa sempervirens)*, Ivy (*Hedera helix)*, Traveller's joy (*Clematis vitalba)*, Wild grape (*Vitis vinifera* ssp. *Sylvestris*), Pilewort (*Ranunculus ficaria)*, Round-leaved birthwort (*Aristolochia rotunda)*, Soapwort (*Saponaria officinalis)*, etc.

The presence of alien fish species Mosquito fish (*Gambussia holbroki*) is a feature of these habitats.

Most of them in this period of the year are dry.

Stream/River Habitat (Running Water)/ drainage channels

This is a very specific type of slow running/almost stagnant water habitat that is characteristic of lowland and plain coastal agriculture land. They provide suitable conditions for a number of freshwater macro-invertebrates, fish (especially eel, (*Anguilla Anguilla)*), Mediteranean killfish (*Aphanius fasciatus*), amphibians, reptiles, and birds.

European Habitats include 72A0 Reed beds (*Phragmito-Magnocaricetea*). The study area is characterised by dominated drainage and irrigation channels. The formation of reed beds is more widespread in these channels. High trunk helophytes, such as Common reed (*Phragmites australis),* Lesser bulrush (*Typha angustifolia),* Round-headed club-rush *(Scirpus lacustris),* Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed (*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species.

Photos: (WP1_1, WP1_2; WP2_1, WP2_2; WP3_1, WP3_2; WP4_1, WP4_2;)



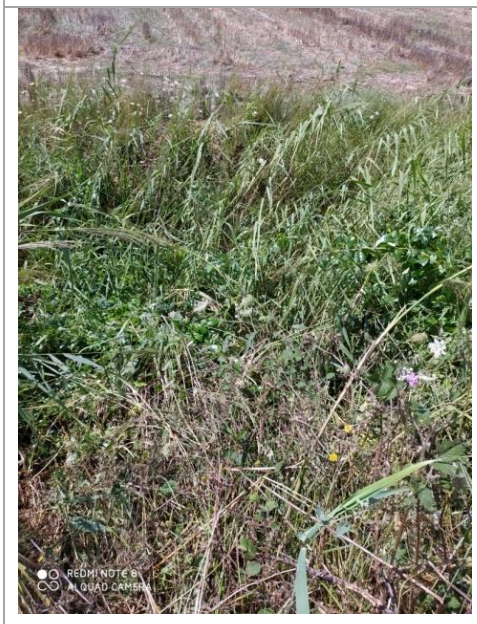














Biological Environment Findings Summary Datasheet Date: 06.08.2020

Biological Environment Findings Summary Datasheet

Project: Karavasta Photovoltaic	Project Feature Investigated: Environment/Ecology
Specialist: Spase Shumka	**Date:** 06.08.2020
Habitats: WP5: Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea); WP6: Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea); WP7: Stream/River Habitat (Running Water)/European Habitats include 92A0 White willow (Salix alba) and White poplar (Populus alba) galleries. WP8: Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea WP9: Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea	Observations: Habitat, aquatic vegetation (including submersed vegetation), riparian vegetation, Macro-invertebrate dominant species and fish species
Key Fauna Species (Latin/English):	Observations: Macro-invertebrates: The widest spread species were: Cerastoderma glaucum, Loripes lacteus, Abra segmentum, Cyclope neritea, Cerithium vulgatum, Pirinela conica, Crangon crangon and Idotea baltica. The main fish of economic use are European eel (Anguilla anguilla), the grey mullets (Mugil cephalus and Liza ramada), the Sparidae dominated by Sparus aurata and Boops boops. The other species includes Gobius buccichi and Aphanius fasciatus etc.
Key Flora Species (English/Latin):	Observations: Vegetaion dominated by Common reed (Phragmites australis), Lesser bulrush (Typha angustifolia) and Scirpus lacustris. These are frequently accompanied by species such as Branched bur-reed (Sparganium erectum), Water plantain (Alisma plantago-aquatica), Spike rush (Eleocharis palustris), Purple loosestrife (Lythrum salicaria), Water speedwell (Veronica anagallis-aquatica) andWater mint (Mentha aquatica). Presence of Tamarix parviflora is also a dominant feature.
Hydrobiology:	Observations: Large and small drainage channels, mostly intermittent
Designated Areas: Divjake-Karavasta NP	

Area in need of a Construction Restriction Period

Avoid works during the reproduction period (April-June)

Conclusions and key aspects:

Stream/River Habitat (Running Water)/Large running channel

The riparian vegetation is composed by White willow (*Salix alba),* white poplar *(Populus alba)*. In these habitats they can form species-rich communities with the accompanying flora, including Grey willow (*Salix elaeagnos*), Purple willow (*S. purpurea*), *Rubus* spp., Evergreen rose (*Rosa sempervirens)*, Ivy (*Hedera helix)*, Traveller's joy (*Clematis vitalba)*, Wild grape (*Vitis vinifera* ssp. *Sylvestris*), Pilewort (*Ranunculus ficaria)*, Round-leaved birthwort (*Aristolochia rotunda)*, Soapwort (*Saponaria officinalis)*, etc.

The presence of alien fish species Mosquito fish (Gambussia holbroki) is a feature of these habitats.

Most of them in this period of the year are dry.

Stream/River Habitat (Running Water)/ drainage channels

This is a very specific type of slow running/almost stagnant water habitat that is characteristic of lowland and plain coastal agriculture land. They provides suitable conditions for a number of freshwater macro-invertebrates, fish (especially eel, (*Anguilla Anguilla)*), Mediteranean killfish (*Aphanius fasciatus*) amphibians, reptiles, and birds.

European Habitats include 72A0 Reed beds (*Phragmito-Magnocaricetea*). The study area is characterised by dominated drainage and irrigation channels. The formation of reed beds is more widespread in these channels. High trunk helophytes, such as Common reed (*Phragmites australis),* Lesser bulrush (*Typha angustifolia),* Round-headed club-rush *(Scirpus lacustris),* Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed (*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species.

Photos: (WP5_1, WP5_2; WP6_1, WP6_2; WP7_1, WP/_2; WP8_1, WP8_2; WP9-1, WP9_2)

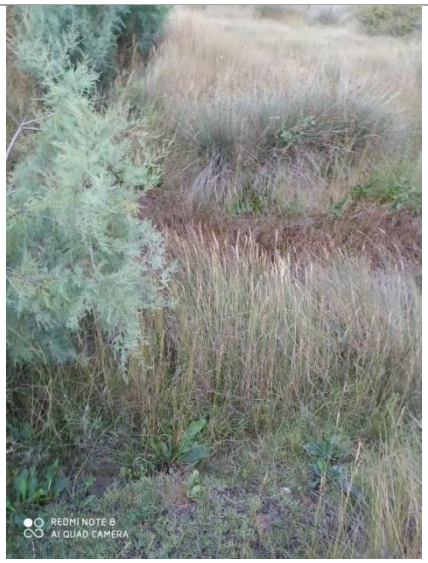






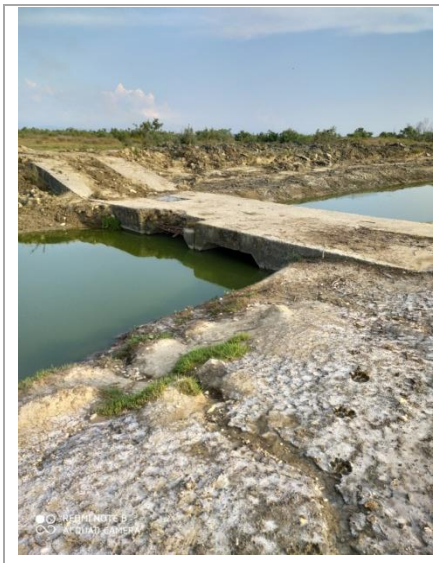
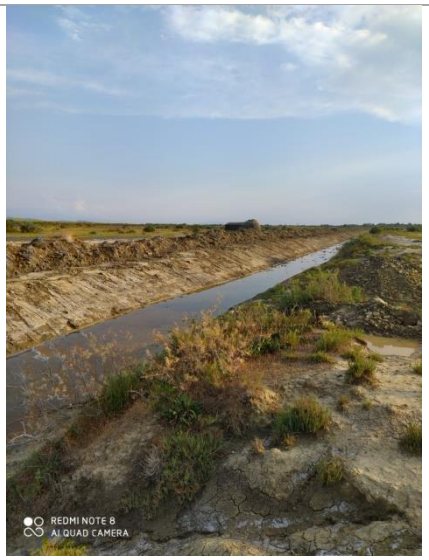

REDMI NOTE 8
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Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology**
Specialist: Spase Shumka	**Date:** 08.08.2020
Habitats: WP10: Large Drainage channel close to Semani River. Stream/River Habitat (Running Water)/European Habitats include 92A0 White willow (Salix alba) and White poplar (Populus alba) galleries. WP11: Large Drainage channel close to Semani River. Stream/River Habitat (Running Water)/European Habitats include 92A0 White willow (Salix alba) and White poplar (Populus alba) galleries. WP12: 1150 Coastal lagoons	**Observations:** Habitat, aquatic vegetation (including submersed vegetation), riparian vegetation, Macro-invertebrate dominant species and fish species
Key Fauna Species (Latin/English):	**Observations:** Macro-invertebrates: The widest spread species were: Cerastoderma glaucum, Loripes lacteus, Abra segmentum, Cyclope neritea, Cerithium vulgatum, Pirinela conica, Crangon crangon and Idotea baltica. The main fish of economic use are European eel (Anguilla anguilla), the grey mullets (Mugil cephalus and Liza ramada), the Sparidae dominated by Sparus aurata and Boops boops. The other species includes Gobius buccichi and Aphanius fasciatus etc.
Key Flora Species (English/Latin):	**Observations:** Vegetaion dominated by Common reed (Phragmites australis), Lesser bulrush (Typha angustifolia) and Scirpus lacustris. These are frequently accompanied by species such as Branched bur-reed (Sparganium erectum), Water plantain (Alisma plantago-aquatica), Spike rush (Eleocharis palustris), Purple loosestrife (Lythrum salicaria), Water speedwell (Veronica anagallis-aquatica) andWater mint (Mentha aquatica). Presence of Tamarix parviflora is also a dominant feature.
Hydrobiology:	**Observations:** Large Drainage channel, Semani River and Laguan e Ushtarit

Designated Areas:

Divjake-Karavasta NP

Area in need of a Construction Restriction Period

Avoid works during reproduction time (April June)

Conclusions and key aspects:

Stream/River Habitat (Running Water)

Semani River, beside the large sediment content and pollution provides important habitat for animal species linked with running freshwater habitats, such as fish (i.e. *Barbus prespensis, Squalius platyceps, Chondrostoma ohridanus, Alosa fallax, Cobitis ohridana, Pachychilon pictum*), amphibians, and birds. During our field surveys, presence of freshwater and migratory fish species (including European eel – *Anguilla anguilla*) were confirmed. The river itself is an important corridor for fauna species, while important riparian vegetation is spread on both sides.

The riparian woodlands is dominated by Common alder (*Alnus glutinosa*), White willow (*Salix alba*), Sage willow (*Salix Incana*), White poplar (*Populus alba*), Grey willow (*Salix elaeagnos*), Purple willow (*S. purpurea*), White poplar (*Populus alba*), Black poplar (P.*nigra*), Ivy (*Hedera helix*), Pilewort (*Ranunculus ficaria*), Odorous hellsbore (*Helleborus odorus*), Italian arum (*Arum italicum*), False brome (*Brachypodium sylvaticum*), Cocksfoot (*Dactylis glomerata*). These habitats also support a range of mosses, lichens and ferns, often dominated by Bracken (*Pteridium aquilinum*).

Coastal Lagoons

The small coastal lagoons nearby the project location (Laguna e Ushtarit) is an important part of Karavaste-Dijvake NP, with capacity of hosting ca. 20000 birds during winter time Numerous fish SPECIES CHARACTERISTIC of the lagoon ecosystem, such as flat head mullet (*Mugil cephalus),* thin-lip mullets *(Liza ramada* and*, L.saliens),* gilt-head bream *(Sparus aurata),*and Mediterranean sand smelt *(Atherina hepsetus),* Mediteranean killfish (*Aphanius fasciatus*) etc., are present there.

The European Habitats include 1150 Coastal lagoons. Karavasta Lagoon is one of important coastal lagoons of Albania situated in the boundary of project area. The main vegetation type present in the Narta lagoon is the sea grass beds dominated by eelgrass (*Zostera noltii)*. Where these do occur, eelgrass is the most dominant species usually with very few other vascular species but often with abundant algae. In more shallow areas, sea grass is outcompeted by spiral tasselweed (*Ruppia cirrhosa*). The sea grass beds contain few species but reach enormous quantities of biomass, and a large number of plankton and benthos organisms life in these communities.

Photos: (WP10_1, WP10_2; WP11_1, WP11_2; WP12_1, WP12_2)






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Biological Environment Findings Summary Datasheet Date: 31.10.2020

Biological Environment Findings Summary Datasheet		
Project: Karavasta Photovoltaic		Project Feature Investigated: Environment/Ecology
Specialist: Spase Shumka		**Date:** 31.10.2020
WP	Habitat type	Current changes compared to previous survey
WP1	Large Drainage channel	This location remains stable. The habitat present here is "Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea". The formation of reed beds is more widespread in these channels. High trunk helophytes, such as Common reed (*Phragmites australis),* Lesser bulrush (*Typha angustifolia),* Round-headed club-rush *(Scirpus lacustris),* Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed (*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species. The widest spread fish species is Flathead grey mullet (Mugil cephalus) and Gobid fish Mediterranean (*Knipowitschia sp.*), European eel (*Anguilla anguilla*) and mediterranean Kill-fish (*Aphanius fasciatus*) were far less present.
WP2	Large Drainage channel	Due to undergoing drainage works, the habitat has totally changed. The side vegetation dominated by *Phragmites autsralis, Tamaryx parviflora, Typha* sp., etc., is still present on the channel sides. Large reefs of serpulid polychaete (*Ficopomatus enigmaticus)* are appeared as remaining of previously vital community. In the reduced water level of water presence mollusk records are observed (Dominant species include: *Cerastoderma glaucum, Abra segmentum, Loripes lacteus, Donax sp.)* and macroinvertebrates *Crangon crangon and Idotea baltica*.
WP3	Tertiary drainage within site	Similar to previous survey. The upper (upstream) section of the tertiary drainage channels due to the lack of maintenance is totally filled with sediment causing change in type of habitat where now the mixture of European Habitats include 1310 *Salicornia* and other annuals colonizing mud and sand, 1410 Mediterranean salt meadows (*Juncetalia maritimi*) and 92D0 Saline tamarisk thickets (*Nerio-Tamaricetea*) are observed. Salt marshes are one of the most prevalent habitats in coastal area, in the low-lying alluvial plain behind sandy dunes. Within this habitat type, plant cover alternates with bare ground that, in areas of high salinity, is covered with crystallized salt. The most common salt marsh plant is glasswort (*Salicornia europaea*), which have worldwide distribution.
WP4	Tertiary drainage within site	Similar to previous survey
WP5	Tertiary drainage within site	Increased water presence and vegetation dominated by European Habitats include 72A0 Reed beds (*Phragmito-*

		Magnocaricetea). The location is characterized by dominated by the reed beds that are more widespread in this and other channels. High trunk helophytes, such as Common reed (*Phragmites australis),* Lesser bulrush (*Typha angustifolia),* Round-headed club-rush *(Scirpus lacustris),* Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed (*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species.
WP6	Tertiary drainage within site	Similar to previous survey
WP7	Semani old river flow	Similar to previous survey
WP8	Secondary drainage within site	The water level is reduced to connectivity with primary drainages mentioned in WP1 and 2. Highly polluted water, while from the fish species can be mention mosquito fish (*Gambusia holbrokii)*.
WP9	Tertiary drainage within site	Similar to previous survey
WP10	Semani old river flow	Similar to previous survey
WP11	River Semani	Similar to previous survey
WP12	Lagoon	Similar to previous survey

Observed changes within wider project area during the second survey

WP	Habitat type	Current changes compared to previous survey
WP1	Large Drainage channel	This location remains stable. The habitat present here is "Drainage Channels / European Habitats include 72A0 Reed beds (Phragmito-Magnocaricetea". The formation of reed beds is more widespread in these channels. High trunk helophytes, such as Common reed (*Phragmites australis),* Lesser bulrush (*Typha angustifolia),* Round-headed club-rush *(Scirpus lacustris),* Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed (*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species. The widest spread fish species is Flathead grey mullet (Mugil cephalus) and Gobid fish Mediterranean (*Knipowitschia sp.*), European eel (*Anguilla anguilla*) and mediterranean Kill-fish (*Aphanius fasciatus*) were far less present.
WP2	Large Drainage channel	Due to undergoing drainage works, the habitat has totally changed. The side vegetation dominated by *Phragmites autsralis, Tamaryx parviflora, Typha* sp., etc., is still present on the channel sides. Large reefs of serpulid polychaete (*Ficopomatus enigmaticus)* are appeared as remaining of previously vital community. In the reduced water level of water presence mollusk records are observed (Dominant species include: *Cerastoderma glaucum, Abra segmentum, Loripes lacteus, Donax sp.)* and macroinvertebrates *Crangon crangon and Idotea baltica*.
WP3	Tertiary drainage within site	Similar to previous survey. The upper (upstream) section of the tertiary drainage channels due to the lack of maintenance is totally filled with sediment causing change in type of habitat where now the mixture of European Habitats include 1310 *Salicornia* and other annuals colonizing mud and sand, 1410 Mediterranean salt meadows (*Juncetalia maritimi*) and 92D0 Saline tamarisk thickets (*Nerio-Tamaricetea*) are observed. Salt marshes are one of the most prevalent habitats in coastal area, in the low-lying alluvial plain behind sandy dunes. Within this habitat type, plant cover alternates with bare ground that, in areas of high salinity, is covered with crystallized salt. The most common salt marsh plant is glasswort (*Salicornia europaea*), which have worldwide distribution.
WP4	Tertiary drainage within site	Similar to previous survey
WP5	Tertiary drainage within site	Increased water presence and vegetation dominated by European Habitats include 72A0 Reed beds (*Phragmito-Magnocaricetea*). The location is characterized by dominated by the reed beds that are more widespread in this and other channels. High trunk helophytes, such as Common reed (*Phragmites australis),* Lesser bulrush (*Typha*

WP	Habitat type	Current changes compared to previous survey
		angustifolia), Round-headed club-rush *(Scirpus lacustris),* Club-rush/bulrush (*Schoenoplechtus lacustris*) are the dominant species. These are frequently accompanied by submersed species species such as Two-leaf water milfoil (*Myriophyllum heterophyllum*), Hornwort (*Ceratophyllum demersum*), Curled pondweed (*Potamogeton crispus*), Common duckweed (*Lemna minor*) and other species.
WP6	Tertiary drainage within site	Similar to previous survey
WP7	Semani old river flow	Similar to previous survey
WP8	Secondary drainage within site	The water level is reduced to connectivity with primary drainages mentioned in WP1 and 2. Highly polluted water, while from the fish species can be mention mosquito fish (*Gambusia holbrokii)*.
WP9	Tertiary drainage within site	Similar to previous survey
WP10	Semani old river flow	Similar to previous survey
WP11	River Semani	Similar to previous survey
WP12	Lagoon	Similar to previous survey

Main features of the water crosses along the transmission line

WP	Coordinate	Habitat type	Some features
WPtl1	404831.63/192829.85	River Semani: 3280-Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of *Salix* and *Populus alba*	Similar features with that described during first ecological survey for the Semani River.
WPtl2	404809.80/192844.89	River Semani: 3280-Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of *Salix* and *Populus alba*	Similar features with that described during first ecological survey for the Semani River.
WPtl3	404749.80/192859.79	River Semani: 3280-Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of *Salix* and *Populus alba*	Similar features with that described during first ecological survey for the Semani River.
WPtl4	404723.35/192907.07	72A0-Drainage tertiary channel: Drainage Channels- Reed beds (Phragmito-Magnocaricetea);	The channel has been found as important one for the presence of European eel (*Angulla anguilla*), while the mosquito fish (*Gambusia holbrooki*) was also recorded. Presence of freshwater mussel *Anadonta cygnea* (NT) was recorded.
WPtl5	404510.37/192813.56	72A0-Hoxhara main Drain channel:	Very similar to the features for the drainage channel in the project area.
WPtl6	404424.73/192957.08	72A0-Vjose-Levan-Fier Irrigation channel:	The presence of freshwater fish species typical for the River Semani drainage and of freshwater mussel *Anadonta cygnea* (NT) was recorded.

Appendix 10. Breeding categories in accordance with the European Breeding Bird Atlas

Description of the breeding evidence	Atlas code
Non breeding (species observed but suspected to be still on migration or to be summering non-breeder)	0
Species observed in breeding season in possible nesting habitat	1
Singing male(s) present (or breeding calls heard) in breeding season	2
Pair observed in suitable nesting habitat in breeding season	3
Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two different days a week or more apart at same place	4
Courtship and display	5
Visiting probable nest-site	6
Agitated behaviour or anxiety calls from adults	7
Brood patch on adult examined in the hand	8
Nest-building or excavating of nest-hole	9
Distraction-display or injury-feigning	10
Used nest or eggshells found (occupied or laid within period of survey)	11
Recently fledged young (nidicolous species) or downy young (nidifugous species)	12
Adults entering or leaving nest-site in circumstances indicating occupied nest (including high nests or nest holes, the contents of which cannot be seen) or adult seen incubating	13
Adult carrying a faecal sac or food for young	14
Nests containing eggs	15
Nests with young seen or heard	16

Bird species present in the project areas and their conservation status

No.	Scientific name	Species	AoI	PDA	TL	Global status	European status	National Status	Annex 1 Bird Dir.	Res 6 of Bern Convention	PBF	CH
1	*Accipiter nisus*	Eurasian Sparrowhawk	1	1	1			EN			+	
2	*Acrocephalus arundinaceus*	Great Reed Warbler			1							
3	*Actitis hypoleucos*	Common Sandpiper	1	1	1							
4	*Aegithalos caudatus*	Long-tailed Tit			1							
5	*Alauda arvensis*	Eurasian Skylark	1	1	1				I		+	
6	*Alcedo atthis*	Common Kingfisher	1		1		VU			I	+	
7	*Anas acuta*	Northern Pintail	1									
8	*Anas crecca*	Eurasian Teal	1									
9	*Anas platyrhynchos*	Mallard	1									
10	*Anthus campestris*	Tawny Pipit		1					I		+	
11	*Anthus pratensis*	Meadow Pipit		1	1					I	+	
12	*Anthus spinoletta*	Water Pipit		1	1							
13	*Ardea alba*	Great Egret	1					EN	I	I	+	
14	*Ardea cinerea*	Grey Heron	1		1			VU		I	+	
15	*Ardeola ralloides*	Squacco Heron			1			VU	I		+	
16	*Athene noctua*	Little Owl		1	1							
17	*Aythya ferina*	Common Pochard	1			VU						
18	*Bubulcus ibis*	Cattle Egret	1									
19	*Burhinus oedicnemus*	Eurasian Stone-curlew	1	1						I	+	
20	*Buteo buteo*	Common Buzzard	1	1	1			VU				
21	*Calandrella brachydactyla*	Greater Short-toed Lark		1					I	I	+	
22	*Carduelis carduelis*	European Goldfinch	1	1	1							
23	*Cecropis daurica*	Red-rumped Swallow		1	1							
24	*Cettia cetti*	Cetti's Warbler	1	1	1							
25	*Charadrius alexandrinus*	Kentish Plover	1						I	I	+	
26	*Chloris chloris*	European Greenfinch			1							
27	*Croicocephalus genei*	Slender-billed Gull	1									
28	*Chroicocephalus ridibundus*	Black-headed Gull	1									

No.	Scientific name	Species	AoI	PDA	TL	Global status	European status	National Status	Annex 1 Bird Dir.	Res 6 of Bern Convention	PBF	CH
29	*Circus aeruginosus*	Western Marsh Harrier	1		1			VU	I	I	+	
30	*Circus cyaneus*	Hen Harrier	1					EN	I	I	+	
31	*Circus pygargus*	Montagu's Harrier	1					EN	I	I	+	
32	*Cisticola juncidis*	Zitting Cisticola	1	1	1							
33	*Clanga clanga*	Greater Spotted Eagle	1	1		VU	EN	CR	I	I	+	
34	*Columba palumbus*	Common Wood Pigeon			1							
35	*Corvus cornix*	Hooded Crow	1	1	1							
36	*Coturnix coturnix*	Common Quail	1	1	1							
37	*Cuculus canorus*	Common Cuckoo			1							
38	*Cyanistes caeruleus*	Eurasian Blue Tit			1							
39	*Delichon urbicum*	Common House Martin		1	1							
40	*Dendrocopos major*	Great Spotted Woodpecker			1							
41	*Dendrocopos syriacus*	Syrian Woodpecker			1				I		+	
42	*Dryobates minor*	Lesser Spotted Woodpecker			1							
43	*Egretta garzetta*	Little Egret	1	1	1			VU	I	I	+	
44	*Emberiza calandra*	Corn Bunting	1	1	1							
45	*Emberiza cirlus*	Cirl Bunting		1	1							
46	*Emberiza schoeniclus*	Common Reed Bunting			1							
47	*Erithacus rubecula*	European Robin	1	1	1							
48	*Falco naumanni*	Lesser Kestrel	1							I	+	
49	*Falco subbuteo*	Eurasian Hobby			1			VU				
50	*Falco tinnunculus*	Common Kestrel	1	1	1			VU	I		+	
51	*Fringilla coelebs*	Common Chaffinch	1	1	1							
52	*Fulica atra*	Eurasian Coot	1									
53	*Galerida cristata*	Crested Lark	1	1	1							
54	*Gallinago gallinago*	Common Snipe	1									
55	*Gallinula chloropus*	Common Moorhen	1		1							
56	*Garrulus glandarius*	Eurasian Jay			1							
57	*Glareola pratincola*	Collared Pratincole	1	1				VU	I	I	+	
58	*Himantopus himantopus*	Black-winged Stilt	1	1				EN	I	I	+	
59	*Hippolais icterina*	Icterine Warbler	1									

No.	Scientific name	Species	AoI	PDA	TL	Global status	European status	National Status	Annex 1 Bird Dir.	Res 6 of Bern Convention	PBF	CH
60	*Hippolais olivetorum*	Olive-tree Warbler			1				I	I	+	
61	*Hirundo rustica*	Barn Swallow	1	1	1							
62	*Iduna pallida*	Eastern Olivaceous Warbler		1								
63	*Ixobrychus minutus*	Little Bittern	1						I	I	+	
64	*Lanius collurio*	Red-backed Shrike		1	1				I	I	+	
65	*Lanius minor*	Lesser Grey Shrike	1	1					I	I	+	
66	*Lanius senator*	Woodchat Shrike		1	1							
67	*Larus michahellis*	Yellow-legged Gull	1									
68	*Linaria cannabina*	Common Linnet	1	1	1							
69	*Lullula arborea*	Woodlark		1	1					I	+	
70	*Luscinia megarhynchos*	Common Nightingale			1							
71	*Mareca penelope*	Eurasian Wigeon	1		1							
72	*Melanocorypha calandra*	Calandra Lark		1						I	+	
73	*Mergus serrator*	Red-breasted Merganser	1									
74	*Merops apiaster*	European Bee-eater	1	1	1							
75	*Microcarbo pygmaeus*	Pygmy Cormorant	1					CR	I	I		+
76	*Motacilla alba*	White Wagtail	1	1	1							
77	*Motacilla flava*	Western Yellow Wagtail		1	1							
78	*Muscicapa striata*	Spotted Flycatcher			1							
79	*Numenius arquata*	Eurasian Curlew	1	1								
80	*Oenanthe oenanthe*	Northern Wheatear			1							
81	*Oriolus oriolus*	Eurasian Golden Oriole			1							
82	*Parus major*	Great Tit			1							
83	*Passer domesticus*	House Sparrow		1	1							
84	*Passer hispaniolensis*	Spanish Sparrow			1							
85	*Passer montanus*	Tree Sparrow			1							
86	*Pelecanus crispus*	Dalmatian Pelican	1					CR	I	I		+
87	*Phalacrocorax carbo*	Great Cormorant		1								
88	*Phoenicopterus roseus*	Greater Flamingo	1						I		+	

No.	Scientific name	Species	AoI	PDA	TL	Global status	European status	National Status	Annex 1 Bird Dir.	Res 6 of Bern Convention	PBF	CH
89	*Phylloscopus collybita*	Common Chiffchaff	1	1	1							
90	*Pica pica*	Eurasian Magpie	1	1	1							
91	*Picus viridis*	European Green Woodpecker			1							
92	*Pluvialis apricaria*	European Golden Plover			1				I		+	
93	*Pluvialis squatarola*	Grey Plover	1									
94	*Podiceps nigricollis*	Black-necked Grebe	1									
95	*Rallus aquaticus*	Water Rail	1	1	1							
96	*Remiz pendulinus*	Eurasian Penduline Tit	1		1							
97	*Riparia riparia*	Sand Martin	1	1								
98	*Saxicola rubicola*	European Stonechat	1	1	1							
99	*Serinus serinus*	European Serin			1							
100	*Spatula clypeata*	Northern Shoveler	1									
101	*Sterna hirundo*	Common Tern	1						I		+	
102	*Sternula albifrons*	Little Tern	1						I		+	
103	*Streptopelia decaocto*	Eurasian Collared Dove			1							
104	*Streptopelia turtur*	European Turtle Dove		1	1	VU	VU				+	
105	*Sturnus vulgaris*	Common Starling	1	1	1							
106	*Sylvia atricapilla*	Eurasian Blackcap			1							
107	*Sylvia borin*	Garden Warbler			1							
108	*Sylvia cantillans*	Eastern Subalpine Warbler			1							
109	*Sylvia communis*	Common Whitethroat		1	1							
110	*Sylvia melanocephala*	Sardinian Warbler			1							
111	*Tachybaptus ruficollis*	Little Grebe	1		1							
112	*Tringa nebularia*	Common Greenshank	1									

No.	Scientific name	Species	AoI	PDA	TL	Global status	European status	National Status	Annex 1 Bird Dir.	Res 6 of Bern Convention	PBF	CH
113	*Tringa ochropus*	Green Sandpiper	1	1	1							
114	*Tringa totanus*	Common Redshank	1									
115	*Troglodytes troglodytes*	Eurasian Wren	1	1	1							
116	*Turdus merula*	Common Blackbird	1		1							
117	*Upupa epops*	Eurasian Hoopoe	1		1							
118	*Vanellus vanellus*	Northern Lapwing	1		1		VU	VU				

Breeding birds in the Project Development Area

No.	Scientific name	English name	Breeding assessment	IUCN status	National Status	Annex 1 Bird Dir.
1	*Actitis hypoleucos*	Common Sandpiper	Probable breeding			
2	*Alauda arvensis*	Eurasian Skylark	Non-breeding			I
3	*Anthus campestris*	Tawny Pipit	Confirmed breeding			I
4	*Athene noctua*	Little Owl	Possible breeding			
5	*Burhinus oedicnemus*	Eurasian Stone-curlew	Probable breeding			
6	*Buteo buteo*	Common Buzzard	Non-breeding		VU	
7	*Calandrella brachydactyla*	Greater Short-toed Lark	Confirmed breeding			I
8	*Carduelis carduelis*	European Goldfinch	Possible breeding			
9	*Cecropis daurica*	Red-rumped Swallow	Confirmed breeding			
10	*Cettia cetti*	Cetti's Warbler	Probable breeding			
11	*Cisticola juncidis*	Zitting Cisticola	Confirmed breeding			
12	*Corvus cornix*	Hooded Crow	Non-breeding			
13	*Coturnix coturnix*	Common Quail	Possible breeding			
14	*Delichon urbicum*	Common House Martin	Non-breeding			
15	*Egretta garzetta*	Little Egret	Non-breeding		VU	I
16	*Emberiza calandra*	Corn Bunting	Confirmed breeding			
17	*Falco tinnunculus*	Common Kestrel	Non-breeding		VU	I
18	*Galerida cristata*	Crested Lark	Confirmed breeding			
19	*Glareola pratincola*	Collared Pratincole	Non-breeding		VU	I
20	*Hippolais icterina*	Icterine Warbler	Non-breeding			
21	*Hirundo rustica*	Barn Swallow	Non-breeding			
22	*Iduna pallida*	Eastern Olivaceous Warbler	Probable breeding			
23	*Lanius collurio*	Red-backed Shrike	Confirmed breeding			I
24	*Lanius minor*	Lesser Grey Shrike	Probable breeding			I
25	*Lanius senator*	Woodchat Shrike	Confirmed breeding			
26	*Merops apiaster*	European Bee-eater	Confirmed breeding			
27	*Motacilla flava*	Western Yellow Wagtail	Confirmed breeding			
28	*Numenius arquata*	Eurasian Curlew	Non-breeding			
29	*Passer domesticus*	House Sparrow	Non-breeding			
30	*Phalacrocorax carbo*	Great Cormorant	Non-breeding			
31	*Pica pica*	Eurasian Magpie	Non-breeding			
32	*Riparia riparia*	Sand Martin	Non-breeding			
33	*Saxicola rubicola*	European Stonechat	Confirmed breeding			
34	*Streptopelia turtur*	European Turtle Dove	Non-breeding	VU		
35	*Sylvia communis*	Common Whitethroat	Confirmed breeding			

Field notes from the survey in the Project Development Area in August 2020

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology - Avifauna**
Specialist: Taulant Bino	**Date:** 05.08.2020 (WP1-12) 06.08.2020 (WP 13-20)
Habitats: WP 1 : Abandoned arable land covered by halophytic vegetation; Lat: 40.85139083862; Long. 19.44490242004	**Observations:** Turtle Dove *Streptopelia turtur*
WP 2 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85234832764; Long. 19.44537734985	Barn Swallow *Hirundo rustica* European Bee-eater *Merops apiaster* Short-toed Lark *Calandrella brachydactyla*
WP 3 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85230255127; Long. 19.44579696655	Lesser Grey Shrike *Lanius minor* Eurasian Magpie *Pica pica* Collared Pratincole *Glareola pratincola*
WP 4 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85200881958; Long. 19.44665908814	Eurasian Curlew *Numenius arquata* Woodchat Shrike *Lanius senator*
WP 5 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85141754154; Long. 19.44689369202	Tawny Pipit *Anthus campestris* Short-toed Lark *Calandrella brachydactyla* House Sparrow *Passer domesticus* Zitting Cisticola *Cisticola juncidis* European Goldfinch *Carduelis carduelis* Woodchat Shrike *Lanius senator* Collared Pratincole *Glareola pratincola*
WP 6 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84978103638; Long. 19.44678497315	Zitting Cisticola *Cisticola juncidis* Eurasian Stone Curlew *Burhinus oedicnemus* European Bee-eater *Merops apiaster*
WP 7 : Abandoned arable land covered by halophytic vegetation; Lat. 40.88291168213; Long. 19.44331741333	Crested Lark *Galerida cristata* Sand Martin *Riparia riparia*
WP 8 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84759521484; Long. 19.44515991211	Great Cormorant *Phalacrocorax carbo* Hooded Crow *Corvus cornix* Western Yellow Wagtail *Motacilla flava*
WP 9 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84407043457; Long. 19.44198036194	Corn Bunting *Emberiza calandra* Zitting Cisticola *Cisticola juncidis*

WP 10 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84543228151; Long. 19.44001388550	Red-rumped Swallow *Cecropis daurica* Common Whitethroat *Sylvia communis*
WP 11 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84865188599; Long. 19.44164848328	Crested Lark *Galerida cristata* Sand Martin *Riparia riparia* Barn Swallow *Hirundo rustica*
WP 12 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85145568848; Long. 19.44357681274	Corn Bunting *Emberiza calandra* Woodchat Shrike *Lanius senator*
WP 13 : Abandoned arable land covered by halophytic vegetation; Lat: 40.84400558472; Long. 19.44979667664	Common Sandpiper *Actitis hypoleucos* Barn Swallow *Hirundo rustica* Tawny Pipit *Anthus campestris*
WP 14 : Abandoned arable land covered by halophytic vegetation; Lat. 40.83988571167; Long. 19.44646263123	Red-rumped Swallow *Cecropis daurica* Barn Swallow *Hirundo rustica* Common Quail *Coturnix coturnix* Icterine Warbler Hippolais icterina Tawny Pipit *Anthus campestris* Eurasian Magpie *Pica pica* Common House Martin *Delichon urbicum* Eurasian Skylark *Alauda arvensis*
WP 15 : Abandoned arable land covered by halophytic vegetation; Lat. 40.83825683594; Long. 19.4454841614	Crested Lark *Galerida cristata* Barn Swallow *Hirundo rustica*
WP 16 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84146118164; Long. 19.44787979126	Eastern Olivaceous Warbler *Iduna pallida* Zitting Cisticola *Cisticola juncidis* Hooded Crow *Corvus cornix*
WP 17 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84577941896; Long. 19.45106124878	Short-toed Lark *Calandrella brachydactyla* Corn Bunting *Emberiza calandra* Cettis Warbler *Cettia cetti* Common Whitethroat *Sylvia communis* European Goldfinch *Carduelis carduelis* Eurasian Magpie *Pica pica* Zitting Cisticola *Cisticola juncidis*
WP 18 : Abandoned arable land covered by halophytic vegetation, close to drainage channel Lat. 40.8438072205; Long. 19.45689010620	Little Egret *Egretta garzetta* Corn Bunting *Emberiza calandra* European Bee-eater *Merops apiaster* Cettis Warbler *Cettia cetti* Zitting Cisticola *Cisticola juncidis*

	Barn Swallow *Hirundo rustica* Common Whitethroat *Sylvia communis* Woodchat Shrike *Lanius senator* European Goldfinch *Carduelis carduelis*
WP 19 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84036636353; Long. 19.45290184021	Zitting Cisticola *Cisticola juncidis* Barn Swallow *Hirundo rustica* Little Owl *Athene noctua* Tawny Pipit *Anthus campestris* Red-rumped Swallow *Cecropis daurica* Red-backed Shrike *Lanius collurio*
WP 20 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84006118774; Long. 19.46003532409	Crested Lark *Galerida cristata* Woodchat Shrike *Lanius senator* Corn Bunting *Emberiza calandra* Tawny Pipit *Anthus campestris* Zitting Cisticola *Cisticola juncidis* Barn Swallow *Hirundo rustica* Common Buzzard *Buteo buteo* Common Kestrel *Falco tinnunculus* European Bee-eater *Merops apiaster*
Key Fauna Species (Latin/English): Turtle Dove *Streptopelia turtur* - VU Global Short-toed Lark *Calandrella brachydactyla* - Annex I Bird Dir. Lesser Grey Shrike *Lanius minor* - Annex I Bird Dir. Collared Pratincole *Glareola pratincola* VU National / Annex I Bird Dir. Tawny Pipit *Anthus campestris* - Annex I Bird Dir. European Bee-eater *Merops apiaster* – EN National Little Egret *Egretta garzeta – VU (Breeding) National* Common Buzzard *Buteo buteo* – VU National Common Kestrel *Falco tinnunculus*– VU National	**COMMENTS** NESTING IN RIPARIAN FOREST AT SEMANI RIVER POTENTIAL BREEDER IN THE PVS PLANT AREA USING THE AREA AS FORAGING GROUND AND NESTING CLOSE TO THE PVS PLANT POTENTIAL BREEDER IN THE PVS PLANT AREA USING THE AREA AS FORAGING GROUND POTENTIAL BREEDER AT DRAINAGE DITCHES IN THE PVS PLANT AREA USING THE DRAINAGE DITCHES FOR FEEDING RESTING AT THE VICINITY OF THE PVS PLANT USING THE AREA AS A FORAGING GROUND
Key Flora Species (English/Latin):	**Observations:**
Hydrobiology:	**Observations:**

Designated Areas:

Divjaka-Karavasta National Park

Area in need of a Construction Restriction Period

Conclusions and key aspects:

The following habitats are considered as important for the preservation of the species of conservation concern:

WPs: Abandoned arable land covered by halophytic vegetation;

The transect is conducted inside the PV plant area area. The habitat is used by ground nesting birds such as Short-toed Lark *Calandrella brachydactyla,* Lesser Grey Shrike *Lanius minor* and Tawny Pipit *Anthus campestris,* both part of Annex I of Birds Directive. Considering that the survey was undertaken quite late in the breeding season, it is recommended to repeat the survey in 2021 at the peak of the breeding season, most probably in mid-June 2021 in order to understand the areas importance for breeding Short-toed Larks and Tawny Pipits.

The habitat is used as a foraging ground by species of conservation interest such as Common Buzzard *Buteo buteo*, Common Kestrel *Falco tinnunculus* and the breeding Collared Pratincoles *Glareola pratincola.* The latter has a colony of at least 70-80 breeding pairs them located some 700 m from the PV Plant area. At this time of the year the colony seems to have at least 70-80 breeding pairs. Considering that the survey was undertaken quite late in the breeding season, it is recommended to repeat the survey in 2021 at the peak of the breeding season, most probably in mid-June 2021 and to understand the areas importance as a foraging ground for breeding Collared Pratincoles.

WP 18 : Drainage ditch (Lat. 40.8438072205; Long. 19.45689010620)

When filled with water and aquatic vegetation, drainage channels and ditches could be important for nesting birds including Moorhen, Water Rail and Warblers. Drainage channels could be of interest for birds in serach of available food such as Little Egret. Common Tern and Little Tern. The maintainance of this habitats is of interest for small migratory birds and for other birds using it as a breeding or foraging ground.

Photos:

WP 1	**WP 2**
	

WP 3	WP 4
	
WP 5	**WP 6**
Abandoned arable land covered by halophytic vegetation	Abandoned arable land covered by halophytic vegetation
WP 7	**WP 8**
	
WP 9	**WP 10**
Abandoned arable land covered by halophytic vegetation	Abandoned arable land covered by halophytic vegetation

WP 11	WP 12
	
WP 13	**WP 14**
	
WP 15	**WP 16**
Abandoned arable land covered by halophytic vegetation	Abandoned arable land covered by halophytic vegetation

WP 17	WP 18
Abandoned arable land covered by halophytic vegetation	
WP 19	**WP 19**
	

Field notes from the survey in the Project Development Area in November 2020, January and February 2021

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology – Avifauna in Project Area of Influence**
Specialist: Taulant Bino	**Date:** 05.11.2020 (WP 8-28)
Habitats: WP 8 : Abandoned arable land covered by halophytic vegetation; Lat: 40.85092926; Long. 19.44700432	**Observations:** Crested Lark *Galerida cristata* Meadow Pipit *Anthus pratensis* Eurasian Skylark *Alauda arvensis* Eurasian Magpie *Pica pica* Common Chiffchaff *Phylloscopus collybita* Eurasian Wren *Troglodytes troglodytes* European Stonechat *Saxicola rubicola*
WP 9 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85169220; Long. 19.44745064	Cetti's Warbler *Cettia cetti* European Robin *Erithacus rubecula*
WP 10 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85072708; Long. 19.44941902	Water Pipit *Anthus spinoletta* Eurasian Magpie *Pica pica* House Sparrow *Passer domesticus*
WP 11 : Abandoned arable land covered by halophytic vegetation and drainage ditch; Lat. 40.85008621; Long 19.45113564.	Common Linnet *Linaria cannabina* Water Rail *Rallus aquaticus* Eurasian Wren *Troglodytes troglodytes* European Stonechat *Saxicola rubicola*
WP 12 : Abandoned arable land covered by halophytic vegetation and drainage ditch;; Lat. 40.84837341; Long. 19.45070648.	European Robin *Erithacus rubecula* European Goldfinch *Carduelis carduelis* Woodlark *Lullula arborea* Common Kestrel *Falco tinnunculus*
WP 13 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85037231; Long. 19.44602394	Greater Spotted Eagle *Clanga clanga* Cetti's Warbler *Cettia cetti*
WP 14 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84862518; Long. 19.44163895	Cetti's Warbler *Cettia cetti* Eurasian Wren *Troglodytes troglodytes*
WP 15 : Abandoned arable land covered by halophytic vegetation;	Meadow Pipit *Anthus pratensis*

Lat. 40.84435272; Long. 19.44097710	Eurasian Magpie *Pica pica* Crested Lark *Galerida cristata* Cetti's Warbler *Cettia cetti*
WP 16 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84296036; Long. 19.44437408	Common Chaffinch *Fringilla coelebs* European Stonechat *Saxicola rubicola* Common Buzzard *Buteo buteo*
WP 17 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84473038; Long. 19.44604874	Meadow Pipit *Anthus pratensis* Zitting Cisticola *Cistiola juncidis* European Stonechat *Saxicola rubicola*
WP 18 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84761429; Long. 19.44750786	Eurasian Skylark *Alauda arvensis*
WP 19 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84898758; Long. 19.44408607	Eurasian Skylark *Alauda arvensis* Eurasian Wren *Troglodytes troglodytes* Meadow Pipit *Anthus pratensis* Crested Lark *Galerida cristata* Calandra Lark *Melanocorypha calandra*
WP 20 : Abandoned arable land covered by halophytic vegetation; Lat. 40.85090256; Long. 19.44496155	Water Pipit *Anthus spinoletta*
WP 21 : Abandoned arable land covered by halophytic vegetation close to a drainage ditch; Lat. 40.84891129; Long. 19.45325089	European Robin *Erithacus rubecula* White Wagtail *Motacilla alba* Little Egret *Egretta garzetta* Common Starling *Sturnus vulgaris*
WP 22 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84407043; Long. 19.44964981	Common Kestrel *Falco tinnunculus* Hooded Crow *Corvus cornix* Eurasian Skylark *Alauda arvensis* European Stonechat *Saxicola rubicola* Crested Lark *Galerida cristata*
WP 23 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84462357; Long. 19.45696449	Meadow Pipit *Anthus pratensis* Crested Lark *Galerida cristata* Eurasian Magpie *Pica pica*
WP 24 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84090042; Long. 19.45471382	Hooded Crow *Corvus cornix* Common Starling *Sturnus vulgaris* Eurasian Magpie *Pica pica* White Wagtail *Motacilla alba* Corn Bunting *Emberiza calandra*
WP 25 : Abandoned arable land covered by halophytic vegetation;	Meadow Pipit *Anthus pratensis*

Lat. 40.85037231; Long. 19.44602394	European Goldfinch *Carduelis carduelis* Water Pipit *Anthus spinoletta* European Robin *Erithacus rubecula*
WP 26 : Abandoned arable land covered by halophytic vegetation; Lat. 40.83960724; Long. 19.44768143	Crested Lark *Galerida cristata* Eurasian Skylark *Alauda arvensis* House Sparrow *Passer domesticus* Eurasian Sparrowhawk *Accipiter nisus*
WP 27 : Abandoned arable land covered by halophytic vegetation; Lat. 40.83840561; Long. 19.45276070	Eurasian Skylark *Alauda arvensis* Crested Lark *Galerida cristata* Water Pipit *Anthus spinoletta*
WP 28 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84039307; Long. 19.45429420	Common Chaffinch *Fringilla coelebs*
Key Fauna Species (English/Latin): Common Kestrel *Falco tinnunculus* – VU National Greater Spotted Eagle *Clanga clanga* – VU (IUCN), CR National, Annex I Bird Dir. Common Buzzard *Buteo buteo* - VU National Little Egret *Egretta garzetta* – VU (breeding) National, Annex I Bird D Eurasian Sparrowhawk *Accipiter nisus* – EN National	**Observations:** SPECIES COMMON DURING WINTER IN OPEN AREAS INCLUDING THE PV PLANT. THE GREATER SPOTTED EAGLE IS REGULARLY WINTERING IN THE AREA INCLUDING THE PV PLANT. SPECIES COMMON DURING WINTER IN OPEN AREAS INCLUDING THE PV PLANT. SPECIES COMMON DURING WINTER IN OPEN AREAS INCLUDING THE PV PLANT. SPECIES COMMON DURING WINTER IN OPEN AREAS INCLUDING THE PV PLANT.
Hydrobiology:	**Observations:**
Designated Areas: Divjaka- Karavasta National Park	
Area in need of a Construction Restriction Period	
Conclusions and key aspects: The following habitats are considered as important for the preservation of birds: The area is used as a foraging ground for small passerines and a fuw birds of prey. A Greater Spotted Eagle (*Clanga clanga*), a Buzzard and Common Kestrel were observed patrolling the area in search of food. The regular presence of the Greater Spotted Eagle, makes the area one of the rare wintering sites for the species in Albania. Mitigation measures aiming the safeguard and net gain for the species need to be proposed to the relevant authorities.	

Photos:

WP 8



WP 9



WP 10



WP 11



WP 12



WP 13



WP 7



WP 8

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology – Avifauna in Project Development Area**
Specialist: Taulant Bino	**Date:** 20.01.2021
Habitats: WP 14 : Abandoned arable land covered by halophytic vegetation; Lat: 40.85059400; Long. 19.44554700	**Observations:** Crested Lark *Galerida cristata* Meadow Pipit *Anthus pratensis*
WP 15 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84969700; Long. 19.44789900	Eurasian Magpie *Pica pica* Hooded Crow *Corvus cornix*
WP 16 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84828600; Long. 19.45101000	Cetti's Warbler *Cettia cetti* European Robin *Erithacus rubecula*
WP 17 : Abandoned arable land covered by halophytic vegetation and drainage ditch; Lat. 40.84737000; Long 19.45244600	Green Sandpiper *Tringa ochropus* White Wagtail *Motacilla alba* Little Egret *Egretta garzetta* Cirl Bunting *Emberiza cirlus* Meadow Pipit *Anthus pratensis*
WP 18 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84343300; Long. 19.45005000	Green Sandpiper *Tringa ochropus*
WP 19 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84161400; Long. 19.44883700	Common Chiffchaff *Phylloscopus collybita*
WP 20 : Abandoned arable land, temporary flooded, covered by halophytic vegetation; Lat. 40.83984000; Long. 19.45188100	Eurasian Magpie *Pica pica*
WP 21 : Abandoned arable land, temporary flooded, covered by halophytic vegetation; Lat. 40.83758500; Long. 19.45710400	Eurasian Skylark *Alauda arvensis* Corn Bunting *Emberiza calandra* Meadow Pipit *Anthus pratensis*
Key Fauna Species (English/Latin): Little Egret *Egretta garzetta* – VU (breeding) National, Annex I Bird D	**Observations:** SPECIES COMMON DURING WINTER IN WETLANDS INCLUDING DRAINAGE DITCHES IN THE PV PLANT AREA.
Hydrobiology:	**Observations:**

Designated Areas:

Divjaka- Karavasta National Park

Area in need of a Construction Restriction Period

Conclusions and key aspects:

The following habitat, WP17 (Abandoned arable land covered by halophytic vegetation and drainage ditch) is considered as important for the preservation of birds as it shelters the Little Egret (*Egretta garzetta*).

Photos:

WP 14	**WP 15**
	
WP 16	**WP 17**
	

WP 18	WP 19
	
WP 20	**WP 21**
	

Breeding birds in the area of project influence

No.	Scientific name	English name	Breeding assessment	Global status	National Status	Annex 1 Bird Dir.
1	*Accipiter nisus*	Eurasian Sparrowhawk	Non breeding		EN	
2	*Actitis hypoleucos*	Common Sandpiper	Probable breeding			
3	*Alcedo atthis*	Common Kingfisher	Probable breeding			I
4	*Anas platyrhynchos*	Mallard	Confirmed breeding			
5	*Ardea alba*	Great Egret	Non breeding		EN	I
6	*Ardea cinerea*	Grey Heron	Non breeding		VU	
7	*Burhinus oedicnemus*	Eurasian Stone-curlew	Confirmed breeding			
8	*Buteo buteo*	Common Buzzard	Probable breeding		VU	
9	*Cettia cetti*	Cetti's Warbler	Confirmed breeding			
10	*Charadrius alexandrinus*	Kentish Plover	Confirmed breeding			I
11	*Chroicocephalus ridibundus*	Black-headed Gull	Non breeding			
12	*Circus aeruginosus*	Western Marsh Harrier	Probable breeding		VU	I
13	*Circus cyaneus*	Hen Harrier	Non breeding		EN	I
14	*Circus pygargus*	Montagu's Harrier	Non breeding		EN	I
15	*Cisticola juncidis*	Zitting Cisticola	Confirmed breeding			
16	*Corvus cornix*	Hooded Crow	Confirmed breeding			
17	*Coturnix coturnix*	Common Quail	Confirmed breeding			
18	*Egretta garzetta*	Little Egret	Non breeding		VU	I
19	*Falco naumanni*	Lesser Kestrel	Non breeding		VU	I
20	*Falco tinnunculus*	Common Kestrel	Confirmed breeding		VU	
21	*Fulica atra*	Eurasian Coot	Confirmed breeding			
22	*Galerida cristata*	Crested Lark	Confirmed breeding			
23	*Gallinula chloropus*	Common Moorhen	Confirmed breeding			
24	*Glareola pratincola*	Collared Pratincole	Confirmed breeding		VU	I
25	*Himantopus himantopus*	Black-winged Stilt	Confirmed breeding		EN	I
26	*Hirundo rustica*	Barn Swallow	Confirmed breeding			
27	*Ixobrychus minutus*	Little Bittern	Confirmed breeding			I
28	*Lanius minor*	Lesser Grey Shrike	Confirmed breeding			I
29	*Larus michahellis*	Yellow-legged Gull	Non breeding		EN	
30	*Linaria cannabina*	Common Linnet	Possible breeding			
31	*Merops apiaster*	European Bee-eater	Confirmed breeding		EN	
32	*Microcarbo pygmaeus*	Pygmy Cormorant	Non breeding		CR	I
33	*Pelecanus crispus*	Dalmatian Pelican	Non breeding		CR	I
34	*Remiz pendulinus*	Eurasian Penduline Tit	Confirmed breeding		VU	
35	*Riparia riparia*	Sand Martin	Confirmed breeding			
36	*Sterna hirundo*	Common Tern	Non breeding		EN	I
37	*Sternula albifrons*	Little Tern	Non breeding			I
38	*Tringa ochropus*	Green Sandpiper	Non breeding			

Field notes from the survey in the Area of Project Influence (API) in early August 2020

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology - Avifauna**
Specialist: Taulant Bino	**Date:** 05.08.2020
Habitats: WP 1 : Abandoned arable land covered by halophytic vegetation; Lat: 40.879806518555; Long. 19.468418121338	**Observations:** Linnet *Linaria cannabina* Montagu's Harrier *Circus pygargus*
WP 2 : Abandoned arable land covered by halophytic vegetation; Lat. 40.881679534912; Long. 19.453237533569	Marsh Harrier *Circus aeruginosus*
WP 3 : Abandoned arable land covered by halophytic vegetation; Lat. 40.882511138916; Long. 19.446725845337	Lesser Kestrel *Falco naumanni* Black-winged Stilt *Himantopus himantopus*
WP 4 : Temporary ponds in the middle of an abandoned arable land covered by halophytic vegetation; Lat. 40.882526397705; Long. 19.446659088135	Collared Pratincole *Glareola pratincola* Green Sandpper *Tringa ochropus* Common Quail *Coturnix coturnix*
WP 5 : Temporary ponds in the middle of an abandoned arable land covered by halophytic vegetation; Lat. 40.882511138916; Long. 19.44665145874	Sand Martin *Riparia riparia* Barn Swallow *Hirundo rustica* Mallard *Anas platyrhynchos* Pygmy Cormorant *Microcarbo pygmaeus* Little Tern *Sternula albifrons* Great White Egret *Ardea alba* Common Sandpiper *Actitis hypoleucos* Kentish Plover *Charadrius alexandrinus* Little Egret *Egretta garzetta*
WP 6 : Abandoned arable land covered by halophytic vegetation; Lat. 40.882911682129; Long. 19.44331741333	Common Kestrel *Falco tinnunculus* Zitting Cisticola *Cisticola juncidis*
WP 7 : Drainage channel covered by Reeds (Phragmites sp.) Lat. 40.867118835449; Long. 19.441600799561	Common Moorhen *Gallinula chloropus* Little Tern *Sternula albifrons* Little Bittern *Ixobrychus minutus*
WP 8: Abandoned arable land covered by halophytic vegetation; Lat. 40.859848022461; Long. 19.451997756958	Kentish Plover *Charadrius alexandrinus* Collared Pratincole *Glareola pratincola* Marsh Harrier *Circus aeruginosus*

	Hen Harrier *Circus cyaneus* Common Buzzard *Buteo buteo*
WP 9 : Abandoned arable land covered by halophytic vegetation; Lat. 40.858554840088; Long. 19.441759109497	Lesser Grey Shrike *Lanius minor*
WP 10 : Riparian vegetation a Semani River Lat. 40.85285949707; Long. 19.421573638916	Back-headed Gull *Chroicocephalus ridibundus* European Bee-eater *Merops apiaster* Sand Martin *Riparia riparia*
WP 11 : Drainage channel and brackish lagoon of Godulla e Ushtarit Lat. 40.857147216797; Long. 19.406585693359	Common Tern *Sterna hirundo* Zitting Cisticola *Cisticola juncidis* Great White Egret *Ardea alba* Grey Heron Ardea cinerea Little Egret *Egretta garzetta* Little Bittern *Ixobrychus minutus* Dalmatian Pelican *Pelecanus crispus* Sand Martin *Riparia riparia* Barn Swallow Hirundo rustica European Coot *Fulica atra* Pygmy Cormorant *Microcarbo pygmaeus*
WP 12: Drainage channel and brackish lagoon of Godulla e Ushtarit Lat. 40.857215881348; Long. 19.411350250244	Green Sandpiper *Tringa ochropus* Yellow-legged Gull *Larus michahellis* Common Kingfisher *Alcedo atthis* Eurasian Penduline Tit *Remiz pendulinus* Cetti's Warbler *Cettia cetti*
WP 13 : Drainage channel Lat. 40.857208251953; Long. 19.41171836853	Collared Pratincole *Glareola pratincola* Common Kingfisher Alcedo atthis
WP 14 : Abandoned arable land covered by halophytic vegetation; Lat. 40.856323242188; Long. 19.439260482788	Eurasian Stone Curlew *Burhinus oedicnemus* Eurasian Sparrowhawk *Accipiter nisus*
WP 15 : Abandoned arable land covered by halophytic vegetation; Lat. 40.855663299561; Long. 19.448406219482	Barn Swallow *Hirundo rustica*
WP 16 : Drainage ditch Lat. 40.852291107178; Long. 19.456056594849	Little Tern *Sternula albifrons*
Key Fauna Species (Latin/English): Eurasian Sparrowhawk *Accipiter nisus* EN/ Annex I Bird Dir. Great White Egret *Ardea alba* EN (breeding)/ Annex I Bird Dir.	**COMMENTS:** USING THE AREA AS FORAGING GROUND USING THE AREA AS FORAGING GROUND USING THE AREA AS FORAGING GROUND

Grey Heron *Ardea cinerea* VU (breeding) Common Buzzard *Buteo buteo* VU (breeding) Kentish Plover *Charadrius alexandrinus* Annex I Bird Dir. Western Marsh Harrier *Circus aeruginosus* VU/ Annex I Bird Dir. Hen Harrier *Circus cyaneus* EN/ Annex I Bird Dir. Montagu's Harrier Circus pygargus EN/ Annex I Bird Dir. Little Egret *Egretta garzetta* VU/ Annex I Bird Dir. Lesser Kestrel *Falco naumanni* VU/ Annex I Bird Dir. Common Kestrel *Falco tinnunculus* VU Collared Pratincole *Glareola pratincola* VU/ Annex I Bird Dir. Black-winged Stilt *Himantopus himantopus* EN/ Annex I Bird Dir. Little Bittern *Ixobrychus minutus* Annex I Bird Dir. Lesser Grey Shrike *Lanius minor* Annex I Bird Dir. Yellow-legged Gull *Larus michahellis* EN (breeding) Pygmy Cormorant *Microcarbo pygmaeus* CR (breeding)/ Annex I Bird Dir. Dalmatian Pelican *Pelecanus crispus* CR / Annex I Bird Dir. Eurasian Penduline Tit *Remiz pendulinus* VU Common Tern *Sterna hirundo* EN/ Annex I Bird Dir. Little Tern *Sternula albifrons* Annex I Bird Dir.	USING THE AREA AS FORAGING GROUND PROBABLE BREEDER IN THE PVS PLANT AREA USING THE AREA AS FORAGING GROUND USING THE AREA AS FORAGING GROUND USING THE AREA AS FORAGING GROUND PRESENT IN THE AREA USING THE AREA AS FORAGING GROUND USING THE AREA AS FORAGING GROUND GROUND NESTING SPECIES. BREEDING CIRCA 700 M FROM THE PVS PLANT PRESENT IN THE PV PLANT AREA PRESENT IN THE PV PLANT AREA POTENTIAL BREEDER IN THE PVS PLANT AREA PRESENT IN THE PV PLANT AREA PRESENT IN THE PV PLANT AREA CROSSING THROUGH THE AREA PRESENT IN THE DRAINAGE DITCHES AROUND THE PV PLANT FORAGING IN DRAINAGE CHANNELS FORAGING IN DRAINAGE CHANNELS
Key Flora Species (English/Latin):	**Observations:**
Hydrobiology:	**Observations:**
Designated Areas: Divjaka- Karavasta National Park	
Area in need of a Construction Restriction Period	

Conclusions and key aspects:

The following habitats are considered as important for the preservation of the species of conservation concern:

WP 8: Abandoned arable land covered by halophytic vegetation; (Lat. 40.859848022461; Long. 19.451997756958)

The area is used by a breeding colony of nesting Collared Pratincole *Glareola pratincola*. At this time of the year the colony seems to have at least 70-80 breeding pairs. Considering that the survey was undertaken quite late in the breeding season, it is recommended to repeat the survey in 2021 at the peak of the breeding season, most probably in mid-June 2021.

WP 16 : Drainage ditch (Lat. 40.852291107178; Long. 19.456056594849)

When filled with water and covered by aquatic vegetation, it could be iportant for nesting birds and foraging birds such as Common Tern and Little Tern. The maintainance of this habitats is important for small migratory birds and for other birds using is as a foraging ground.

Photos:

WP 1



WP 2



WP 3



WP 4



WP 5	WP 6
	
WP 7	**WP 8**
	
WP 9	**WP 10**
	

WP 11	WP 12
	
WP 13	**WP 14**
	
WP 15	**WP 16**
	

Field notes from the area of project influence in early November 2020

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology – Avifauna in Project Area of Influence**
Specialist: Taulant Bino	**Date:** 05.11.2020 (WP 1-7)
Habitats: WP 1 : Abandoned arable land covered by halophytic vegetation, drainage channel and agriculture plantation; Lat: 40.86708069; Long. 19.44161606	**Observations:** Crested Lark *Galerida cristata* Kingfisher *Alcedo atthis* Little Egret *Egretta garzetta* Common Sandpiper *Actitis hyoleucos* Eurasian Magpie *Pica pica* Common Buzzard *Buteo buteo* Marsh Harrier *Circus aeruginosus* Zitting Cisticola *Cisticola juncidis* Cetti's Warbler *Cettia cetti* Grey Heron *Ardea cinerea*
WP 2 : Abandoned arable land covered by halophytic vegetation, drainage channel and agriculture plantation; Lat. 40.87044525; Long. 19.44159698	Crested Lark *Galerida cristata* Marsh Harrier *Circus aeruginosus* Grey Heron *Ardea cinerea*
WP 3 : Abandoned arable land covered by halophytic vegetation; Lat. 40.86190796; Long. 19.44177818	Eurasian Skylark *Alauda arvensis* Common Chiffchaff *Phylloscopus collybita* Common Blackbird *Turdus merula* Zitting Cisticola *Cisticola juncidis* Common Linnet *Linaria cannabina* Common Bunting *Emberiza calandra* Common Starling *Sturnus vulgaris* Hooded Crow *Corvus cornix* White Wagtail *Motacilla alba* European Stonechat *Saxicola rubicola*
WP 4 : Drainage channel Lat. 40.85130310; Long 19.43436623.	Common Moorhen *Gallinula chloropus* European Robin *Erithacus rubecula*
WP 5 : Brackish wetland (Godulla e Ushtarit); Lat. 40.85721970; Long. 19.40671730.	Mallard *Anas platyrhynchos* Eurasian Wigeon *Mareca penelope* Eurasian Teal *Anas crecca* Northern Shoveler *Spatula clypeata* Little Egret *Egretta garzetta* Northern Pintail *Anas acuta*

	Common Greenshank *Tringa tetanus* Dalmatian Pelican *Pelecanus crispus* Great Cormorant *Phalacrocorax carbo* Great White Egret *Ardea alba* Common Kingfisher *Alcedo atthis* European Robin *Erithacus rubecula* Eurasian Wren *Troglodytes troglodytes* Common Buzzard *Buteo buteo* *250 individuals of Anas sp.* Greater Flamingo *Phoenicopterus roseus* Grey Heron *Ardea cinerea* Marsh Harrier *Circus aeruginosus* Water Rail *Ralus aquaticus* Pygmy Cormorant *Microcarbo pygmaeus* Common Moorhen *Gallinula chloropus*
WP 6 : Brackish wetland (Godulla e Ushtarit); Lat. 40.87022781; Long. 19.40045738	Black-headed Gull *Chroicocephalus ridibundus* Grey Heron *Ardea cinerea* Marsh Harrier *Circus aeruginosus*
WP 7 : Brackish wetland (Godulla e Ushtarit) Lat. 40.85514450; Long. 19.40112114	Little Grebe *Tachybaptus ruficollis* Pygmy Cormorant *Microcarbo pygmaeus* European Goldfinch *Carduelis carduelis* Common Linnet *Linaria cannabina*
Key Fauna Species (English/Latin): Common Kingfisher *Alcedo atthis* – Annex 1 Birds Dir. Great White Egret *Ardea alba* – EN (breeding) National, Annex 1 Birds Dir. Grey Heron *Ardea cinerea* – VU (breeding) National Common Buzzard *Buteo buteo* – VU National Marsh Harrier *Circus aeruginosus* – VU National, Annex 1 Birds Dir. Little Egret *Egretta garzetta* – VU (breeding) National, Annex 1 Birds Dir. Pygmy Cormorant *Microcarbo pygmaeus* - CR (breeding) National Dalmatian Pelican *Pelecanus crispus* - CR (breeding) National, Annex I Bird Dir.	**Observations:** COMMON IN DRAINAGE CHANNELS AND OPEN WATER AREAS DURING MIGRATION AND WINTER. COMMON IN DRAINAGE CHANNELS AND OPEN WATER AREAS DURING MIGRATION AND WINTER. COMMON IN DRAINAGE CHANNELS AND OPEN WATER AREAS DURING MIGRATION AND WINTER. COMMON IN DRAINAGE CHANNELS AND OPEN WATER AREAS DURING MIGRATION AND WINTER. SEVERAL SPECIMEN PAROLING THE AREA. COMMON IN DRAINAGE CHANNELS AND OPEN WATER AREAS DURING MIGRATION AND WINTER. COMMON IN DRAINAGE CHANNELS AND OPEN WATER AREAS DURING MIGRATION AND WINTER. COMMON IN OPEN WATER AREAS DURING MIGRATION AND WINTER.
Hydrobiology:	**Observations:**
Designated Areas: Divjaka- Karavasta National Park	

Area in need of a Construction Restriction Period

Conclusions and key aspects:

The following habitats are considered as important for the preservation of waterbirds:

WP 5: Brackish wetland (Godulla e Ushtarit, Lat. 40.85721970; Long. 19.40671730.)

This brackish wetland, at the north-western edge of Project Area of Influence, is an important wetland site for migratory and breeding birds, particularly for waterbirds.

Photos:

WP 1



WP 2



WP 3



WP 4



WP 5



WP 6



WP 7	WP 8
	

Breeding birds in the transmission line route

No.	Scientific name	Species	Breeding assessment	Global Status	National Status	Annex 1 Bird Dir.
1	*Acrocephalus arundinaceus*	Great Reed Warbler	Confirmed breeding			
2	*Actitis hypoleucos*	Common Sandpiper	Possible breeding			
3	*Aegithalos caudatus*	Long-tailed Tit	Confirmed breeding			
4	*Alcedo atthis*	Common Kingfisher	Confirmed breeding			I
5	*Ardea cinerea*	Grey Heron	Non-breeding		VU	
6	*Ardeola ralloides*	Squacco Heron	Non-breeding		VU	I
7	*Athene noctua*	Little Owl	Confirmed breeding			
8	*Buteo buteo*	Common Buzzard	Confirmed breeding		VU	
9	*Carduelis carduelis*	European Goldfinch	Confirmed breeding			
10	*Cecropis daurica*	Red-rumped Swallow	Confirmed breeding			
11	*Cettia cetti*	Cetti's Warbler	Confirmed breeding			
12	*Chloris chloris*	European Greenfinch	Confirmed breeding			
13	*Cisticola juncidis*	Zitting Cisticola	Confirmed breeding			
14	*Coturnix coturnix*	Common Quail	Confirmed breeding			
15	*Cuculus canorus*	Common Cuckoo	Possible breeding			
16	*Cyanistes caeruleus*	Eurasian Blue Tit	Possible breeding			
17	*Delichon urbicum*	Common House Martin	Confirmed breeding			
18	*Dendrocopos major*	Great Spotted Woodpecker	Probable breeding			
19	*Dryobates minor*	Lesser Spotted Woodpecker	Probable breeding			
20	*Emberiza calandra*	Corn Bunting	Confirmed breeding			
21	*Emberiza cirlus*	Cirl Bunting	Probable breeding			
22	*Falco subbuteo*	Eurasian Hobby	Possible breeding		VU	
23	*Galerida cristata*	Crested Lark	Confirmed breeding			
24	*Gallinula chloropus*	Common Moorhen	Confirmed breeding			
25	*Garrulus glandarius*	Eurasian Jay	Confirmed breeding			
26	*Hippolais olivetorum*	Olive-tree Warbler	Possible breeding			I
27	*Hirundo rustica*	Barn Swallow	Confirmed breeding			
28	*Lanius collurio*	Red-backed Shrike	Confirmed breeding			I
29	*Lanius senator*	Woodchat Shrike	Confirmed breeding			
30	*Luscinia megarhynchos*	Common Nightingale	Confirmed breeding			
31	*Merops apiaster*	European Bee-eater	Confirmed breeding		EN	
32	*Motacilla flava*	Western Yellow Wagtail	Confirmed breeding			
33	*Muscicapa striata*	Spotted Flycatcher	Confirmed breeding			
34	*Oenanthe oenanthe*	Northern Wheatear	Confirmed breeding			
35	*Oriolus oriolus*	Eurasian Golden Oriole	Confirmed breeding			
36	*Parus major*	Great Tit	Confirmed breeding			
37	*Passer domesticus*	House Sparrow	Confirmed breeding			
38	*Passer hispaniolensis*	Spanish Sparrow	Confirmed breeding			
39	*Passer montanus*	Eurasian Tree Sparrow	Confirmed breeding			
40	*Pica pica*	Eurasian Magpie	Confirmed breeding			
41	*Picus viridis*	European Green Woodpecker	Confirmed breeding			
42	*Rallus aquaticus*	Water Rail	Possible breeding			
43	*Riparia riparia*	Sand Martin	Confirmed breeding			
44	*Saxicola rubicola*	European Stonechat	Confirmed breeding			

No.	Scientific name	Species	Breeding assessment	Global Status	National Status	Annex 1 Bird Dir.
45	*Streptopelia turtur*	European Turtle Dove	Probable breeding	VU		
46	*Sylvia atricapilla*	Eurasian Blackcap	Probable breeding			
47	*Sylvia cantillans*	Subapline warbler	Probable breeding			
48	*Sylvia communis*	Common Whitethroat	Confirmed breeding			
49	*Sylvia melanocephala*	Sardinian Warbler	Probable breeding			
50	*Tachybaptus ruficollis*	Little Grebe	Confirmed breeding			
51	*Tringa ochropus*	Green Sandpiper	Non-breeding			
52	*Turdus merula*	Common Blackbird	Confirmed breeding			
53	*Upupa epops*	Eurasian Hoopoe	Possible breeding		VU	

Field notes from the surveys in the route 1 of the Transmission Line

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology - Avifauna**
Specialist: Taulant Bino	**Date:** 06.08.2020 (OHL 1 Morning)
Habitats: WP 1 : Urban area and orchards Lat: 40.77964782715; Long. 19.59318923950	**Observations:** Zitting Cisticola *Cisticola juncidis* Red-rumped Swallow *Cecropis daurica* Crested Lark *Galerida cristata* House Sparrow *Passer domesticus* Sardinian Warbler *Sylvia melanocephala* Eurasian Collared Dove *Streptopelia decaocto* Woodchat Shrike *Lanius senator* European Goldfinch *Carduelis carduelis* Subalpine Warbler *Sylvia cantillans*
WP 2 : Peshtan reservoir and fresh water vegetation; Lat. 40.78285980225; Long. 19.58198547363	Little Grebe *Tachybaptus ruficollis* Sand Martin *Riparia riparia* Common Kingfisher *Alced atthis* Barn Swallow *Hirundo rustica* Great Reed Warbler *Acrocephalus arundinaceus*
WP 3 : Hills covered by arable land and orchards; Lat. 40.79508590698; Long. 19.57168197632	Crested Lark *Galerida cristata* House Sparrow *Passer domesticus* Tree Sparrow *Passer montanus* Eurasian Magpie *Pica pica* Red-rumped Swallow *Cecropis daurica* Barn Swallow *Hirundo rustica* European Goldfinch *Carduelis carduelis* Common Whitethroat *Sylvia communis*
WP 4 : Riparian vegetation at Semani River; Lat. 40.79375457764; Long. 19.56317520142	Barn Swallow *Hirundo rustica* Eurasian Collared Dove *Streptopelia decaocto* Grey Heron *Area cinerea* House Sparrow *Passer domesticus*
WP 5 : Arable land; Lat. 40.80867004395; Long. 19.54555892944	European Greenfinch *Chloris chloris* Olive-tree Warbler *Hippolais olivetorum* Cetti's Warbler *Cettia cetti* European Bee-eater *Merops apiaster* Sardinian Warbler *Sylvia melanocephala*

WP 6 : Riparian forest surrounded by arable land; Lat. 40.81944656372; Long. 19.5310573578	Barn Swallow *Hirundo rustica* European Goldfinch *Carduelis carduelis* Common Blackbird *Turdus merula* Eurasian Golden Oriole *Oriolus oriolus* Common Buzzard *Buteo buteo* Common Nightingale *Luscinia megarhynchos* European Bee-eater *Merops apiaster* House Sparrow *Passer domesticus* Sardinian Warbler *Sylvia melanocephala* Zitting Cisticola *Cisticola juncidis* Eurasian Magpie *Pica pica* Eurasian Blackcap *Sylvia atricapilla*
WP 7 : Riparian forest at Semani Nature Monument; Lat. 40.82515716553; Long. 19.50195121765	European Green Woodpecker *Picus viridis* Eurasian Hopooe *Upupa epops* European Turtle Dove *Streptopelia turtur* Eurasian Golden Oriol *Oriolus oriolus* Common Nightingale *Luscinia megarhynchos* Long-tailed Tit *Aegithalos caudatus* Eurasian Blackcap *Sylvia atricapilla* Eurasian Blue Tit *Cyanistes caeruleus* Great Tit *Parus major* Great Spotted Woodpecker *Dendocopos major* Lesser Spotted Woodpecker *Dryobates minor* Eurasian Hobby *Falco Subbuteo* Red-rumped Swallow *Cecropis daurica* Barn Swallow *Hirundo rustica* European Green Woodpecker *Picus viridis* Eurasian Magpie *Pica pica*
WP 8 : Arable land; Lat. 40.8464994421; Long. 19.4661293342	Crested Lark *Galerida cristata* Barn Swallow *Hirundo rustica*
Key Fauna Species (English/ Latin): Common Kingfisher *Alcedo atthis* - Annex I Bird Dir. Eurasian Hobby Falco Subbuteo VU National Olive-tree Warbler *Hippolais olivetorum* - Annex I Bird Dir. European Bee-eater *Merops apiaster* – EN National Turtle Dove *Streptopelia turtur* - VU Global	**COMMENTS** NESTING IN PESHTANI RESERVOIR PROBABLE BREEDING IN RIPARIAN FORESTS PROBABLE BREEDING IN ORCHARDS AND VEGETATED FENCES LARGE COLONY AT WP 1

Common Buzzard *Buteo buteo* – EN National	CONFIRMED BREEDING IN RIPARIAN FORESTS PROBABLE BREEDING IN RIPARIAN FORESTS
Key Flora Species (English/Latin):	**Observations:**
Hydrobiology:	**Observations:**

Designated Areas:

1. Nature Monument “Kurora e Semanit”
2. Divjake- Karavasta National Park

Area in need of a Construction Restriction Period

WP 1 – No major construction activities during the breeding season.

WP 4 and **WP 8** - Both WP are inside the OHL area of influence. Any vegetatiton clearance at those riprian forests to be avoided.

Conclusions and key aspects:

The following habitats are considered as important for the preservation of the species of conservation concern:

WP 1: Urban area and orchards (Lat: 40.77964782715; Long. 19.59318923950)

A large colony of European Bee-Eaters is located in sandstones close to the village of Vajkan. Breed

WP 4 : Riparian vegetation at Semani River (Lat. 40.79375457764; Long. 19.56317520142) and **WP 8 :** Riparian forest at Semani Nature Monument (Lat. 40.82515716553; Long. 19.50195121765)

Riparian forests along the transmission lines looked very important for breeding birds. Despite the short time in the area, a high number of species was resgitered and soe of the species are of conservation concern at international and national level.

Photos:

WP 1	WP 2
	
WP 3	**WP 4**
	

WP 5	WP 6
	
WP 7	**WP 8**
	

Field notes from the surveys in the route 2 of the Transmission Line

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology - Avifauna**
Specialist: Taulant Bino	**Date:** 06 and 14.08.2020 (OHL 2)
Habitats: WP 1 : Urban area and orchards Lat: 40.68677902222; Long. 19.55148887634	**Observations:** Common House Martin *Delichon urbicum* House Sparrow *Passer domesticus*
WP 2 : urban area surrounded by orchards; Lat. 40.69224929810; Long. 19.53904914856	Eurasian Collared Dove *Streptopelia decaocto* Great Spotted Woodpecker *Dendrocopos major* House Sparrow *Passer domesticus* Spotted Flycatcher *Muscicapa striata*
WP 3 : Former sandstone quarry; Lat. 40.70380783081; Long. 19.52567100524	Common Whitethroat *Sylvia communis* Barn Swallow *Hirundo rustica* Sardinian Warbler *Sylvia melanocephala*
WP 4 : Reservoir surrounded by wetland vegetation; Lat. 40.71236419678; Long. 19.52353477478	Eurasian Jay *Garrulus glandarius* Water Rail Rallus aquaticus Common House Martin *Delichon urbicum* European Bee-eater *Merops apiaster* Barn Swallow *Hirundo rustica* Little Grebe *Tachybaptus ruficollis* Cetti's Warbler *Cettia cetti* Green Sandiper *Tringa ochropus* Common Sandpiper *Actitis hypoleucos* Common Moorhen *Gallinula chloropus*
WP 5 : Urban area surrounded by orchards; Lat. 40.71659088135; Long. 19.52043533325	House Sparrow *Passer domesticus* Subalpine Warbler *Sylvia cantillans*
WP 6 : Urban area surrounded by arable land; Lat. 40.73845291138; Long. 19.51507949830	Little Owl *Athene noctua* House Sparrow *Passer domesticus*
WP 7 : Urban area surrounded by arable land Lat. 40.73763656616; Long. 19.51795768738	Barn Swallow *Hirundo rustica* European Bee-eater *Merops apiaster* Spanish Sparrow *Passer hispaniolensis* Red-backed Shrike *Lanius collurio*
WP 8 : Arable land close to highway Fier-Levan; Lat. 40.74857330322; Long. 19.51492500305	Red-backed Shrike *Lanius collurio* House Sparrow *Passer domesticus*

	Zitting Cisticola *Cisticola juncidis* Barn Swallow *Hirundo rustica* European Stonechat *Saxicola rubicola* Cetti's Warbler *Cettia cetti* Red-rumped Swallow *Cecropis daurica* House Sparrow *Passer domesticus*
WP 9 : Urban area surrounded by arable land Lat. 40.75756835937; Long. 19.51528167724	House Sparrow *Passer domesticus*
WP 10 : Urban area surrounded by arable land Lat. 40.76477432251; Long. 19.51466941833	Barn Swallow *Hirundo rustica* House Sparrow *Passer domesticus*
WP 11 : Drainage ditch and arable land Lat. 40.78050994873; Long. 19.50811576843	Common Moorhen *Gallinula chloropus* Squacco Heron *Ardela ralloides* European Bee-eater *Merops apiaster*
WP 12 : Arable land and drainage ditches Lat. 40.78671264648; Long. 19.50441360474	Common Moorhen *Gallinula chloropus* Northern Wheatear *Oenanthe oenanthe* Western Yellow Wagtail *Motailla flava* European Bee-eater *Merops apiaster* Eurasian Magpie *Pica pica* House Sparrow *Passer domesticus* Crested Lark *Galerida cristata* Zitting Cisticola *Cisticola juncidis* Common Cuckoo *Cuculus canorus*
WP 13 : Arable land Lat: 40.79439926147; Long. 19.50138854981	Red-backed Shrike *Lanius collurio* Cirl Bunting *Emberiza cirlus* European Bee-eater *Merops apiaster* Eurasian Magpie *Pica pica* Eurasian Hoopoe *Upupa epops* Olive-tree Warbler *Hippolais olivetorum* European Turtle Dove *Streptopelia turtur* Corn Bunting *Emberiza calandra* Spotted Flycatcher *Muscicapa striata* European Stonechat *Saxicola rubicola* House Sparrow *Passer domesticus* Barn Swallow *Hirundo rustica*
WP 14 : Arable land Lat: 40.82009124756; Long. 19.48726654052	Spanish Sparrow *Passer hispaniolensis* Common Quail *Coturnix coturnix* Red-backed Shrike *Lanius collurio* Eurasian Collared Dove *Streptopelia decaocto*

	Zitting Cisticola *Cisticola juncidis*
WP 15 : Arable land Lat: 40.82892608642; Long. 19.48218154907	Eurasian Magpie *Pica pica*
WP 16 : Arable land Lat: 40.83631896973; Long. 19.47428894042	House Sparrow *Passer domesticus*
WP 17 : Arable land Lat: 40.84003448486; Long. 19.46994018554	Zitting Cisticola *Cisticola juncidis* House Sparrow *Passer domesticus* Barn Swallow *Hirundo rustica*
Key Fauna Species (English/ Latin): Squacco Heron Ardeola rallloides – VU National Olive-tree Warbler *Hippolais olivetorum* - Annex I Bird Dir. European Bee-eater *Merops apiaster* – EN National Turtle Dove *Streptopelia turtur* - VU Global Red-backed Shrike *Lanius collurio* – Annex I Bird Directive Eurasian Hoopoe *Upupa epops* – *VU National*	**COMMENTS** FORAGING ALONG DRAINAGE DITCHES PROBABLE BREEDING IN ORCHARDS AND VEGETATED FENCES LARGE COLONY AT WP 1 CONFIRMED BREEDING IN RIPARIAN FORESTS CONFIRMED BREEDING IN ORCHARDS POSSIBLE BREEDING IN RIPARIAN FORESTS AND SEVERAL INDIVIDUALS ALREADY MIGRATING.
Key Flora Species (English/Latin):	**Observations:**
Hydrobiology:	**Observations:**

Designated Areas:

1. Nature Monument “Kurora e Semanit”
2. Divjake- Karavasta National Park
3. Landscape Protected Area of Vjose-Narta

Area in need of a Construction Restriction Period

WP 3 – It is very likely that a colony of European Bee-eaters *Merops apiaster* is located here in breeding season. Certain holes possibly used by the European Roller *Coracias garrulus*. No major construction activities should take place during the breeding season.

WP 4 – The reservoir seems important for breeding birds and particularly some waterbird species. Close by is also an former sandstone quarry that early summer is used by a breeding colony of European Bee-eaters *Merops apiaster*. No major construction activities should take place during the breeding season.

Conclusions and key aspects:

The following habitats are considered as important for the preservation of the species of conservation concern:

WP 3 : Former sandstone quarry (Lat. 40.70380783081; Long. 19.52567100524)
It is very likely that a colony of European Bee-eaters *Merops apiaster* is located here in breeding season. Certain holes possibly used by the European Roller *Coracias garrulus*.

WP 4 : Reservoir surrounded by wetland vegetation (Lat. 40.71236419678; Long. 19.52353477478)

The reservoir seems important for breeding birds and particularly some waterbird species including Common Moorhen *Gallinula chloropus*, Water Rail *Rallus aquaticus* etc. Close by is also an former sandstone quarry that early summer is used by a breeding colony of European Bee-eaters *Merops apiaster*.

Photos:

WP 1	**WP 2**
	
WP 3	**WP 4**
	
WP 4	**WP 5**
	

WP 6	WP 7
	
WP 8	**WP 9**
	
WP 10	**WP 11**
	

WP 12	WP 13
	
WP 14	**WP 15**
	

Field notes from the surveys in the route 3 of the Transmission Line

Biological Environment Findings Summary Datasheet	
Project: Karavasta Photovoltaic	**Project Feature Investigated: Environment/Ecology – Avifauna in the Transmission Line**
Specialist: Taulant Bino	**Date:** 06.11.2020
Habitats: WP 1 : Abandoned arable land covered by halophytic vegetation; Lat: 40.85771179; Long. 19.44174385	**Observations:** European Goldfinch *Carduelis carduelis* Eurasian Magpie *Pica pica* Crested Lark *Galerida cristata* Marsh Harrier *Circus aeruginosus*
WP 2 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84908294; Long. 19.44906997	European Stonechat *Saxicola rubicola*
WP 3 : Abandoned arable land covered by halophytic vegetation; Lat. 40.84434127; Long. 19.45950698	Common Kestrel *Falco tinnunculus*
WP 4 : Abandoned arable land covered by halophytic vegetation close to a drainage channel Lat. 40.83821487; Long 19.46018028.	Eurasian Skylark *Alauda arvensis*
WP 5 : Abandoned arable land covered by halophytic vegetation; Lat. 40.83341598; Long. 19.45663833.	Eurasian Skylark *Alauda arvensis* Common Kestrel *Falco tinnnculus* Meadow Pipit *Anthus pratensis* Eurasian Magpie *Pica pica* European Robin *Erithacus rubecula* Eurasian Wren *Troglodytes troglodytes* Cettis Warbler *Cettia cetti* Common Buzzard *Buteo buteo* Nothern Lapwing *Vanellus vanellus* Marsh Harrier *Circus aeruginosus*
WP 6 : Arable land close to a drainage channel covered by Common Reed; Lat. 40.83044433; Long. 19.45875740	Common Linnet *Linaria cannabina* Water Rail *Rallus aquaticus* Common Starling *Sturnus vulgaris* Corn Bunting *Emberiza calandra* Common Moorhen *Gallinula chloropus*

WP 7 : Arable land close to a drainage channel covered by Common Reed; Lat. 40.82793045; Long. 19.46438980	Common Buzzard *Buteo buteo*
WP 8 : Arable land close to a drainage channel covered by Common Reed; Lat. 40.8250122; Long. 19.47113037	Common Kestrel *Falco tinnunculus* European Stonechat *Saxicola rubicola* European Goldfinch *Carduelis carduelis* Eurasian Sparrowhawk *Accipiter nisus*
WP 9 : Arable land close to a drainage channel covered by Common Reed; Lat. 40.82226943; Long. 19.47720718	European Goldfinch *Carduelis carduelis* Common Moorhen *Gallinula chloropus* Water Rail *Rallus aquaticus* Cettis Warbler *Cettia cetti* European Tree Sparrow *Passer montanus* European Stonechat *Saxicola rubicola* Eurasian Wren *Troglodytes troglodytes* Common Starling *Sturnus vulgaris* Eurasian Skylark *Alauda arvensis*
WP 10 : Arable land close to a drainage channel covered by Common Reed; Lat. 40.81906891; Long. 19.47479630	House Sparrow *Passer domesticus*
WP 11 : Arable land close to a drainage channel covered by Common Reed; Lat. 40.81417847; Long. 19.47112846	European Robin *Erithacus rubecula* Eurasian Wren *Troglodytes troglodytes* Common Chiffchaff *Phylloscopus collybita* Hooded Crow *Corvus cornix* Common Buzzard *Buteo buteo* European Goldfinch *Carduelis carduelis* Eurasian Sparrowhawk *Accipiter nisus*
WP 12 : Arable land and eucalyptus forest; Lat. 40.81024170; Long. 19.47013092	Eurasian Sparrowhawk *Accipiter nisus* Eurasian Penduline Tit *Remiz pendulinus* Grey Heron *Ardea cinerea* Water Pipit *Anthus spinoletta* Eurasian Skylark *Alauda arvensis*
WP 13 : Riparian vegetation at Semani River; Lat. 40.80901718; Long. 19.47480011	Eurasian Magpie *Pica pica* Cetti's Warbler *Cettia cetti* Eurasian Wren *Troglodytes troglodytes* Long-tailed Tit *Aegithalos caudatus* Common Buzzard *Buteo buteo* Common Kingfisher *Alcedo atthis* Common Chiffchaff *Phylloscopus collybita*

	Common Reed Bunting *Emberiza schoeniclus*
WP 14 : Arable land with crops and alfalfa; Lat. 40.69619370; Long. 19.54806900	European Robin *Erithacus rubecula* Corn Bunting *Emberiza calandra* Common Chiffchaff *Phylloscopus collybita* Cetti's Warbler *Cettia cetti* Common Kestrel *Falco tinnunculus* Common Buzzard *Buteo buteo* European Goldfinch *Carduelis carduelis* Meadow Pipit *Anthus pratensis*
WP 15 : Olive plantations and urban area; Lat. 40.69398117; Long. 19.53892326	Syrian Woodpecker *Dendrocopos syriacus* Common Chiffchaff *Phylloscopus collybita* European Robin *Erithacus rubecula* House Sparrow *Passer domesticus* Common Blackbird *Turdus merula* Great Tit *Parus major* Sardinian Warbler *Curruca melanocephala* Eurasian Wren *Troglodytes troglodytes*
WP 16 : Arable land close to a drainage channel covered by Common Reed; Lat. 40.71856308; Long. 19.52642059 Arable land and urban area	Common Moorhen *Gallinula chloropus* European Robin *Erithacus rubecula* House Sparrow *Passer domesticus* Eurasian Skylark *Alauda arvensis* Crested Lark *Galerida cristata* Cetti's Warbler *Cettia cetti* Water Pipit *Anthus spinoletta* Meadow Pipit *Anthus pratensis* Eurasian Magpie *Pica pica* European Stonechat *Saxicola rubicola* Common Chiffchaff *Phylloscopus collybita* Little Owl *Athene noctua*
WP 17 : Arable land and urban area Lat. 40.72301102; Long. 19.52009201	Woodlark *Lullula arborea*
WP 18 : Arable land and urban area Lat. 40.72524261; Long. 19.51793289	Garden Warbler *Sylvia borin* European Goldfinch *Carduelis carduelis* European Stonechat *Saxicola rubicola* European Serin *Serinus serinus*
WP 19 : Arable land with crops and alfalfa Lat. 40.73826599; Long. 19.51592445	House Sparrow *Passer domesticus*

WP 20 : Arable land and urban area Lat. 40.73355600; Long. 19.51405800	House Sparrow *Passer domesticus* Eurasian Skylark *Alauda arvensis* Crested Lark *Galerida cristata* Tree Sparrow *Passer montanus* Common Starling *Sturnus vulgaris* White Wagtail *Motacilla alba* Common Chaffinch *Fringilla coelebs* Corn Bunting *Emberiza calandra*
WP 21 : Arable land and urban area Lat. 40.74185562; Long. 19.48182487	Common Chaffinch *Fringilla coelebs* Common Starling *Sturnus vulgaris* Crested Lark *Galerida cristata* Eurasian Skylark *Alauda arvensis*
WP 22 : Arable land close to a drainage channel covered by Common Reed Lat. 40.75272751; Long. 19.46898842	European Goldfinch *Carduelis carduelis* Eurasian Skylark *Alauda arvensis* European Robin *Erithacus rubecula* Crested Lark *Galerida cristata* Cetti's Warbler *Cettia cetti* Corn Bunting *Emberiza calandra* House Sparrow *Passer domesticus* White Wagtail *Motacilla alba* Common Moorhen *Gallinula chloropus* Meadow Pipit *Anthus pratensis* Common Starling *Sturnus vulgaris*
WP 23 : Arable land close to a drainage channel covered by Common Reed Lat. 40.76523209; Long. 19.47495651	Crested Lark *Galerida cristata* Eurasian Skylark *Alauda arvensis* European Stonechat *Saxicola rubicola* Cetti's Warbler *Cettia cetti* European Greenfinch *Chloris chloris*
WP 24 : Arable land close to a drainage channel covered by Common Reed Lat. 40.77218246; Long. 19.47816849	House Sparrow *Passer domesticus* Eurasian Skylark *Alauda arvensis* Cetti's Warbler *Cettia cetti* Crested Lark *Galerida cristata* Eurasian Magpie *Pica pica* Common Starling *Sturnus vulgaris*
WP 25 : Arable land with crops and alfalfa Lat. 40.78956604; Long. 19.48623657	Cetti's Warbler *Cettia cetti* Eurasian Magpie *Pica pica* Crested Lark *Galerida cristata* Eurasian Skylark *Alauda arvensis*

	Meadow Pipit *Anthus pratensis* Common Chiffchaff *Phylloscopus collybita* European Robin *Erithacus rubecula* Grey Heron *Ardea cinerea (c. 50 inividuals)*
Key Fauna Species (English/Latin): Eurasian Sparrowhawk *Accipiter nisus* – EN National Common Kingfisher *Alcedo atthis* – Annex 1 Birds Dir. Grey Heron *Ardea cinerea* – VU (breeding) National Common Buzzard *Buteo buteo* – VU National Marsh Harrier *Circus aeruginosus* – VU National, Annex 1 Birds Dir. Common Kestrel *Falco tinnunculus* – VU national Penduline Tit *Remiz pendulinus* – VU National	**Observations:** COMMON IN ARABLE LAND IN WINTERING SEASON. PRESENT IN DRAINAGE CHANNELS AND OPEN WATER AREAS DURING MIGRATION AND WINTER. COMMON IN WETLAND AREAS IN WINTERING SEASON. COMMON ARABLE LAND IN WINTERING SEASON. COMMON IN WETLAND AREAS IN WINTERING SEASON. COMMON ARABLE LAND IN WINTERING SEASON. PRESENT IN DRAINAGE CHANNELS DURING WINTER.
Hydrobiology:	**Observations:**
Designated Areas:	
Area in need of a Construction Restriction Period	
Conclusions and key aspects: The following habitats are considered as important for the preservation of birds: **WP 13 :** Riparian vegetation at Semani River (Lat. 40.80901718; Long. 19.47480011) The Riparian vegetation shelter a good number of species and it is inhabited by several species of National and European conservation concern. In the evening. Some 50 individuals of Grey Heron (*Ardea cinerea*) were seen flying towards the riparian forest in the dawn and evening, providing evidences for the presence of a roosting site for the Grey Herons.	

Photos:	
WP 1	**WP 2**
	
WP 3	**WP 4**
Similar to the above	Similar to the above
WP 5	**WP 6**
	

WP 7	**WP 8**
	Similar to WP 7
WP 9	WP 10
Similar to WP 7	Similar to WP 7
WP 11	WP12
Similar to WP 7	Similar to WP 7
WP 13	WP 13
	
WP14	WP15

	
WP 16	WP17
	
WP 18	WP19
Similar to WP 18	Similar to WP 18
WP 20	WP 21
	
WP 22	Wp 23
	
WP 24	WP 25





Appendix 11. Appropriate Assessment (AA)

REPUBLIC OF ALBANIA

MINISTRY OF TOURISM AND ENVIRONMENTAL
GENERAL DIRECTORY OF REGULATORY AND COMPLIANCE IN TOURISM AND ENVIRONMENTAL
DIRECTORY OF PERMIT, LICENCE AND MONITORING

No. 308 Prot. 17th January 2022

Subject: Response

"**KARAVSTA SOLAR" Shpk**
Street "Murat Toptani", Qendra Eurocol, Kati 4, Tirana

In response to your request, forwarded to the Ministry of Tourism and Environment with letter no. 8637, dated 01.12.2021 (MTE reference), as well as the following communications, we clarify as follows:
The concept "Appropriate Assessment" is presented in law no. 128/2020 "For some changes and additions to law no. 10440, dated 7.7.2011 "on environmental impact assessment", as amended", as an attempt to partially approximate Directive 92/43 / EEC dated 21 May 1992 "on the conservation of natural habitats and of wild flora and fauna" , as amended", by definition and definitions specifically in Articles:

Article 3, point 4: *After point 16 is added point 16/1: "Appropriate Assessment" is the process that assesses the importance of the impacts of a project proposed individually or in combination with other approved plans or projects, or in development, in specific areas of preservation, in order to inform the decision-making processes.*

Article 5: The following changes and additions are made to Article 8:

1. The letter "ç" is amended as follows: ç) the projects listed or not in appendix I or II of this law, which do not have a direct impact, or are not necessarily related to the management of a specific conservation area, but which are likely to have a significant effect in this area, which are also subject to Appropriate Assessment, in order to ensure the competent authorities that these projects will not have consequences on the integrity of the area;

2. After the letter "ç" is added the letter "d" with the following content: d) the projects defined in letter "ç", which are also subject to appropriate assessment, are identified on a case-by-case basis by the authority responsible for the management of specific conservation areas, referring to the legislation in force for protected areas.

In this case, the preliminary EIA report includes the appropriate assessment defined in point 16/1 of article 6 of this law, of the impacts of these projects in that area, which is reviewed by the authority responsible for the management of special conservation areas.

Article 14, Articles 20, 21 and 24 are amended as follows: Article 21, Approval of development in special conservation areas.

1. The authorities responsible for the development approval shall give the relevant approval only if the appropriate assessment has concluded that it will not have significant effects on the integrity of this area.

2. When the project is to be developed for reasons of major national public interest, notwithstanding the impacts in the area identified in the appropriate assessment and the lack of alternative solutions, the responsible authorities approve the development only on condition that the developer takes all compensatory measures in order ensuring that the special conservation area does not lose its integrity, taking into account the opinion of the municipality where the project will be developed based on the development plans in that area.

As above, in addition to the introduction of "appropriate assessment" through its definition, the law "On Environmental Impact Assessment", as amended, has also defined the case-by-case review methodology, as an identifying way, of projects that are also subject to appropriate assessment, as well as the authority responsible for the management of special conservation areas, in the capacity of the responsible authority that carries out this identification.

Specifically, for the "140 MW photovoltaic project" proposed by the developer "Karavasta Solar" Ltd., the Ministry of Tourism and Environment has approved an Environmental Declaration, concluding the in-depth process of environmental impact assessment.
The Environmental Statement is based on the reports drafted by experts on behalf of the developer, on the summary of public consultations, as well as on the opinions of the competent institutions, including the National Agency of Protected Areas.
As quoted in the Environmental Declaration document, the NEA states: Based on the project planning, part of the activity is located on the borders of the Divjaka-Karavasta National Park. We request that the project envisage a green belt without constructions and infrastructure up to 15 m from the border of the park.

Thank You,

Minister Secretary
LEDINA BEQIRAJ AGALLIU

Appendix 12. Birdlife International Engagement, MoM

January 2022

Participants:
Bird Life International
Senior E&S Specialist, IFC
Global Biodiversity Lead, IFC
Head of the Albanian Ornithological Society

BirdLife International then raised three issues:

- The impact of the PV plant in an IBA/KBA area
- The impact of the Overhead Transmission Line on birds and
- Cumulative impacts of the Karavasta SPP on the colony of Collared Pratincole

During the meeting IFC discussed about protected area which are located near the PV plant site, they pointed out that the project does not cause direct impact on the protected areas of Karavasta Lagoon, KBA/IBA. They also noted that the OHL is far from protected areas.

Birdlife highlighted that the impact of the PV plant was reduced. On the OHL, BirdLife suggested that the risk of bird fatalities related to collision and electrocution with the powerline remains relatively low. Nevertheless, bird diverters, electric poles designs and insulation of the electric poles could avoid fatalities if those measures are undertaken by Voltalia. IFC recommends incorporating certain clauses in the EPC contracts, to implement mitigations measures, adequated construction protocols and staff trainings as well as additional equipments to be put in place. IFC also recommends exploring and implement any potential cooperation with the National Park where the opportunities of the PV plant could benefit the local biodiversity (nesting inside the PV plant site, etc).

Regarding the cumulative impacts, BirdLife informed that there are two colonies of the Collared Pratincole in the area. One colony is situated in the southern part of the Divjaka-Karavasta National Park (DKNP) and another colony just north of Karavasta SPP. This second colony is outside of the DKNP but still inside of the Important Bird Area. The colony in the Park is flooded mid-season and birds join the southern colony. This breeding ground of the second colony risks being occupied by intensive agriculture.

In order to avoid this cumulative impact, BirdLife suggested to implement mitigation measures that avoid flooding of the breeding ground of the colony inside the National Park. This is obviously out of the construction scope of work but could very well be treated in the context of side projects lead by the E&S team in concertation with the National Park, Birdlife and etc. IFC supported the compensation measures inside the National Park and stressed that those measures will serve for abetter reputation for Voltalia.

In addition IFC informed that it expects further information on bird movements with regard to the project area. Besides, IFC reiterated the support for bird diverters, pre-construction surveys to avoid fatalities and post-construction surveys to monitor bird fatalities.

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