



West Power Investments SRL



Environmental and Social Impact Assessment

Dama PV Project in Arad, Romania

3 November 2023

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Dama PV Project in Arad, Romania



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Acronyms and Abbreviations

Name	Description
AA	Appropriate Assessment
ANIF	National Agency for Land Improvements
Aol	Area of Influence
APIA	Agency for Payments and Intervention in Agriculture
approx	Approximately
AZE	Alliance for Zero Extinction
b.g.l.	Below ground level
BAP	Biodiversity Action Plan
CHA	Critical Habitat Assessment
CIA	Cumulative Impact Assessment
cm	Centimeter
CR	Critically Endangered
dBA	A-weighted decibels
E&S	Environmental and Social
EAAA	Ecologically Appropriate Area of Analysis
EBRD	European Bank for Reconstruction and Development
EC	European Council
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EN	Endangered
EP	Equator Principles
ERM	Environmental Resources Management
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plans
EU	European
FGD	Focus Group Discussions
GBVH	Gender-based violence and harassment
GEO	Government emergency ordinance
GHG	Greenhouse gas
GIIP	Good International Industrial Practice
GIS	Geographical Information System
H&S	Health and Safety
ha	Hectare
IBA	Important Bird and Biodiversity Area
IBAT	Integrated Biodiversity Assessment Tool
IFC	International Finance Corporation
INHGA	National Hidrology and Water Management Institute
IPPC	Integrated Prevention and Pollution Control
IUCN	International Union for Conservation of Nature

KBA	Key Biodiversity Areas
KII	Key Informant Interviews
km	Kilometre
kV	Kilowatt
LC	Least Concern
LMI	List of Historical Monuments
m	Meters
mm	Millimetres
MW	Megawatt
NGO	Non-Governmental Organizations
NT	Near threatened
NTS	Non-technical summary
OHL	Over the head line
OHS	Operational Health and Safety
PA	Protected Area
PBF	Priority Biodiversity Features
PR	Performance Requirement
PS	Performance Standard
PUZ	Zoning plan
PV	Photovoltaic
SCI	Site of Community Importance
SEA	Strategic Environmental Assessment
SEP	Stakeholder Engagement Plan
SEP	Stakeholder Engagement Plan
SPA	Special Protection Area
SPP	Shared Socio-Economic Pathway
t	Tones
TCFD	Task Force on Climate-Related Financial Disclosures
ToR	Terms of Reference
TPH	Total Petroleum Hydrocarbons
TSO	Transmission System Operator
VEC	Valued Environmental and Social Components
VU	Vulnerable
ZTV	Zone of Theoretical Visibility
MACs	Maximum Allowable Concentrations
AAQS	Ambient Air Quality System
EMS	European Macroseismic Scale
LCU	Landscape Characteristic Unit
VSR	Visual Sensitive Receptors
FAA	Federal Aviation Administration
FoV	Field of view
CICES	Common International Classification of Ecosystem Services

MAES	Mapping and Assessment of Ecosystems and their Services
NTFPs	Non-Timber Forest Products
CCRA	Climate Change Risk Assessment
NIA	Noise Impact Assessment
APIA	National Agency for Payments in Agriculture
EPC	Engineering, Procurement and Construction
SME	Small and medium enterprises
FTE	Full time equivalent
AIDS	Acquired immunodeficiency syndrome
PPE	Protective personnel equipment

1. INTRODUCTION

1.1 Background

ERM Environmental Resources Management SRL (ERM) was contracted in November 2022 by West Power Investments SRL (hereafter referred as “the Client”) to perform a Scoping exercise (outcomes summarized in section 4.2) as an initial step in developing the Environmental and Social Impact Assessment (ESIA) for the 1065 MW Dama Photovoltaic (PV) Plant (hereafter referred as “the Project”), located in Arad County, Romania. The output of the scoping stage was the Terms of Reference (ToR) for specialist studies that informed the present ESIA process.

Based on the Environmental and Social (E&S) Policy criteria as implemented by the major international finance institutions and international lenders in general (including but not limited to Equator Principle EP4¹ signatories), the Project qualifies as ‘Category A’. Consequently, a comprehensive Environmental and Social Impact Assessment (ESIA) performed in a participatory manner is required for the Project to identify potential associated impacts and address these through effective mitigation measures.

ERM was contracted by the Client to perform the ESIA for the Project in January 2023. The Client intends to begin construction of the Project in 2023.

This ESIA will be accompanied by a Non-technical Summary (NTS) and a Stakeholder Engagement Plan (SEP). Further, the ESIA outcomes will inform the required management systems, procedures, plans and practices addressing the Project E&S risks and impacts, collectively known as Environmental and Social Management Plans (ESMP). Together, these documents will represent the Supplemental Lenders Information Package (SLIP).

1.2 Project Parties

The parties involved in Dama Project, their role and responsibilities are listed in Table 1-1 below.

Table 1-1 Project Parties

Responsible Party	Role	Responsibilities
Monsson	Project Developer	<ul style="list-style-type: none"> Local project developer Development of Project Design
Rezolv Energy	Project Owner	<ul style="list-style-type: none"> Development of Project Design Procurement of Project components Construction of the Project Operation of the Project
West Power Investments SRL	Dama Project Company	<ul style="list-style-type: none"> Project SPV
ERM	Independent international sustainability consulting firm engaged by Rezolv	<ul style="list-style-type: none"> Development of Scoping Report Development of the ESIA package
GREENVIROTIM SRL	Independent consulting firm from Romania sub-contracted by	<ul style="list-style-type: none"> Preparation of environmental permitting documents

¹ The Equator Principles is a risk management framework adopted by financial institutions, for determining, assessing and managing environmental and social risk in project finance.

Responsible Party	Role	Responsibilities
	Monsson to develop permitting documents	

1.3 ESIA Approach

1.3.1 Purpose of the ESIA

ERM was commissioned by West Power Investment (the Client) to undertake an ESIA of the Dama PV Plant located in Arad County, Romania.

The purpose of the ESIA is to inform the Client and their Project partners about the environmental and social impacts associated with the Project and in particular the extent to which the Project complies with the Equator Principles IV (2020), and aligns with the expectations of International Finance Corporation (IFC) Performance Standards (PSs, 2012) and associated World Bank Group Environmental, Health and Safety (EHS) Guidelines, and with EBRD Performance Requirements (PRs, 2019) set out in the EBRD's Environmental and Social Policy.

The ESIA will be prepared on the agreed scope of baseline data collection and impact assessment methodology.

1.3.2 Objectives and Scope of the ESIA Report

The main objectives of the ESIA are to:

- Identify Key Environmental and Social Impacts of the Project, including:
 - A detailed description of the Project and relevant Project alternatives;
 - A register of legislation, guidelines and strategies (both national and international) pertinent to the Project and associated ESIA;
 - A detailed baseline review of the physical, biological and socio-economic and cultural environments of the Aol and its surrounds;
 - The outcomes associated with stakeholder engagement activities carried out to date;
 - An assessment of impacts (both positive and negative) to the physical, biological and socio-economic environments related to the different phases (pre-construction, construction and operational phases) of the Project, in a manner consistent with the applicable standards;
 - Mitigation measures to anticipate and avoid risks and impacts, and associated management plans that aim to enhance positive impacts and to avoid / minimise / manage the severity of any negative identified impacts;
 - An assessment of cumulative impacts associated with other planned, existing or Project-related developments in the broader Aol;
- Develop an Environmental and Social Management Plan (ESMP) that will be put forward to avoid, minimize or compensate the negative aspects and enhance the positive aspects of the Project, as well as mechanisms for their implementation in the Project process, and to incorporate this ESMP into a workable Environmental and Social Management System (ESMS) for the Project,
- Ensure that ESIA documentation is aligned with the expectations of both national and EU legislation, the EBRD E&S Policy (2019) and the incorporated Performance Requirements (PRs), IFC Performance Standards (PSs) (2012), and the World Bank Group's Environmental, Health and Safety (EHS) Guidelines and EP4.

The ESIA has been developed based on the latest design update (April 2023), in addition to the collection of available data at the regional and local levels resulting from field visits and consultations with stakeholders, including local communities.

The scope of the baseline and impact assessment for Arad PV Plant are summarized in table below. Further details of impact assessment are identified and presented in section “Environmental and Social Impact Assessment”.

Table 1-2 Relevant Scope of Baseline and Impact Assessment

Topic	Scope of Work
Baseline Survey	
Environmental Baseline Studies	Obtain the physical environmental baseline information (e.g., air quality, underground and surface water quality, soil) for the AoI and its surrounds
Biodiversity Assessment	Determine the presence of IUCN Endangered or Critical Endangered species and endemic or restricted range species, Undertake an assessment of natural and modified habitats, Determine key biodiversity values, and Note any existing key threats to habitats and species
Socio-Economic Studies	Baseline Undertake stakeholder engagement, Complete a community survey, collect primary data and analysis
Stakeholder Engagement Plan	Determine any stakeholder identification and mapping previously undertaken, Determine stakeholder engagement/disclosure activities to date, including nature of information and the medium of disclosure, Establish how findings of stakeholder engagement have been included in the decision-making process, Establish any ongoing issues identified during stakeholder engagement that might have relevance for the Project.
Impact Assessment	
Air Quality	Emissions of NO _x , SO _x , PM, CO.
Water resources - Surface and Groundwater Quantity	Assess impacts on changes in groundwater levels and water availability, in the case of groundwater resources used for the Project
Water resources - Surface and Groundwater Quality	Assess impacts on changes to physical, chemical or biological quality of surface water bodies and groundwater resources and changes in habitat quality, abundance, diversity
Soil Environment	Assess impacts on changes to soil properties
Biodiversity	Habitat loss, damage and disturbance to fauna
Social Impact Assessment	Assess impacts on physical/economical displacement, economy and employment, occupational and community health and safety, infrastructure and public services, cultural resources
Glare and Glint	Impact on surrounding receptors including residents, road users, railway infrastructure (including train drivers) and aviation infrastructures (including pilots and air traffic controllers) due to the sunlight reflection produced by the PV modules surface (no PV module absorbs 100% the incoming light).

Mitigation measures	Mitigation measures that aim to enhance positive impacts and to avoid / minimize / manage the severity of any negative identified impacts
Cumulative Impact	An assessment of cumulative impacts associated with other planned, existing or Project-related developments in the broader Aol

1.3.3 Structure of the ESIA Report

The structure of this ESIA Report is as follow:

Table 1-3 ESIA Report Structure

Section	Contents
Section 1. Introduction	Presents a brief background to the Project, the ESIA process and the purpose and structure of the ESIA Report (this Report).
Section 2. Project Description	Describes the Project and associated activities during the pre-construction, construction, operation, and decommissioning phases. This section also discusses Project alternatives.
Section 3. Administrative Framework	Identifies and briefly describes the administrative and legal regulatory framework of the ESIA including the national Romanian environmental and social legislative requirements, as well as International best practice applicable to the Project. Also refer to licenses and permits already obtained for the Project.
Section 4. ESIA Approach and Methodology	Describes the ESIA approach and associated impact assessment methodology to be followed for the Project.
Section 5. Stakeholder Engagement	Summarises the Stakeholder engagement plan for the Project and outcomes associated with ESIA engagement.
Section 6. Project Baseline Conditions	Presents a brief overview of the receiving physical, biological and socio-economic environments of the Project Area and surrounds.
Section 7. Environmental Impact Assessment	Describes the potential environmental impacts that have been identified as part of the ESIA Study.
Section 8. Social Impact Assessment	Describes the potential social impacts that have been identified as part of the ESIA Study.
Section 9. Cumulative Impact Assessment	Determine if the cumulative impacts caused by the Project and other existing or predictable future projects would threaten the sustainability of valuable environmental component (VEC) in the area and presents mitigation measures to prevent unacceptable conditions of VECs.
Section 9. Summary of Impacts	Presents a brief overview of the interactions between the Project activities and various resources/receptors that could result in significant impacts
Section 10. ESIA Conclusion	Describes the potential impacts to the physical, biological and social environments as a result of the Project, and the mitigation measures to manage these impacts and reduce the significance of the impacts to a minor or negligible level.

Appendix A.	ESIA Scoping Report
Appendix B.	Climate Change Risk Assessment Report
Appendix C.	Surface Water Sampling and Analysis
Appendix D.	Biodiversity Baseline Report
Appendix E.	Critical Habitat Assessment Report
Appendix F.	Socioeconomic Baseline Study
Appendix G.	Cultural Heritage Gazetteer and Impact Assessment Details
Appendix H.	Cultural Heritage Locations
Appendix I.	Noise Impact Assessment Report
Appendix J.	Glare model results
Appendix K.	Cumulative Impact Assessment Report

1.3.4 Assumptions and Limitations of the present ESIA

This ESIA Report has been prepared by ERM with all reasonable skill, care, and diligence within the terms of the Contract with the Client and taking account of the resources devoted to it by agreement with the Client.

At the time preparing this ESIA, Project details are not fully available. Therefore, Cumulative Impact Assessment was conducted based on assumption of ‘worst-case’ estimates and assumption that Project sites, components and facilities are the latest design update.

Specific limitations and assumptions on this assessment are as follows:

- Environmental and social baseline data was collected from both desktop study and field observations during the time of writing this ESIA;
- ERM’s findings are accurate and complete only to the extent that information provided to ERM was itself accurate and complete.

The information provided in this Report is not to be construed as legal advice.

2. PROJECT DESCRIPTION

2.1 Project Overview

The Project involves the development of a 1044 MW solar PV plant, on approximately 1,064,5 ha of land in Arad County, Romania.

The Project team intends to adopt a dual-use land management strategy, with a particular emphasis on integrating symbiotic agricultural activities on the site to increase biodiversity, through partnership with local authorities and residents. The goal is to return to pasture use a large segment of the Project site.

The Project has ambitions to include an Education Centre with an integrated renewable energy museum, conference facilities, training, and education rooms, which will be built for the benefit of the local community and the surrounding villages and cities. The centre is expected to include environmental research and development equipment for weather forecast and analysis.

The Project footprint is located within Natura 2000 SCI and SPA protected sites *Câmpia Crișului Alb și Crișului Negru* (ROSPA0115) and *Nădab - Socodor – Vârșad* (ROSCI023).

The Project is expected to be one of the largest PV facilities in Europe, being able to power more than 350,000 households. The Project will not require displacement of individual or built structures and secured the land via voluntary lease or concession agreement.

2.2 Project schedule

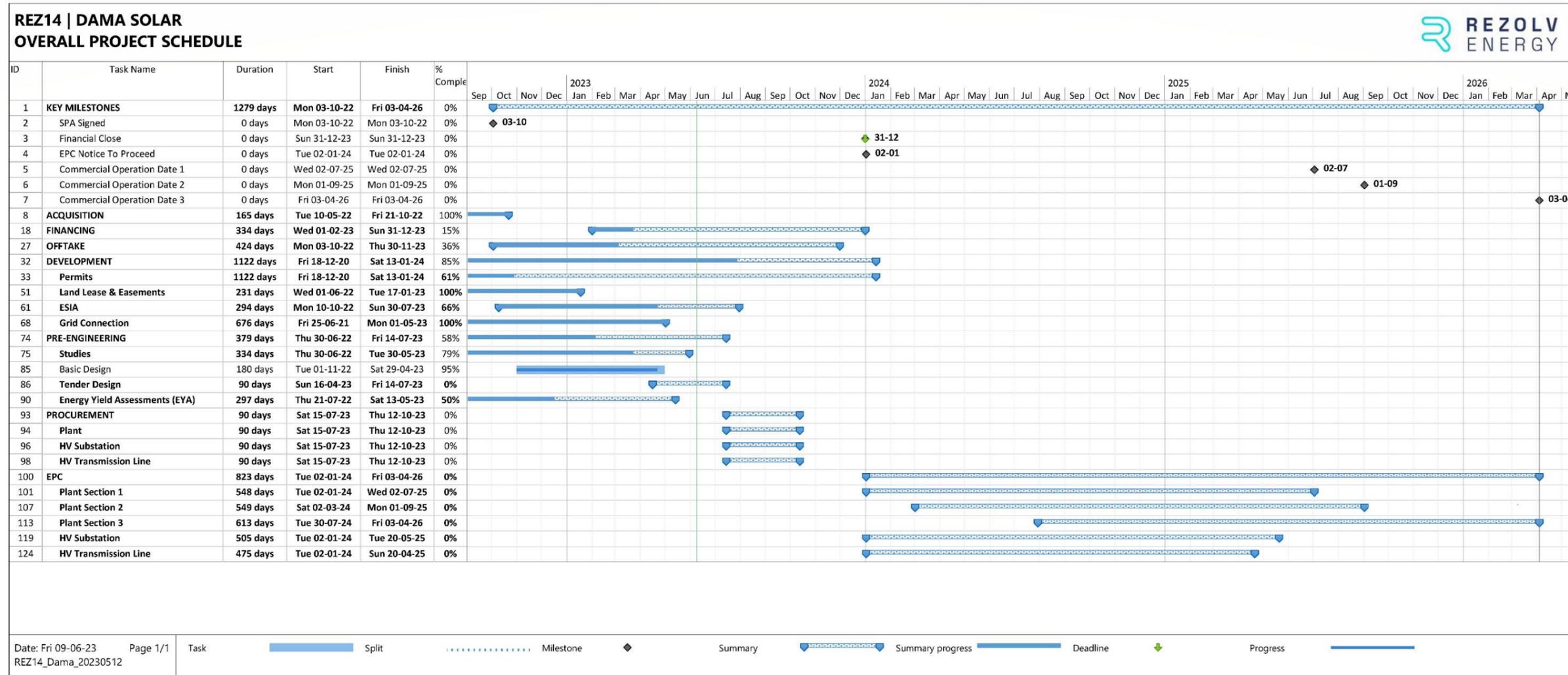
Project construction phase will take approximately 2.5 years and will be carried out in three stages, with the first section put into operation after 10 months from the start of the works.

Works are expected to start in 2024.

The estimated period of operation of the Project is at least 25 years.

A high-level Project schedule is provided in the table below:

Figure 2-1 Estimated Schedule for Project Implementation



Source: Rezolv Energy

2.3 Project location

The Project is located in Western Romania, in the North-Western area of Arad County, on the territory of Grăniceri and Pilu communes, at approximately 3.6 km east of the border with Hungary – see Figure 2-2 below.

Figure 2-2 Project layout



Source: ERM, using client data, 2023

2.3.1 Surroundings

The nearest settlements to the Project area are:

- Graniceri – 250 m west;
- Pilu – 2.5 km north-west;
- Siclau – 2 km south-east;
- Socodor – 2.7 km east;

The Project is located approximately 3.5 km East of the border between Romania and Hungary and the nearest Hungarian settlement, Elek, is located at approximately 4.3 km west of the Project site.

The Project site is relatively far from major urban areas and significant industrial pollution sources. The nearest industrial area is located 11 km east of the Project boundary, in Nadab. The industrial area comprises companies involved in warehousing and in the production of silicone tubes and food-grade plastic packaging.

2.3.2 Site access

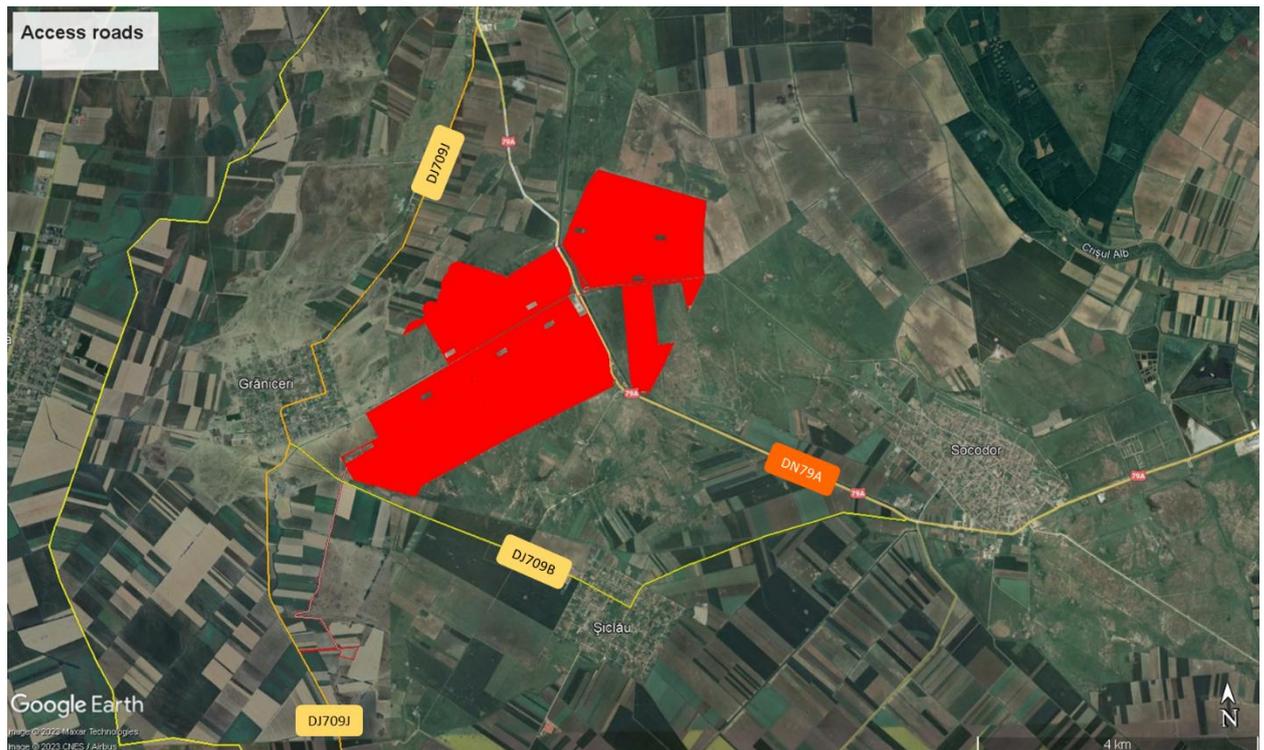
During construction, Dama Project will have two access points. The access point for the west part of the project is from road DN79A, located at coordinates 46°32'0.22"N, 21°21'38.34"E. The access point for the east side is located at coordinates 46°32'7.93"N, 21°23'7.08"E. The access points are indicated in the figure below.

Figure 2-3 Site access



The existing road network in the area of the Project is shown in the figure below:

Figure 2-4 Road network in the area of the Project



Source: ERM, using client data and Google Earth Pro

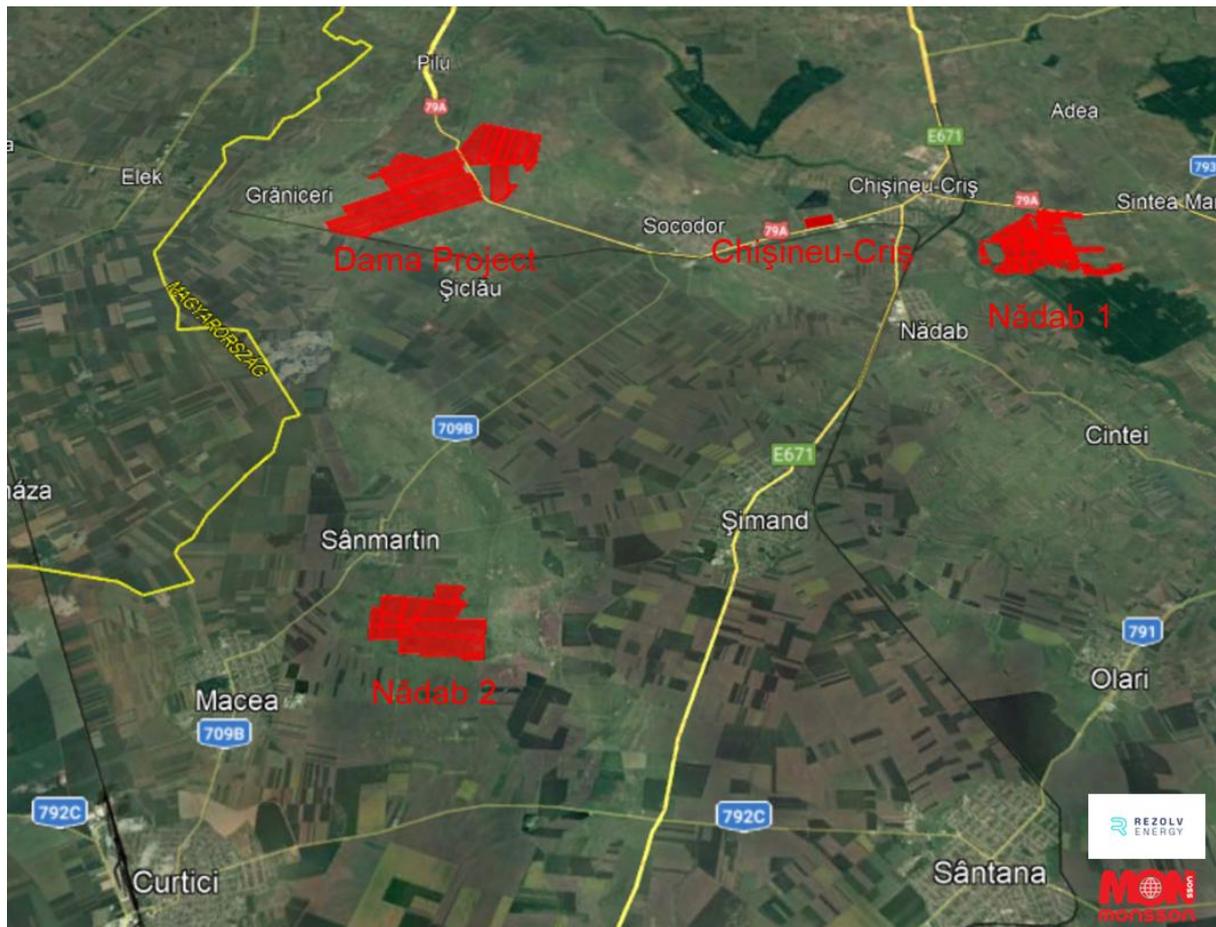
No Route Surveys have been done for the project at this stage.

2.4 Other Projects in the area

Two other photovoltaic (PV) projects are currently being developed by Monsson within an approximate 10 km radius – Nădab 1 and 2 (approx. 675 MW) and Chisineu-Cris PV (50 MW), as presented in Figure 2-5 below.

The projects are in different stages of permitting and could potentially be implemented on a similar timeline.

Figure 2-5 Other PV projects in the Area



Source: Monsson, edited by ERM, 2023

2.5 Key Project Components

2.5.1 PV Modules

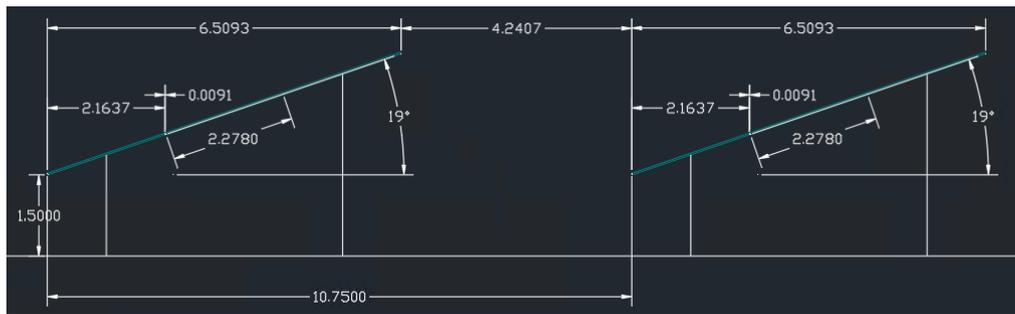
The principle of photovoltaic (PV) technology is based on the so-called photovoltaic effect, which brings about direct transformation of solar radiation energy into electrical energy. This effect occurs in semiconductor materials such as silicon (Si), the most common material used for the manufacturing of PV panels.

Currently the project design foresees the installation of bi-facial 580 Wp PV modules. The exact PV technology has not been communicated, however, it is assumed that the project will use the most widely used silicon-based mono- or polycrystalline PV technology; hence other PV technologies and materials such as Cd/Te-based thin-film PV modules are excluded in this report. The panels will have a multilayer anti-reflection film to increase the absorption.

2.5.2 Mounting Systems

The PV modules will be mounted on metallic or concrete-based fixed substructures between 1.5 m and 3.75 m above ground level. The panels will be tilted at 19° towards geographic south (the required orientation for PV systems in the northern hemisphere) as shown in the following figure:

Figure 2-6 PV modules mounting design



Source: Monsson, 2023

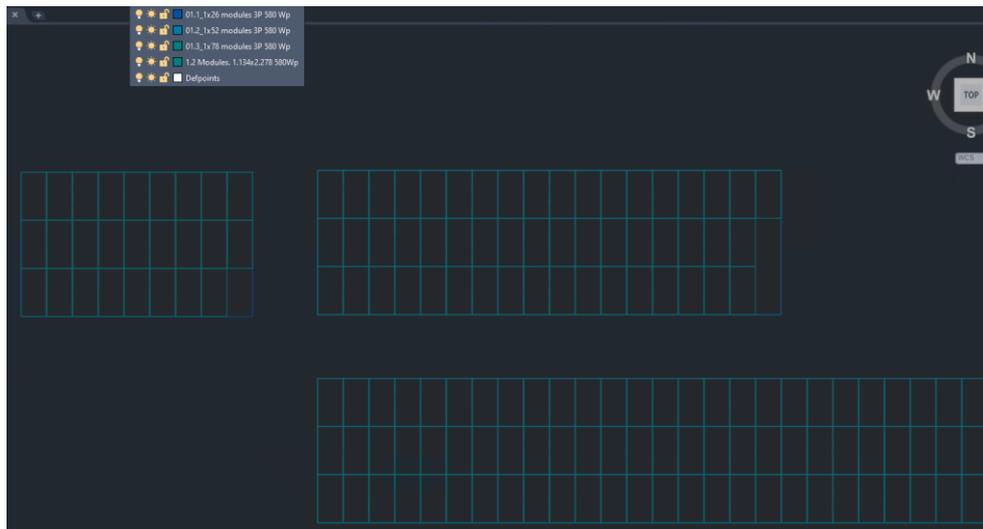
Currently, no tracking systems are foreseen for the project.

2.5.3 PV Plant Electrical Configuration

The PV plant will have an approximate capacity of 1,044 MW, divided in 9 Solar PV Groups of around 118 MW power each. Each group will include 24 electricity-producing basic units (blocks) of approximately 5 MW.

Electrical strings will have 26 modules each and will be mounted in substructure units of three different sizes according to the number of strings: one string (26 PV modules), two strings (52 PV modules) and three strings (78 PV modules), as shown in the figure below:

Figure 2-7 PV Substructure Sizes



Source: Monsson, 2023

2.5.4 Electrical Installation

The electrical installation of the PV plant will consist of the following main components:

2.5.4.1 Low voltage system (< 1 kV)

- DC circuits that will conduct the energy produced by PV modules into the inverters for conversion from DC to AC.
- AC circuits, which will allow the transmission of electricity from the inverters into the LV/MV substations.

2.5.4.2 AC / DC Inverters

Since PV modules generate direct current, for grid applications, solar inverters are necessary to convert the variable DC output of the PV array into alternating current (AC) at the utility frequency.

The inverter type to be installed is not decided yet but will be most likely string inverter with a capacity of 330-350 kW. The anticipated quantity of the inverters is approximately 3,300 pieces and they will be mounted under the PV structures.

2.5.4.3 Medium voltage system

- **LV/33 kV Transformer substations** that will raise the low voltage to medium voltage using LV/MV power transformers, with protective and switching auxiliary equipment.
- Network of **MV underground lines** transmitting the power collected from the LV/MV transformers into the **Step-up Transformer stations** 33/110 kV.

2.5.4.4 High voltage system

Each step-up transformer will be connected to the **Main 110/400 kV Transformer Substation**, containing the following:

- 110/400 kV Transformer/-s to raise the 110 kV voltage to the 400 kV grid voltage
- 400 kV line-transformer block cells equipped with circuit breakers, separators, voltage/current transformers, arresters, etc.;
- transformers for supplying internal services;
- generators for supplying internal services as backup sources; secondary circuit cabinets;
- earthing installation;
- lightning arrester installation;
- lighting installation, sockets, air conditioning and heating;
- security system;

2.5.4.5 Grid Connection Substation 400 kV

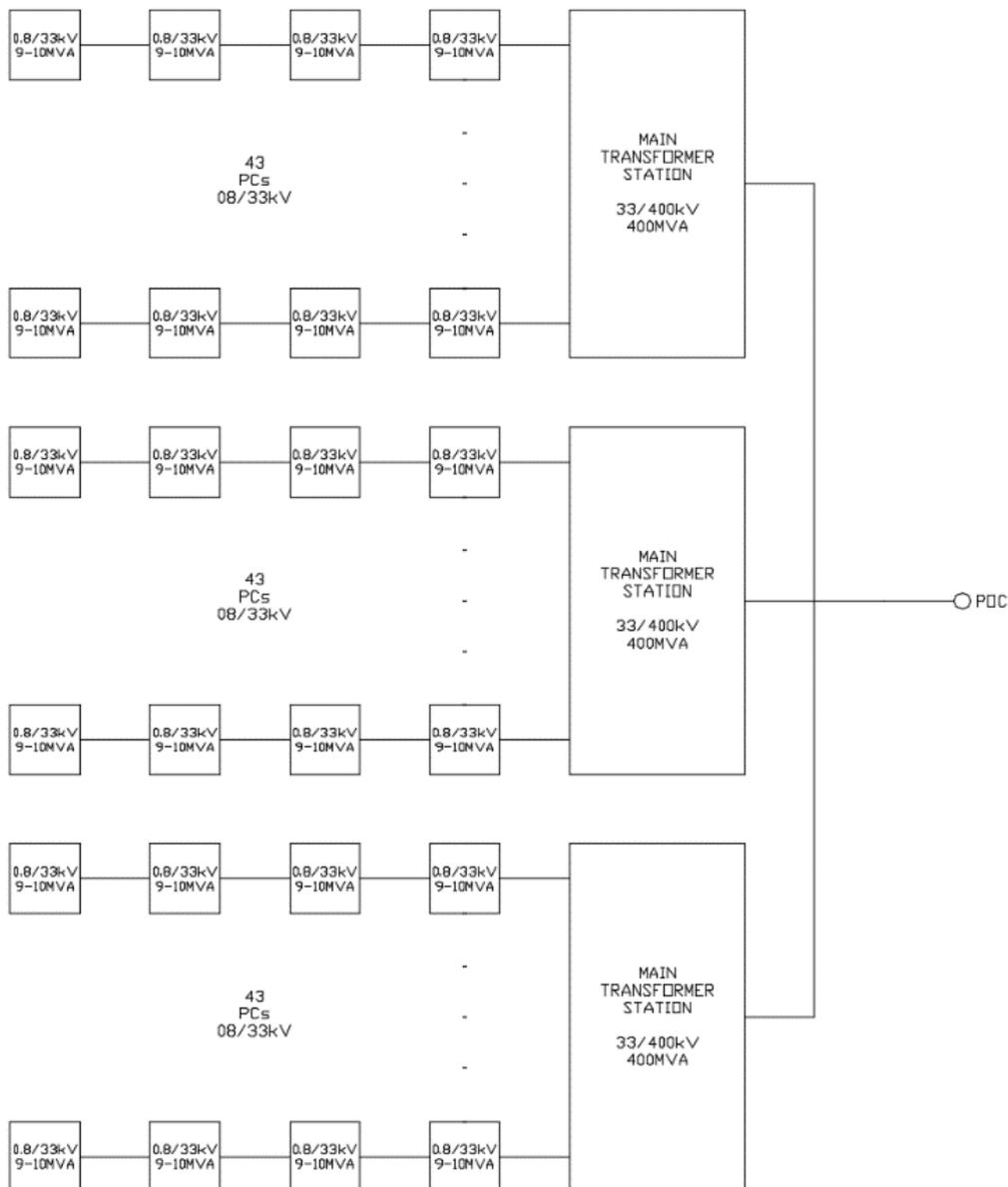
The new grid connection substation is to be constructed on a 0.3 ha of private land belonging to Grăniceri Commune, secured via a 49 year concession agreement.

The Project will be connected to the Nadab-Bekescsaba 400 kV high voltage overhead line operated by Transelectrica S.A., the Romanian Transmission System Operator (TSO), located approximately 2.5 km south of the Project PV plant area.

2.5.4.6 HV Cabling

- Summarizing, following underground HV cables will be installed:
 - 33 kV underground cabling from the 9 PV blocks to the 33/400 kV step-up substation;
 - 110 kV underground cabling from step-up transformers substations to the 110/400 kV main transformer substation
 - 400 kV underground cabling from the Main Transformer HV Station to the Grid Connection Station.
- The Project's electrical and network cabling will be installed along the internal roads, while the underground grid connection will mainly follow a route along existing local dirt roads.
- A block diagram providing information on the key Project components and the electrical configuration is presented in the figure below:

Figure 2-8 Project Block Diagram



2.5.4.7 Grid connection line

The Grid connection substation will be connected to the electrical grid by means of input-output system at the existing 400 kV OHL (Overhead Power Line) Nadab-Bekecsaba, which belongs to the transmission operator Transelectrica. The HV grid connection line will have a length of approx. 3.6 km and will be installed underground, meaning this that after laying the cables, the land will be brought to its original state.

2.5.5 Security Installations

2.5.5.1 Fencing

Based on consultation with neighboring landowners and local authorities, fencing is likely to be installed along specific Project site boundary sections. Site limit sections to be fenced were determined in response to requests by landowners of agricultural plots to the north and west of the Project to prevent the sheep grazing on the Project area from entering their crops.

According to the technical documentation provided, the fence will consist of panels or mesh, fixed on pipe poles, with a foundation. Between the lower part of the fence and the ground a space of 20 cm will be left free to allow the free movement of terrestrial fauna. At the top it will be provided with 3 rows of barbed wire. The pedestrian access gates will be made of pipes with fence panels. The height of the fence will be about 2.5 m for mesh panels and about 25 cm for wire barbed. The fencing will not be electrified.

2.5.5.2 Video Surveillance

A video surveillance system, consisting of outdoor IP video cameras mounted on lighting poles will be installed. The communication between the video cameras and the network recorder will be done via communication cables. The network recorder can be placed in the substation building or in a separated control room. Foundations designed for lighting poles will be made of reinforced concrete.

2.5.6 Project Internal and External Roads

2.5.6.1 PV Plant Internal Roads

Internal Project roads will comprise newly built roads and existing dirt tracks that will be rehabilitated as needed. The existing dirt tracks are located along the drainage channels present on-site. Bridges over the waterways and culverts will be upgraded as required.

The sizing of the newly proposed roads inside the park will be established according to the technical requirement of the equipment to be used, being their width at least 4 meters and the radius of curvature at least 5 m. In front of each substation the road will be widened, forming a mounting platform appropriate for cranes.

2.5.6.2 External access roads

Agreements were concluded with the Local Councils of Graniceri, Pilu and Socodor communes for consolidation of commune and agricultural roads for site access to the PV and substation area as follows:

- For the access routes from Socodor village (Socodor commune) to the SE part of the PV area for communal road and six exploitation roads (DE158/1; DE 177/1; DE 502/1; DE 325/5; DE 249; DE 323/1;
- For the access from county Road DJ 709J in Graniceri village to the substation area, for communal road DE 553/1 for a total surface of 8,961 m² to be temporarily used.

2.5.7 Arad Project Administrative Center

The Project plans to develop several facilities within the compound of Agricola Graniceri Managing SRL premises for a range of activities and functions during project development, as detailed below.

The land acquisition and detailed planning of this area is to be done when the EPC contractor will be engaged.

During construction phase, the area will serve as:

- Project Management Office
- Public Information Desk
- Education & Training Center
- Recruiting and Hire Office
- Press and Marketing Desk
- Storage & Logistic Desk

- During operational phase, the area will serve as:
- Administration Office
- Operations Center
- Education & Training Center
- Community Center for Public & Conferences
- Press & Marketing & Public Information Desk
- Spare parts storage area

The proposed layout of the Administrative Center is presented in Figure 2-9 below:

Figure 2-9 Administrative Center proposed layout



Source: Monsson, edited by ERM, 2023

2.6 Project Phases

2.6.1 Construction

The Project will use the existing Agricola Graniceri (local agriculture company) premises for a range of activities and functions during project development, including site organization and laydown areas.

The organization of the construction site in the Project area consists in the temporary arrangement of a space for the office containers, materials storage space, car parking, as well as the supply of utilities: electricity, drinking water, sanitary water, waste storage area, equipment space, lighting, security, etc.

Main construction activities will comprise:

- Contractors mobilisation;
- Site preparation including fencing, vegetation clearing, levelling and grading;
- Construction/rehabilitation of internal roads and temporary facilities;
- Installation of substructures and PV modules;
- Installation of inverters and transformer units;
- Erection of main HV substation
- Trenches excavation and cable laying;
- Execution of the grid connection transmission line;

2.6.1.1 Site access

During construction, Dama Project will have two access points.

The access point for the west part of the project is from road DN79A, located at coordinates 46°32'0.22"N, 21°21'38.34"E. The access point for the east side is located at coordinates 46°32'7.93"N, 21°23'7.08"E. The access points are indicated in the figure below.

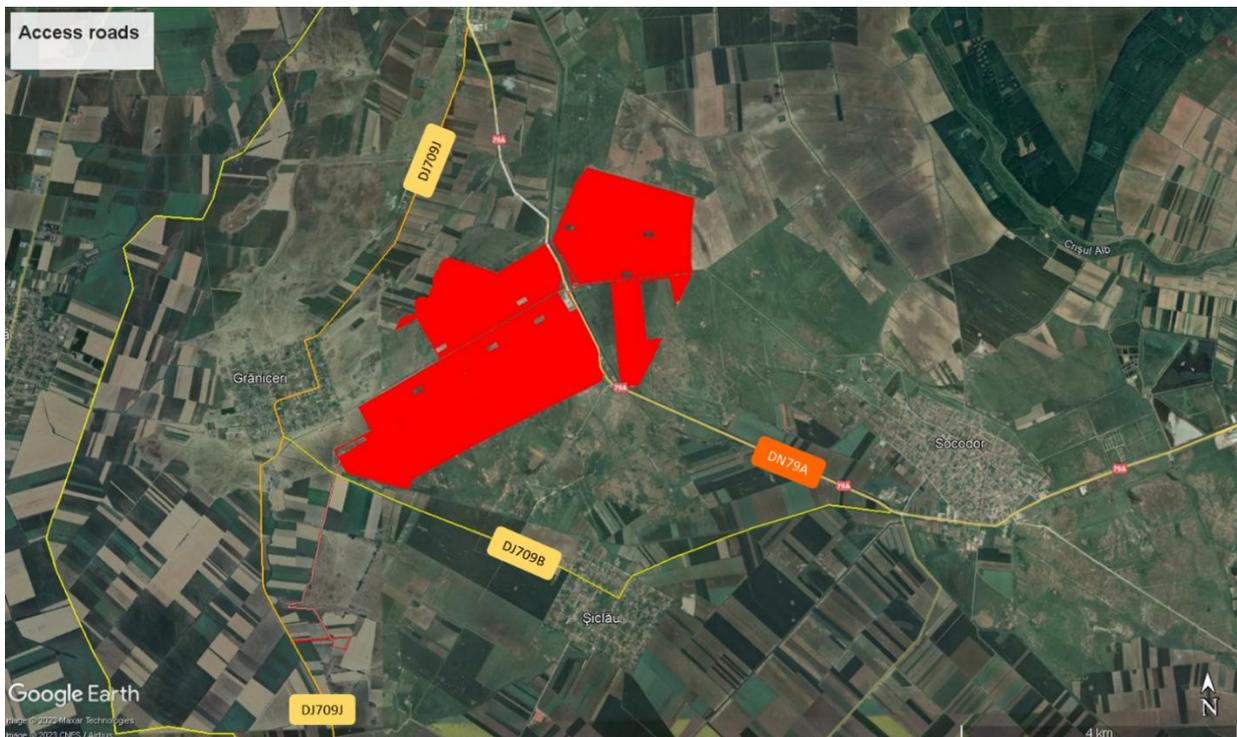
Figure 2-10 Project access points



Source: ERM, using client data and Google Earth Pro

The existing road network in the area of the Project is shown in the figure below:

Figure 2-11 Project access roads



Source: ERM, using client data and Google Earth Pro

No Route Surveys have been done for the project at this stage.

2.6.1.2 Construction aspects related to dual use

Careful consideration has been given to the future land management strategy of the Project during operation, which will aim to integrate symbiotic agricultural activities on the site. The design of the Project incorporates design / construction embedded measures that allow dual use during operation:

- Fencing will not be electrified
- Internal cabling are underground

According to the permitting documentation submitted to the regulator, a minimum of 20% of the project area will be maintained as green areas.

2.6.2 Operation

2.6.2.1 Operation of PV Plant

The PV Plant will include a space for storing equipment and an operation and maintenance center including office spaces, sanitary and other facilities for the operation and maintenance staff.

PV plant vegetation control is intended to be by means of sheep grazing by local farmers.

2.6.2.2 Dual use during operation

The Project team intends to adopt a dual-use land management strategy, with a particular emphasis on integrating symbiotic agricultural activities on the site to increase biodiversity, through partnership with local authorities and residents. The long-term goal is to return to pasture use a large segment of the Project site.

The dual-use land management strategy will be developed and implemented during the operational phase.

2.6.3 Decommissioning

Project lifetime has not been established yet, but is expected to be 25 year or more.

As part of the Project decommissioning, the site will be reinstated as pasture land.

When the beneficial life of the Project facilities comes to an end a detailed Decommissioning Plan will be prepared in line with the technology available at the time to guide the execution of the decommissioning works. The Decommissioning Plan will be developed in consultation with the relevant regulatory authorities and will be fully compliant with legislation and Good International Industrial Practice (GIIP) in place at the time.

2.7 Resource Requirement

2.7.1 Land requirements

The Project is not associated with physical displacement of people or built structures and the land was secured via voluntary agreements, as described below.

2.7.1.1 Land required for the PV area

The PV area will be located on a compact area of 1,061 ha of land privately owned by SC Agricola Graniceri Managening SRL, the agri-company. This area was secured via the Superficies Agreement no. 1253/ 09.10.2021 signed for a 33 years period, with the possibility to extend by the decision of both parties.

Payments started from the start of the agreement and the land owner has the right to continually farming the land until notified start of construction. The agreement includes compensation for lost crops based

on expert valuation, in the case the start of work will happen prior to harvest. The company activities continued uninterrupted in 2022/23 year, but no further land cultivation activities are scheduled past the harvest in summer 2023.

The big majority of the PV area is low-quality arable land, being 1.8% unproductive land. The PV area belongs 87% to the Graniceri Commune (924.53 ha) and 13% to the Pilu Commune (136.61 ha). The table below shows the Land Registry plot allocation.

Table 2-1 PV Area land plots per commune

Administrative Teritorial Unit (ATU)	Surface (ha)	Land registry No.
Graniceri	76.4047	302721
Graniceri	51.9631	302722
Graniceri	35.5522	302723
Graniceri	258.1892	302724
Graniceri	139.7997	302725
Graniceri	254.7818	302727
Graniceri	29.8100	302807
Graniceri	63.9700	302808
Graniceri	7.7300	302809
Graniceri	1.9500	301862
Graniceri	4.3800	300374
Pilu	136.6177	304045
TOTAL	1061.1484	

2.7.1.2 Land required for the Grid Connection Substation and the underground 400 kV connection line

The grid connection for the Project consists of an approximately 3.6 km underground 400 kV line, at 1.2 m depth, and a new 400 kV substation located on 3.3 ha plot, all located on land owned by Graniceri Commune.

The grid connection line is to be developed on a limited area of pastureland along the existing agricultural/ technological roads, railway and drainage channels crossings and County road DJ709B (Graniceri – Siclau), in line with national permitting requirements. The agricultural road DE 553/1 connecting the substation to County Road DJ709J will be consolidated.

The total surface required for the works is 5.6361 ha, comprising:

- 1.44 ha – total surface affected by the underground transmission line, to be temporarily affected during construction;
- 0.9 ha – total surface affected by the required upgrade works to DE 553/1;
- 3.3 ha – surface permanently occupied by the 400kV substation.

For the new Substation, a 3.3 ha land plot was concessioned for a 49-year period and for a royalty to be paid from the start of the concession agreement, which will double when construction starts and the land is accessed. Additional to that, a 189 sqm surface was purchased from the Commune for the purposes of the grid connection and further 0.5 ha were additionally secured via Right of Use and Servitude Agreements – see Table 2-2 for details.

The land plots for the underground grid connection line are owned by Grăniceri Commune and were secured via land concession contract and respectively use and servitude agreements, in line with Law

No. 123 of 2012 On Electricity and Natural Gas (updated), free of charge². According to the Article 14 of the Law, the right of use on the land for the execution of the works necessary for the realization / relocation/ cancellation or refurbishment of energy capacities extends for the duration necessary for the execution of the works.

According to the Law, damaged crops will be compensated, and the land will be reinstated at the conclusion of the works.

Table 2-2 Land secured for the Grid Connection substation and transmission line

Land registry No.	Type of contract	Type of use	Surface (ha)
301896	Concession contract 1985/05.08.2021. Yearly payment from the moment the concession is signed	permanent	3.3000
304187	Right of Use and Servitude Agreement - decision of Graniceri Local Council 11/ 30.01.2023 for E-Distributie Banat. Free of charge.	temporary	0.4800
Plot 324/15	Right of Use and Servitude Agreement - decision of Graniceri Local Council 10/ 30.01.2023 for E-Distributie Banat. Free of charge.	temporary	0.0156
304093	Right of Use and Servitude Agreement no.409/24.03.2022	temporary	0.68
304094		temporary	44.6968

2.7.1.3 Land required for roads consolidation

Free-of-charge use contracts for the upgrade of agricultural and communal roads of Graniceri, Pilu and Socodor exploitation and communal roads were signed with the three communes as follows:

- Contract signed with Socodor Commune on 04.04.2022 for consolidation of exploitation roads connecting from National Road DN79A via communal roads in Socodor village and agricultural roads connecting to the SE entry of the park;
- Contract signed with Graniceri Communes on 24.03.2022, including consolidation of access road to the substation area via County Road DJ 709J and consolidation of agricultural roads connecting the grid connection substation to PV area, along which the underground transmission line will be installed.
- Contract signed with Pilu Commune on 24.03.2022 – no roads currently considered for consolidation and site access.

Road consolidation works required are to be confirmed as route surveys are determined in the next stages of Project development.

² Note: Art 12, paragraph 4: The exercise of the rights of use and easements on the state properties and of the administrative territorial units affected by the energy capacities shall be carried out free of charge, throughout their existence

2.7.1.4 Land required for the Project Administrative Center

The land required for the Project Administrative Centre is owned by Agricola Graniceri Managing SRL and is still to be secured.

2.7.2 Workforce and workers' accommodation

According to information provided by the Client, the Project will employ approximately 500 workers during construction, with up to 50 people required to ensure operational maintenance of the PV Plant.

A worker camp is not planned for the Project and no further information was provided by the Client in respect to worker accommodation.

2.7.3 Water use and management

As the final design is still in progress, and an EPC contractor has not yet been appointed, specific details about water usage and sourcing are not available at this time.

The EPC contractor would be required to obtain water during construction from a legal source, with consumption measurements and reporting in place. Typical water uses during the construction phase include: water for concrete, cleaning, damping gravel road, clearing main roads.

During construction and operation, drinking water will be supplied to the site in bottles.

Sanitary wastewater generated on-site will be collected in mobile sanitary units and collected by certified wastewater disposal companies.

Once the operation stage begins, dry cleaning methods will be employed for the panels to avoid any potential soil contamination or water-related issues.

The National Agency for Land Improvements (ANIF) is operating the two drainage system pumps located near the cereal storage facility of Agricola Grăniceri. When needed, the company liaises with the local authority and ANIF for turning on the pumps; water is evacuated in Canalul Morilor. Secondary channels are under the management of the local authorities. Dama Project will contract ANIF to maintain the waterways and possibly upgrade the pumping stations.

2.7.4 Power

2.7.4.1 During Construction:

The project will use the power connection of the existing Agricola Graniceri compound.

2.7.4.2 During Operation:

The Project will be connected to the Nadab-Bekescsaba 400 kV high voltage overhead lines operated by Transelectrica S.A., the Romanian Transmission System Operator (TSO), located approximately 2.5 km south of the Project PV plant area.

Technical connection approvals and Interconnection Agreements for the Project have been obtained from TSO.

The Main Transformer Station will be equipped with transformers for supplying internal services.

2.7.5 Raw materials

■ Estimates on raw materials needed during construction and operation and how they will be supplied to the plant (e.g., road, rail, air travel) are to be discussed with the EPC Contractor, once they are selected.

2.7.6 Fire safety and security

Security is likely to be locally sourced. The ESMS will document fire safety and security requirements for the Project.

2.8 Associated facilities

Associated facilities are defined by IFC as *'facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.'*

Based on the above definition, the project has no associated facilities.

2.9 Project Alternatives

2.9.1 'No Project' Alternative

Dama PV plant, as a power-generation Project based on renewable resources, will provide public benefits safeguarding the increasing energy demand of the country while reducing energy dependency.

The "No Project Alternative" assumes that the 1044 MW solar PV plant will not be developed, hence the Project site area would remain the same, with its current characteristics. In this scenario, the Project related negative environmental and social impacts, anticipated in this ESIA report, would be avoided.

However, in the "No Project Alternative", the following positive impacts would be missed:

- The Project will contribute on decreasing power outages within the area, as it is expected to be the largest PV project in Europe and power 350,000 households.
- The Project will have a dual-use land management strategy, with a particular emphasis on integrating symbiotic agricultural activities on the site to increase biodiversity and return a large segment of the Project site to pasture use at the end of project lifecycle. In the "No Project" scenario, no such action will be implemented and agricultural exploitation will continue.
- The socio-economic benefits such as indirect local (local villages and cities) scale social benefits and subsequent employment opportunities due to the Project team's plan to develop an Education Centre with an integrated renewable energy museum, conference facilities, trainings, education rooms including environmental research and development weather equipment. With the "No Project Alternative", the community will not benefit of such socio-economic advantages.
- The Project will contribute to decreasing the annual carbon intensity of the country each year it will remain in operation.

In the absence of the Project, the identified potential environmental and social impacts that are to be managed properly throughout Project's life would not take place. However, above mentioned benefits associated with the Project would not be achieved either.

2.9.2 Alternative site selection

2.9.2.1 Alternatives to grid connection

The developers have analysed the existing electrical network in the proximity of the project area and have identified two electrical installation of 400 kV which could be connected to the Project:

- Nadab- Bekescsaba 400 kV d.c. aboveground electric line, located approximately 2.5 km from the project site boundary;
- Nadab 400 kV connection station, located approximately 15.5 km from the project site boundary.

The former alternative (Nadab- Bekescsaba 400 kV) was chosen due to proximity to the site.

2.9.3 Alternative Technologies

2.9.3.1 Alternatives for plant vegetation control

Careful consideration has gone into designing a suitable and feasible solution for PV plant vegetation control. Tall vegetation growing around solar installations can create shading that reduces the functionality of the system and is a potential fire hazard. The alternatives considered by the project developers were:

- Contracting a specialized maintenance company for managing vegetation growth (e.g. by manual weeding, spraying herbicides);
- Contracting local farmers to access the PV area with their sheep herds, for grazing.

It is likely that a combination of the above methods will be required to ensure the vegetation control of the entire PV plant area.

The shared use of the PV Plant footprint allowing on-site sheep grazing will likely be favorably received by the local community. Sheep grazing at the area is not currently possible as the area is in agricultural/arable land use since 2005.

Sheep-based agrivoltaics are becoming an established practice in the industry.

3. ADMINISTRATIVE AND LEGISLATIVE FRAMEWORK

This Section details the national and international legislation and good practice requirements for the Project. National laws deemed relevant for the successful implementation of all environmental and social components of the Project are introduced here. Furthermore, this Section lists the environmental and social requirements of the EBRD Environmental and Social (E&S) Performance Requirements (2019), the IFC Performance Standards on Environmental and Social Sustainability (2012) (the IFC PS), the associated General & Industry Specific Environmental, Health and Safety (EHS) Guidelines, and how the Project relates to these requirements.

3.1 National Policy, Legal and Administrative Framework

3.1.1 Institutional Framework

The administrative structure in Romania is governed by central and local administrations. The Romanian President is elected for a five-year representative, for maximum two terms. The Romanian Parliament is bicameral consisting of the Chamber of Deputies (Camera Deputaților) composed of 330 directly elected deputies and the Senate (Senatul) composed of 136 directly elected senators. Both chambers have a four-year term.

The Government is the public authority of executive power that functions based on the vote of confidence granted by Parliament, ensures the achievement of the country's domestic and foreign policy and that exercises the general leadership of public administration. The Government is appointed by the President of Romania based on the vote of confidence granted to the Government by Parliament³. The Prime Minister leads the Government and coordinates the activities of its members, in compliance with their legal duties. The working structure of the Government is composed of the Prime Minister's Office, Secretariat - General of the Government, departments and other similar organizational structures with specific tasks set by Government Decision.

Framework Law no. 195/2006 on decentralization, revised by Government Emergency Ordinance no. 42/2016, establishes the principles, rules, and institutional framework, which regulates the administrative and decentralization process and establishes own and shared competencies for the different levels of government.

The 41 counties of Romania and the city of Bucharest are governed by the council president and the elected county councillors, while the central government appoints a prefect in each county. The role of the prefect is to represent the central authority (the government) at local level, with the power to oppose and block local authorities' unlawful or unconstitutional actions.

At municipality and commune level, the government structure consists of elected Mayors and Local Councils. There is no further representation at village level, all executive decisions are taken at commune level. Local councils and Mayors for municipalities and communes are also elected for a four-year representative. According to the Constitution, Romanian territory is organized administratively into Counties (in Romanian "Județe"), at the intermediate level, while Communes, Towns and Municipalities (Cities) form the local administrative level. The status as Municipality ("Municipiu" in Romanian) is given to larger towns, but it does not give their administrations any greater powers. Below communal or town level, there are no further formal administrative subdivisions. However, communes are divided into villages (which have no administration of their own).

3.1.2 National Regulatory Framework

The environmental legal framework within Romania (Law no. 137⁴ which came into force in 1995) contains overarching laws covering such areas as environmental protection, water, waste, nature protection, noise protection, air quality and cultural heritage, which transpose the main obligations of

³ Source: Romanian Government website <https://www.gov.ro/en/government>

⁴ [LEGE 137 29/12/1995 - Portal Legislativ \(just.ro\)](#)

particular EU Directives. In addition, the Law on Integrated Prevention and Pollution Control (IPPC) is fully aligned with the Council Directive 96/61/EC concerning integrated pollution prevention and control ("IPPC Directive").

With regards to social aspects, there are national laws covering health protection, occupational health & safety, labour relations, occupational safety, employment, social protection, land Acquisition, cadastre etc.

The main environmental regulatory instruments relevant to the proposed Project and that will need to be considered as part of the ESIA process for the Project are outlined in table below:

Table 3-1 Relevant National Legislation

Law	Number	Description	Relevance
Environmental			
<i>Law on Environmental Protection</i>	137/1995	Makes a reference to the Environmental Impact Assessment (EIA) as a means for the protection of natural resources.	EIA shall be an integral part of the technical documents; the Project execution cannot commence if the EIA procedure is not properly implemented.
<i>Law on Environmental Impact Assessment</i>	292/2018 ⁵	<p>Defines the procedures for the identification, assessment, and reporting of the environmental impacts of certain proposed projects and associated administrative procedures, required for the decision-making process on <i>issuing the Environmental Consent by the Ministry of Environment</i>.</p> <p>The major provisions set out in the Law include:</p> <ul style="list-style-type: none"> - Principles and strategic elements that are the basis of further environmental legislation; - Right to access information on environmental quality; - Right to information and consultation in decision-making of the public; - Establishment of liabilities regarding environmental quality rehabilitation; - Management regime for hazardous chemicals, wastes, fertilizers, and pesticides; - Protection of natural resources and biodiversity conservation; - Protection of water and aquatic ecosystems; 	The Law defines the following EIA phase.

⁵ Source: Romanian Legislative Portal [LEGE 292 03/12/2018 - Portal Legislativ \(just.ro\)](https://www.lege.ro/leges/292-2018)

		<ul style="list-style-type: none"> - Protection of the atmosphere, climate change, management of environmental noise; - Protection of soil, subsoil and terrestrial ecosystems - Protection of human settlements; - Prerogatives and responsibilities of the environmental protection authorities, central and local authorities, natural and legal persons; - Right to appeal to the administrative or judicial authorities. 	
<i>Law on Waters</i>	107/1996 ⁶	<p>Stipulates Good surface waters and Groundwater chemical status - the chemical status required to meet the environmental objectives for surface waters and does not exceed environmental quality standards.</p> <p>Sets a requirement for any interventions aimed to improve, rehabilitate, and maintain the water status to be aligned with plans for management of river basins.</p>	Define the need for classification of surface and ground water.
<i>Law on Ambient Air Quality</i>	104/2011	<p>Transposes EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe into national law.</p> <p>The law aims to protect human health and the environment as a whole by regulating measures aimed at maintaining or improving ambient air quality.</p>	Sets out methods and criteria, established at the European level, for the assessment of air quality and provides limit values for pollutants.
<i>Law on Nature Protection</i>	49/2011 amending 57/2007 ⁷	<p>Law on the regime of natural protected areas, the conservation of natural habitats, wild flora and fauna, amends the previous comprehensive Government Emergency Ordinance 57/2007.</p> <p>Establishes a national ecological network of protected areas.</p>	Regulates that an assessment of impacts deriving from plans / measures / interventions on conservation goals and integrity of the ecological network is compulsory.
<i>Law on Waste</i>	92/2021 ⁸	<p>Government Emergency Ordinance 92/2021 replaces Law 211/2011 on the waste regime (repealed), and ensured transposition into Romanian legislation of the new EU Waste Directive 2018/851.</p>	Ensures a high level of protection of the environment and of the health of the population through the institution of measures:

⁶ Source: Romanian Legislative Portal [LEGE 107 25/09/1996 - Portal Legislativ \(just.ro\)](#)

⁷ Source: Romanian Legislative Portal [OUG 57 20/06/2007 - Portal Legislativ \(just.ro\)](#)

⁸ Source: Romanian Legislative Portal [ORD DE URGENTA 92 19/08/2021 - Portal Legislativ \(just.ro\)](#)

			prevention and reduction of waste generation and management, reduction of the adverse effects and of the general effects determined by the use of resources.
<i>Law on Noise Protection</i>	121/2019 ⁹	Law on the assessment and management of ambient noise.	Sets obligation for developing measures to reduce noise emitted by the major sources, in particular road and rail traffic aircraft, outdoor and industrial equipment, mobile machinery and other sources of environmental noise pollution and annoyance.
Social			
<i>Law on Road Traffic Safety</i>	195/2002 ¹⁰	Government Emergency Ordinance 195/2002 on traffic on public roads, with several amendments and additions, was republished as Law 49/2006.	Regulates the rules and behaviour of participants in the traffic, signalisation, drivers` licensing, vehicles` public safety and maintenance etc.
<i>Law on Cultural Heritage</i>	422/2001 ¹¹ 26/2008 ¹² 451/2002 ¹³	Law 422/2001 amended several times, provides that historical monuments are immovable assets, constructions and lands located on the territory of Romania, significant for national and universal history, culture and civilization.	Regulates the scope of Cultural Heritage regarding preservation, protection, public access, communication, and provision of necessary resources in order that the heritage is enjoyed by current generations and forwarded to future generations.
<i>Law on Labour</i>	53/2003 ¹⁴	Partially amended by several laws and republished. Stipulates that: discrimination is prohibited in employment and occupation in respect of recruitment, training, promotion of employment, terms and conditions of employment, disciplinary measures, cancellation of the contract of employment or other matters arising out of the employment relationship and regulated by Law and other Laws into force.	Regulates the rights and obligations deriving from employment. Provisions of the Collective Contract, Employer's Internal Act and Labour Contract shall be in compliance with the provisions of this Law.

⁹ Source: Romanian Legislative Portal [LEGE 121 03/07/2019 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/lege/121-03-07-2019)

¹⁰ Source: Romanian Legislative Portal [OUG \(R\) 195 12/12/2002 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/oug/195-12-12-2002)

¹¹ Source: Romanian Legislative Portal [LEGE 422 18/07/2001 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/lege/422-18-07-2001)

¹² Source: Romanian Legislative Portal [LEGE 26 29/02/2008 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/lege/26-29-02-2008)

¹³ Source: Romanian Legislative Portal [LEGE 451 08/07/2002 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/lege/451-08-07-2002)

¹⁴ Source: Romanian Legislative Portal [CODUL MUNCII \(A\) 24/01/2003 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/codul-muncii/a/24-01-2003)

<p><i>Law on Occupational Safety and Health at Work</i></p>	<p>319/2006¹⁵</p>	<p>Law on Occupational Safety and Health at Work, amended by Law 198/2018 and Law 208/2021.</p> <p>The objective of the Law on Occupational Safety, Health and the Working Environment is to prevent occupational injuries and diseases at the workplace and to protect the working environment.</p>	<p>Sets measures for improving occupational the safety and health of employees.</p> <p>General principles for prevention of occupational hazards, elimination of hazardous and accidents factors, information, consultation, balanced participation in improving the occupational safety and health, treatment of employees, their representatives, and general guidelines for implementing such principles.</p>
<p><i>Law on Cadastre</i></p>	<p>105/2019¹⁶</p>	<p>Law on the amendment and completion of the Law 7/1996 on cadastre and real estate advertising, and which amends and completes Law 18/1991 on land.</p>	<p>The Law regulates the Cadastre of immovable property, national and cadastral surveys, geodesic and cadastral works as well as acquisition, registration, record keeping, maintenance and use of cadastral data.</p> <p>Immovable property – specific part of the land surface, which has boundaries (land, natural objects affixed to the land, business buildings, residential buildings etc.).</p>
<p><i>Law on Property and other al Rights</i></p>	<p>185/2018¹⁷</p>	<p>Law for approval of Government Emergency Ordinance 31/2018 on the amendment and completion of cadastre and real estate advertising Law 7/1996.</p>	<p>The Law governs the creation, content, transfer, protection, and termination of real rights. It also regulates ownership and, as limited real rights, possession, real security rights and real rights of use.</p>

Source: ERM 2023

3.1.2.1 Details of applicable Romanian Environmental Legislation

Engagement for the Environmental Impact Assessment in Romania

Following the approval of the Urban Zoning Plan and as a pre-condition to obtaining the Construction Permit for the Project, an Environmental Impact Assessment (EIA) needs to be undertaken in line with the requirements of Law 292/2018, which is aligned with the requirements of the EU EIA Directive 2014/52/EU.

¹⁵Source: Romanian Legislative Portal [LEGE 319 14/07/2006 - Portal Legislativ \(just.ro\)](https://www.legislativ.ro/legislativ/legge/319-14-07-2006)

¹⁶ Source: Romanian Legislative Portal [LEGE 105 17/05/2019 - Portal Legislativ \(just.ro\)](https://www.legislativ.ro/legislativ/legge/105-17-05-2019)

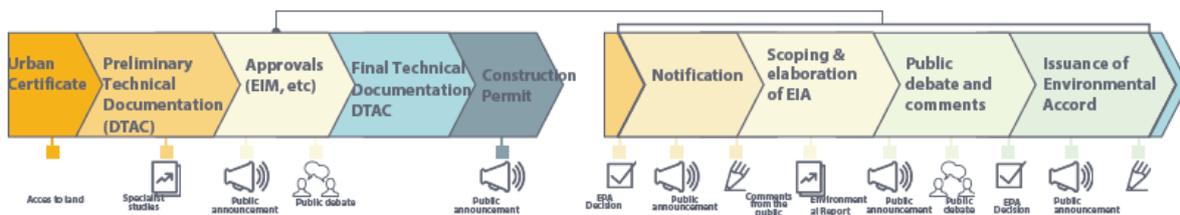
¹⁷ Source: Romanian Legislative Portal [L_185_2018.pdf \(anaf.ro\)](https://www.anaf.ro/legislativ/legge/185-2018)

The procedure is run by the central environmental authority (National Environmental Protection Agency) in line with article 19 of Government Emergency Ordinance no. 195/ 2005, approved with amendments by Law 265/ 2006, subsequently amended. The EIA procedure will require public participation similarly to the SEA procedure in alignment with the following requirements:

- The submission of the application documents (firstly, Notification and then, Presentation Memorandum) for Project approval by the owner needs to be disclosed publicly by the Project developer through media (newspaper) announcement whose standard text is indicated by EPA; The *screening decision* is to be published in local media and own website by the Project developer as well as on the environmental authority’s website;
- Following the submission of the EIA Report to competent environmental authority, this will be published on the environmental authority’s webpage and on that of the Project developer, and this will issue a public announcement to communicate the details of the public hearing at least 30 days prior to the event; Any relevant *comments received to the draft EIA* need to be incorporated in the final EIA Report;
- The decision made by the competent environmental authority to approve the Project and issue the regulatory approval document (Environmental Agreement) also needs to be subject to public commenting over a period of 10 days.

Figure below presents the process for securing the construction permit for the Project (left side) with an in-depth view of the stakeholder engagement milestones as part of the EIA procedure (right side), which is required to be completed prior to subsequently applying for the construction permit (left side).

Figure 3-1 Stakeholder engagement milestones as part of the EIA procedure



Strategic Environmental Assessment (SEA) Process in Romania

In Romania, according to article 14 of the Government Decision no. 1076/2004 (transposition of the SEA Directive) “the scope and level of detail of the information to be included in the environmental report, as well as the assessment of the significant effects of the plan or program on the environment” are established in an SEA Working Group, which is specially created for this purpose. The SEA Working Group shall include representatives of the program holder, competent authorities for the environment and public health and representatives of other authorities concerned with the program.

The information presented in the report is presented to the working group in one or more meetings, and the finalization of the environmental report begins only after all the issues presented have been agreed.

In addition, the SEA will comply with the following documents:

- EC Guideline on the implementation of Directive 2001/42 / EC on the assessment of the effects of certain plans and programs on the environment (Law no. 292/2018)
Directive 79/409/CEE on the conservation of wild birds and Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna (Government Emergency Ordinance 57/2007 on the regime of protected natural areas, conservation of natural habitats, wild flora and fauna);

- Assessment of plans and projects that significantly affect Nature 2000 sites - 2002, Methodological guide on the provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC;
Handbook on SEA for Cohesion Policy 2007-2013 "(SEA Handbook) - January 2006, Network“ Greening Regional Development Programs”;
- Guidelines on the integration of climate change and biodiversity in the strategic environmental assessment - EU, 2013;
Convention on Environmental Impact Assessment in a Transboundary Context (EIA Convention), adopted at Espoo, Finland on 25 February 1991, ratified by Romania by Law no. 22 of 22 February 2001;
- Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context, adopted in Kiev, Ukraine, on May 21, 2003, ratified by Romania by Law no. 349 of 18 November 2009.

Also, the specific national legislation, manuals and guidelines developed by Romania are taken into account.

The list of key documents related to the SEA process is presented in the following table:

Table 3-2 Romanian legal framework and relevant documents related to SEA process

Romanian laws and regulations related to the SEA

- Government Decision 1076/2004 on the environmental assessment (SEA) procedure for plans and programs (transposition of Directive 2001/42/EC);
 - Law 292/2018 on assessing the impact of certain public and private projects on the environment (transposition of Directive 2011/92/EU)
 - Law on environmental protection – promulgated by Government Emergency Ordinance (GEO) 195/2005, approved and amended by Law 265/2006 and subsequently amended by GEO 57/2007; 114/2007 and 164/2008;
 - Legislation on the regime of protected natural areas, conservation of natural habitats and wild flora and fauna (transposing Directive 92/43/EEC, as amended) – promulgated by Government Emergency Ordinance (GEO) 57/2007, approved and amended by Law 49/2011;
 - Methodological guide regarding the adequate evaluation of the potential effects of the plans / programs and projects on the protected natural areas of community interest – approved by the Ministerial Order 19/2010, amended by Ministerial Order 262/2020;
 - Manual on completing the environmental assessment for plans and programs – 2006, approved by Ministerial Order 117/2006;
 - Generic guidance for strategic environmental assessment – 2007, finalized by the Ramboll Consortium team in the project “Strengthening institutional capacity to implement and implement SEA and reporting directives” – EuropeAid/121491/D/SER/RO (PHARE 2004/016 - 772.03 .03);
 - Guidelines on strategic environmental assessment for sectors: land use planning; transport and energy – 2007, completed by the Ramboll Consortium team in the project "Strengthening the institutional capacity for the implementation and enforcement of SEA and reporting directives" – EuropeAid/121491/D/SER/RO (PHARE 2004/016 - 772.03.03);
 - Generic Guide to Environmental Assessment for Plans and Programs- 2007, finalized by the Ramboll Denmark Consortium team in the framework of “Strengthening Institutional Capacity for Implementation and Implementation of the SEA Directive and the Reporting Directive” – EuropeAid/121491/D/SER/RO (PHARE 2004/016 - 772.03.03);
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- Guide on environmental assessment for land use plans and programs and urbanism in Romania - 2007, finalized by the team of the Ramboll Denmark Consortium within the project “Strengthening the institutional capacity for the implementation and implementation of the SEA Directive and the Reporting Directive” – EuropeAid/121491/D/SER/RO (PHARE 2004/016 - 772.03.03).
-

The legislation on Strategic environmental assessment (SEA) requires the analysis of strategic documents that are relevant to the plan under assessment. These strategic documents may be relevant because they address conditions and issues that must be properly reflected in the evaluated plan as they may influence that plan.

The identification of the relationships between different relevant strategic documents and the plan subject to evaluation serves the following purposes:

- Identifying the existence of possible synergies or potential inconsistencies and constraints;
- Identification of issues that have already been addressed in other policies, plans, programs or projects;
- Verification of the environmental information collected for a strategic environmental assessment performed for other policies, plans, programs or projects, which can be used for the strategic environmental assessment of the evaluated plan; considering the cumulative effects on the key receivers following the implementation of several connected plans / programs, in order to substantiate the evaluation of the alternative options and the specific forms of impact of the evaluated plan.

In order to identify the strategic documents relevant for the evaluated plan, the following considerations were taken into account:

- EU industrial policy; Strategies / programs / policies in the same sector (economic) and in related sectors and objectives / measures established at national level regarding the evolution of the sector.

The methods and techniques considered for the environmental assessment and for completing the environmental report are those specified in the guidance documents and manuals listed in the previous section, in particular in the following documents:

- Handbook on SEA for Cohesion Policy 2007-2013” (SEA Handbook) - January 2006, Network “Greening Regional Development Programs”;
- Guidelines on the integration of climate change and biodiversity in the strategic environmental assessment - EU, 2013.

The objectives of environmental protection at international / Community level are reflected in international conventions and EU policies on the environment and sustainable development. The SEA report will analyze the international environmental protection objectives related to the Dama PV plan and how these objectives and any environmental considerations were considered during the preparation of the program.

3.1.2.2 Details of applicable Romanian Labour and Social Legislation

National Legislation on Social Assessment

As per Law 292/2018, which is aligned with the requirements of the EU EIA Directive 2014/52/EU on the Environmental Impact Assessment (EIA), the contents of the EIA Study include requirements for the initial situation and the potential impact of the project/activity proposed, on:

- Demographic characteristics / local population;
- Local economic conditions, labour market, job growth; Local economic activities;

- Living conditions in the area.

Other relevant *regulatory instruments including social issues* are as follows:

- Romanian Civil Code establishing the basic rules on real estate transaction and contracts, usufruct rights, tenants' rights and obligations, landowners' rights and obligations towards tenants;
- Law on Cadastre 105/2019;
- Law 350/2001 on Urban Planning and Land Development, successively amended, last time by Law 151/2019; which establishes the objectives, competences and measures for urban and spatial planning;
- Law no. 247/2005 on property and justice reform and some accompanying measures, with special references on Legal circulation of land; amended by Decision 597/2020 on the exception of unconstitutionality conditioning the right to compensation of the holders of compensation titles, for his selection of a certain mode of compensation;
- Government Emergency Ordinance 34/2013 on the organization, management and operation of permanent grassland, and amending and supplementing Law 18/1991 on Land Reclamation.

Regarding the *regulatory framework of health and safety at work*, the main Romanian legal acts and regulations are:

- Law 53/2003 – the Labour Code;
- Law 319/2006 on health and safety at work, amended by Law 198/2018 and Law 208/2021;
- Government Decision 1425/2006 including the methodological norms for enforcement and implementation of Law 319/2006, amended.

National Legislation on Stakeholder Engagement

Law 137/1995 on environmental protection, with further amendments, and Law 292/2018 on environmental impact assessment, covers the stakeholder consultation and engagement, and stipulates that one of the main principles governing the environmental protection is “Right to information and consultation in decision-making of the public”.

A key provision of the Environmental and Social Impact Assessment (ESIA) is to enable stakeholders to participate in environmental decision-making for projects. Thus, Government Decision 445/2009 on impact assessment of certain public and private projects on the environment – sets out the permitting competences as well as the list of projects subject to EIA, procedural stages and instructions, including the associated requirements for public consultation and involvement.

Law 292/2018 on environmental impact assessment of public and private projects – regulates the procedure for issuing the Environmental Agreement.

The Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, ratified by Law 86/2000, stipulates that the right of public participation is guaranteed by law.

Also, the Romania Social Inclusion Project – Operational Manual: Guidelines for Environmental Analysis of Sub-Projects (Report E1362, World Bank, 2006) outlines that “the Romanian system screening process is comprehensive and provides adequate procedural details. However, the differences in the Romanian EIA process and the Principles stated in the Bank’s OP/BP 4.00 relate to: (a) continuing consultation throughout implementation of high-risk projects, and (b) use of independent advisory panels during the implementation of such projects”.

3.2 International Legislation, Guidelines and Standards for the ESIA

It is envisaged that the Project will be financed by international development banks, which in turn results in the need for the Project to be compliant with the following standards (collectively referred to as the “Relevant Standards”):

- Romanian laws, regulations, and permits that pertain to environmental and social issues;
- Applicable EBRD Performance Requirements (PR) (2019):
 - PR 1: Assessment and Management of Environmental and Social Risks and Impacts;
 - PR 2: Labour and Working Conditions;
 - PR 3: Resource Efficiency and Pollution Prevention and Control;
 - PR 4: Health and Safety;
 - PR 5: Land Acquisition, Involuntary Resettlement and Economic Displacement;
 - PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
 - PR 8: Cultural Heritage; and
 - PR 10: Information Disclosure and Stakeholder Engagement.

*PR7 refers to requirements linked to Indigenous Peoples, which are not present in Romania, thus is not applicable to the Project.

*PR 9 refers to standards to be considered by financial intermediaries, thus is not applicable to the Project.
- Equator Principles IV (2020);
- International Financing Corporation (IFC), Performance Standards (PS) (2012);
- IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007);
- World Bank Group, General Environmental, Health, and Safety Guidelines (2007); and
- World Bank Group, Environmental, Health and Safety Guidelines for Wind Energy (2015).

3.2.1 International Conventions

3.2.1.1 The Kyoto Protocol on Climate Change (UNFCCC)

Romania became a signatory to the UNFCCC in 1998 with a full ascension in 2002. This obligates Romania to assure that the future development in the country meets the conditions of the Convention.

Relevant to the present Project are the requirements associated with the potential generation of greenhouse gas. Further conditions of relevance include:

- Enhancement of energy efficiency in relevant sectors;
- Protection and enhancement of sinks and reservoirs of greenhouse gases;
- Promotion of sustainable forest management practices, afforestation and reforestation;
- Promotion of sustainable forms of agriculture;
- Implementation of measures to limit and/or reduce emissions of greenhouse gases; and
- Limitation and/or reduction in methane emissions.

3.2.1.2 *The United Nations Convention on Biodiversity 1992*

This Convention seeks to conserve biodiversity and promote its sustainable use. It requires the identification and monitoring of the biodiversity in an area and adopting the necessary conservation measure. Romania became party to this Convention in 1994.

3.2.1.3 *The Basel Convention 1989*

This was developed under the auspices of the United Nations Environmental Programme (UNEP) in response to the growing worldwide awareness of the problem of international traffic in hazardous waste.

The Basel Convention 1989 is the first and foremost global environmental treaty that strictly regulates the trans-boundary movement of hazardous wastes. It obligates parties to ensure environmentally sound management, especially during the disposal process.

The objectives of the Convention are to:

- Ensure that waste is disposed of as near as possible to the place or source of its generation;
- Reduce trans-boundary waste and where it cannot be avoided, to be disposed of in an environmentally sound and efficient manner; and
- Provide assistance to developing countries in the management of hazardous waste and the generation.

3.2.1.4 *International Union for Conservation of Natural Resources Red List of Threatened Species*

The IUCN Red List, in 1994, was founded in order to provide a comprehensive inventory of the global conservation status of biological species, and to set of precise criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are applicable to all species and all regions of the world.

3.2.2 *International Lender Standards and Guidelines*

The applicable International Standards that will be adopted for the present Project are as follows:

3.2.2.1 *The Equator Principles*

The Equator Principles (Eps) refer to the environmental and social risk management framework voluntarily adopted by 83 member financial institutions (Equator Principle Financial Institutions (EPFIs)). They are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs were developed by private-sector banks and launched in June 2003. They were several times revised; the last revision known as EP IV took effect on July 2020.

The EPs establish voluntary principles for addressing environmental and social risks and issues in global project finance transactions, including adherence to IFC PS. The EPs are designed to serve as a benchmark for the financial industry to manage social and environmental risks in project financing. They apply to all new project financings across all industry sectors. The Principles (EPs 1 to 10) are:

- **Principle 1:** Review and Categorisation;
- **Principle 2:** Environmental and Social Assessment;
- **Principle 3:** Applicable Environmental and Social Standards;
- **Principle 4:** Environmental and Social Management System and Equator Principles Action Plan;
- **Principle 5:** Stakeholder Engagement;
- **Principle 6:** Grievance Mechanism;

- **Principle 7:** Independent Review;
- **Principle 8:** Covenants;
- **Principle 9:** Independent Monitoring and Reporting; and
- **Principle 10:** Reporting and Transparency.

The EP IV (2020) can be found on the Equator Principle website¹⁸.

Principle 2: Environmental and Social Assessment: all *Category A* and *Category B* Projects are required to conduct an assessment process to address the relevant environmental and social risks and impacts of the proposed Project.

Principle 3: Applicable Environmental and Social Standards: requires that the Project comply with relevant host country laws, regulations and permits that pertain to environmental and social issues. The principle also brings into consideration compliance with the IFC OS in Environmental and Social Sustainability and the World Bank EHS Guidelines.

Principles 4 to 7 and **Principles 9 and 10** apply to all *Category A* and, as appropriate, to *Category B* Projects.

3.2.2.2 IFC Performance Standards

In April 2006, the IFC, a member of the World Bank Group, released a set of Performance Standards on Environmental and Social Sustainability (PS) based upon the original World Bank Group Safeguard Policies, which recognised further the specific issues associated with private sector projects. The IFC PS have been broadened to include issues such as greenhouse gases, human rights, community health, and safety and security.

A revised set of IFC PS came into force in January 2012. A summary of each PS and an indication of their applicability to the Project is provided in the table below, and more details can be found on the IFC website¹⁹.

Table 3-3 Summary of IFC Performance Standards and an Indicator of their Applicability to the Project

Performance Standards	Objectives and Applicability
<p>Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts.</p> <p>Underscores the importance of managing environmental and social performance throughout the life of a Project (any business activity that is subject to assessment and management).</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • Impact identification and assessment: to identify and assess environmental and social impacts, both adverse and beneficial, in the Project Area of influence (Aol); • Mitigation: to avoid, or where avoidance is not possible, to minimize, mitigate or compensate the adverse impacts on the environment, workers and affected communities; • Stakeholder engagement: to ensure that affected communities are appropriately engaged on issues that could potentially affect them; • Effective management: to promote improved social and environment performance of companies through the effective use of management systems. <p>Applicability:</p>

¹⁸ [The Equator Principles EP4 July2020 \(equator-principles.com\)](https://www.equator-principles.com/)

¹⁹ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_pps

Performance Standards	Objectives and Applicability
	<p>Due to the scale and nature of the Project, PS1 is applicable. The Project has identified and assessed a range of E&S impacts for all Project phases, developed mitigation/management measures, and held engagement with stakeholders.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 5 – Stakeholder Engagement • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 2 – Labor and Working Conditions.</p> <p>Recognizes that the pursuit of economic growth through employment creation and income generation should be balanced with protection for basic rights of workers.</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> • To promote fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labor and employment laws; • To establish, maintain and improve the worker management relationship; • To promote compliance with national employment and labor laws; • To protect the workforce by addressing child labor and forced labor; • To promote safe and healthy working conditions, and to protect and promote the health of workers. <p><u>Applicability:</u></p> <p>Project workers (for all project phases) will need to be provided with fair labor and working conditions. This will apply to all categories of workers, irrespective of whether directly engaged by the Project Proponent or Contractors (direct workers), engaged through third parties (contracted workers), and workers engaged by the Client’s primary suppliers (supply chain).</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 2 – Project Description • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 3 – Resource Efficiency and Pollution Prevention.</p> <p>Recognizes that increased industrial activity and urbanization often generate increased levels of pollution to air, water, and land that may threaten people and the environment at the local, regional, and global level.</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> • To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from Project activities; • To promote more sustainable use of resources, including energy and water; • To reduce Project related Green House Gas (GHG) emissions; <p><u>Applicability:</u></p> <p>Development of the Project will require resources such as water, which have the potential to cause some negative environmental and social impacts. All required resources will need to be used efficiently, and all wastes to be managed in accordance with the waste management hierarchy, where avoidance of waste generation is the main priority.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 2.8 – Project Alternatives

Performance Standards	Objectives and Applicability
	<ul style="list-style-type: none"> • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 4 – Community Health, Safety and Security.</p> <p>Recognizes that Project activities, equipment and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development.</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • To anticipate and avoid adverse impacts on health and safety of the affected communities during the project life both from routine and non-routine circumstances; • To ensure that the safeguarding of personnel and property is carried out in accordance with the relevant human rights principles and in a manner that avoids or minimizes risks to the affected communities. <p>Applicability:</p> <p>PS4 is applicable as the Project will have a work force during the construction phase that may impact on the health and safety of the community.</p> <p>Implementation of the Project will need to ensure that the health, safety and security of all communities that may be directly and/or indirectly impacted are not compromised.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 5 – Land Acquisition and Involuntary Resettlement.</p> <p>Outlines that involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of Project related land acquisition.</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • To anticipate and avoid, or where not possible, to minimize adverse social and economic impacts from land acquisition or land rental, or restrictions on land use by: (i) providing compensation for loss of assets at replacement cost, and (ii) ensuring that resettlement activities (if any) are implemented with appropriate disclosure of information, consultation and the informed participation of those affected. • To improve, or restore, the livelihoods and standards of living of displaced/affected persons. <p>Applicability:</p> <p>The Project site/s and interconnection line is mainly utilized as pastures for raising cows and sheep, and on a small proportion for farming activities. Land acquisition and land rental for the Project will result in occasional restrictions on land use and economic displacement, and thus PS5 is applicable to the Project.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 5 – Stakeholder Engagement • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 6 – Biodiversity Conservation and</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • To protect and conserve biodiversity;

Performance Standards	Objectives and Applicability
<p>Sustainable Management of Living Natural Resources.</p> <p>Recognizes that protecting and conserving biodiversity (including ecosystem diversity) and its ability to change and evolve, is fundamental to sustainable development.</p>	<ul style="list-style-type: none"> • To maintain the benefits from ecosystem services; • To promote the sustainable development of living natural resources through the adoption of practices that integrated conservation needs and development priorities. <p>Applicability:</p> <p>PS6 is applicable to the Project as the habitats within the Project site/s are utilized for ecosystem services. Assessment of Project impacts has been carried out in line with the requirements of the PS6.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 2.8 – Project Alternatives • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 7 – Indigenous Peoples.</p> <p>Recognizes that indigenous peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalized and vulnerable segments of the population.</p>	<p>Applicability: As there are no indigenous people in Romania, PS7 is not applicable for the Project.</p>
<p>Performance Standard 8 – Cultural Heritage.</p> <p>Recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention concerning the protection of the World Cultural and Natural Heritage, PS8 aims to ensure that Clients protect cultural heritage in the course of their Project activities.</p>	<p>Objectives:</p> <p>PS8 aims to protect the irreplaceable cultural heritage and to guide clients on protecting cultural heritage in the course of their business operations. In addition, the requirements of PS8 on a Project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.</p> <p>PS8 recognizes the importance of cultural heritage with the objective to:</p> <ul style="list-style-type: none"> • Protect cultural heritage from the adverse impacts of Project activities and support its preservation, and • Promote the equitable sharing of benefits from the use of cultural heritage in business activities. The PS requires the Project Proponent to comply with relevant national law on the protection of cultural heritage, including the national law implementing Romania's obligations under the Convention concerning the protection of the World Cultural and Natural Heritage and other relevant international law. <p>Applicability:</p> <p>Cultural heritage sites were identified for the Project Area of Influence (Aoi), and assessment of Project impacts on these has been carried out in line with the requirements of the PS8.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts

3.2.2.3 World Bank Environmental, Health and Safety Standards

Supplementing the IFC PS are the General EHS Guidelines that were released in April 2007. The EHS Guidelines are the technical reference documents with general and industry-specific examples of Good International Industry Practices (GIIP). They are categorised by environment, occupational and community health and safety, and construction and decommissioning. The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, which provide guidance to users on EHS issues within specific industry sectors.

3.2.2.4 EBRD Environmental and Social Policy and Performance Requirements

The Environmental and Social Policy is one of the Bank’s three good governance policies and a 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 we implement this commitment in practice and on our projects.

The Policy and Performance Requirements were reviewed over a year and a half long period through extensive internal and external consultation, culminating with a 45-day public consultation period on the draft Policy and in-person consultation events in eight countries. The 2019 Environmental and Social Policy and related Performance Requirements were approved by the EBRD Board of Directors on 25 April 2019 and apply to projects initiated after 1 January 2020.

The Policy will be reviewed in 2024²⁰.

At current stage of development, the Project qualifies **Category A** according to the Environmental and Social (E&S) policies of major international finance institutions, commercial banks and export credit agencies signatory to Equator Principles.

To access international finance, *Category A projects* require identification and assessment of associated E&S impacts based on an **Environmental and Social Impact Assessment (ESIA)**. ESIA outcomes are subject to public disclosure in line with the specific requirements of the international finance institution(s) to participate in the Project finance (different disclosure requirements may apply). Additionally, establishment of Project-specific Environmental and Social Management System (ESMS), appropriate to the nature and scale of the Project and commensurate with the level of its environmental and social risks and impacts is considered necessary.

3.3 Developer’s Policies and Standards

The Project Sponsors have their own policies and standards related to social and environmental topics, the relevant ones to be included in the ESMP.

3.4 Licenses and Permits

The table below summarizes the main E&S permitting documents obtained for Arad PV Project. The conditions imposed by the Permits together with the ESIA recommended mitigation measures are to be included in the Project’s Commitments Register (Commitments Register to be developed as part of ESMP- not part of the current SoW).

Table 3-4 Romanian E&S Permits and Main Permitting Documentation for Arad PV Project

Permit type	No./Date of issuance	Regulatory/ Authorizing Agency	Comment
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²⁰ Environmental and Social, European Bank for Reconstruction and Development, 2019

Screening stage decision	7133/13.05.2021	EPA Arad	The authority requested an Environmental Report.
Working Group Decision	9443/23.06.2021	EPA Arad	Perform an Adequate Assessment report and an Environmental Report by 23.06.2022. The Adequate Assessment study was submitted on 13.12.2021. The Environmental Report was submitted 11.02.2022.
Environmental Approval	1/25.07.2022	EPA Arad	Approval is issued with a series of conditions.
EPA Decision	3957/16.03.2022	EPA Arad	EPA Arad decides that the grid connection infrastructure does not require an Environmental Impact Assessment.
Water Management Approval	No. C114/21.06.2022	Water Management Administration Crisuri	Approval is issued with a series of conditions.
Favorable Approval	No. 11/30.06.2022	ANANP Arad	Favorable Approval is issued with a series of conditions.

4. ESIA APPROACH AND METHODOLOGY

4.1 Introduction

As mentioned in Chapter 1 – Introduction and Context, the ESIA process for the Project is being undertaken in compliance with the Romanian legislative requirements described in Chapter 3 – Administrative Framework. In addition to the applicable regulations and norms of Romania, the Project should comply with the Relevant Standards described in section 3.2.

Overview of the ESIA Process

The purpose of this ESIA is to examine how the Project will lead to a measurable difference in the quality of the environment, and the quality of life of impacted individuals and communities. Over the past decades, EIAs have expanded to include social impact assessments as well as public consultation/stakeholder engagement in the planning and decision-making process to avoid, reduce, or mitigate adverse impacts, and to maximise the benefits of the proposed Project. More recently, the emphasis has moved to the ESIA producing robust social and environmental management plans, which can effectively implement the recommended mitigation measures (developed in partnership with the Project proponent) identified in the ESIA during the life of the Project. An Environmental and Social Management System (ESMS) has been developed for this Project (which will be expanded as the Project progresses) and is included in [Appendices to this ESIA Report](#).

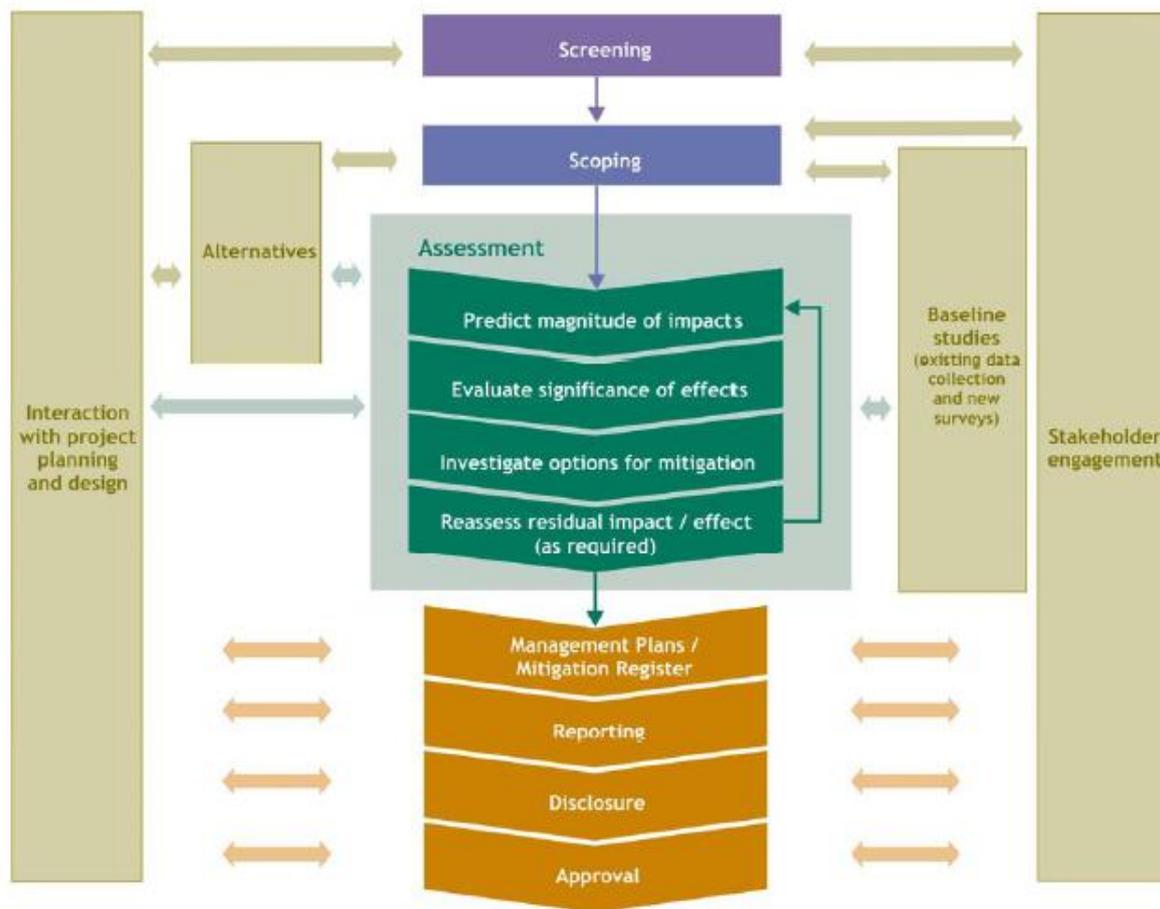
Thus, the key objectives of the ESIA are to assess the potential environmental and social impacts associated with the planning, construction, operation and, where possible, decommissioning and closure phases of the Project and, to identify measures that can be adopted to avoid, minimise or offset adverse impacts and enhance beneficial impacts.

The key stages for this ESIA process are highlighted in Figure 4-1 below and include:

- Scoping;
- Baseline data collection;
- Assessment of impacts and mitigation;
- Interaction with design and decision-making processes;
- Management system integration; and
- Change management.

It must be noted that these key stages do not follow a linear process, but several stages are carried out in parallel. Many assumptions are revisited and modified as data becomes available and as the Project and ESIA progresses.

Figure 4-1 Overview of the ESIA Process



Source: ERM 2022

4.2 Impact Assessment Approach

4.2.1 Scoping Stage

For the current ESIA, the Scoping stage was conducted in 2022, prior to developing the methodologies for the baseline data collection for each environmental and social topic.

4.2.1.1 Purpose of the Scoping stage

The purpose of the previous Scoping stage was to identify key sensitivities and those activities with the potential to contribute to, or cause, potentially significant impacts to environmental and socio-economic receptors and resources, and to evaluate siting, layout and alternatives for the Project.

Scoping for the proposed Project has been undertaken with the following objectives:

- Identify the Project's Preliminary Area of Influence (AoI), and thus an appropriate Study Area;
- Identify where interactions between the Project and Project activities result in impacts to environmental and social resources and receptors;
- Make a tentative evaluation of the impact of such effect and identify which should be included in the scope of the impact assessment;
- Develop a detailed assessment of impacts.

This stage is intended to ensure that the impact assessment focuses on those issues that are most important for design, decision-making and stakeholder interest.

4.2.1.2 Findings of the Scoping Report

The outcome of the ESIA scoping exercise performed by ERM is presented below.

The full Scoping Report can be consulted in Appendix A .

Table 4-1 Scoping Summary

Subject	Source of Potential Impact	Receptor	Potential Impact	Scoped In/ Scoped Out
Climate Change	<ul style="list-style-type: none"> Future climate conditions: higher temperatures, extreme weather events, precipitation 	<ul style="list-style-type: none"> Project infrastructure (solar panels) 	<ul style="list-style-type: none"> Damages on the project infrastructure due to extreme weather events (e.g., heavy rains, storms, hails, etc.). Lower efficiency / conversion rate of the solar panels. 	In
GHG Emissions	<ul style="list-style-type: none"> Construction activities Traffic On-site power generation (construction) Emergency generator testing 	<ul style="list-style-type: none"> Climate 	<ul style="list-style-type: none"> GHG emissions (minor) 	Out
Air Quality	<ul style="list-style-type: none"> Construction activities Traffic On-site power generation (construction) Emergency generator testing 	<ul style="list-style-type: none"> Construction workers Local communities Habitats Species 	<ul style="list-style-type: none"> Dust emissions Pollutants emissions (NO₂, PM₁₀, VOCs, etc.) from vehicular traffic and power generators 	In only construction
Noise and vibration	<ul style="list-style-type: none"> Construction activities Traffic On-site power generation (construction) Emergency generator testing 	<ul style="list-style-type: none"> Construction workers Local communities 	<ul style="list-style-type: none"> Construction noise Noise from transformers at the Substation Noise from back-up generators testing 	In only construction
Geology and soil	<ul style="list-style-type: none"> Site clearance, excavations. Construction of access roads Foundations Accidental spills of oils or chemicals 	<ul style="list-style-type: none"> Topsoil Soil 	<ul style="list-style-type: none"> Soil loss Degradation of soil quality: mixing of topsoil with subsoil, loss of organic material, seed banks, etc. Soil erosion Soil compaction and alteration of natural drainage Soil contamination 	In only for soil erosion during construction
Groundwater and surface water	<ul style="list-style-type: none"> Site clearance, excavations Construction of access roads 	<ul style="list-style-type: none"> Surface water quality and quantity 	<ul style="list-style-type: none"> Pollution and reduced water quality Increased turbidity in surface water sources due to soil erosion by wind/water 	In

Subject	Source of Potential Impact	Receptor	Potential Impact	Scoped In/ Scoped Out
	<ul style="list-style-type: none"> ■ Use of access roadsUnplanned events such as erosion/sedimentation, flooding, accidental oil/fuel/chemical spills ■ Water abstraction for construction ■ Modifications to the existing network of artificial drains/canals (e.g. excavations to deepen drains, closing of drains, construction of additional drains) 	<ul style="list-style-type: none"> ■ Groundwater quality and quantity ■ Local water users ■ Freshwater (aquatic) biodiversity(flora and fauna) ■ Infrastructure sensitive to flooding 	<ul style="list-style-type: none"> ■ Altered flood profiles ■ Lowering of local water table due to increased drainage effectiveness and water abstraction during construction 	
Waste management	<ul style="list-style-type: none"> ■ Construction materials and activities ■ Wastewater ■ Domestic waste ■ Hazardous waste ■ Project camp 	<ul style="list-style-type: none"> ■ Soil ■ Water ■ Fauna and Flora ■ Human environment 	<ul style="list-style-type: none"> ■ Contamination of soil and groundwater in case of improper disposal. ■ Increased load on waste management infrastructure. 	In
Terrestrial & Aquatic Biodiversity	<ul style="list-style-type: none"> ■ Pre-construction activities (surveys, setting-out of works) ■ Construction mobilization activities and earthworks ■ Temporary works including construction camp sites and material/equipment laydown areas ■ Associated facilities such as borrow areas ■ Vegetation clearing, topsoil removal, general construction activities associated with access roads 	<ul style="list-style-type: none"> ■ Terrestrial & aquatic (freshwater) habitat ■ Terrestrial & aquatic flora ■ Terrestrial & aquatic fauna ■ Protected Areas ■ Critical Habitat ■ Priority Biodiversity Features ■ Biodiversity associated to primary supply chain. 	<ul style="list-style-type: none"> ■ Permanent loss of habitat as a result of construction ■ Fragmentation of habitat, including wildlife corridors ■ Damage or loss of flora (plants) ■ Damage or loss of fauna, particularly direct mortalities or injury caused to wildlife during excavations and vehicle collisions (especially at dawn and dusk) ■ Barrier effect to species movement and behaviour alteration ■ Indirect habitat loss or degradation from pollution ■ Indirect erosion and sedimentation impacts to wetland habitat and associated aquatic biodiversity (flora and fauna species) 	In

Subject	Source of Potential Impact	Receptor	Potential Impact	Scoped In/ Scoped Out
	<ul style="list-style-type: none"> ■ Construction workers presence (noise, disturbance) ■ Waste management ■ Unplanned events such as erosion/sedimentation, flooding, accidental oil/fuel/chemical spills ■ Water abstraction for construction ■ Operation of project, including dual-purpose use (solar farm and grazing livestock) 		<ul style="list-style-type: none"> ■ Drainage impacts on surface watercourses (wetlands) and associated aquatic biodiversity ■ Noise, vibration, dust and/or light disturbance to wildlife ■ Increased hunting pressure on wildlife in surrounding areas (e.g. by construction workforce) ■ Introduction and spread of invasive alien species through construction materials, equipment and plant brought to site ■ Loss of integrity to Protected Areas and/or Internationally Recognised Areas (such as Key Biodiversity Areas and Important Bird and Biodiversity Areas) ■ Impact on Critical Habitat ■ Impact on Priority Biodiversity Features (PBF) 	In/Out
			<ul style="list-style-type: none"> ■ Damage or loss of conservation important flora (plants) ■ Increased risk of fire ■ Trophic cascade effects 	
Economy, Employment and Income	<ul style="list-style-type: none"> ■ Employment of direct and contracted workforce for the Project construction and operation ■ Procurement of equipment, goods and services, especially during construction ■ Payment of taxes to the central / local administration 	<ul style="list-style-type: none"> ■ Local working age population in Arad County this includes vulnerable groups such as women, youth and elderly ■ Local, regional and national business 	<ul style="list-style-type: none"> ■ Increase in direct employment levels in the Social Aol and the wider area of Arad County (positive impact) ■ Economic benefits on indirect and induced employment and Project procurement ■ Increase in local councils revenue from payment of taxes by the Project ■ Potential discontent of local communities with level of employment and procurement opportunities 	In
Education and Training	<ul style="list-style-type: none"> ■ Development of skills and work experience through on-the-job training for employees 	<ul style="list-style-type: none"> ■ Project workforce 	<ul style="list-style-type: none"> ■ Improved levels of education and skills which can also be transferred to future employment opportunities. 	In

Subject	Source of Potential Impact	Receptor	Potential Impact	Scoped In/ Scoped Out
	<ul style="list-style-type: none"> Increased pressure on education services and facilities 	<ul style="list-style-type: none"> Existing school population 	<ul style="list-style-type: none"> Reduced services and accessibility to existing students as a result of worker influx 	Out
Land Use, Ownership	<ul style="list-style-type: none"> Acquisition of land for the permanent structures such as PV area, access roads, Project substation Right of way of electrical underground cables Loss of arable land for the Project 	<ul style="list-style-type: none"> Private landowners Public landowners Land users 	<ul style="list-style-type: none"> Economic displacement impacts associated to land take for the Project 	In
	<ul style="list-style-type: none"> Land take for the Project 	<ul style="list-style-type: none"> Local population in the AoI 	<ul style="list-style-type: none"> Physical displacement of households and assets 	Out
Ecosystem Services	<ul style="list-style-type: none"> Conversion of land from private arable plots to a dual-use PV plant using sheep grazing for vegetation management 	<ul style="list-style-type: none"> Local shepherds Local population in the AoI 	<ul style="list-style-type: none"> Loss of quality and availability of ecosystem services Inconsistent results regarding reconversion of the area 	In
Infrastructure and Public Services	<ul style="list-style-type: none"> Transport of workforce, equipment and construction materials to the Project site Influx of non-local workforce requiring accommodation and access to health services, water and sanitation 	<ul style="list-style-type: none"> Local population using local roads and public services Local population needing housing 	<ul style="list-style-type: none"> Increased traffic on local roads resulting in congestion and increased risk of road accidents Increased traffic on local roads resulting in accelerated damage to pavement, bridges, culverts, and other road infrastructure. Increased demand of public services potentially reducing availability for existing local users Pressure on housing stock through influx of non-local workers (in the absence of a worker camp) 	In
Community Health and Safety	<ul style="list-style-type: none"> Influx of non-local workforce Increased noise along local community roads due increased truck traffic Heavy equipment during construction 	<ul style="list-style-type: none"> Local population including sensitive groups (elderly, children) or people with underlying conditions 	<ul style="list-style-type: none"> Construction Phase Impacts on Air Quality and Health Noise related health impacts Changes in Infectious Disease Incidence Related to Land Clearing Changes in Infectious Disease Incidence Related to Workforce Presence 	In

Subject	Source of Potential Impact	Receptor	Potential Impact	Scoped In/ Scoped Out
	<ul style="list-style-type: none"> Storage and use of hazardous materials during construction Visual and Glint and Glare during Operation Stage of the Project 		<ul style="list-style-type: none"> Impacts from unplanned events - Increased Risk of Accidents and Injuries Related to Project Road Traffic, and fire, explosion and spills. Overburdening of Healthcare and Emergency Services due to Project Associated Workforce resulting in decreased access to medical services by the local population 	
Traffic	<ul style="list-style-type: none"> Traffic and transport management of heavy and non-heavy vehicle traffic to and from the site. 	<ul style="list-style-type: none"> Road users and residents, including children Project workers Fauna 	<ul style="list-style-type: none"> Increase of risk of traffic accidents Vehicular access to construction sites may result in localised congestion Severance issues Degradation of existing public roads and bridges 	In
Visual and Glare	<ul style="list-style-type: none"> Operational PV Area 	<ul style="list-style-type: none"> Local residents of nearby settlements Road users for DN Farmers using the neighbouring plots Aviation 	<ul style="list-style-type: none"> Mental and physical distress on people Disturbance on local communities, traffic and aviation hazard („after-image” effect). 	In
Security	<ul style="list-style-type: none"> Protests against the Project requiring intervention of public forces and potential use of force 	<ul style="list-style-type: none"> Local population including vulnerable groups such as women, children, elderly 	<ul style="list-style-type: none"> In case of heightened tensions and opposition to the Project, potential protests by the local communities may require the intervention of local public security forces and potential use of force. This could impact personal security as well as private and public property. 	Out
Labour and working conditions (including occupational health and safety, child labour and forced labour)	<ul style="list-style-type: none"> Recruitment and management of labour relations Routine operations conducted by workers 	<ul style="list-style-type: none"> Project direct staff Contractor workforce Supply chain workers 	<ul style="list-style-type: none"> Inadequate working conditions which do not meet the requirements of Romanian law and international standards for Project staff and contractors Inadequate working conditions along the supply chain Potential worker health and safety impacts as a result of incidents during routine operations Potential health impacts on workers due to asbestos found on Project site 	In

Subject	Source of Potential Impact	Receptor	Potential Impact	Scoped In/ Scoped Out
<p>Gender-based violence and harassment (GBVH)</p>	<ul style="list-style-type: none"> ■ Interactions between Project workforce ■ Interactions between Project workforce and local communities 	<ul style="list-style-type: none"> ■ Project workforce ■ Local population in the AoI, including vulnerable groups such as women 	<ul style="list-style-type: none"> ■ GBVH among the workforce ■ GBVH towards community members 	In
<p>Human Rights in the supply chain</p>	<ul style="list-style-type: none"> ■ Child and forced labour, labour conditions in the supply chain 	<ul style="list-style-type: none"> ■ Supply chain workers 	<ul style="list-style-type: none"> ■ Potential Human Rights Impacts associated with use of child and forced labour in the PV equipment and components supply chain 	In
<p>Archaeology and Cultural Heritage</p>	<ul style="list-style-type: none"> ■ Ground disturbance and earthworks associated with the construction phase ■ Any structures (bridges, fly-overs, embankments etc.) may have an impact on the setting of built and living cultural heritage through the introduction of intrusive visual or auditorial elements to their physical environment or 'setting'. ■ Construction-related restriction zones: The creation of restriction zones associated with the construction phase has the potential to restrict access to existing cultural heritage sites. Restriction zones, operation of development and associated infrastructure during the operation phase 	<ul style="list-style-type: none"> ■ Above ground and buried archaeology, including undiscovered archaeological sites; ■ Built heritage including historic buildings and shrines; and ■ Industrial heritage including historic railways, rail and road bridges, etc. ■ Living heritage resources (churches, cemeteries, other religious (ritual sites) 	<ul style="list-style-type: none"> ■ Ground disturbing activities associated with pre-construction and construction ■ Built heritage and living heritage resources are also susceptible to direct physical impacts ■ Built and living heritage resources are also susceptible to indirect impacts through the introduction of intrusive visual or auditory elements to their physical environment or "setting". ■ The creation of construction restriction zones associated with the Project could also restrict user access to existing cultural heritage sites. 	In

Source: ERM 2022

4.2.2 Scope of the Assessment

The ESIA covers the following Project elements, which were described in detail in Chapter 2 and section 4.2.1 Scoping stage, above:

Environmental Impact Assessment (EIA)	■	Climate Change
	■	Air Quality
	■	Noise and vibration
	■	Geology and soil
	■	Groundwater and surface water
	■	Waste management
	■	Biodiversity (incl. Rapid Critical Habitats Assessment)
Social Impact Assessment (SIA)	■	Economy, Employment and Income
	■	Education and Training
	■	Land Use, Ownership
	■	Ecosystem Services
	■	Infrastructure and Public Services
	■	Community Health and Safety
	■	Traffic
	■	Visual and Glare
	■	Labour and working conditions (including occupational health and safety, child labour and forced labour)
	■	Gender-based violence and harassment (GBVH)
	■	Human Rights in the supply chain
	■	Archaeology and Cultural Heritage
	Cumulative Impact Assessment (CIA)	■

4.2.3 Defining Area of Influence

Definition of the general Area of Influence (Aoi) for the Dama PV Project has been derived following the guidance provided in the EBRD PR1. The process has also considered all the relevant environmental and social aspects included in PR's 2 through 8.

Thus, the Project Aoi encompasses the physical boundaries of the Project's components and activities as the core area/s, plus a wider buffer zone covering access to the Project, and any natural or community receptors which may be affected by the Project.

Based on available information on the Project provided by the Client, and information obtained from site visits, the scoping opinion meeting with local authorities and good international industry practice on potential E&S impacts of a solar power project, the Project's Aoi is defined as below:

- **Area likely to be affected** – by:
 - the primary Project sites and related facilities that the Client develops and/or controls, and the additional areas in which aspects of the environment could conceivably experience significant impacts;
 - impacts from unplanned but predictable developments caused by the Project that may occur later or at a different location;
 - indirect Project impacts on biodiversity or ecosystem services upon which Affected Communities' livelihoods are dependant;
- **Associated facilities** – facilities not funded as part of the Project and that would not have been constructed if the project did not exist and without which the project would not be viable.
- **Cumulative impacts** – resulting from the incremental impact on areas or resources used or directly impacted by the Project from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

Further, for each environmental or socio-economic factor, separate Aols were identified, depending on the specifics of the respective factor, the working phase and the estimated impacts.

4.2.3.1 Environment Area of Influence

Environment Aol includes the Project components and the environmental receptors which may be affected by the Project development:

- **direct Environment Aol**, which comprises:
 - location of primary Project sites and related facilities that the Client develops and/or controls (e.g. solar arrays, power transmission corridors, transformer substation, access roads, borrow and disposal areas, lay-down areas, temporary offices, etc.).
 - additional areas in which aspects of the environment could conceivably experience significant impacts. We are considering an area of up to 2 km applied around the Project sites and facilities.
- **indirect Environment Aol**, including any other additional areas where impacts from unplanned but predictable developments caused by the Project may occur later or at a different location.

4.2.3.2 Social Area of Influence

The development of the Project will have direct and indirect effects on the socioeconomic conditions over different geographic areas. These range from the immediate area around the Project components such as, PV field, access roads, electric powerlines and substation, to the whole of Arad County.

As outlined by the requirements of major international finance institutions, only impacts over which the Client has control or influence are considered.

The Project activities might also potentially indirectly affect the socioeconomic conditions (mostly through the economic and workforce employment impacts) at the regional, national, and international level; however due to their low significance, these indirect impacts are not included in the SEBS and are only considered for cumulative impacts assessment.

Accordingly, the Project Social Area of Influence (Social Aol) has been defined as follows:

- the **direct Social Aol**, also understood as the study area for the socioeconomic qualitative baseline data collection field survey – see Table 4-2. The Direct Social Aol, hereinafter referred to as Social Aol, comprises:

- settlements impacted by land take for the Project components: PV area, substation, cable trenches (it has been communicated that the project will use existing access roads). All land plots required by the Project belong to the administrative territorial units of Grănicei and Pilu communes²¹.
 - settlements that might be affected by potential temporary impacts during the construction, such as noise or air pollution, or long-term impacts during operation, such as glint and glare effect, located in a 2 km buffer from the PV area, also defined as the Environmental AoI for the Project.
 - Note that settlements impacted by increased road traffic are considered in the Traffic section in the ESIA – please refer to relevant sections in the assessment for more details.
- the **indirect Social AoI** (considered as study area for the desktop data review) includes the entire Arad County, where the Project site is located. This also includes the municipalities of Arad (main urban centre and the seat of the county, having the same name as the county) and Chisineu-Cris, located approximately 20 km from the Project area. The larger area could be experiencing economic and employment impacts as a result of the Project implementation through employment of workforce and supply of goods and services, also considered for cumulative impacts.

Table 4-2 below provides a more detailed identification of impacted settlements and their relevance for the Project. The Direct Social Area of Influence will be further referred to as the Social AoI, with reference made to Arad County whenever relevant.

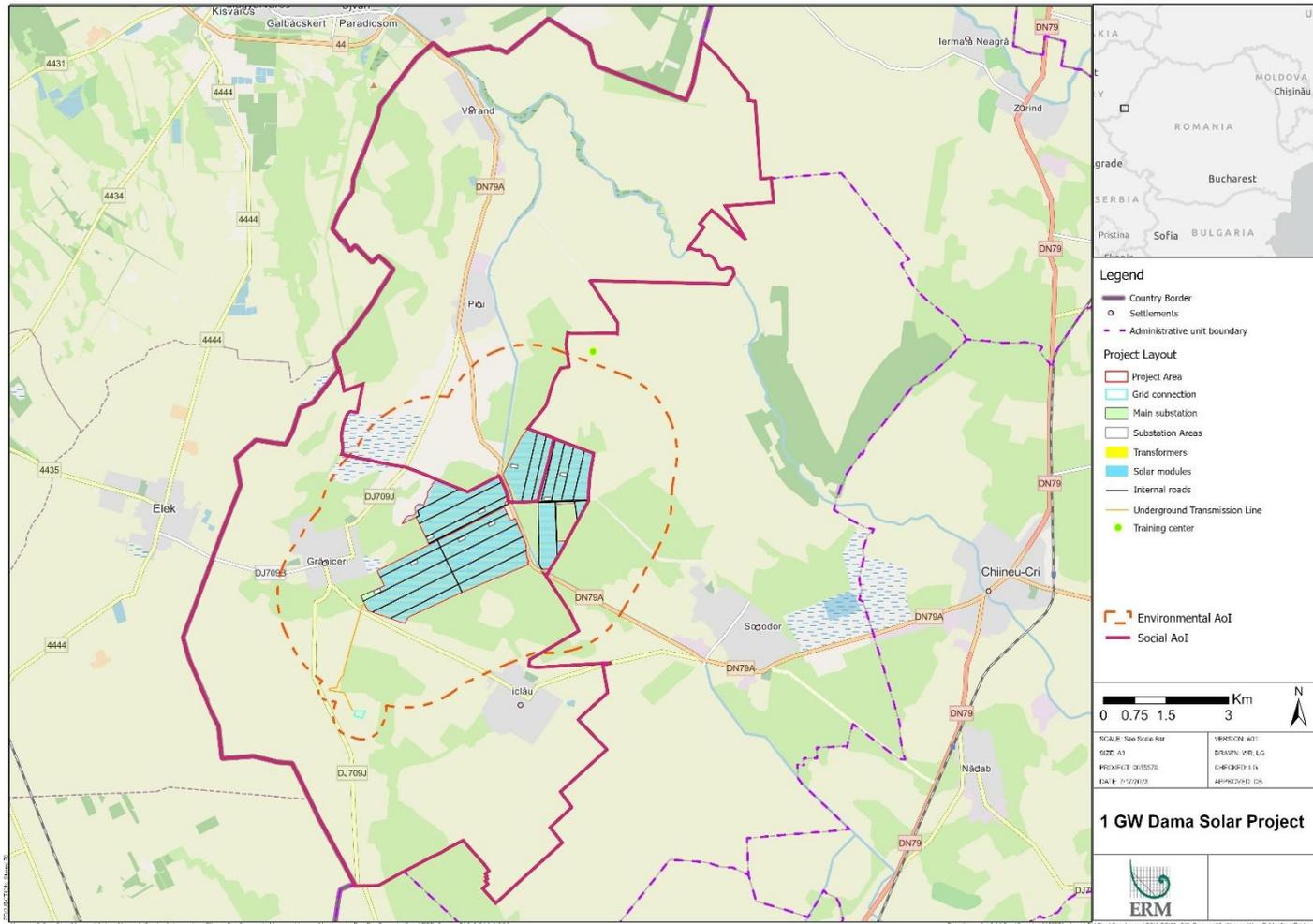
²¹ According to the Romanian Administrative Code, the commune is defined as the administrative territorial unit consisting of one or several villages characterised by rural population joined by interests and traditions and organised depending on the socioeconomic, cultural, and geographic conditions.

Table 4-2 Settlements in the Project's Social Aol

Administrative Territorial Unit (ATU)	Settlement	Urban (u) or Rural (r)	Social Aol	Located in the 2 km Environmental Aol	Residential areas distance to Project components	Relevance to the Project
Grăniceri Commune	Grăniceri	r	Direct	Yes	The SE edge of the village is located	The Project overlaps with the administrative area of the Commune. Proximity to the Project area during construction, operation and decommissioning stages. Potential impacts associated with land acquisition for the substation and underground transmission line. Potential
	Șiclău	r	Direct	No	2.7 km SE from the connection substation	
Pilu Commune	Pilu	r	Direct	No	Over than 2.5 km from the NE part of the Project site	The Project overlaps with the administrative area of the Commune. DN79A, the main access road for the commune, will be used for Project-related transportation.
	Vârșand	r	Direct	No	Over 9 km from the NE part of the Project site	
Socodor Commune	Socodor	r	Indirect	No	4 km SE from the Project area	Potentially impacted by traffic impacts. Land users of plots SE from the PV area potentially impacted by accidental damages during construction/operation.
Chisineu-Cris	Chisineu-Cris	u	Indirect	No	15 km E from the Project area	Closest urban centre to the project site
	Nadab	r	Indirect	No	20 km SE from the Project area	Nadab Industrial Park is located here, providing employment for the local residents
Arad County	All municipalities/settlements		Indirect	No	The entire county will benefit from potential procurement and employment opportunities linked to the Project.	

Source: ERM, 2023

Figure 4-2 Project's Social Area of Influence (Social AoI)



Source: ERM, 2023

4.2.4 Baseline Data Collection

One of the main objectives of the ESIA process is to collect suitable data on the physical, biophysical and socio-economic environment, so as to understand what receptors and resources have the potential to be significantly affected by the Project. Chapter 6 – Project Baseline Conditions describes the baseline conditions that have been used to make the assessment of physical and biological impacts, and Chapters 7 and 8 – Environmental and Social Impact Assessment define the environmental and socio-economic impacts (and impact assessments).

The description of the baseline aims at providing sufficient detail to meet the following objectives:

- Identify the key conditions and sensitivities in areas potentially affected by the Project;
- Provide a basis for extrapolation of the current situation, and development of future scenarios without the Project;
- Provide data to aid in the prediction and evaluation of possible impacts of the Project;
- Understand stakeholder concerns, perceptions and expectations regarding the Project;
- Allow the Project to develop appropriate mitigation measures as part of the ESIA process; and
- Provide a benchmark to assess future changes and to assess the effectiveness of mitigation measures.

At the ESIA stage, further assessment of cumulative impacts shall be performed in line with the IFC Good Practice Handbook for Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (2013), following the six-step approach proposed therein.

Additional desktop studies are needed to identify existing and foreseeable projects that may have common VECs with the Dama project, as well as these VECs themselves.

Baseline status of the VECs shall be determined and significant cumulative impact shall be identified and assessed based on collected information. Once cumulative impacts are identified and assessed, appropriate mitigation measures shall be developed.

4.2.5 Stakeholder Engagement

A comprehensive impact assessment requires engagement with relevant stakeholders through key stages of development. This serves to enhance the understanding of stakeholder views on the Project as well as identifying issues that should be taken into account in the prediction and evaluation of impacts. Details of the stakeholder engagement activities undertaken for the development of this document are presented in Chapter 5 – Stakeholder Engagement.

A standalone Stakeholder Engagement Plan (SEP) is provided in addition to this ESIA document.

4.3 Impact Assessment and Mitigation Methodology

4.3.1 Introduction

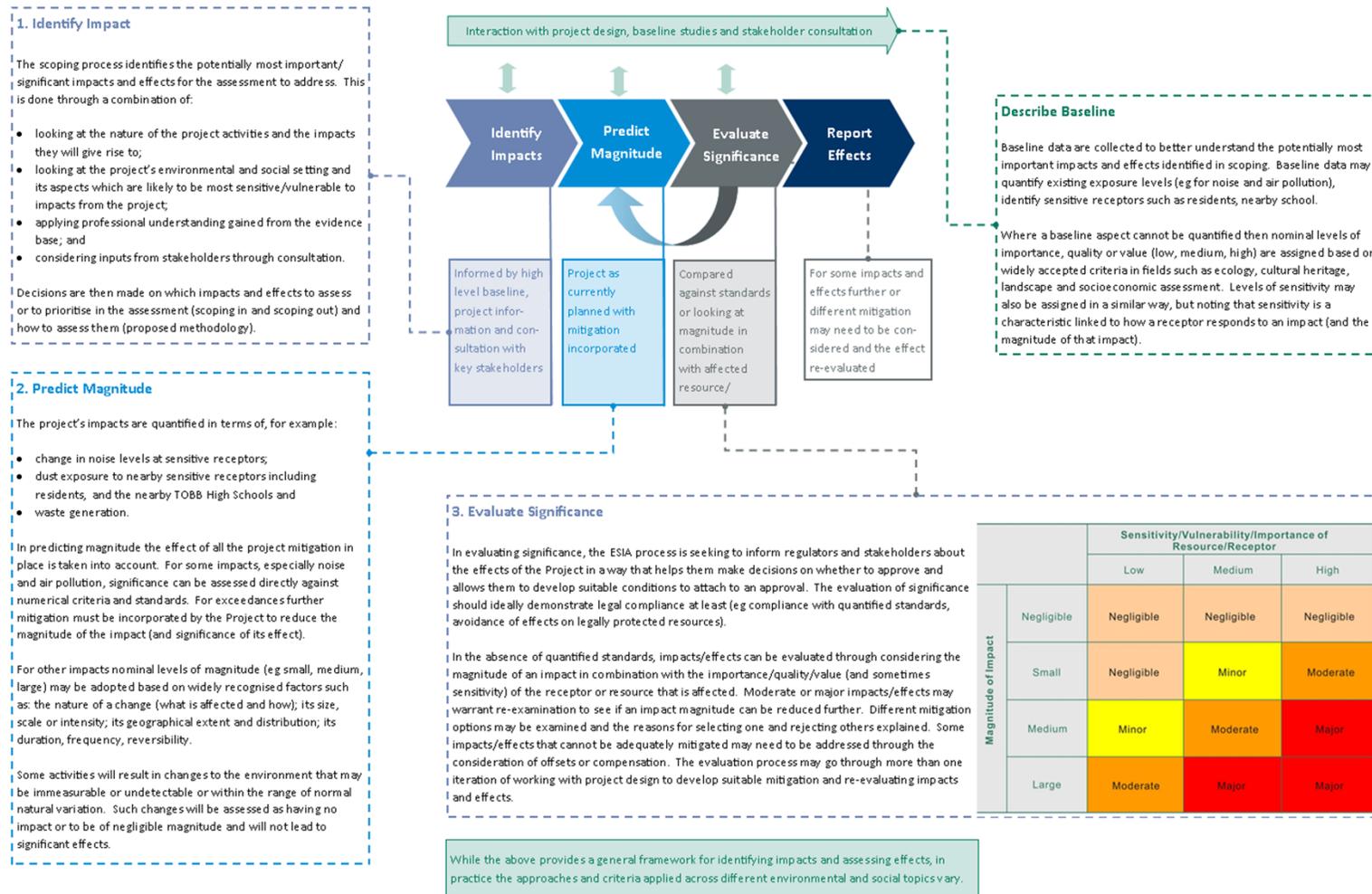
The impact assessment stage comprises a number of steps that collectively assess the manner in which the Project will interact with the elements/factors of the physical, biological, cultural or human environment to produce impacts to resources/receptors. The steps involved in the impact assessment stage are described in detail below.

4.3.2 Identification and Assessment of Impacts

Impact identification and assessment starts with scoping and continue throughout the remainder of the ESIA Process. The main ESIA steps are summarized below and comprise of:

- **Potential impact identification:** to determine what could potentially to resources/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/receptor;
- **Management and mitigation enhancement measures:** to identify appropriate and justified measures to mitigate potential negative impacts and enhance potential positive impacts;
- **Residual impact evaluation:** to evaluate the significance of potential impacts assuming effective implementation of mitigation and enhancement measures.

Figure 4-3 ESIA Methodology



4.3.2.1 Impact Prediction

The impact assessment process predicts and describes impacts that are expected to occur for different phases of the Project.

Where possible, impacts are quantified to the extent practicable, which may include e.g. hectares of land affected; increase in noise or air pollution levels above acceptable standards; volume of waste or water discharged, number of graves affected etc.

For each impact, its significance is evaluated by defining and evaluating two key aspects:

- The *magnitude* of the impact; and
- The *sensitivity* of the feature or receptor that will be impacted.

4.3.2.2 Impact Magnitude

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. A magnitude rating tends to reflect a combination of the size of an area that may be affected, the duration over which the aspect may be altered, and the size, degree or scale of that change. In essence, magnitude is a descriptor for the degree of change that is predicted to occur in the resource or receptor.

For positive impacts (which are mostly socio-economic impacts) magnitude is generally categorised as 'Positive' unless sufficient information is available to support a more robust characterisation and to assign the degree of magnitude as Small, Medium or Large. For instance, if the number of jobs to be assigned to local community members is confirmed or if the size or value of the contribution to the national, regional or district economy is known then a magnitude rating can be assigned. If not, then the significance rating is assigned based on the sensitivity of the feature impacted by a specific activity or change.

The term '*magnitude*' therefore encompasses all the characteristics of the predicted impact including:

- Extent;
- Duration;
- Scale;
- Frequency; and
- Likelihood (only used for unplanned events).

The definitions for characteristics of magnitude used during the impact assessment are summarised in table below.

Table 4-3 Impact Characteristics Terminology

Characteristics	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect) as explained in 4.1	- Direct - Indirect - Inducted
Extent	The "reach" of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc)	- Local – impacts that affect an area in a radius of 20km around the development Site - Regional – impacts that affect regionally important environmental resources or are experienced at a

		regional scale as determined by administrative boundaries, habitat type/ecosystem. - International – impacts that cross national borders, affect an area that is nationally important/or have macro-economic consequences.
Duration	The time period over which a resource/receptor is affected.	- Temporary – impacts are predicted to be of short duration and intermittent/occasional. - Short-term – impact that are predicted to last only the duration of the construction period. - Long-term – impacts that will continue for the life of the Project, but ceases when the Project stops operating. - Permanent – impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of ecological habitat) that endures substantially beyond the Project lifetime.
Scale	The size of the impact (e.g., the size of the are damaged or impacted, the fraction of a resource that is lost or affected, etc.)	(no fixed designations; intended to be a numerical value or a qualitative description of “intensity”)
Frequency	A measure of the constancy or periodicity of the impact	(no fixed designations; intended to be a numerical value or a qualitative description)

The *evaluation of pre-mitigation impact significance* takes into account control measures that are already part of, or embedded within, the Project design. This avoids the situation where an impact is assigned a magnitude based on a hypothetical version of the Project that considers none of the embedded controls that are defined as part of the Project description. Examples of embedded controls could include acoustic reduction measures around noisy equipment, or buffer requirements the development is obliged to implement and is part of the layout. Additional mitigation measures aimed at further reducing the significance of impacts are proposed where necessary, or appropriate and are assessed as part of the ‘*residual*’ impact significance rating.

In the case of type, the designations are defined universally (i.e., the same definitions apply to all resources/receptors and associated impacts). For these universally defined designations, the definitions are provided in table below.

Table 4-4 Designation Definitions

Designation	Definition
Type	
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).

Induced	Impacts the result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large workforce).
Extent	
Local	Impacts that affect an area in proximity to the development area within an area defined on a resource/receptor-specific basis.
Regional	Impacts occurring at a regional scale as determined by administrative boundaries or which affect regionally important resources or ecosystems.
International	Impacts that extend across international boundaries or affect resources such as features, resources or areas protected by international conventions
Duration	
Temporary	Impacts are predicted to be short duration (in the order of days) and/or intermittent/occasional.
Short-term	Impacts that are predicted to last only for the duration of the construction period (i.e. – 8 to 9 months).
Medium-term	Impacts that will continue for a period of 5 to 10 years following the completion of the construction phase e.g., where the impact may reverse or affected resources or receptors recover within this period of time.
Long-term	Impacts that will continue for the life of the Project, but will either cease when the Project stops operating or is decommissioned, or where the impact may reverse or the affected resource/receptor recovers or reverts to a near-natural state after 10 or within 20 years following the completion of the construction phase.
Permanent	Impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of the ecological habitat) that endures substantially beyond 20 years following the completion of the construction phase.

In the case of *scale and frequency*, these characteristics are not assigned fixed designations, as they are typically numerical measurements (e.g., number of acres affected, number of times per day, etc.).

The terminology and designations are provided to ensure consistency when these characteristics are described in an impact assessment deliverable. However, it is not a requirement that each of these characteristics be discussed for every impact identified.

For *unplanned events* (e.g., accidental release of hazardous materials) the likelihood of the impact occurring is taken into consideration in deriving the magnitude rating. The likelihood of an impact occurring as a result of an unplanned event is expressed as a probability and is designated using a qualitative scale (or semi-quantitative, where appropriate data are available), according to the attributes described in table below.

Table 4-5 Designation of Likelihood Designations

Likelihood	Definition
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).
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Likelihood is estimated on the basis of experience and/or evidence that such an outcome has previously occurred.

It is important to note that likelihood is a measure of the degree to which the unplanned event is expected to occur, not the degree to which an impact or effect is expected to occur as a result of the unplanned event. The latter concept is referred to as uncertainty, and this is typically dealt with in a contextual discussion in the impact assessment deliverable, rather than in the impact significance assignment process.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation. There is an inherent challenge in discussing impacts resulting from (planned) Project activities and those resulting from unplanned events. To avoid the need to fully elaborate on an impact resulting from an unplanned event prior to discussing what could be a very low likelihood of occurrence for the unplanned event, this methodology incorporates likelihood into the magnitude designation (i.e. in parallel with consideration of the other impact characteristics), so that the "likelihood-factored" magnitude can then be considered with the resource/receptor sensitivity/vulnerability/importance in order to assign impact significance. Rather than taking a prescriptive (e.g. matrix) approach to factoring likelihood into the magnitude designation process, it is recommended that this be done based on professional judgment, and assisted by quantitative data (e.g. modelling, frequency charts) where available.

Once the impact characteristics are understood, these characteristics are used (in a manner specific to the resource/receptor in question) to assign each impact a magnitude.

In summary, *magnitude* is a function of the following impact characteristics:

- Extent;
- Duration;
- Scale;
- Frequency; and
- Likelihood.

Magnitude essentially describes the degree of change that the impact is likely to impart upon the resource/receptor. As in the case of extent and duration, the magnitude designations themselves (i.e. negligible, small, medium, large) are universally used and across resources/receptors, but the definitions for these designations will vary on a resource/receptor basis, as is discussed further below.

The universal magnitude designations are:

- Positive;
- Negligible;
- Small;
- Medium; and
- Large.

The *magnitude of impacts* takes into account all the various dimensions of a particular impact in order to make a determination as to where the impact falls on the spectrum (in the case of adverse impacts) from negligible to large. Some impacts will result in changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes can be regarded as essentially having no impact, and should be characterised as having a negligible magnitude.

4.3.2.3 Sensitivity

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/vulnerability/importance* of the impacted resource/receptor to the type of activity proposed (e.g. habitat clearance, topsoil removal, etc.) or the consequences of a Project activity (e.g. dust, noise, water pollution, or induced population influx). This requires a range of physical, biological, cultural or human factors to be taken into account and may also need to include other factors such as legal protection, government policy, stakeholder views and economic value.

Characterisation of sensitivity for a physical or biological resource or receptor (e.g. a water feature or parameter, cliff, vegetation type) will take into account its conservation status and importance (on a local, national and international scale), its vulnerability to disturbance, and its resilience to recover or withstand a specific impact or type of impact. Where the receptor is human or cultural, the value of that social and cultural heritage receptor/s and its vulnerability to the impact is considered, taking into account the receptor’s resilience, including ability to adapt to change or use alternatives where available.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis.

The universal sensitivity/vulnerability/importance designations are:

- Low;
- Medium; and
- High.

4.3.2.4 Evaluating Significance

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterised, the significance of the impact is assigned using the impact significance matrix shown in Table 4-6 below.

For impacts resulting from unplanned events (typically accidents, such as a major oil spill or other event that cannot be reasonably foreseen), the above methodology is applied but likelihood is also considered when assigning the magnitude designation, as classified in table below, Impact Significance.

Table 4-6 Impact Significance

SIGNIFICANCE				
		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
MAGNITUDE	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	High	Moderate	Major	Major
	Positive Impacts			
	Positive	Positive Impact		

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor- or impact-specific considerations are factored into the assignment of magnitude and sensitivity designations that enter into the matrix.

Table below presents a brief description of the different categories of Impact Significance / Significance Definitions.

Table 4-7 Significance Definitions

Significance definitions	
Negligible significance	An impact of negligible significance (or an insignificant impact) is where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be `negligible` or `imperceptible` or is indistinguishable from natural background variations.
Minor significance	An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and will within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate significance	An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that `moderate` impacts are being managed effectively and efficiently.
Major significance	An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the ESIA process 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 has been applied). An example might be the visual impact of a development. It is then the function of regulators and stakeholders weigh such negative factors against the positive factors such as employment, in coming to a decision on the Project.

4.3.3 Identification of Mitigation and Enhancement Measures

Once the significance of a given impact has been characterised using the above-mentioned methodologies, the next step is to evaluate what mitigation measures are warranted.

In keeping with the *Mitigation Hierarchy*, the priority in mitigation 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).

It is important to have a solid basis for recommending mitigation measures. The role of any given ESIA is to help develop a consentable/approvable Project, and to help clients meet their business objectives in a responsible manner. Impact assessment is about identifying the aspects of a Project that need to be managed, and demonstrating how these should be appropriately dealt with through implementation of the *Project Environmental and Social Management System (ESMS)*.

As key influencers in the decision-making process, the role of the impact assessment is not to stop development or propose every possible mitigation or compensatory measure imaginable, but rather to make balanced judgements as to what is warranted, informed by a high-quality evidence base.

Additional *mitigation measures* should not be declared for impacts rated as not significant, unless the associated activity is related to conformance with an applicable requirement. Further, it is important to note that it is not an absolute necessity that all impacts be mitigated to a not significant level; rather the objective is to mitigate impacts to an as low as reasonably practicable (ALARP) level.

As previously mentioned, embedded controls (i.e. physical or procedural controls that are planned as part of the Project design and are not added in response to an impact significance assignment), and are considered as part of the Project (prior to entering the impact assessment stage of the impact assessment process).

4.3.4 Residual Impact Evaluation

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.

4.4 Alternatives and Interaction with Design and Planning Process

The interaction between the ESIA team and the Design and Planning Process is one of the key areas in which an ESIA can influence how a Project develops.

It includes involvement in defining the Project and identifying those activities with the potential to cause environmental and social impacts (e.g. physical presence, noise, workforce, traffic, local employment, procurement).

Project planning, decision-making and refinement of the Project description continue throughout the ESIA process, and in response to the identified impacts, and stakeholder concerns.

5. STAKEHOLDER ENGAGEMENT

This Section provides a summary of the stakeholder engagement activities undertaken to date and an overview of the key issues raised by stakeholders.

Applicable International Standards place an emphasis on the need to identify the range of stakeholders that may be affected by a project from the early stages and to undertake engagement commensurate with projects risks and adverse impacts for developing the ESIA in a participatory manner.

5.1 Preliminary Stakeholder identification

IFC's Stakeholder Engagement Good Practice Handbook for Companies Doing Business in Emerging Markets defines stakeholder(s) as *any individual or group who is potentially affected by a project or activity or who has an interest in the project or activity, and/or the ability to influence its outcome, positively or negatively.*

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 and its activities.

Stakeholder groups identified to date are included in **Table 5-1** below.

The communication methods will be tailored depending on each stakeholder group to allow adequate information disclosure and enable participation in the decision-making process, as the ESIA process progresses.

Table 5-1 Preliminary Stakeholder Identification

Stakeholder Category	Stakeholder Group	Stakeholders
<p>National and County Government</p> <p>National Government is of primary national political importance to the business and/or projects/activities in terms of establishing policy, granting permits or other approvals, and monitoring and enforcing compliance with Romanian regulations throughout all stages of the Project life cycle.</p>	<p>National government County government Key ministries National regulatory bodies</p>	<p>Arad County Council Ministry of Agriculture Ministry of Environmental Protection Arad Environmental Protection Agency Ministry of Culture Arad County Culture Directorate ANANP – National Association of Nature Protected Areas Ministry of Transport</p>
<p>Local Public Administration</p> <p>Local government is of importance to the business or and/or project as they are responsible for implementation of legislation, and development plans and policies at the municipal or commune level.</p> <p>In addition, the municipalities and/or communes in the Project area will be impacted by the Project and will need to be kept informed of progress and plans in their area, to consider the Project activities in their policy-making, regulatory and other duties and activities.</p>	<p>Local Mayors Local Councillors Local inspectorates and public utilities (spatial & urban planning, cadastre, communal affairs, environment, social assistance, agricultural register, roads, etc.)</p>	<p>Local Mayors from Grăniceri and Pîlu Communes Local Mayors of the communes/ municipalities located in the Social Area of Influence, including Socodor, Chisineu-Cris, Arad and from the larger West Region</p>
<p>Parastatals</p> <p>Parastatals may have land or other assets within the country (electrical grid, public roads), which could be affected by</p>	<p>Government funded and/or private enterprises in charge of managing specific activities</p>	<p>Transelectrica – the national grid operator</p>

Stakeholder Category	Stakeholder Group	Stakeholders
<p>the project or activity, or whose assets are influencing the project/activities (underground pipelines /overhead lines crossing the project areas).</p>		<p>ANIF - <i>National Agency for Land Improvements</i> – owning and operating the water drainage pumps Other utility providers</p>
<p>Communities or Settlements</p> <p>Households and communities that may be directly or indirectly affected by the Project. This includes people living on land affected by the Project, through direct land take or by social and environmental impacts, and other people who visit or use land or resources that may be affected. Primary stakeholders include landowners and land users.</p>	<p>Land-affected stakeholders Local population affected in some form by the project/activity, including Project traffic Potential local partners for development and implementation of a community investment plan</p>	<p>Agricola Grăniceri – current landowner and user of the land Potential landuser(s) of the substation area People living or using the land plots near the project site Residents of settlements located near roads used for project activities, such as transporting materials during construction and operation, contractor and supplier vehicles Social / public infrastructure Service companies Church</p>
<p>Vulnerable Persons/Groups</p> <p>Vulnerable groups may be affected by the project or activity by virtue of their physical disability, social or economic standing, limited education, lack of employment or access to land.</p> <p>Appropriate engagement practices and tools will be adopted to ensure the identification of vulnerable groups and their adequate access to information and participation.</p>	<p>Vulnerable groups</p>	<p>Ethnic Minority Groups – e.g. Roma minorities Female-headed households, including single mothers and widows Low-income households Unemployed youth Elderly people living alone, in remote areas Disabled persons</p>
<p>Non-Governmental Organizations (NGOs)</p> <p>NGOs with direct interest in the Project and its social and environmental aspects and that are able to influence the project and/or activity directly or through public opinion.</p>	<p>International National Local</p>	<p>Industry Associations – Solar/renewables: PATRES, etc. NGOs already engaging with the Project during rezoning and environmental permitting consultations: Eco Ruralis, Milvus Local farmers associations Local hunting associations Women associations Sports associations Others</p>
<p>Other interest groups</p> <p>Regional and national level media will typically have a higher level of influence over the Project and may be leveraged to influence local stakeholders' perceptions of the Project.</p>	<p>Media End customers</p>	<p>Specialised renewables media Online regional and national media TV stations Regional and national newspapers Regional and national radio stations End customers purchasing electricity</p>

Stakeholder Category	Stakeholder Group	Stakeholders
<p>Potential partners</p> <p>Organizations, businesses and individuals with direct interest in the Project e.g. running businesses or providing services and supplies to the project.</p>	<p>Employees Contractors and subcontractors Suppliers Other businesses operating within the region/ villages Company shareholders (for example, lenders)</p>	<p>Other Renewable Energy Operators in the area Companies operating in the Project area Vestas, Civil and Electrical Contractors International Lenders – e.g. EBRD, IFC, banks.</p>

Source: ERM 2022

5.2 Previous Stakeholder Engagement

Public consultation during the development stage was conducted in line with regulatory requirements. Part of the re-zoning process, the public was consulted regarding the opportunity of the Project.

Notice boards were set up in the project area and a public debate was organized on the 23rd of February 2021 at Arad County Council. As per legal requirements, public consultation meetings also took place in Grăniceri and Pilu communes part of the formal procedure.

The County Council issued a Public Consultation Report on 05.03.2021, in line with the legal requirements and further requested the developer to clearly identify all project stakeholders in order to formally consult them as the permitting process continues.

Stakeholders raised concerns regarding the impact of the Project, which were formally answered within the regulatory consultation process facilitated by Arad Environmental Protection Agency:

- conservation NGO *Milvus Asociatia pentru Protectia Pasarilor Targu Mures* raised concerns that a significant proportion of the Project area is currently used as pastureland.
- a written opinion was submitted by NGO *Societatea Carpatina Ardeleana – Satu Mare*, raising biodiversity impacts concerns.
- a formal opinion was raised by a Pilu landowner, who raised concerns regarding impacts to his property (not providing details).

Additional voluntary engagement with local stakeholders – local authorities of Grăniceri and Pilu communes – was conducted by the Project developer throughout the development and permitting process, however this was not documented.

The Project benefits from coverage in the local and national media. Topics covered include key Project information, the size and ownership of the Project, links to political decision makers and potential biodiversity and land impacts.

5.3 ESIA Stakeholder Engagement

In support of the ESIA and in alignment with the lender requirements, key stakeholders are consulted during the following stages:

- Scoping process for the ESIA;
- Baseline data collection for the ESIA; and
- Disclosure of the Draft ESIA.

5.3.1 ESIA Scoping engagement

In support of the ESIA scoping study and in alignment with the international requirements, key stakeholders were consulted during the Scoping site visit organized on 28th and 29th of November 2022.

The stakeholder meetings were organised by Monsson team. The meetings were attended by Monsson and Rezolv Energy representatives and ERM as the ESIA consultant.

Meetings took the form of semi-structured interviews designed to facilitate open conversation and information sharing. The purpose of these initial engagement meetings was to:

- Share relevant information about the Project and the forthcoming ESIA process including planned activities.
- Validate the Social Area of Influence defined for the Project.
- Establish communication channels with key institutional stakeholders.
- Explore concerns, grievances, and questions that stakeholders may have about the Project and general sentiment towards the Project.

Key stakeholders interviewed at the scoping stage include:

- Two representatives of Agricola Grăniceri, the landowner of the PV area;
- Four Grăniceri Commune representatives;
- Two Pilu Commune representatives;
- Grăniceri Priest.

In total 9 people, out of whom 2 women, were engaged during the ESIA scoping engagement.

ESIA team representatives began with a presentation of the current status of the Project and the ESIA process and scope, allowing stakeholders the opportunity to ask questions and provide feedback on the current socio-economic status and challenges.

Photos taken during the scoping phase engagement are illustrated in **Figure 5-1** below.

Results of the ESIA Scoping engagement are summarised in **Table 5-2** below.

Figure 5-1 ESIA Scoping Engagement Meetings (29 November 2022)





Top: Meeting held at Pilu Commune Hall with Pilu Commune Mayor and Vice-Mayor; Bottom: Meeting held at Grăniceri Commune Hall with Grăniceri Commune Mayor, Vice-Mayor and Secretary and Client representatives

Source: ERM 2022

Table 5-2 Overview of scoping phase engagement

Date and place	Stakeholders met	Feedback
<p>28 November 2022</p> <ul style="list-style-type: none"> ■ Agricola Grăniceri offices 	<ul style="list-style-type: none"> ■ Agricola Grăniceri Representatives: ■ Agricola Grăniceri Agronomist ■ Agricola Grăniceri Economist 	<ul style="list-style-type: none"> ■ History of land ownership and use <ul style="list-style-type: none"> - The PV area was used as pastureland prior to being fragmented and transferred to private ownership during the land restitution campaign in 2005 - 2007. An Italian investor bought the individual land plots and consolidated the approximately 1,000 ha plot that was then transferred to arable use. - Land improvement works conducted on the site include levelling and building of secondary drainage channels, alongside the existing Buderiu Channel. - The land proved in time that it has a very low productivity, with soil drainage issues that the company could not address. The area is declared a disadvantaged area by Agency for Payments and Intervention in Agriculture (APIA). - The National Agency for Land Improvements (ANIF) is operating the two drainage system pumps located near the cereal storage facility of Agricola Grăniceri. When needed, the company liases with the local authority and ANIF for switching on the pumps; water is evacuated in Canalul Morilor. Secondary channels are under the management of the local authorities. ■ Current economic activity of the company <ul style="list-style-type: none"> - Agricola Grăniceri produces, stores and commercialises agricultural products (grains). The storage facilities have a total capacity of 12,000 t. - The Company has 6 employees and retrenchment is not envisioned when the production activity will cease due to Project implementation. - The storage and commercial activities of Agricola Grăniceri are expected to continue. - The arable surface is currently cultivated in its entirety with Wheat and Triticale, no other suitable crop for the land – sowing campaign for 2022 is completed. - The yield is much lower than on the arable plots nearing the village, which are of better quality. Company representatives confirmed that the APIA farming subsidies are the bloodline of the farm. - The land area becomes inaccessible in autumn – several cases in the past of farming equipment stuck in mud. - The land is surrounded by pasture, however the site has a drainage channel on every border. - Other two big farmers in Grăniceri commune, cultivating 1,000 ha and 700 ha each.
<p>28 November 2022</p> <p>Pilu Commune Hall</p>	<ul style="list-style-type: none"> ■ Pilu Commune Representatives: ■ Pilu Commune Mayor 	<ul style="list-style-type: none"> ■ Key Project Benefits <ul style="list-style-type: none"> - Access to additional pastureland for the local farmers. Three to five sheepholds in Pilu could benefit from accessing the Project site for grazing.

Date and place	Stakeholders met	Feedback
	<ul style="list-style-type: none"> ■ Pilu Commune Vice-Mayor 	<ul style="list-style-type: none"> ■ Development Priorities <ul style="list-style-type: none"> - To maintain and operate the storage facilities of Agricola Grăniceri, used by local farmers also ■ Local communication <ul style="list-style-type: none"> - Facebook Page of the Commune, dedicated groups for each village; Commune website; word of mouth via the Local Councillors ■ Socio Economic Context <ul style="list-style-type: none"> - No self-declared Roma in the commune. - There is a Catholic Church and a Pentecostal Church in Varsand. The commune has 2 orthodox priests, 1 catholic and one Pentecostal. No local tensions recorded. - 25 applications for the Minimum Living Wage support and 15 disabled people registered - Road Infrastructure: the Varsand Crossing is causing long queues of trucks of 20 km on a daily basis - Besides agriculture, economic sectors include construction, transport and small-scale commerce. Residents are employed in Chisineu-Cris and the area, where several factories are located (farming equipment; packaging; aluminium products, construction) - A smaller PV Project is planned to be developed on a 5,5 ha plot in Pilu (no relation to the Project) - Utilities: electricity and centred water supply (not yet in all areas); all roads are asphalted; natural gas network is currently extended in the commune - Education: both villages benefit from school and kindergarten; highschool is available in Chisineu-Cris - Health infrastructure: family doctor in every village - No traffic-related accidents recorded. - no gender based violence cases ■ Local farming activities: <ul style="list-style-type: none"> - 4 to 6 animal husbandry larger farms. The commune has approximately 9,000 sheep and 3,000 cattle, utilising approximately 430 ha of pastureland; - arable land constitutes around 7,300 ha - Several farmers cultivate 100 – 200 ha, however there are farmers cultivating smaller plots of 2-3 ha - A cereal warehouse is active in Pilu (3,000 t capacity)
<p>28 November 2022</p> <p>Grăniceri Commune Hall</p>	<ul style="list-style-type: none"> ■ Grăniceri Commune Mayor ■ Grăniceri Commune Vice-Mayor ■ Grăniceri Commune Secretary ■ Two Granieri Local Councilor 	<ul style="list-style-type: none"> ■ Key Project Benefits <ul style="list-style-type: none"> - Access to additional pastureland for the local farmers, whilst also producing green energy and revenue for the local budget - Consolidation of the road leading to the substation ■ Development Priorities <ul style="list-style-type: none"> - Attract projects in the local area – biomass is also investigated; - Planting shelterbelts to protect cultures - Conclude sewerage and natural gas infrastructure works ■ Socio Economic Context

Date and place	Stakeholders met	Feedback
		<ul style="list-style-type: none"> - No particular vulnerabilities reported - Basic health (family doctor) and education (kindergarten and school) are present in each village - Utilities: electricity and water supply are available, sewerage system and natural gas network are under construction - The Church in Grăniceri was renovated in 2013 following community support; The Grăniceri school was built between 1920 and 1927 - Issues with water supply, which is now sourced from Mures as Cris Rivers does not have required capacity - MILVUS Group (NGO) worked on a study of Lesser white-fronted goose/ Anser erythropus in 2021/22, in partnership the coordinators of the Protected area ■ Local farming activities <ul style="list-style-type: none"> - Approximately 20 young farmers (30 – 50 years) in Grăniceri Commune, farming between 100 and 200 ha, with two bigger farmers. 3 Mobile SA located in Siclau cultivates a total surface of 1000 ha – partly owned; - Main crops are wheat, corn and rapeseed; - The subsidies are offered for 6 sheep or 1 cattle/ ha, resulting in a 400 Eur/ ha of pastureland / year for the farmer - The area is flat and no shelterbelts are available to protect crops - Fallow deer is present in the area and often damage crops. This may impact the Project infrastructure fencing some borders of the PV area is recommended, moreover in areas where the PV will border arable plots - The fishpond used to have 200 ha in the past, however now is not utilised -

6. PROJECT BASELINE CONDITIONS

6.1 Physical and Biological Environment

This chapter provides an overview of the environmental (physical and biological) baseline conditions within the Project area and its surroundings (Aol) including climate, air quality, noise and vibration, topography and land cover, geology and soil, groundwater and surface water, water and wastewater, biodiversity and waste management.

The objective is to outline the existing environmental conditions in the Project area, so as to understand what receptors and resources have the potential to be significantly affected by the Project. This information is further used in Chapter 7 Environmental Impact Assessment to assess potential impacts caused by the Project in both the construction and operation phases and provide mitigation measures and/or monitoring programs to reduce adverse impacts.

Information in this chapter is primarily sourced from the technical studies undertaken by the Project developer in relation to obtaining the permitting documentation and other studies necessary for the development of the project (e.g. presentation memorandum of the Project, floodability studies, geotechnical study, hydrological studies, surface water quality survey).

Additional desktop research and review of reliable information sources was conducted by ERM to supplement the available data and meet this ESIA needs.

6.1.1 Introduction

The site is located, from a geographical point of view, in the Crisurilor Low Plain (*Campia Joasa a Crisurilor*), which represents the central part of the Banato-Crisane Plain (*Campia Banato-Crisana*), a subunit that is part of the Western Plain (*Campia de Vest*), a component unit of the Pannonian Depression. The site area is relatively flat, located at altitudes ranging between 90-100m.

The site is crossed by multiple drainage channels with a depth of approximately 1 m with the role of preventing flooding of land surfaces. The main canal (*Canalul Morilor*) is equipped with dikes on both banks. Water pooling on site is collected by the drainage channels and evacuated by the pumps owned by ANIF (land improvements national association).

Land improvement works (land levelling and building of the secondary drainage channels) were performed during 2007-2010.

An old river bed (assumed to be the former bed of Buderiu river, which according to Grăniceri Village Monography, has a drained spring) was observed within the northern site area on historical imagery from Google Earth – see Figure 6-1 below and is also visible on the historical (1964, 1968) orthophotographs of the area. The river was converted to a channel (Buderiu channel) which is located adjacent to the northern boundary of the Project's PV area site.

Figure 6-1 Aerial imagery of the northern area of the Project

August 2013



July 2022



Source: Google Earth Pro

Figure 6-2 below shows the Project site area, as observed by ERM during the site visits:

Figure 6-2 Pictures of the Project area (28-29 November 2022)

Central area of the site



View of a drainage channel in the central area of the site.



Water pooling on the site



Morilor Channel and dikes (left) and adjacent national road DN79A (right).



Scope: ERM, November 2022

6.1.2 Climate/ Climate change

6.1.2.1 Area of Influence

The Area of Influence (Aoi) can be defined as the area likely to be affected by the Project activities during operational and decommissioning phases of the Project.

With regards to assessing the Climate Change Risk aspects of a site the respective Aoi will include the actual site and the surrounding areas and communities, as the site and the surrounding areas can both have an effect on each other. Hence, it is important to be aware of the entire context of the location of the site.

The Project Aoi will include the farming areas to the north, east, south and west, the old river bed to the north, the developments and communities to the south and west, all the national and country roads, the various power lines and the railway to the west (see Figure 6-3 below).

Figure 6-3 Satellite image of Arad PV Plant Aol showing site and surrounding areas



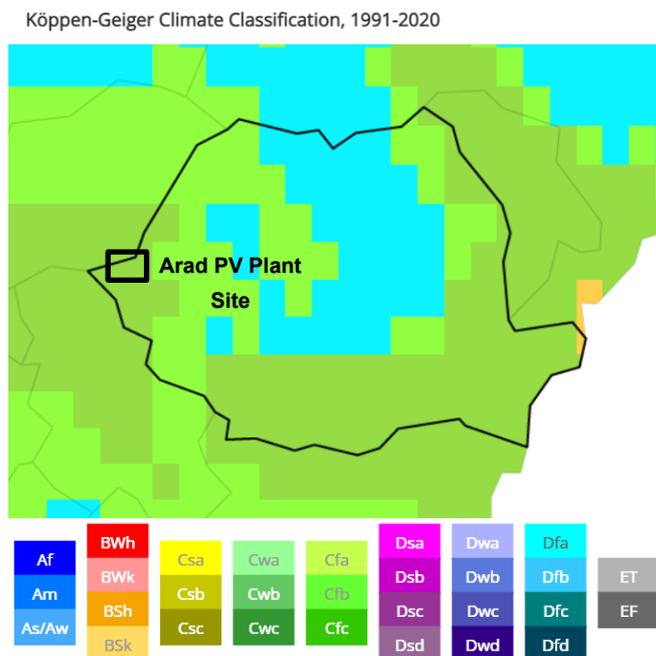
Source: Google Earth, 2023.

6.1.2.2 Baseline conditions

Climate Overview: Romania

Figure 6-4 shows a breakdown of the climatic classification in Romania. Romania’s “climate variability is linked with its geological sub-state, which includes coastal, plain areas and mountains” (World Bank, 2021).

Figure 6-4 Map of Romania’s climate classification



Source: The World Bank Group, 2021.

The Project falls within the ‘Humid subtropical climate’ in Köppen-Geiger classification, highlighted in medium green [Cfa] in Figure 6-4. Romania has three main seasons (Country Reports, 2023):

- A long, and sporadically harsh winter from December to March;
- May to August being a hot summer, and
- September to November being the elongated autumn.

Romania’s peak temperatures and precipitation occur in the summer months and rainfall is experienced throughout the year. Romania’s climate is relatively mild, average temperatures equal 11-12°C in the plains and 2-3°C in the mountains. Romania has a strong dependence on its aquatic facilities namely its lakes, rivers, groundwaters, streams and marine waters. “It’s hydrographical and hydrological variabilities are determined mainly by its geographic position within the temperate continental climate and the presence of the Carpathian Arch” (World Bank, 2021).

Climate Overview: Site

Climatic factors are dynamic factors and have a determining role in the formation of water runoff, through the form and intensity of precipitation, evaporation, humidity and air and soil temperature.

From a climatological point of view, the study area falls under the temperate-continental moderate climate with varied nuances determined by local peculiarities, having some Mediterranean influences.²²

The average annual temperature is approximately 11°C.

The amounts of precipitation falling in the study area during a year show variations from season to season. The lowest amounts of precipitation are recorded in winter, when the average value is 38 mm, and summer is the rainiest period and the average amount of precipitation is 65 mm. The average amount of precipitation in the study area is 572.9 mm.

The following table shows the monthly and annual average amounts (mm) recorded at the Arad meteorological station, in the period 1961-2010, according to the National Meteorological Administration.

Table 6-1 Monthly and annual average amounts (mm) recorded at the Arad meteorological station

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual
Arad	34.8	31.2	36.5	45.9	63.4	86.2	58.5	49.9	41.6	33.5	42.6	48.8	572.9

The frost depth in the site area is 60-70 cm, according to the geotechnical study.

Existing Project Baseline Studies and Surveys:

- **"Floodability study. flood risk assessment the event occurrence maximum flows probabilities of overflow in the area of the Arad 1 project of West Power Investments"** (Vol 1) produced by the National Hidrology and Water Management Institute (INHGA) April 2022.
- *2002-2021 Rainfall data from the National Meteorological Administration.*
- *Geotechnical study prepared by SC B&B Geotech Consulting SRL, September 2021.*

²² The Köppen-Geiger classification of the site climate is Cfa (Humid subtropical climate)

Site Receptors

The Project has a number of Project elements (Site Receptors) for the operation and decommissioning phases that will be affected by Climate Change.

The whole CCRA Specialist Study in the Appendix B provides a summary of the Project elements for the operation and decommissioning phases, divided into a number of receptor types. Receptors are defined as the elements of the Project site(s) that are allocated into types based on their function and/or use (See Appendix B CCRA report for the range of site receptors considered for both phases).

Risk Scores and Material Hazards: Risk Score Baseline Data

Risk score composition

Table 6-2 below shows the most material hazards for the baseline. It shows the identified six material hazard types for the Project.

Table 6-2 Baseline Material Hazards

Asset	Material Hazards					
	Wildfires	Water Stress & Drought	Extreme Rainfall Flooding	River Flooding	Extreme Cold	Extreme Heat
Arad PV Plant	Yes	Yes	Yes	Yes	Yes	Yes

Summary of Material Hazards

Table 6-3 presents a summary of the potentially material hazards* for the Project for both the baseline and projections. In summary:

- Extreme Heat will significantly increase for the site;
- On the other hand, as heat increases, Extreme Cold will decrease moderately (it decreased from a moderate to a low risk);
- Water Stress & Drought will also increase significantly for the site, overall, it is categorized as moderate risk;
- Wildfires will also increase significantly for the site, and it increases from a low to a very high risk;
- River Flooding is categorised as a very high risk and even though there may be minimal increases or no changes it still remains as a very high risk;
- For Extreme Rainfall Flooding, it is categorised as a high risk and even though there may be minimal decreases it still remains as a high risk.

Table 6-3 Summary of Material Hazards for baseline and projections

Asset: Arad PV Plant	Period					
	Baseline			Projection		
	Material Hazards					
SSP ²³ 1-2.6 and SSP5-8.5	Red	Yellow	Purple	Cyan	Blue	Orange

²³ Shared Socio-Economic Pathway

Asset: Arad PV Plant	Period						
	Baseline			Projection			
	Material Hazards						
SSP1-2.6 - 2030	I	I	D&S		D	I	
SSP1-2.6 - 2050	I	I	D&S	I	D	I	
SSP5-8.5 - 2030	I	I			D	I	
SSP5-8.5 - 2050	I	I	D&S		D	I	

*Note - It is to be noted that we have taken the worst case risk.

Key:

Wildfires	Water Stress & Drought	Extreme Flooding	Rainfall	River Flooding	Extreme Cold	Extreme Heat
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I – Increase in Hazard for 2030 and 2050.

D – Decrease in Hazard for 2030 and 2050.

D&S – Decrease in Hazard for 2030 and 2050 but still a significant risk.

6.1.3 Air Quality

6.1.3.1 Area of Influence

The air quality baseline has been identified within the Project’s Area of Influence. The area of influence (Aol) for air quality impacts at the solar power plant is defined as the geographical area in which air quality may be affected by the construction and operation of the plant and associated infrastructure. The size of the Aol depends on a number of factors, such as the capacity of the solar plant, prevailing weather patterns, topography, and the location of nearby sensitive receptors such as homes, schools, and hospitals.

During the construction phase of the solar power plant, the primary sources of emissions are likely to be construction activities associated with fuel combustion and dust generation. Dust is known to precipitate at distances up to approximately 500 meters from the source. This distance is expected to be the maximum extent of significant air quality impacts of the Project. Therefore, the Aol for air quality impacts during the construction stage is defined as a 500-meter radius around the construction site and transportation route.

Solar power plants at operational stage are typically not associated with significant air quality impacts. Therefore, no Aol was determined for the operational stage of the solar power plant. However, this does not mean that there will be no emissions or air quality impacts during the operational stage. Instead, the anticipated emissions and impacts are not expected to be significant enough to warrant a defined area of influence.

6.1.3.2 Ambient Air Quality Standards

Ambient Air Quality Standards (AAQS) are standards or guidelines setting the maximum permissible concentrations of pollutants in air, for the purposes of protecting human health and sensitive vegetation.

In Romania, these are derived from the following sources:

- AAQs derived from the European Union Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe.
- Guidelines set on a national basis, referred to as Maximum Allowable Concentrations (MACs). These MACs are generally more relaxed than the standards set forth by the EU.

The AAQS in force in Romania are set out in Table 6-4. Pollutants unlikely to be emitted by the project are not considered and have been excluded from the table.

Table 6-4 Romanian Ambient Air Quality Standards

Pollutant	Averaging period	Value ($\mu\text{g}/\text{m}^3$)	Reference
Human Health Criteria			
SO ₂	1-hour mean	350	L 104/2011
	24-hour mean	125	L 104/2011
	Annual mean	60	STAS 12574-87
NO ₂	1-hour mean	200	L 104/2011
	Annual mean	40	L 104/2011
PM ₁₀	24-hour mean	50	L 104/2011
	Annual mean	40	L 104/2011
PM _{2.5}	Annual mean	25	L 104/2011
CO	8-hour maximum daily mean	10,000	L 104/2011
Benzene	Annual average	5	L 104/2011
Dust deposition	Month mean	17 g/m ² /day	STAS 12574-87
Vegetation criteria			
SO ₂	Annual mean	20	L 104/2011
NO _x	Annual mean	30	L 104/2011

Source: L 104/2011, STAS 12574-87

The International Finance Corporation (IFC) in its General Environmental, Health, and Safety (EHS) Guidelines requires to apply national legislated standards, or in their absence, the current World Health Organization's (WHO) Air Quality Guidelines. The table below lists the ambient air quality guidelines established by these organizations.

Table 6-5 IFC/WHO Guidelines on Ambient Air Quality

Pollutant	Averaging Period	Value ($\mu\text{g}/\text{m}^3$)
NO ₂	Annual mean	40 ⁽¹⁾
NO ₂	1-hour maximum	200 ⁽¹⁾
NO _x (ecosystems only)	Annual mean	30 ⁽²⁾
SO ₂	24-hour highest	125 ⁽¹⁾
SO ₂	10-minute maximum	500 ⁽¹⁾
SO ₂ (ecosystems only)	Annual mean	20 ⁽²⁾

PM ₁₀	Annual mean	20 ⁽¹⁾
PM ₁₀	24-hour, 4 th highest (99 th percentile)	50 ⁽¹⁾
PM _{2.5}	Annual mean	10 ⁽¹⁾
PM _{2.5}	24-hour	25 ⁽¹⁾
O ₃	8-hour daily maximum	100 ⁽¹⁾
VOCs (as benzene)	Annual mean	1.7 (based on 1:100,000 lifetime cancer risk) ⁽²⁾
CO	1-hour mean	30,000 ⁽²⁾
CO	8-hour mean	10,000 ⁽²⁾

Sources:

- 1: IFC (2007) General EHS Guidelines: Environmental, Air Emissions and Ambient Air Quality
- 2: World Health Organisation (2000) Air Quality Guidelines for Europe

IFC requires that when host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. Table 6-3 below defines the standards which have been considered for the Project. The selected values represent only the most stringent criteria from the range presented above in Table 6-4 and Table 6-5, in order to provide highly precautionary standards for the protection of human health and the environment.

Table 6-6 Project Ambient Air Quality Standards

Pollutant	Averaging Period	Value (µg/m ³)
NO ₂	Annual mean	40 ⁽¹⁾
NO ₂	1hour maximum	200 ⁽¹⁾
NO _x (ecosystems only)	Annual mean	30 ⁽²⁾
SO ₂	24-hour highest	125 ⁽¹⁾
SO ₂	10-minute maximum	500 ⁽¹⁾
SO ₂ (ecosystems only)	Annual mean	20 ⁽²⁾
PM ₁₀	Annual mean	20 ⁽¹⁾
PM ₁₀	24-hour, 4 th highest (99 th percentile)	50 ⁽¹⁾
PM _{2.5}	Annual mean	10 ⁽¹⁾
PM _{2.5}	24-hour	25 ⁽¹⁾
VOCs (as benzene)	Annual mean	1.7 (based on 1:100,000 lifetime cancer risk) ⁽²⁾
CO	1-hour mean	30,000 ⁽²⁾
CO	8-hour mean	10,000 ⁽²⁾

Sources:

- 1: IFC (2007) General EHS Guidelines: Environmental, Air Emissions and Ambient Air Quality
- 2: World Health Organisation (2000) Air Quality Guidelines for Europe

6.1.3.3 Baseline conditions

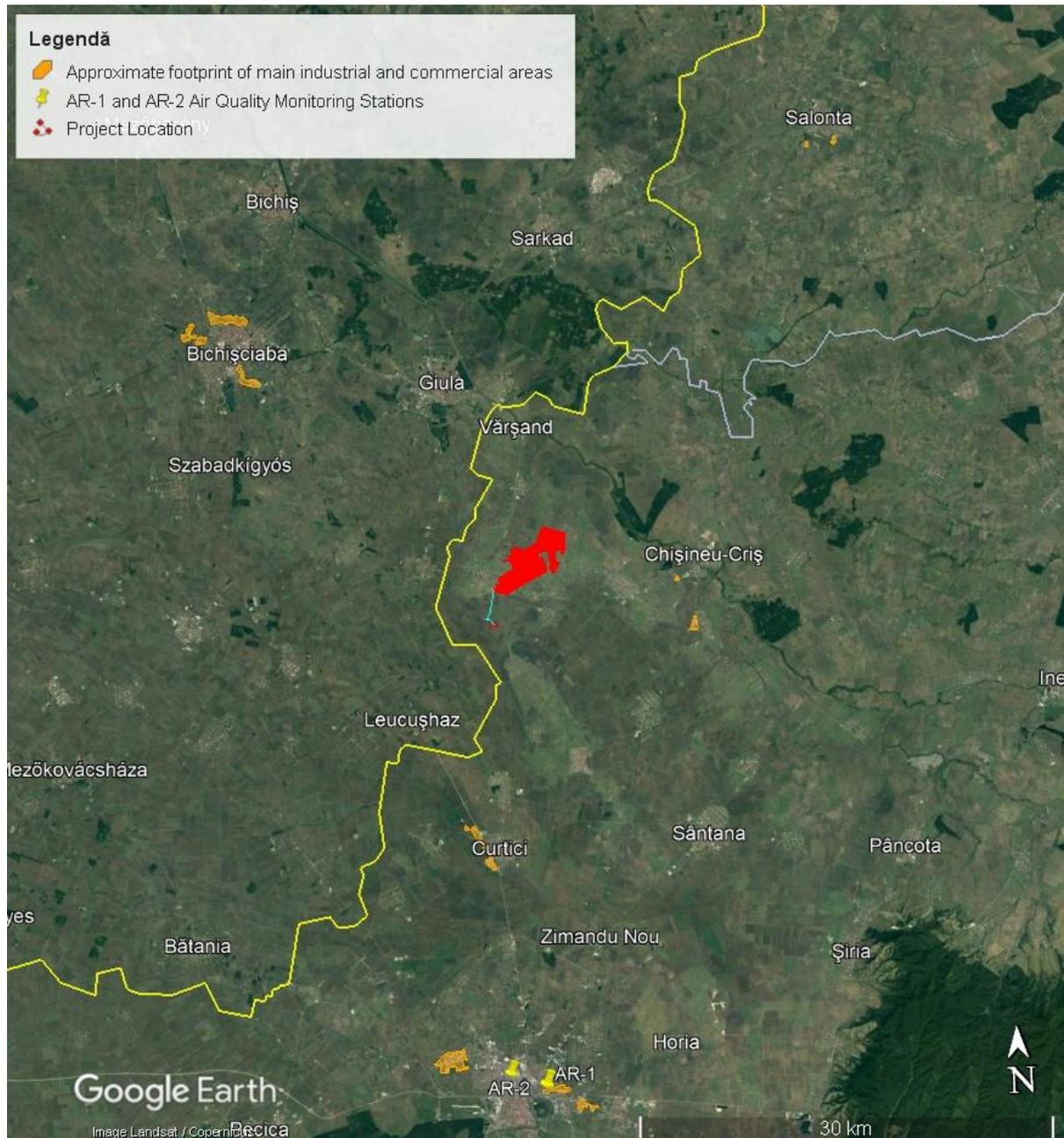
Unlike certain industrial activities, such as manufacturing or mining, photovoltaic projects are typically not significant sources of air pollution. In addition, the Project site is relatively far from major urban areas

and significant industrial pollution sources. In addition, the Project site is relatively far from major urban areas and significant industrial pollution sources. The existing impact is due to agricultural activities – the use of agricultural machinery, pesticides – carried out on neighboring agricultural lands.

The nearest industrial area is located 11 km east of the Project boundary, in Nadab. The industrial area comprises companies involved in warehousing and in the production of silicone tubes and food-grade plastic packaging. The site area is relatively flat, located at elevations ranging between 90-100m.

The approximate footprints of the main industrial and commercial areas in the area of the Project are shown in Figure 6-5, below.

Figure 6-5 Surrounding industrial and commercial areas



Source: ERM, using Google Earth Pro aerial imagery and Client data

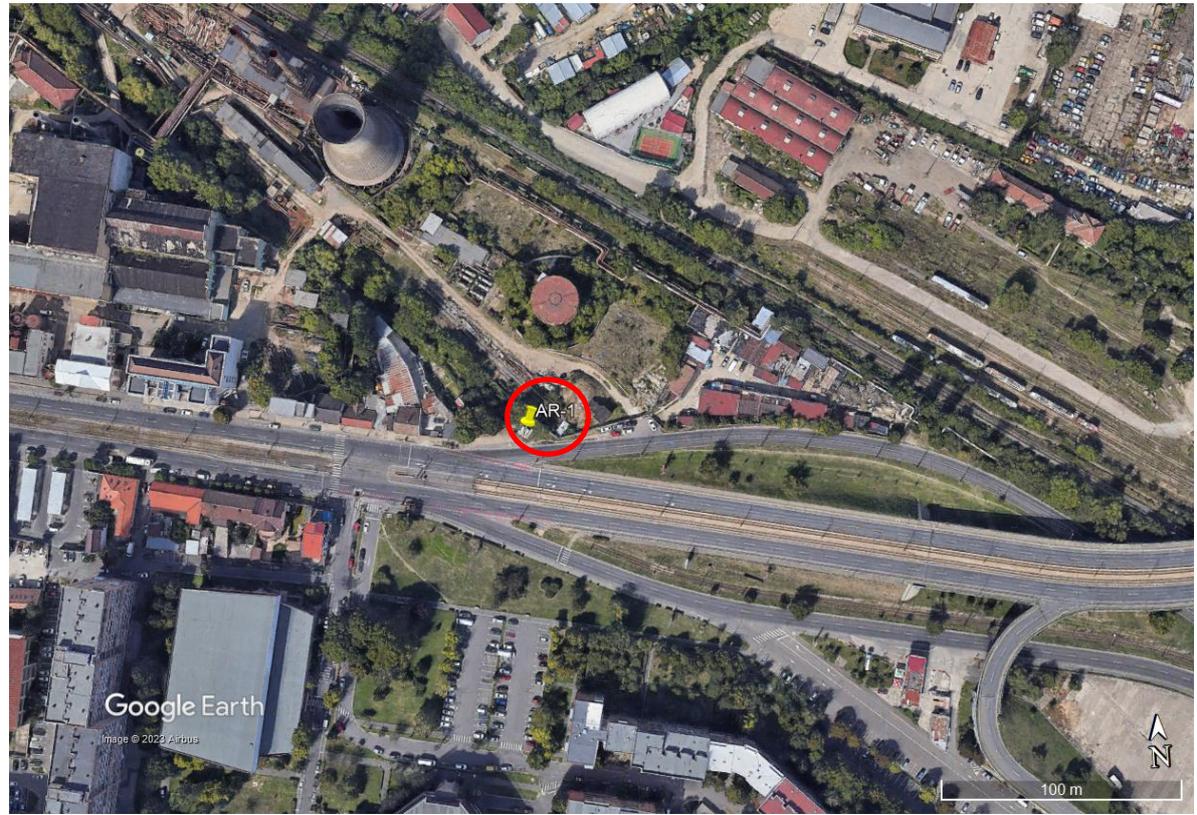
No ambient air quality monitoring is currently undertaken in the vicinity of the Project, based on publicly available information. Air quality baseline is obtained from the National Database²⁴.

The nearest air quality monitoring stations (AR-1 and AR-2) of the National Air Quality Monitoring Network are located in Arad city, approximately 30 km south of the Project boundary. Both stations are located in residential-commercial areas, as shown in Figure 6-6 below.

²⁴ National Database Monitoring, link: https://www.calitate aer.ro/public/monitoring-page/reports-reports-page/?__locale=ro

Figure 6-6 Location of nearest air quality monitoring stations

AR-1 Air quality monitoring station



AR-2 Air quality monitoring station



Source: ERM, using Google Earth Pro aerial imagery

Average values of Air Quality Indicators for the interval 01.01.2018-2023 show mainly Good-Acceptable values²⁵, according to the rating index established by the National Database²⁶, as detailed below:

Table 6-7 National Database Air Quality Index

Specific Index	SO2 (µg / m3)	NO2 (µg / m3)	O3 (µg / m3)	PM2.5 (µg / m3)	PM10 (µg / m3)
	1-hour mean	1-hour mean	1-hour mean	24-hour mean	24-hour mean
1 Good	0-100	0-40	0-50	0-10	0-20
2 Acceptable	100-200	40-90	50-100	10-20	20-40
3 Moderate	200-350	90-120	100-130	20-25	40-50
4 Bad	350-500	120-230	130-240	25-50	50-100
5 Very Bad	500-750	230-340	240-380	50-75	100-150
6 Extremely Bad	750-1250	340-1000	380-800	75-800	150-1200

Source: https://www.calitateaer.ro/public/monitoring-page/quality-indices-page/?_locale=ro

The General Index is based on the hourly values recorded for SO2, NO2, O3, PM2.5 and PM10.

²⁵ National Database AQ Index, link: https://www.calitateaer.ro/public/monitoring-page/quality-indices-page/?__locale=ro

Table 6-8 Average annual values of monitored parameters at AR-1 and AR-2 stations [$\mu\text{g}/\text{m}^3$]

Monitoring station	AR-1	AR-2	AR-1	AR-2	AR-1	AR-2	AR-1	AR-2	AR-1	AR-2	AR-1	AR-2	AR-1	AR-2	AR-1	AR-2
Parameter	NO ₂	NO ₂	NO _x	NO _x	PM _{2.5}	PM _{2.5}	PM ₁₀	PM ₁₀	Benzene	Benzene	CO	CO	SO ₂	SO ₂	O ₃	O ₃
2018	22.49	17.68	45.30	27.04	-	17.87	25.74	17.78	2.13	-	143.00	164.06	7,89	6,75	52,42	51,41
2019	25.30	18.14	50.66	30.60	-	-	23.32	19.37	-	-	121.30	160.89	9,83	9,56	56,86	55,21
2020	23.10	20.59	45.34	30.58	-	-	18.62	16.81	-	2.53	121.43	163.34	10,48	9,13	57,53	46,40
2021	24.38	17.57	47.67	29.10	-	15.92	16.85	22.14	-	2.04	144.68	177.51	8,83	9,88	42,98	52,27
2022	27.46	20.10	56.66	33.13	-	12.66	14.73	17.22	-	1.54	135.71	141.88	8,90	9,14	38,68	45,51
Project Standard Limits	40	40	30	30	10	10	20	20	1.7	1.7	10,000 (*)	10,000 (*)	20 (**)	20 (**)	-	-

(*) - Value limit for 8 hours

(**) – Value limit for ecosystems only

123	Value exceeds the Project Air Quality Standard limit
	'1 - Good', according to the National Database Air Quality Index
	'2 - Acceptable', according to the National Database Air Quality Index

Baseline air quality in the areas near the site may be affected by reoccurring traffic congestion and truck lines forming near the Vârșand Border Crossing Point, located approximately 9.4 km north of the Project boundary.

ERM considers that the airshed in the area of the Project is **undegraded**, given the distance to industrial areas and mainly agricultural use of the site. AR-1 and AR-2 stations results are not considered representative for the Project area, as these monitoring stations are located in densely populated areas and in proximity of industrial sites of Arad city.

6.1.4 Noise and Vibration

6.1.4.1 Baseline conditions

The project area is constituted by agricultural land, mostly arable, surrounded by pasture. Domestic noise and noise from agricultural activities are typical for the project area and at rural receptors.

There are no readily available public noise baseline data sources in Romania.

No baseline noise survey was performed to date for the Project.

6.1.4.2 Romanian Noise Standards

Permissible noise levels applicable to the communities outside of (and individuals living in protected zones within) the Project boundaries are established by the following regulations:

- STAS 10009/88: Urban Acoustics: Permitted limits of noise levels. The standard considers admissible noise limits within urban areas, differentiated by zones and areas of specific use, and categories of streets.
 - Category III (collector) streets have a maximum admissible equivalent level of noise of 65 dB(A).
 - Category II (connector) streets have a maximum admissible noise equivalent of 70 dB(A).

The maximum admissible level of noise, LAeq, at the limit of industrial zones in urban areas is 65 dB(A). Dwellings can be built on streets of different technical categories, or at the limit of zones or areas of a certain use, as long as the maximum noise value is 50 dB(A), measured 2 meters away from the building façade.

- Order No. 119/2014 of the Ministry of Health establish that in protected areas the following maximum limits for noise will be assured:
 - During the day, between the hours of 07:00 – 23:00, the level of continuous sound pressure weighted equivalent A (LAeq) must not exceed the value outside the home of 55 dB(A);
 - During the night, between the hours of 23:00-7:00, the level of continuous sound pressure weighted equivalent A (LAeq) must not exceed the value outside the home of 45 dB(A).

6.1.5 Geology and Soil

6.1.5.1 Area of Influence

The direct Aol with respect the geology and soil is represented by the footprint of the Project components and facilities. This includes areas affected throughout the Project life time (e.g. PV arrays, transformer stations, underground cables, internal roads), areas affected temporarily (e.g. construction laydown areas etc.), as well as any other areas in which the geology and soil could experience significant impacts.

6.1.5.2 Baseline conditions

Geology

From a geological point of view, the study area falls within the Pannonian Basin, a basin of tectonic origin formed in the Pliocene by the submergence of a large ante-Pliocene continental surface. Quaternary deposits cover older formations of the eastern area of the Pannonian basin. Up to depths of approximately 2,000-3,000 m below ground level (b.g.l.), the quaternary deposits are underlain by Pannonian deposits comprising of marly clays, sands and gravels. The granitoid crystalline basement rock is estimated at approximately 3,000 m b.g.l. in the Project area.

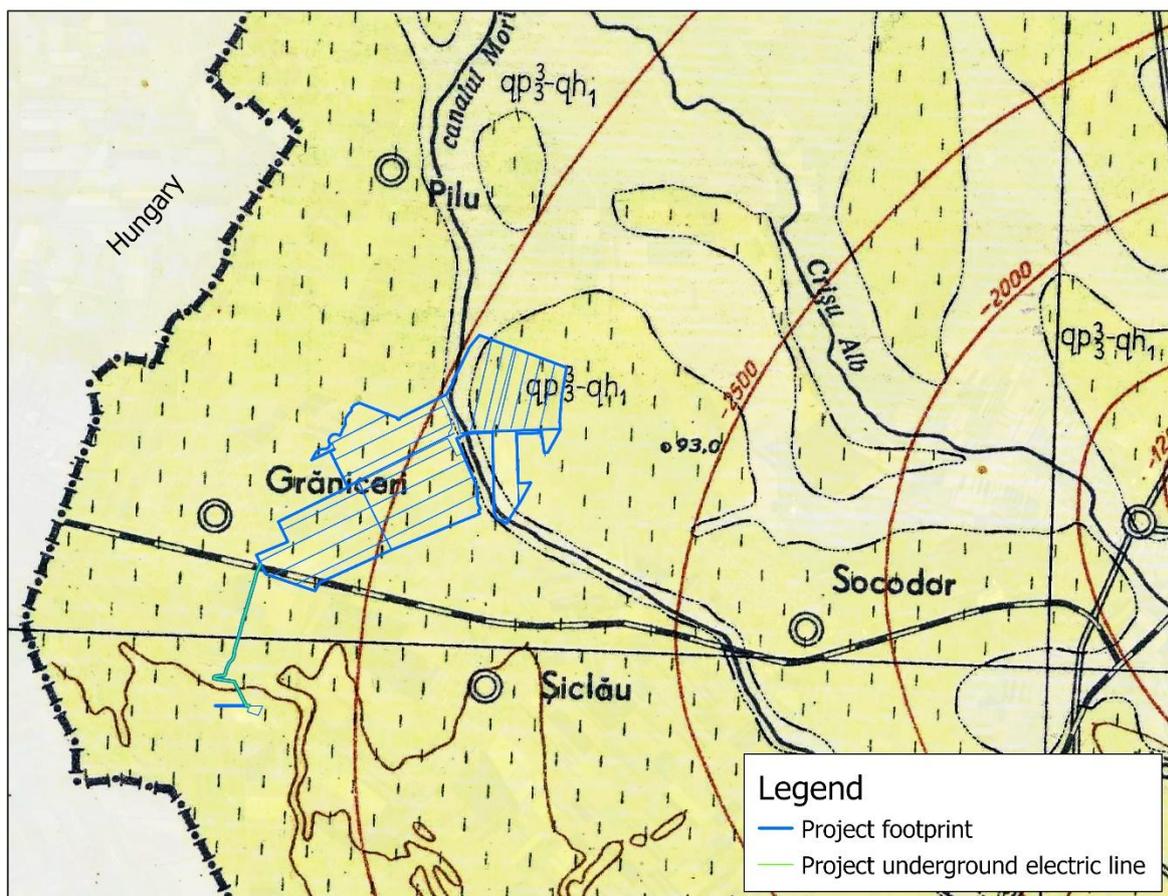
According to the Geotechnical Survey prepared for the Project, the 42 soil borings performed on-site up to depths between 5-8 m b.g.l. (below ground level) identified the following stratigraphy:

- 0 m to 0.4 m b.g.l. – topsoil
- 0.4 m to 1.2 m b.g.l. – brownish clays
- 1.2 m to 5.0 m b.g.l. – brown-greyish silty clay

Below 5.0 m b.g.l. – alternating layers of clayey silt, clayey-sandy silt, clayey sand, silty sand and sand.

The geological map of the Project area is shown in Figure below; light-yellow areas indicating quaternary deposits in the project areas and in surrounding areas.

Figure 6-7 Geological map of the Project area



Source: Geological map of Romania L-34-XVI - Arad, issued by the Geological Institute of Romania, adapted by ERM

Soils

The project site was converted from pasture to agricultural use in 2005. Considering the agricultural use, it is assumed the native topsoil has since been treated with fertilizers and pesticides.

Soil characterization

Based on the Pedological and Agrochemical Study performed on the Project area in 2021 by Arad Pedological and Agrochemical Study Office (OSPA), the following types of soils were identified on-site:

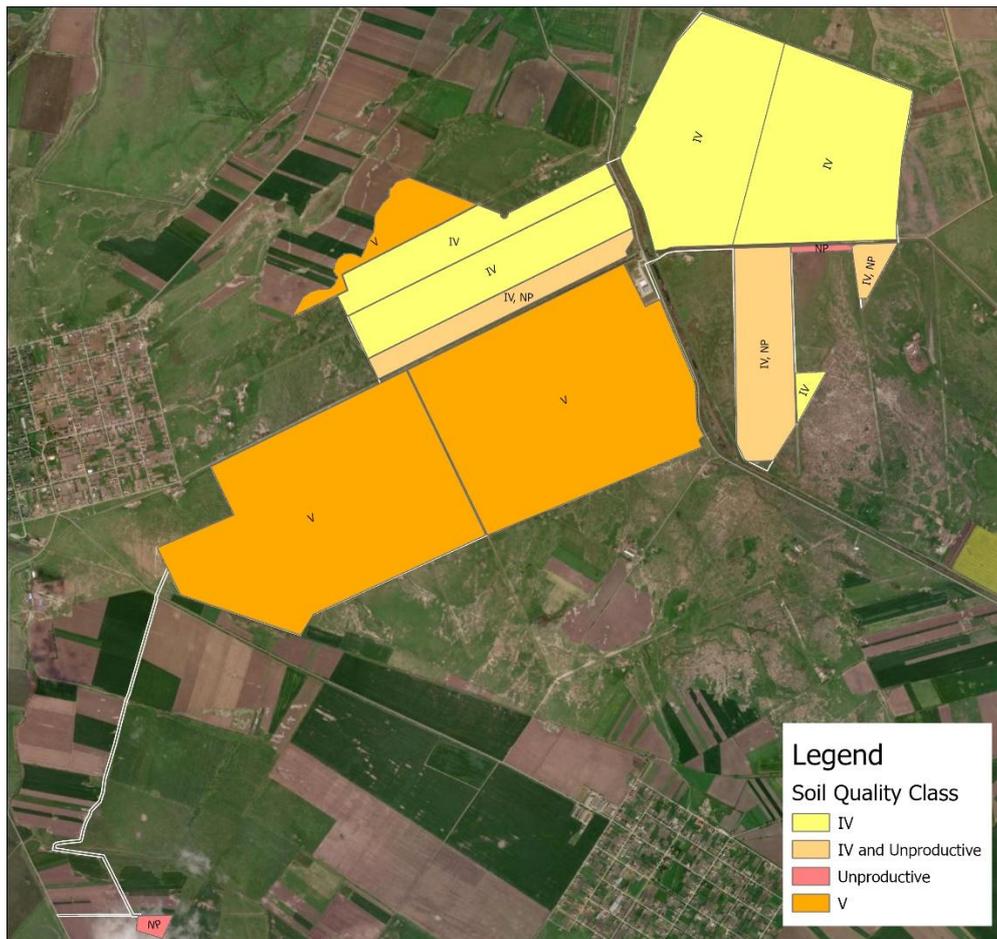
- **US 1.01 - eutricambosol vertic-gleic-salsodic (EC st-gc-ss)**, moderately gleic, with moderate salinization between 50-100 cm, strongly sodicized between 50-100 cm (quality class III);
- **US 2.01 - vertosol gleic salsodic (VS st-gc-ss)**, moderately gleic, with weak salinization between 50-100 cm, strongly sodicized between 50-100 cm (quality class IV);
- **US 3.01 - amphigleic-salsodic vertosol (VS st-gc-ss)**, strongly gleic, with strong stagnogleication, with moderate salinization between 50-100 cm, moderately sodicized between 50-100 cm (quality class IV);
- **US 4.01 - amphigleic-salsodic vertosol (VS st-gc-ss)**, strongly stagnogleic, strongly gleic, with weak salinization between 25-50 cm, moderately sodicized between 25-50 cm (quality class IV);
- **US 5.01 - vertosol gleic salsodic (VS st-gc-ss)**, moderately glaciated, with strong salinization between 50-100 cm, strongly sodicized between 25-50 cm (quality class V);
- **US 6.01 - pelosol gleic salsodic (PE st-gc-ss)**, strongly glaciated, with moderate salinization between 25-50 cm, strongly sodicized between 25-50 cm (quality class IV);
- **US 7.01 - amphigleic-alkaline pelosol (PE st-gc-ac)**, with moderate stagnoglaization, moderate glaciation, with weak salinization below 100 cm, strongly sodicized between 50-100 cm (quality class IV);
- **US 8.01 - vertosol gleic stagnosol (SG gc-vs)**, strong stagnogleic, moderately gleic, with weak salinity between 50-100 cm, strongly sodicized between 50-100 cm (quality class IV);
- **US 9.01 - solonetz gleic saline (SN gc-sc)**, moderately glaciated, with moderate salinization between 25-50 cm, strongly sodicized, between 25-50 cm (quality class V);
- **US 10.01 - solonetz gleic vertic saline (SN gc-sc)**, moderately glaciated, with moderate salinization between 0-25 cm, strongly sodicized between 0-25 cm (quality class V).

A general overview of landcover and soils in the project area is presented in Geology Figure 6-7.

Soil Quality

Overall, the pedological study performed by OSPA Arad had classified the soils in quality class IV, which is defined as “lands with poorly fertile soils, frequently skeletal or with hard rock, at a shallow depth, with varied texture (coarse to fine), strongly affected by degradation phenomena (salination, acidification, erosion, active landslides, excess moisture, etc.), in climatic conditions less favourable for agricultural crops”. The figure below shows the quality class of different areas of the Project area, based on the Pedological Study:

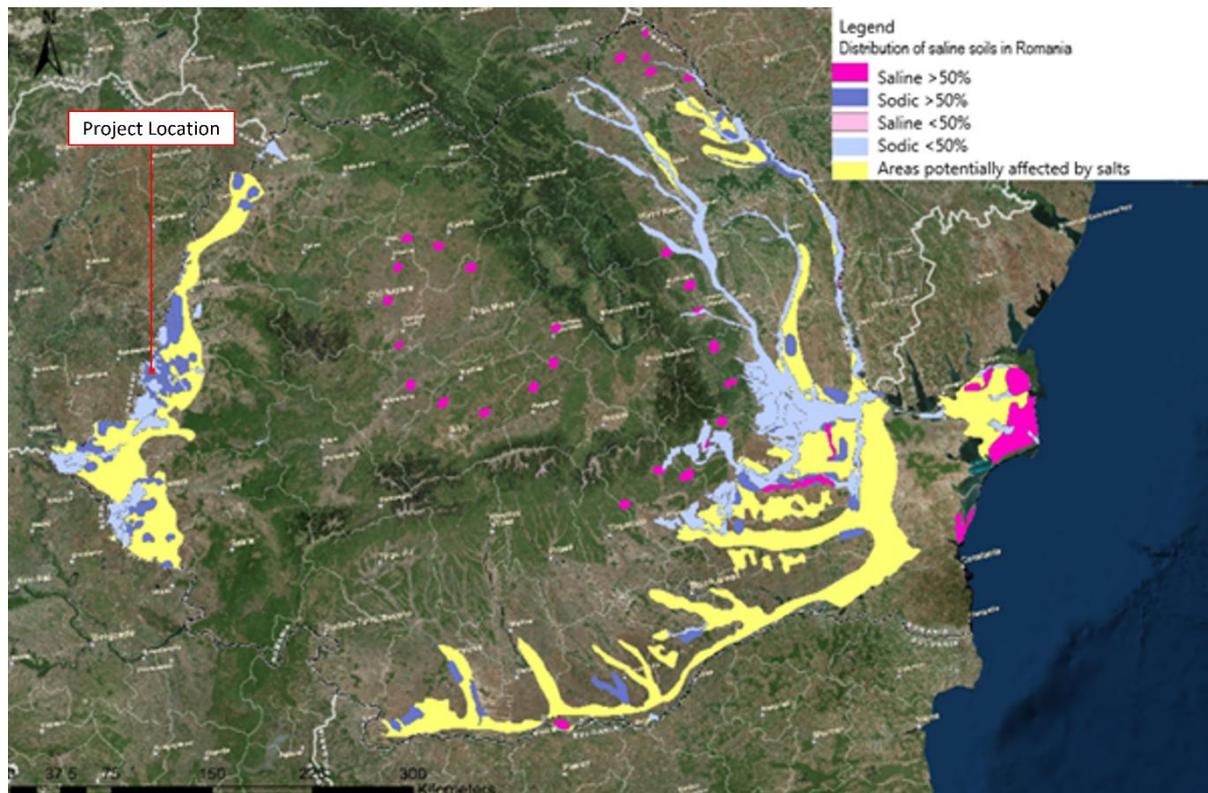
Figure 6-8 Project area soil quality class based on Pedological study



Source: ERM, using data from the Pedological Study, OSPA Arad

The findings of the pedological study are supported by previous scientific literature on the topic, as shown in Figure 6-9, indicating the distribution of saline soils by degree of salinity in Romania, below:

Figure 6-9 Distribution of saline soils by degree of salinity in Romania and Project area, 2008



Source: Toth et al., 2008²⁷

Natural hazards

Tectonic processes in the area:

- Seismicity – According to the European Macroseismic Scale (EMS-98), which denotes how strongly a specific place is affected by an earthquake (‘I – Not felt’ to ‘XII – Completely devastating’), the area of the project is classified as having intensity grade ‘IV – Largely Observed’.

Geomorphological processes and land degradation in the Project AoI – are the most common natural hazards. The potential hazards that occur in the Project AoI are shortly described below:

- Water excess and water accumulation – is linked with occasional short-term accumulation of rainwater on-site due to low drainage quality of the soil.
- Landslides – no landslides were reported in the Project AoI. Landslide potential is considered to be low.

²⁷ https://www.researchgate.net/figure/Harta-solurilor-afectate-de-saruri-din-Romania-dupa-Toth-si-colab-2008_fig1_294855962/download

6.1.6 Groundwater and Surface water

6.1.6.1 Area of Influence

Water resources Aol (direct Aol) is represented by the primary Project sites, components and facilities that may interact with the groundwater and surface water resources, together with any additional areas in which the water resources could experience significant impacts.

- Direct Aol – Footprint areas of the PV arrays foundations, transformer stations, underground cables, internal roads, temporary construction laydown areas, fencing.

Indirect Environment Aol is represented by any additional areas where impacts on underground and surface water resources, from unplanned but predictable developments caused by the Project, may occur later or at a different location.

- Indirect Aol – Additional areas in which aspects of the environment could conceivably experience significant impacts.

6.1.6.2 Groundwater and Surface Water Quality Standards

In Romania, the standards for evaluation of water quality derive from a series of normative acts:

- Law no. 458/2002 (republished) on drinking water quality;
- OM no. 161/2006 for the approval of the Norm regarding the classification of surface water quality in order to establish the ecological status of water bodies;
- GD no. 100/2002 for the approval of the Quality Standards to be met by the surface waters used for drinking water and of the Regulation on the methods of measurement and frequency of sampling and analysis of samples from surface waters intended for the production of drinking water (NTPA-013);
- Order no. 621/2014 on the approval of threshold values for groundwater in Romania;
- GD no. 516/2016 for the amendment of the annex no. 2 to the National Plan for the protection of groundwater against pollution and damage, approved by Government Decision no. 53/2009;
- GD no. 53/2009 for the approval of the National Plan for the protection of groundwater against pollution and damage.

6.1.6.3 Baseline conditions

Surface Water

Natural salt marsh wetlands are recorded in the areas adjacent to the Project boundary and these are likely to be permanent surface water features in the landscape, with water levels and degree of saturation modified by the artificial drainage features constructed to facilitate agriculture in the area.

From a hydrological point of view, the investigated perimeter is in the drainage basin of the Crisul Alb river.

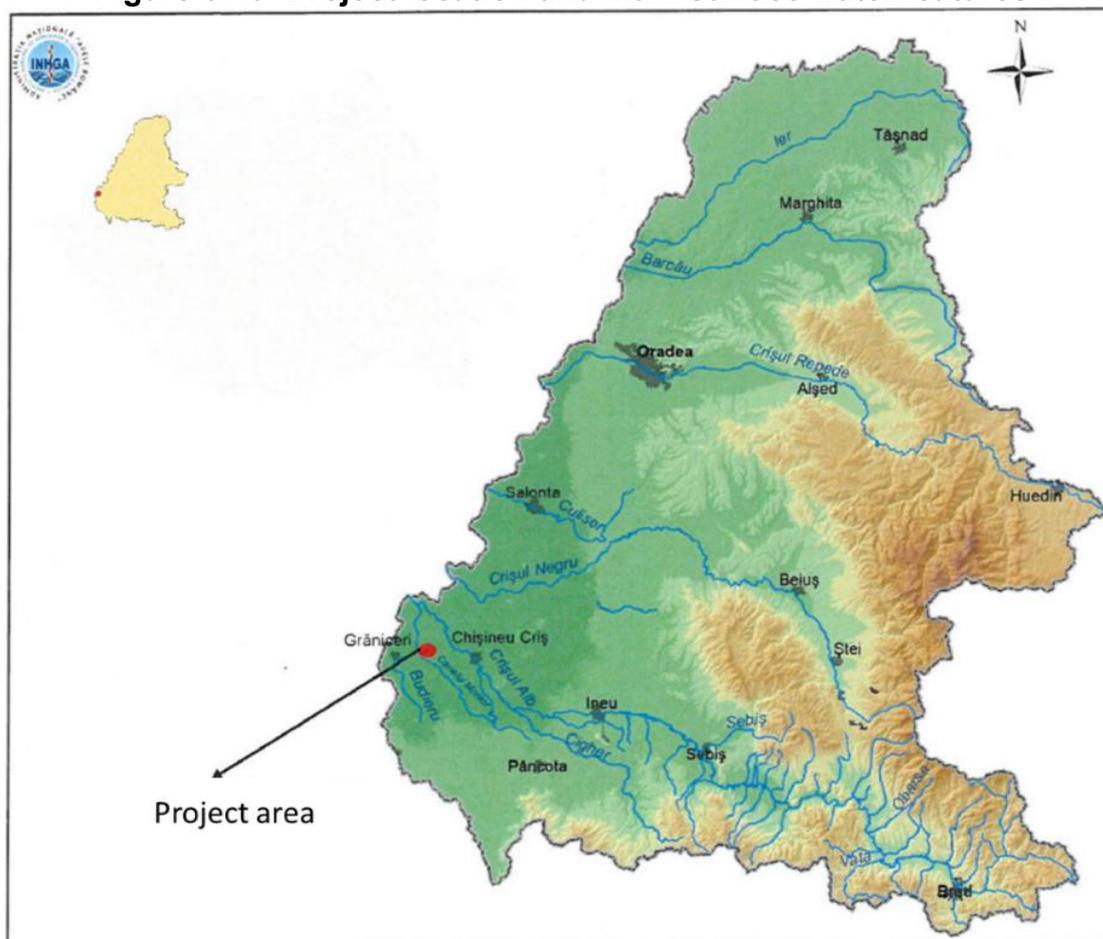
The following channels are located near the Project site²⁸:

- **Canalul Morilor** – an artificial channel located adjacent to the central area of the site, along the national road DN97A. In the project area, the channel is approximately 10 km upstream from the confluence with the Crisul Alb river. The hydrological basin of Crisul Alb river is within the area managed by Crisuri Water Basin Administration.

²⁸ According to Flood study for flood risk assessment in the event of the occurrence of floods with maximum flows with different probabilities of overflow in the area of the Arad 1 project of West Power Investments (Vol 1) produced by the National Hydrology and Water Management Institute (INHGA), April 2022.

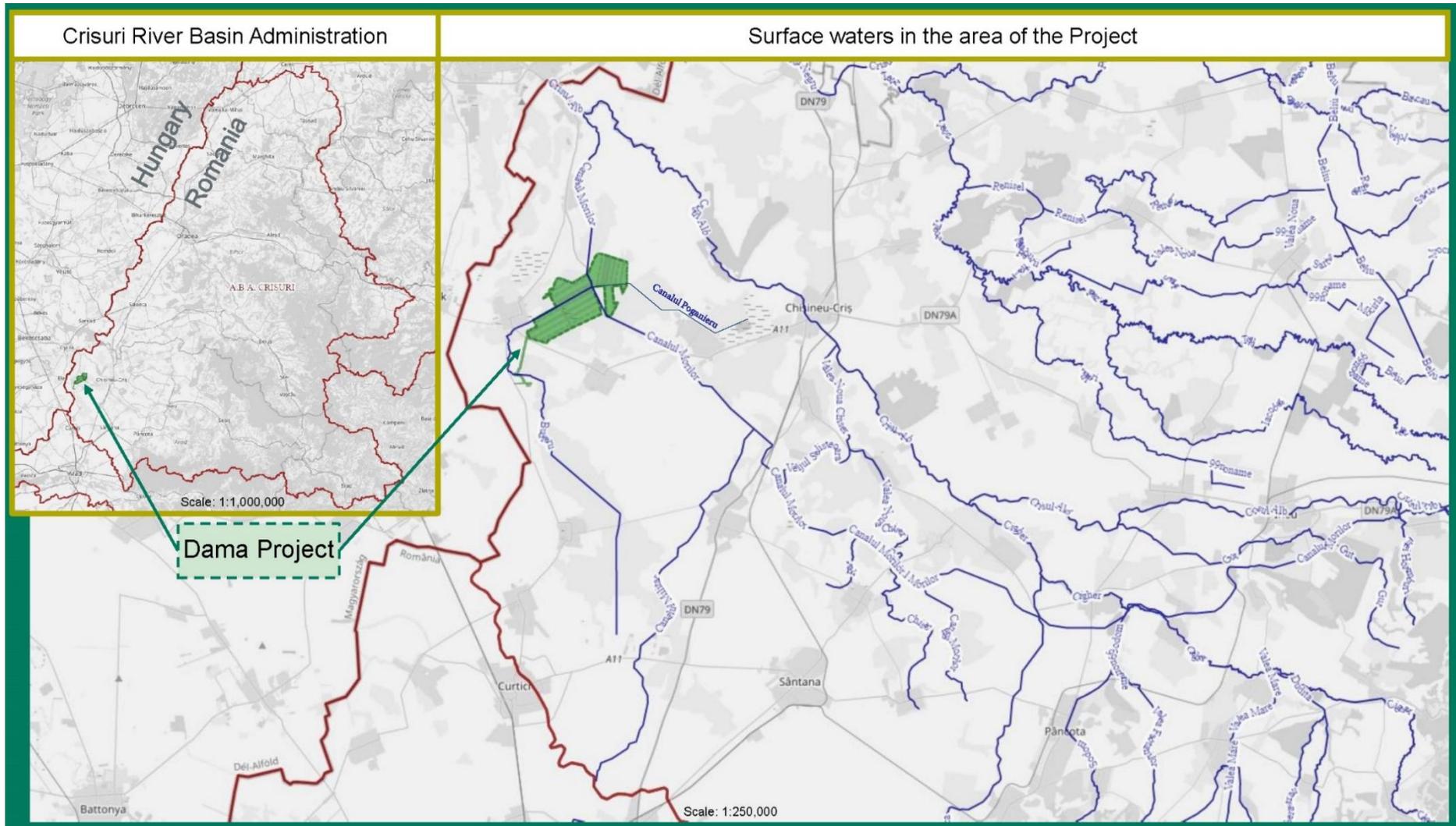
- The first development works began in the 19th century when the outlet from Buteni was executed, through which a flow of 2.5 m³/s was derived from Crisul Alb on the Morilor Canal. In the area of Varsand locality, the canal re-converges upstream of the country border with the Crisul Alb river. The canal was initially developed to supply a succession of water mills. The damming works were put into operation in 2011 and are managed by Crisuri Water Basin Administration (right bank) and the ANIF/ land improvements national association (left bank). The canal intercepts the left tributaries of Crisul Alb river (Cleciova, Hodis, Potoc and Trei Holamburi).
- **Canalul Poganiu** – an artificial channel located on the right bank of the Morilor Canal, crossing the Project site north-eastern area on an east-west direction. The canal drains the surface located in the dammed enclosure created by the dike on the left bank of the Crisului Alb river and the dike on the right bank of the Morilor Canal.
- **Canalul Budieru** – an artificial channel, adjacent to the western-northern boundary of the site and crossing the Project site in the central area, uniting with Morilor channel in the central area of the site. As reported in the Grăniceri Village Monography²⁹, in the past a natural spring was present in the area and Budieru river had a different riverbed. After the river spring had dried, the riverbed was converted to a channel with its current layout.
- Secondary channels were built within the site area between 2005-2010 to support the main channels capacity of draining water from the site.

Figure 6-10 Project location and main surface water features



Source: Flood study produced by the National Hidrology and Water Management Institute (INHGA) in April 2022 for the Project area.

²⁹ Grăniceri Village Monography, *AUTHOR, YEAR*



Source: Cycle 2 Flood Hazard and Risk Maps Public Web Viewer³⁰, with ERM edits

³⁰ <https://harticiul2.inundatii.ro/>

Surface water quality

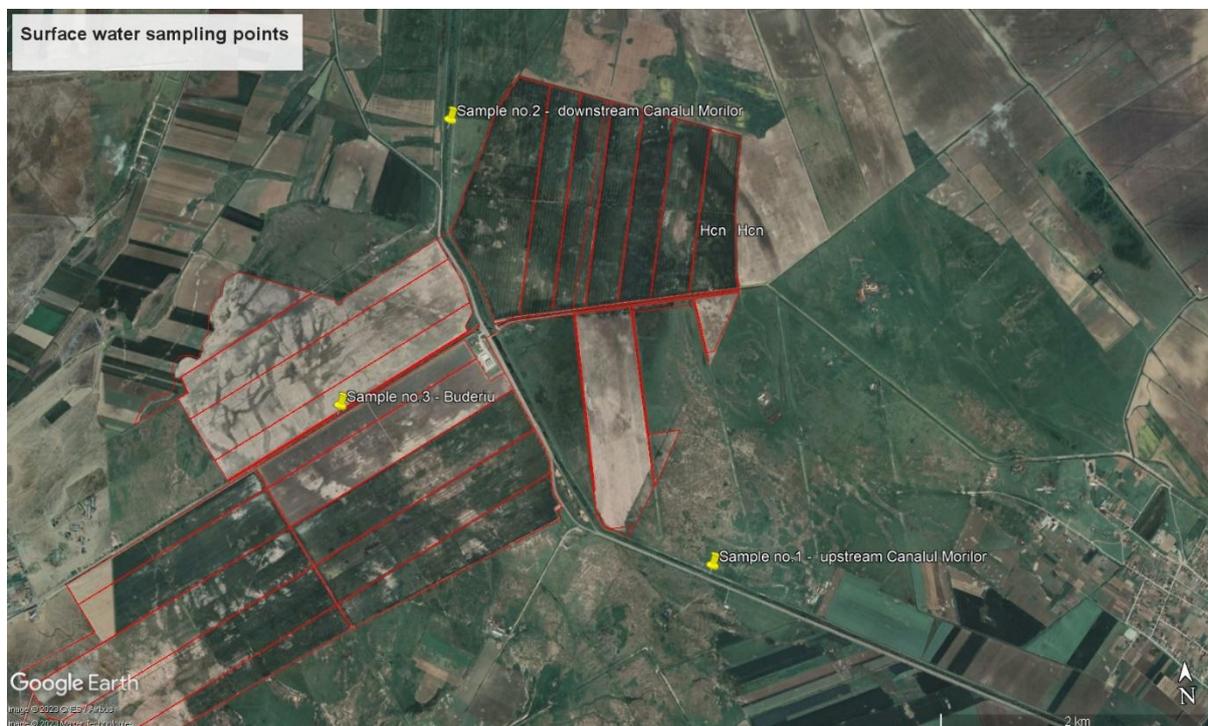
Surface water investigations were carried out by an ISO 17025 accredited laboratory in Romania (Wessling Romania SRL) to determine the baseline quality of surface water in the Project area. Surface water sampling locations were selected to characterize the water quality of the streams upstream, within and downstream of the catchment which includes the proposed Project.

Three (3) surface water sampling locations were selected as follows:

- Sample no.1 – from Canalul Morilor, upstream of the Project area.
- Sample no.2 – from Canalul Morilor, downstream of the Project area;
- Sample no.3 – from Budieru river, before the confluence with Canalul Morilor.

The sampling locations are presented in the figure below:

Figure 6-11 Location of surface water sampling points



Source: ERM, Client data, Google Earth Pro aerial imagery

A summary of the results of the sampling campaign and applicable water quality standards is presented in **Table 6-9** below. The complete sampling report and analysis reports are available in **Appendix C**.

Table 6-9 Summary of surface water analysis reports and applicable water quality standards

Test report no.		2306645/ 26.04.2023	2306646/ 26.04.2023	2306646/ 26.04.2023	According to Order 161/2006, five ecological states are established for natural rivers. Limit values are presented below for the classification of each ecological state				
Coordinates		N- 46,516832 E-21,380875	N- 46,547193 E-21,358357	N- 46,528360 E- 21,346496					
Sample code		07310	07312	7315					
Sampling time		29.03.2023	29.03.2023	29.03.2023					
Parameters	Unit	Sample No. 1 Upstream of Morilor Canal	Sample No.2 Downstream of the Morilor Canal	Sample No.3 Buderi channel	I Very Good	II Good	III Moderate	IV Weak	V Bad
Temperature	C°	8.6	7.5	7.4	-	-	-	-	-
pH (25°C)	pH units	7.88	7.77	8.35	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5
Conductivity (20 °C)	µS/cm	801	912	1160	-	-	-	-	-
Dissolved oxygen	mg O ₂ /l	9.95	6.76	9.14	9	7	5	4	<4
Turbidity	NTU	2.87	7.18	23.3	-	-	-	-	-
Total suspended solids	mg/dm ³	15.6	9.20	23.6	500	750	1000	1300	>1300
Ammonium (NH ₄ ⁺)	mg/dm ³	Bql*	bql	bql	0.4	0.8	1.2	3.2	>3.2
Kjeldhal nitrogen	mg/dm ³	2.24	1.68	1.11	1.5	7	12	16	>16
Nitrite	mg/dm ³	bql	bql	bql	0.01	0.03	0.06	0.3	>0.3
Nitrate	mg/dm ³	9.40	bql	bql	1	3	5.6	11.2	>11.2
Total nitrogen (calculated)	mg/dm ³	4.36	bql	bql	1.5	7	12	16	>16
Phosphorus	mg/dm ³	3.9	2.10	0.75	0.15	0.4	0.75	1.2	>1.2
Color	-	Slightly yellow	Slightly yellow	Slightly yellow	-	-	-	-	-

Arsenic	µg/dm ³	6.4	12	15.8	10	20	50	100	>100
Copper	mg/ dm ³	0.0093	0.0081	0.0069	0.02	0.03	0.05	0.1	>0.1
Iron	µg/dm ³	430	890	1150	300	500	1000	2000	>2000
Lead	µg/dm ³	0.7	0.7	0.8	5	10	25	50	>50
					Decision no. 546/2008 on bathing water quality management – Quality parameters for interior waters				
					Excellent Quality	Good Quality	Satisfactory		
Escherichia coli	MPN/100 ml	172	17	2	500	1000	900		
Pesticides					According to Order 161/2006, Regulation of 16 February 2006, Table 8.A - Relevant and priority dangerous substances				
Total organichlorine pesticides	µg/dm ³	<0.01900	<0.01900	<0.01900	-	-	-	-	-
Alpha- (HCH)	µg/dm ³	<0.00100	<0.00100	<0.00100	-				
beta- (HCH)	µg/dm ³	<0.00100	<0.00100	<0.00100	-				
gamma- (HCH)	µg/dm ³	<0.00100	<0.00100	<0.00100	0.02				
delta- (HCH)	µg/dm ³	<0.00100	<0.00100	<0.00100	-				
Heptachlor	µg/dm ³	<0.00100	<0.00100	<0.00100	0.0002				
Aldrin	µg/dm ³	<0.00100	<0.00100	<0.00100	0.01				
Izodrin	µg/dm ³	<0.00100	<0.00100	<0.00100	0.005				
Heptachlor-epoxid	µg/dm ³	<0.00100	<0.00100	<0.00100	-				
o,p'-DDE	µg/dm ³	<0.00100	<0.00100	<0.00100	0.025 (sum)				
alpha-Endosulfan	µg/dm ³	<0.00100	<0.00100	<0.00100	0.00002				
p,p'-DDE	µg/dm ³	<0.00100	<0.00100	<0.00100	-				
Dieldrin	µg/dm ³	<0.00100	<0.00100	<0.00100	0.01				
o,p'-DDD	µg/dm ³	<0.00100	<0.00100	<0.00100	0.025 (sum)				

Endrin	µg/dm ³	<0.00100	<0.00100	<0.00100	0.005
beta-Endosulfan	µg/dm ³	<0.00100	<0.00100	<0.00100	0,004 (sum of alpha- and beta-endosulfan)
p,p'-DDD	µg/dm ³	<0.00100	<0.00100	<0.00100	0.025 (sum)
o,p'-DDT	µg/dm ³	<0.00100	<0.00100	<0.00100	0.025 (sum)
p,p'-DDT	µg/dm ³	<0.00100	<0.00100	<0.00100	0.025 (sum)
p,p'-Metoxiclor	µg/dm ³	<0.00100	<0.00100	<0.00100	-

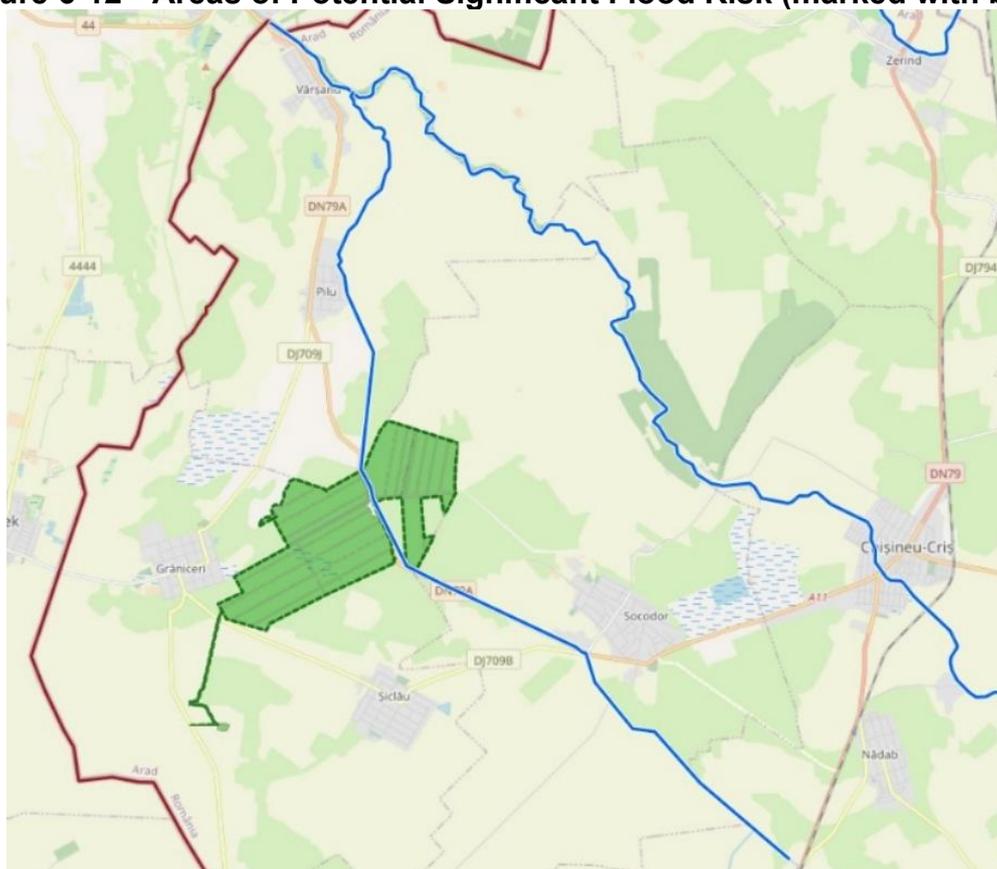
*Bql – below quantifiable limit

Flood hazard and risk

The Ministry of the Environment, Waters and Forests (MMAP), together with the National Administration "Romanian Waters" (ANAR) and the National Institute of Hydrology and Water Management (INHGA) are the institutions responsible for the implementation of the EU Floods Directive on the territory of Romania. The most recent Flood Hazard and Risk Maps were updated as part of the implementation of the second cycle of the Flood Directive through the "RO-FLOODS" Technical Assistance project.

Figure 6-12 below shows the Areas of Potential Significant Flood Risk (APSFR) identified in the area of the Project: Morilor Channel.

Figure 6-12 Areas of Potential Significant Flood Risk (marked with blue)



Source: RO-FLOODS Cycle 2 maps (<https://harticiclu2.inundatii.ro/>) and client data.

Flood hazard maps for various annual exceedance probabilities (AEP) have been developed as part of hydrological and flood studies performed for the Project³¹³²³³ and include:

- floods with a low probability of occurrence, 0.1% AEP (has a 0.1% chance of occurring in any given year);

³¹ „Flood study for the site located at Grăniceri village, Grăniceri Commune, Arad County” produced by the National Hydrology and Water Management Institute (INHGA), Contract no. 34/28.09.2020.

³² Hydrological study necessary for the development of the documentation "Flood study for flood risk assessment in the event of the occurrence of floods with maximum flows with different probabilities of overflow in the area of the Arad 1 project of West Power Investments" (Vol 1) produced by the National Hydrology and Water Management Institute (INHGA) April 2022.

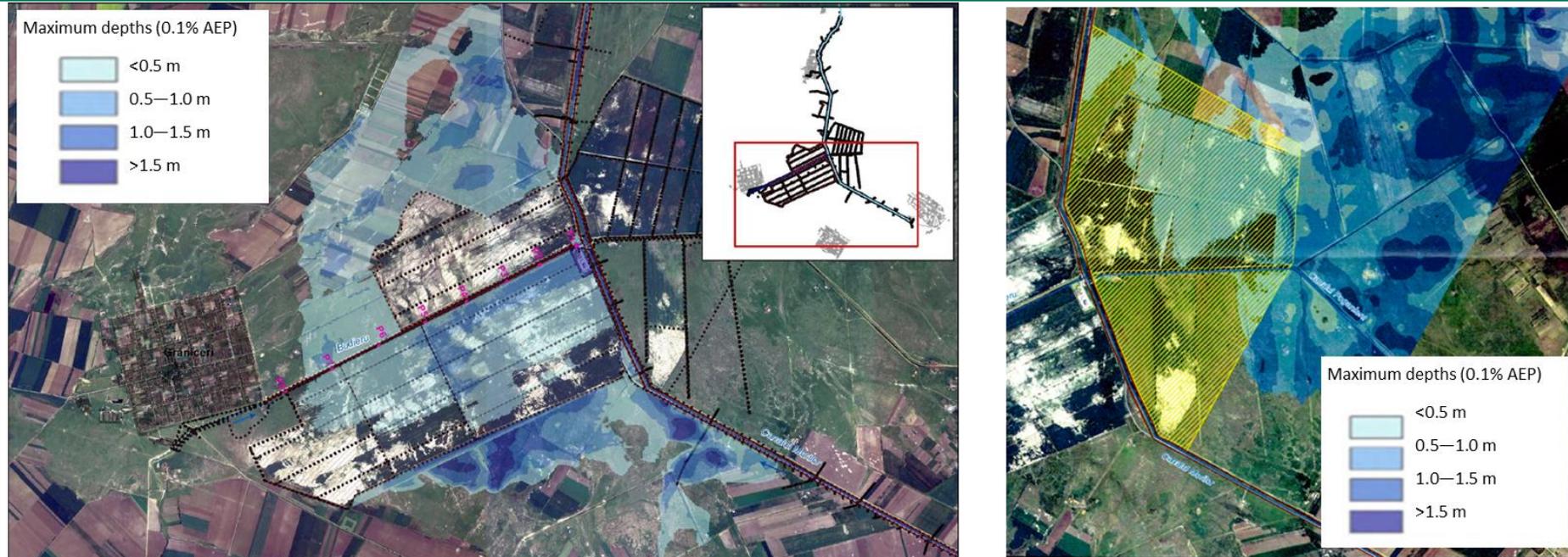
³³ Flood study for flood risk assessment in the event of the occurrence of floods with maximum flows with different probabilities of overflow in the area of the Arad 1 project of West Power Investments (Vol 1) produced by the National Hydrology and Water Management Institute (INHGA), April 2022.

- floods with a low probability of occurrence, 0.5% AEP (has a 0.5% chance of occurring in any given year);
- floods with a medium risk probability of occurrence, 1% AEP (has a 1% chance of occurring in any given year).
- floods with a medium-high risk probability of occurrence, 2% AEP (has a 2% chance of occurring in any given year).

Figure 6-13 below shows fluvial flood extent in the 4 AEP scenarios in the area of the Project site.

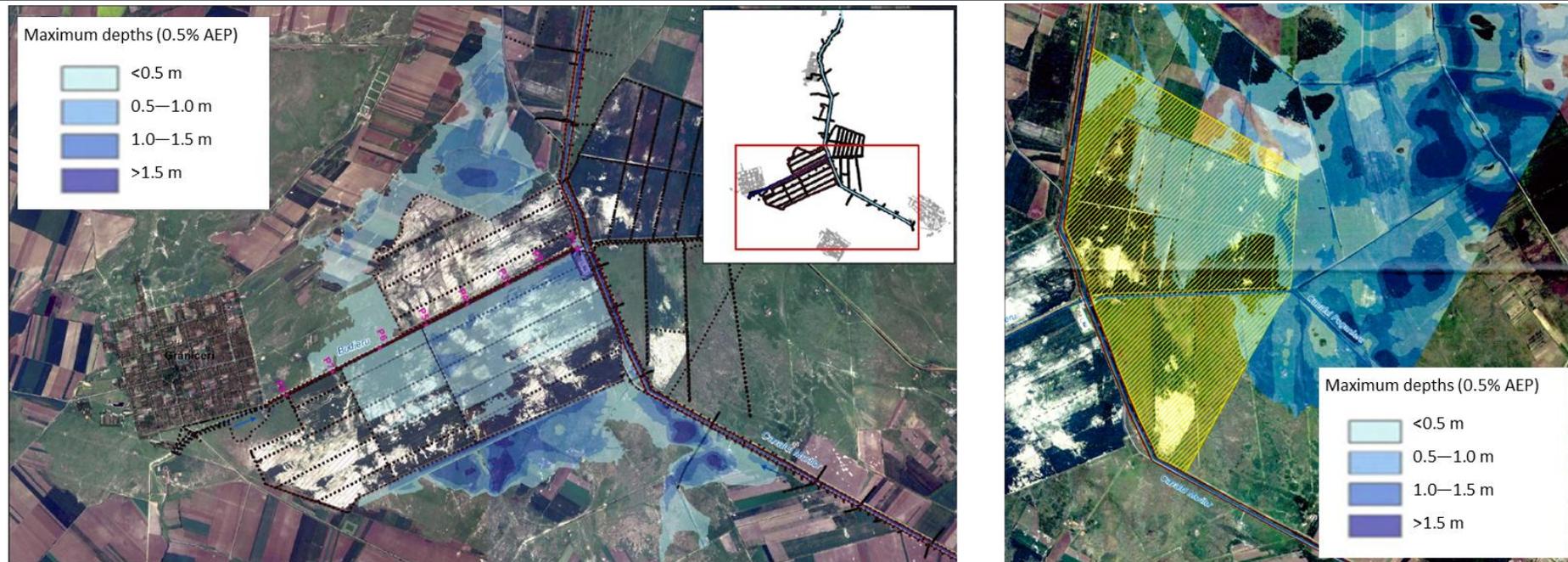
Figure 6-13 Fluvial flood extent in the area of the Project

0.1% AEP (has a 0.1% chance of occurring in any given year)



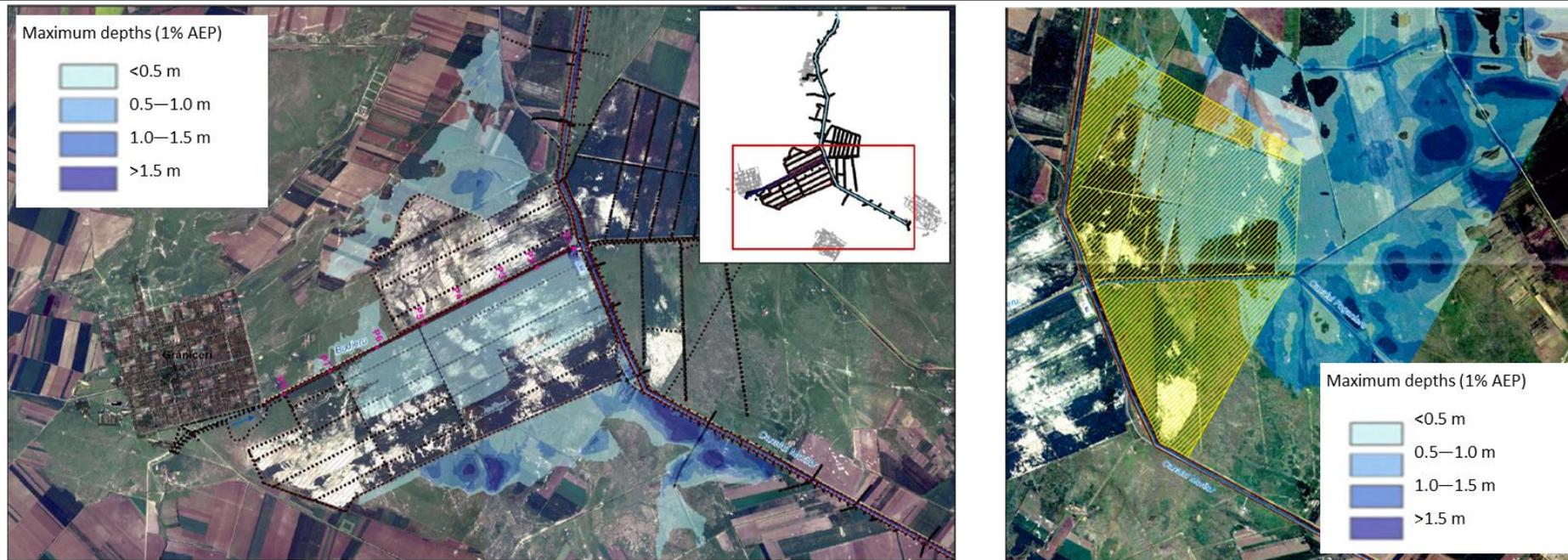
- Flooding occurs across more than half of the Project areas South of Morilor and Budieru channels.
- Approximately 1/3 of Project areas east of Morilor channel and north of Poganieru channel are affected by floods, in the central Project area and near the northern and eastern boundaries.
- In the Project area, water depth ranges between <0.5 and 1 m. Most of the affected areas are below 0.5 m water depth. Areas within 300 m south of Budieru channel and the central area of the site have water depth between 0.5 and 1 m.
- Areas outside the project boundary (north, south and east) are affected by floods with water depths ranging from 0.5 to >1.5 m.

0.5% AEP (has a 0.5% chance of occurring in any given year)



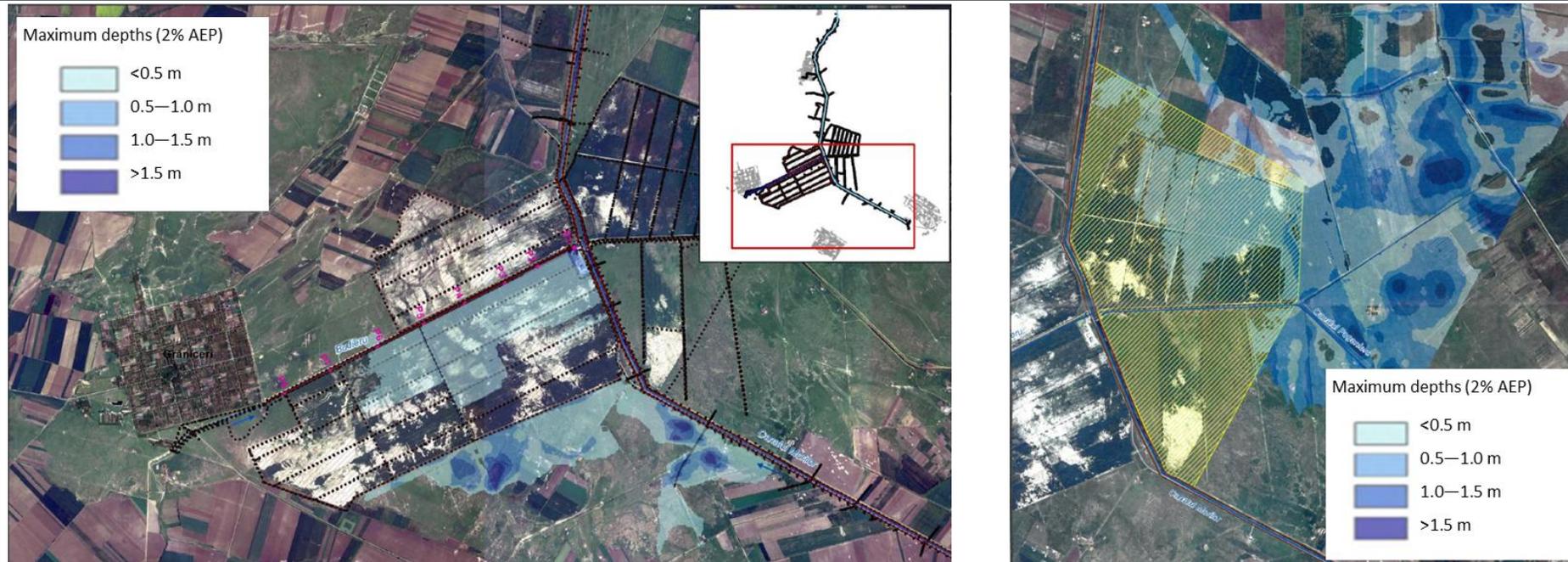
- In the central area of the site, flooding occurs across less than half of the Project areas South of Morilor and Budieru channels.
- Approximately 1/3 of Project areas east of Morilor channel and north of Poganieru channel are affected by floods, in the central Project area and near the northern and eastern boundaries.
- In the Project area, water depth ranges between <0.5 and 1 m. Most of the affected areas are below 0.5 m water depth. Limited areas in the central area of the Project area and near the eastern Project area boundaries may reach water depths ranging from 0.5 to 1 m.
- Areas outside the project boundary (north, south and east) are affected by floods with water depths ranging from 0.5 to >1.5 m.

1% AEP (has a 1% chance of occurring in any given year)



- In the central area of the site, flooding occurs across less than half of the Project areas South of Morilor and Budieru channels.
- Approximately 1/3 of Project areas east of Morilor channel and north of Poganiuru channel are affected by floods, in the central Project area and near the northern and eastern boundaries.
- In the Project area, water depth ranges between <0.5 and 1 m. Almost all of the affected areas are below 0.5 m water depth. Limited areas near the eastern boundary of the Project may reach depths between 0.5 and 1 m.
- Areas outside the Project boundary (north, south and east) are affected by floods with water depths ranging from 0.5 to >1.5 m.

2% AEP (has a 2% chance of occurring in any given year)



- In the central area of the site, flooding occurs across less than half of the Project areas South of Morilor and Budieru channels.
- Approximately 1/3 of Project areas east of Morilor channel and north of Poganieru channel are affected by floods, in the central Project area and near the northern and eastern boundaries.
- Water depth ranges between <0.5 and 1 m. Most of the affected areas are below 0.5 m water depth. Limited areas near the eastern boundary of the Project may reach depths between 0.5 and 1 m.
- Areas outside the Project boundary (south and east) are affected by floods with water depths ranging from 0.5 to >1.5 m.

Sources: 1. „Flood study for the site located at Grăniceri village, Grăniceri Commune, Arad County” produced by the National Hydrology and Water Management Institute (INHGA), Contract no. 34/28.09.2020. 2. Flood study for flood risk assessment in the event of the occurrence of floods with maximum flows with different probabilities of overflow in the area of the Arad 1 project of West Power Investments (Vol 1) produced by the National Hydrology and Water Management Institute (INHGA), April 2022.

Groundwater

According to the Geotechnical study performed for the Project, shallow groundwater layer is present in quaternary deposits made up of sands with different granulometry, gravels with clay intercalations, clayey dusts. In the upper part of these permeable deposits, formations with a lower permeability develop, which cause the hydrostatic levels to show ascending characteristics in certain areas.

Groundwater was encountered in all 42 soil borings performed on-site at depths between 1.8 m to 4 m b.g.l.. In the area of the Project substation, groundwater was encountered at depths between 2.0m-2.2m b.g.l..

There are no hydrogeological or sanitary protection areas within the area of the Project or in the surrounding areas included in Pilu and Grăniceri communes, according to Sanitary Protection and Hydrogeological Protection Areas map produced by the Arad County Council³⁴ in 2012.

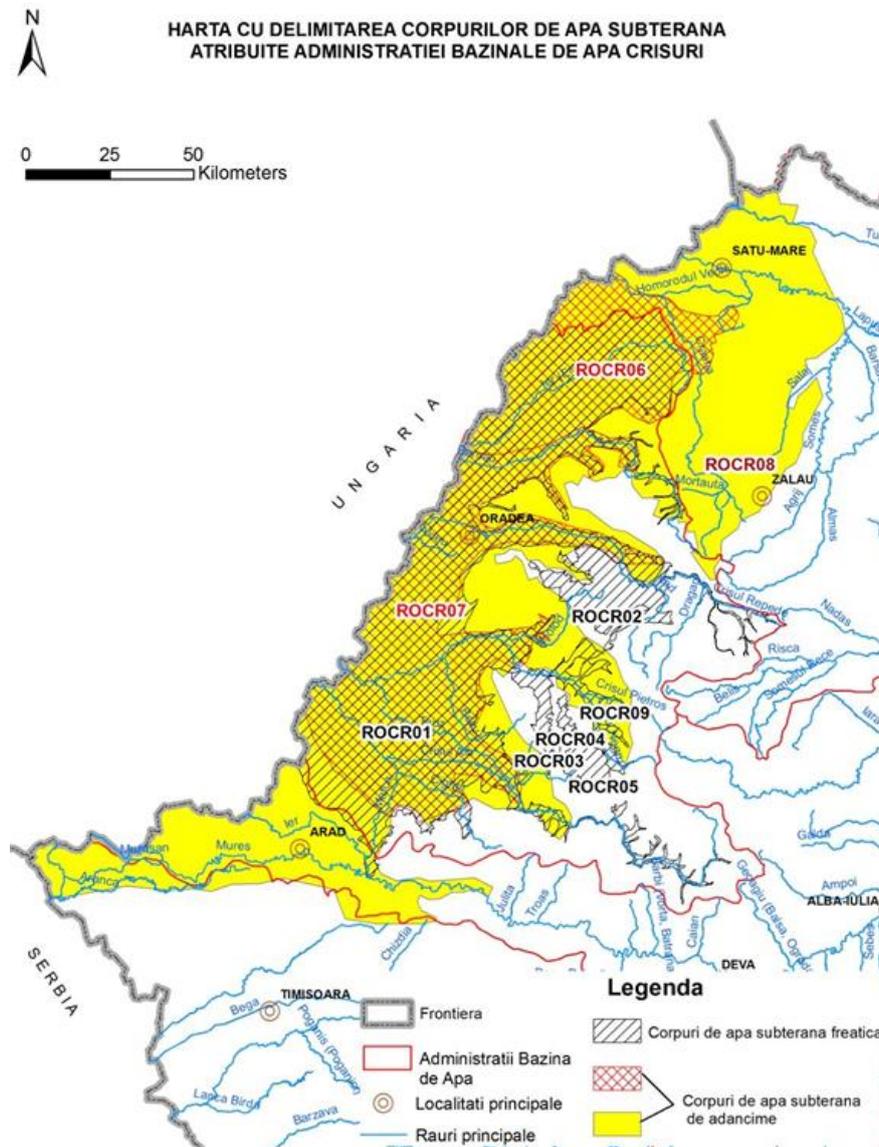
The following groundwater bodies have been defined in the area of the site by the Crisuri Water Basin Administration, as shown in **Figure 6-14** below:

- ROCR01 Oradea – shallow aquifer (1 -10 m b.g.l.);
 - The phreatic groundwater body is delimited in the porous-permeable floodplain deposits of the Crisul Repede, Crisul Negru, Crisul Alb, Ierul and Barcau rivers, being alluvial-proluvial deposits of Quaternary age. This aquifer body is transboundary.
 - Water uses: drinking, irrigation, industry;
- ROCR07 Crisuri – deep aquifer (30 m b.g.l.)
 - Water uses: drinking, irrigation, industry, pisciculture;
- ROCR08 Arad-Oradea-Satu Mare – deep aquifer (0-150 m)
 - Water uses: drinking, irrigation, industry, pisciculture, zootechnics

The ROCR07 and ROCR08 aquifers are confined aquifers located in the Quaternary or Pannonian deposits. Both are transboundary and have economic importance.

³⁴https://www.cjarad.ro/uploads/files/Serv_ amen.ter.urbanism/postare%20site%20%202011/3.%20PERIMETRELE%20ZONELOR%20DE%20PROTECTIE%20HIDROGEOLOGICA/zone_pr_sanit_perim_hidrogeol_site_2012.pdf

Figure 6-14 Groundwater bodies in the region



Source: Crisuri Water Basins Management Plan draft, 2021

6.1.7 Biodiversity and Protected Areas

6.1.7.1 Area of Influence

The spatial scope should be ecologically determined and defined, encompassing wider distributions of potentially affected biodiversity features and the ecological patterns, processes, and functions that are necessary for maintaining them throughout this distribution. The Aoi can typically extend well beyond a Project’s physical footprint and are usually anticipated to be greater than the Aoi while taking into account individual species ecology. It is nevertheless permissible to have a study area that captures a number of species or to have a series of areas depending on ecosystem or ecological factors.

Given the nature of the project and minimal to insignificant potential risk to volant species (i.e. highly mobile/flying species such as avifauna: birds and bats), a separate Aoi for volant and non-volant (non-flying) species is not considered necessary for this project. This is appreciably different to the Aoi defined for developments such as wind farms and overhead power transmission lines which can have

significant risks to avifauna and therefore consider larger Aol to cover species movement over larger areas, particularly for migratory birds.

Instead, it is considered appropriate that the Aol for the Project encompass the direct footprint of the Project infrastructure based on the preliminary layout as well as all temporary works areas (such as camp sites, equipment laydown areas, soil/material borrow pits, stockpile areas and any dump sites). This will cover impacts to habitat and vegetation (including any threatened plant species) as well as direct impacts to fauna and glint and glare effect related impact on avifauna, aviation and local population.

Furthermore, it is suggested that the Aol also consider the potential for indirect impacts such as visual, noise and vibration disturbance to fauna (wildlife) and in this case the literature reviewed (such as Kwon et al., 2018), suggests there is a strong possibility that species could be disturbed by noise up to a radius of approximately 250 m from the construction site, and outside of the 250m, noise level from construction should have been attenuated to background noise levels.

On this basis therefore, it is recommended that the Aol extend to include terrestrial habitats within a distance of at least 250 m from project activities and planned infrastructure as well as temporary infrastructure and a distance of 500 m for aquatic habitats (watercourses including rivers/streams and wetland ecosystems and related habitats).

6.1.7.2 Baseline Conditions

Biodiversity receptors for the Project Aol have been identified as follows (see also Appendix D for further detailed information):

- Most infrastructure will be restricted to existing modified habitats (cultivated areas, fallow lands/pasture, existing artificial canals/agricultural drains, roads), however there appear to be areas of untransformed / semi-natural habitat in adjacent areas which includes remnant habitats of salt steppes (grassland/meadows) and salt marsh (wetlands). 'Pannonic salt steppes and salt marshes' is a Priority habitat in the terms of the EU Red List of Habitats, and is particularly threatened in Europe given its limited geographical distribution and existing level of transformation, mainly due to habitat conversion to agricultural land use.
- 10 flora species of conservation importance potentially occur in the Project Aol, in terms of the IUCN red data list and these are primarily herbs and mushrooms (fungi) that are typically associated with grassland, wetlands and cultivated land / pasture (see Appendix E for full list).
- Several fauna species of conservation importance have the potential to occur in the Project Aol, including 12 species of birds (mainly raptors and waterbirds), 7 mammals (terrestrial and freshwater species), one species of fish, one reptile species, one amphibian species and 12 invertebrate species in terms of the IUCN red data list (see Appendix E for full list).
- Several birds, mammals, amphibians, reptiles and invertebrate species are also strictly protected fauna in terms of the EU Habitats Directive 92/43/EEC³⁵ and several bird species require special conservation measures as per the EU Birds Directive 2009/147/EC³⁶.
- Key species at risk (based on ecology and known threats) include plant species, due to potential habitat impacts, mammals and reptiles due to noise and potential direct interactions and birds (temporary disturbance, however waterbirds could be affected by longer term hydrological impacts).
- The Project is located within the boundary of two Romanian national Protected Areas (Nature 2000 sites) which are likely to be directly and/or indirectly impacted, including Câmpia Crișului Alb și

³⁵ Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention / EU habitats directive 92/43/EEC of 21 May 1992.

³⁶ EU Birds Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

Crișului Negru (ROSPA0015) and Nădab - Socodor – Vârșad (ROSCI0231), the former also being an identified Key Biodiversity Areas (KBA) and Important Bird and Biodiversity Area (IBA). The risk of directly/indirectly impacting the PAs, KBA and IBA needs to be investigated further during the ESIA phase.

- Salt steppes and salt marsh habitats potentially qualify as 'Critical Habitat' for supporting Critically Endangered/Endangered species, as defined in terms of IFC PS6 (see Appendix E).
- Several species potentially qualify as 'Priority Biodiversity Features' (PBFs), as defined in terms of EBRD PR6 (see Appendix A).
- The following existing biodiversity baseline studies and data were made available to inform the assessment:
 - Wildlife Management Consulting srl (2021). Final report on the potential impact of the implementation of the "Grăniceri-Pilu Photovoltaic Park" project on biodiversity. Final, July 2021. [Machine Translated using Google Translate™ from Romanian to English].

The report on biodiversity considers the impacts of the project on key biodiversity receptors and includes the comprehensive field sampling conducted in 2021 that included habitats, flora and fauna (including birds, mammals, herpetofauna and invertebrates).

6.1.8 Wastewater/ Waste management

6.1.8.1 Area of Influence

For waste and wastewater management, the Aol defined is within Arad County, as these services are organized and managed at county level.

6.1.8.2 Baseline conditions

Waste Management

The following existing waste operators and infrastructure were identified within the area of influence (Arad County):

- Retim SA - Domestic/municipal waste, construction waste, electrical and electronical waste, glass packaging waste, hazardous waste (packaging containing residues of or contaminated by hazardous substances, absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances, glass, plastic, and wood containing or contaminated with hazardous substances, batteries, and accumulators etc.), large type of wastes, oil and fats, gases in pressure containers (including halons) etc. (<https://retim.ro/>)
- Consult SOC Centrum – no data available for the types of waste collected. According to the public information this company is in insolvency starting from January 2023 (<https://adideseuriarad.ro/zone-de-colectare/>).
- FCC Environment Romania – collecting, transportation and storage of wastes: domestic/municipal waste, recyclable waste and hazardous and non-hazardous industrial waste ([Servicii \(fcc-group.eu\)](http://Servicii(fcc-group.eu))).
- Grup Salubritate Urbană SA Sucursala Arad - recyclable waste – paper/cardboard, plastic, metal ([KMBT_C224-20181210161557 \(primariachisineucris.ro\)](http://KMBT_C224-20181210161557_primariachisineucris.ro))

The Intercommunity Development Association Integrated Waste Management System Arad County (Asociația de Dezvoltare Intercomunitară Sistem Integrat de Gestionare a Deseurilor jud. Arad) represents the association of county councils for the development of waste management

infrastructure in the region. Through this, authorized economic operators (listed above) were contracted to be able to offer these facilities to the communities.

Wastewater

At the county level, there is the "Integrated Waste Management System in Arad County"³⁷ project, implemented under the responsibility of the Arad County Council, which consists of investments in the solid waste management sector.

The Association includes members from all Arad counties, including Grăniceri and Pîlu. A network of waste collection, sorting, composting, transfer and treatment stations are present in the County.

Regarding wastewater, there are no sewer systems installed in the project area.

No topic-specific baseline survey was conducted. For sanitary wastewater, the project documentation mentions the use of mobile sanitary units that will be collected by authorized wastewater disposal companies.

6.2 Socio-Economic Environment

6.2.1 Socio-Economic

Find below an overview of key socio-economic baseline conditions. For more detailed baseline information see Appendix F.

6.2.1.1 Social Area of Influence

The Project's Social Area of Influence (AoI) was defined as follows:

- the **indirect Social AoI** (considered as study area for the desktop data review) includes the entire Arad County, where the Project site is located. This also includes the municipalities of Arad (main urban centre and the seat of the county, having the same name as the county) and Chişineu-Criş, located approximately 20 km from the Project area. The larger area could be experiencing economic and employment impacts as a result of the Project implementation through employment of workforce and supply of goods and services, also considered for cumulative impacts.
- the **direct Social AoI**, also understood as the study area for the socioeconomic qualitative baseline data collection field survey. The Direct Social AoI, hereinafter referred to as **Social AoI**, comprises:
 - settlements impacted by temporary and/or permanent land take for the Project components: PV area, substation, cable trenches and access roads. All land plots required by the Project belong to the administrative territorial units of Grănicei and Pîlu communes³⁸.
 - settlements that might be affected by potential temporary impacts during the construction, such as noise or air pollution, or long-term impacts during operation, such as glint and glare effect, located in a 2 km buffer from the PV area, also defined as the Environmental AoI for the Project.

6.2.1.2 Governance and administration

- Since 2007 Romania is a member of the European Union. The country is also a founding member of the International Labour Organisation.

³⁷ <https://adideseuriarad.ro/>

³⁸ According to the Romanian Administrative Code, the commune is defined as the administrative territorial unit consisting of one or several villages characterised by rural population joined by interests and traditions and organised depending on the socioeconomic, cultural, and geographic conditions.

- At the intermediate administrative level Romania's four micro-regions are divided into counties, while communes, towns, and municipalities (cities) form the local administrative level.
- The Arad County is located in the western part of the country, in the West Development Region. It consists of 68 communes, 8 towns and 10 municipalities (including the capital city - Arad Municipality and Chisineu-Cris), and 270 villages.
- The direct Social Aol consists of two communes of rural character – Grăniceri and Pilu communes. The communes, municipalities, and towns' own competences include community health care, management of water supply and sewage system, and administration of local public transport.

6.2.1.3 Planning and Development

- The country's development is based on a number of strategic documents from the European to the local level.
- Each commune in the Social Aol prepared the local development strategy for 2021 – 2027, guiding priority investments in the area. These strategies include the development of renewable energy production capacity.

6.2.1.4 Demographics

- Romania had a total population of approximately 19 million people in 2021; however, the country experienced a strong population decline in recent years.
- Based on the preliminary results of the 2021 census, the total population of Arad County was 411,746 people, with more female than male; the largest population group was economically active (i.e., between 50-55 years old) with the average population age at 42.4 years. Although most of the county inhabitants are Romanian, over 6% of the population are Magyars.
- The population number in both communes of the Social Aol is similar and presenting a stable trend in the last decade, with a balanced gender ratio. In 2021, Grăniceri had a population of approx. 2,203 inhabitants, while Pilu has a population of approx. 2,078 inhabitants, according to the 2021 Census results. Over 80% of the population is constituted by Romanian ethnics, followed by Roma population (11% in Pilu and 6% in Grăniceri). Most of the population is Orthodox-Christian and speaks Romanian.

6.2.1.5 Land ownership and use

- Most of the land in the country constitutes a private land of individuals. Similarly, at the county and local level, over 90% of land is private. Almost half of the land in the country is arable land (42%), followed by forests and other forest vegetation (27%), and pastureland (15%).
- Arad County and the communes of the Social Aol follow the national ratio in terms of arable, pasture and forest land.
- Across the Direct Social Aol, arable land represents the major land use (over 60% in Graniceri and 55% in Pilu), followed by pastures in similar ratios (over 20% and more than the county ratio) and with very limited forested areas (less than 1% compared to approximately 30% at County level).
- Grăniceri commune has a larger area of degraded land (116 ha) compared to Pilu (19 ha).
- Arable land is over 99% in private ownership.

6.2.1.6 Economy, employment, and livelihoods

- Romania has been experiencing economic growth in recent years, with agriculture and industry showing a decreasing trend in the country's GDP. The primary sector includes mining, agriculture, animal husbandry, fisheries and aquaculture, and forestry. The secondary sector in Romania contributed with more than 27% to the national GDP in 2021 and is focused on energy resources

and power and on labour-intensive manufacturing, including food processing, textiles, and wood processing. The construction sector accounts for 6.85% of the national economy. The tertiary, services sector, represents the largest economic sector in Romania and includes the provision of services to other businesses as well as to final consumers.

- Government revenues in Romania are less than 30% of GDP with a low tax burden on labour force. What is more, similarly to other European countries, the inflation in Romania is high – in December 2022 the annual inflation level was equal 16.4%.
- The unemployment rate in Romania in 2021 was 5.6%. The largest unemployment group was youth (15-24 years old) in rural areas (23.8%).
- In 2021, the active population of Arad County was approximately 411,746 people and included 187,100 people in employment. Manufacturing sector has the largest employment base, followed by Trade, with a relatively balanced distribution across genders. Following sectors are Agriculture and Transportation, where most jobs are occupied by men.
- The highest unemployment level in the Social Aol was noted in Pilu commune. Overall, unemployment is similar for men than women. Main employment sectors include the public sector - administration, education and health and the private sector - mainly manufacturing, construction, commerce, transport, and agriculture companies present in the local area. Many workers commute from the Social Aol to Chişineu-Criş or Arad City. Additionally, pensioners represent a significant group in the community with many identified challenges.
- The main livelihood activity in the Social Aol is agriculture, practised at both economic and subsistence levels. Most of the farmers do not receive an additional salary, they are self-employed or considered as unpaid domestic workers. Additionally, public administration, education and health sectors provide a significant part of the jobs available locally.
- Cereal production in the Aol is dominated by larger farmers, although there are small farmers cultivating one to three ha of land also, according to the Agricultural Registry representatives in each commune, interviewed during the ERM Field Survey. Many of the owners of smaller land plots are leasing land to the larger farmers in exchange of land rent or produce, via lease contracts for five to 10 years.
- The high degree of mechanisation enables large farms to operate on a limited number of workers. In some families, the younger generation is actively contributing to the farming family business, whilst in others they decide to take on studies and other opportunities in Arad City or elsewhere, leaving their ageing parents unable to maintain the scale of farming activities. Securing temporary work for agricultural works during peak season is an issue, thus most family-run operations are relying on the family members.
- Animal husbandry (sheep, cows, goats, pigs and poultry) is also a key livelihood in the Aol, practiced economically by larger farmers and as a subsistence/ complementary activity by small-scale farmers. Sheep milk is processed into cheese, but sheep wool is not being utilised and is discarded.
- 15,000 sheep were reported in Graniceri and 9,000 in Pilu in 2022, and a number of over 10 shepherders utilise the pastureland bordering the PV area, thus potentially benefitting from the dual-use opportunities during operations stage of the Project.
- Up to 10 beekeepers were reported in each commune, with further engagement recommended as the dual use plans are defined in the next stages of Project implementation.

6.2.1.7 Infrastructure and public services

- Most of the households in the Social Aol are are benefiting from access to electricity, via the main medium voltage line LEA20kV16 from Chişineu-Criş, with most householdes connected to the centralised power supply according to the KII.

- Additionally, wood is used for heating, while cooking is mostly done via liquified petroleum gas tanks. Graniceri commune has a centralised water supply system and sewage system implemented in both Graniceri and Siclau settlements. In Pilu Commune only 10% of the households in Pilu settlement currently benefit from centralised water supply, whilst the sewage system is not yet developed.
- Both Pilu and Grancieri communes are members of the Intercommunity Development Association Integrated Waste Management System Arad County.
- The housing stock consists largely of detached brick houses with one or two storeys and with variable front and back gardens. The housing stock is privately owned and renting is not a common practice.

6.2.1.8 Education and skills

- Despite high adult literacy rate (almost 99%) in Romania, in 2021, only 50% of population aged 16-19 had basic or above-basic digital skills. Many educational challenges in the country are a result of small expenditure on schooling, the highest percentage of early leavers from education and training in the EU, and unequal access to quality education, amongst others. There is also a substantial mismatch of workers' skills in Romania.
- There are two tertiary education options offered in Arad City: Aurel Vlaicu University and West University Vasile Goldiș.
- Vocational paths are also offered in the county, especially at the engineering company Astra Vagoane, a company in Arad City, specialized in producing wagons for passenger transportation.
- Both villages' seats of the commune in the direct Aol (a.i. Graniceri and Pilu settlements) benefit from pre-school, primary and lower secondary education. Additional funding is needed for outdoor sports facilities and school extra-curricular activities.

6.2.1.9 Community health and safety

- Access to healthcare services is free in Romania. The leading cause of mortality is cardiovascular disease, while lung cancer is the most frequent cause of cancer death. Although the spending on health services in the country has been increasing, it stays below the EU average.
- The main causes of death in Arad County in 2021 were circulatory system diseases, although respiratory diseases have been on the rise in recent years. The number of work-related accidents has been slightly increasing in Arad County, from 93 cases in 2017 (out of which 3 were fatal) to 97 cases reported in 2021 (out of which 2 were fatal).
- In the direct Social Aol, the level of provided healthcare is satisfactory. Each commune has a dedicated family doctor. Additionally, first aid is available for everyone, irrespective of the status of insurance.

6.2.1.10 Security

- In general, more men are convicted of a crime than women in Romania. In terms of the type of crime, public road traffic offences were the most prevalent, followed by offences against patrimony and offences against persons. Romania is also considered a country of origin for victims of human trafficking.
- Public perception of renewable energy projects in Romania is good, with around 82% of Romanians accepting the possibility of having a wind farm investment in their nearest neighbourhood.
- In the Social Aol, prostitution or alcohol consumptions was not confirmed as an issue. Theft was not raised as a key concern, nor other types of crimes, except traffic-related contraventions, due to speeding, although these are rare.

- A Voluntary Emergency Situation Service (SVSU) is present in each commune, offering first level of intervention in local emergency situations. Usual interventions include vegetation and chimney fires, supported by the Fire Service from Chişineu-Criş.

6.2.2 Visual

This section provides a summary of the existing environmental conditions within the Project study area. The local environmental setting was determined through desktop analysis and photos from fieldwork (performed in November 2022 and May 2023) to gain a general understanding of the site visual context and landscape setting.

6.2.2.1 Landscape Area of Influence

The landscape area of influence was identified as a buffer of 2 km from the solar plant fence to understand the wider landscape setting and context and where it is assumed that most of the potential impacts will occur (Figure 6-15).

Figure 6-15: Landscape Study Area



Source: ERM

6.2.2.2 Landscape Key baseline conditions

The landscape is characterized by different components: topography, land use and potentially sensitive areas relating to landscape (e.g., cultural heritage sites), and according to the presence of common elements. Therefore, the proposed assessment has been developed according to the following tasks:

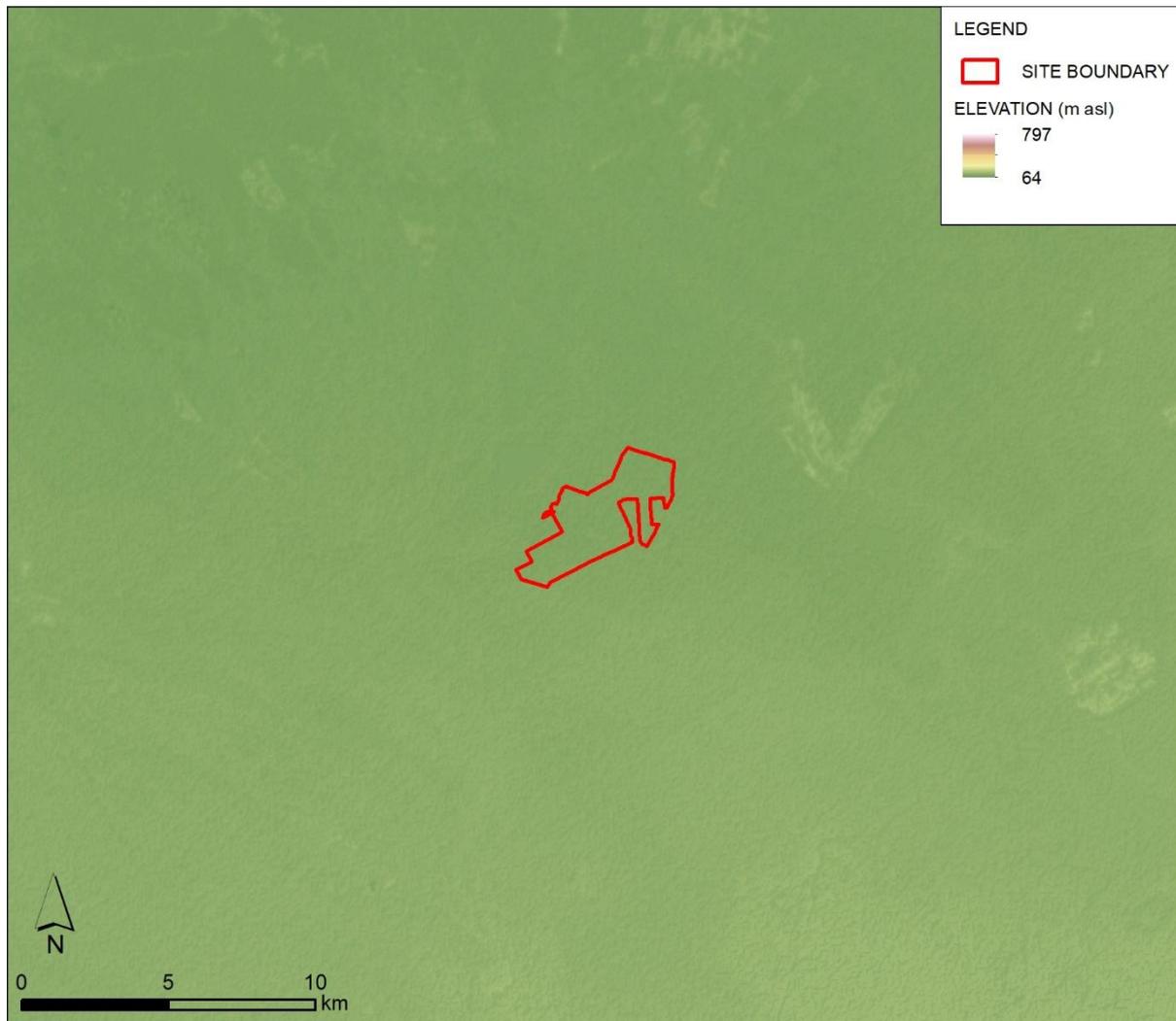
- Description of the baseline landscape and topography in the study area;
- Mapping and description of Landscape Character Unit (LCUs);
- Landscape character; and
- Landscape value.

Topography

Romania's landscape is almost evenly divided among mountains, hills, and plains. These varied relief forms spread rather symmetrically from the Carpathian Mountains, which reach elevations of more than 2,400 metres, to the Danube Delta, which is just a few metres above sea level.

The site area is relatively flat, located at altitudes ranging between 90-100m. The landscape of the Project Area and topography are shown in Figure 6-16.

Figure 6-16: Topography of Project Area



Source: ERM

Landscape Characteristic Unit (LCU)

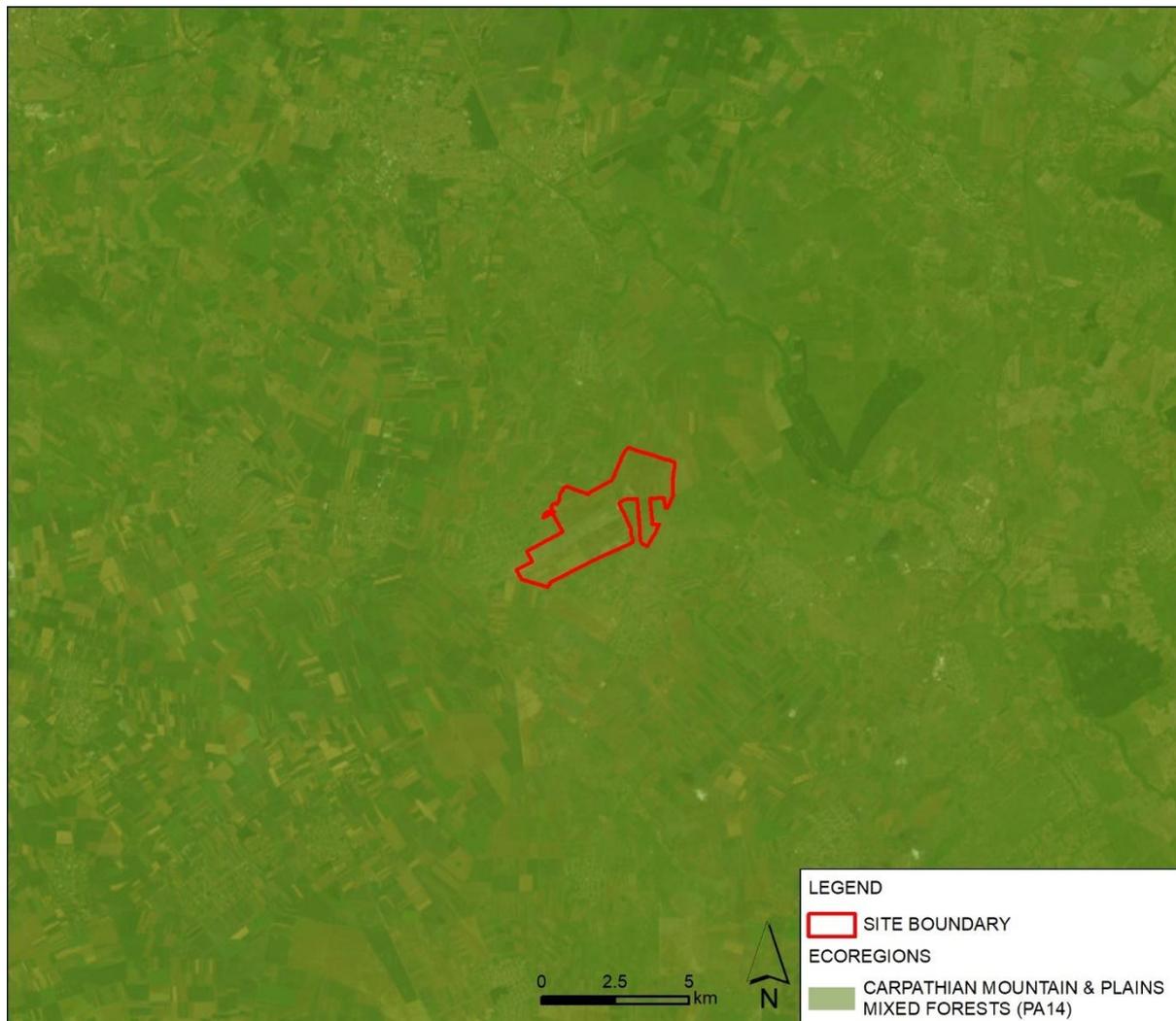
The One Earth³⁹ has classified landscape into “*bioregions*”. A bioregion is a geographical area defined not by political boundaries but by ecological systems. Each ecoregion is characterized by distinct landscape characteristics.

The Project area is located within the ecoregion ‘**Pannonian Mixed Forests**’ (ID: 674) that is part of the bioregion “Carpathian Mountain & Plains Mixed Forests Bioregion” located in the Western Eurasia realm (western Palearctic).(see Figure 6-17)

The region is almost entirely enclosed by low-lying hills and mountains, with the large basin of Pannonian Mixed Forest being host to one of the largest grasslands left in Europe. Forest steppe once dominates in the center of the basin and temperate forest the rest of the ecoregion. Previously, this great plain was covered in large tracts of oak-dominated forests, steppes, and lakes; however, habitat transformation for low-lying grazing and cultivation has converted most of the natural habitat. Despite the significant anthropogenic influence humans, a considerable amount of natural wildlife and rich biodiversity still remains.

³⁹ <https://www.oneearth.org/>

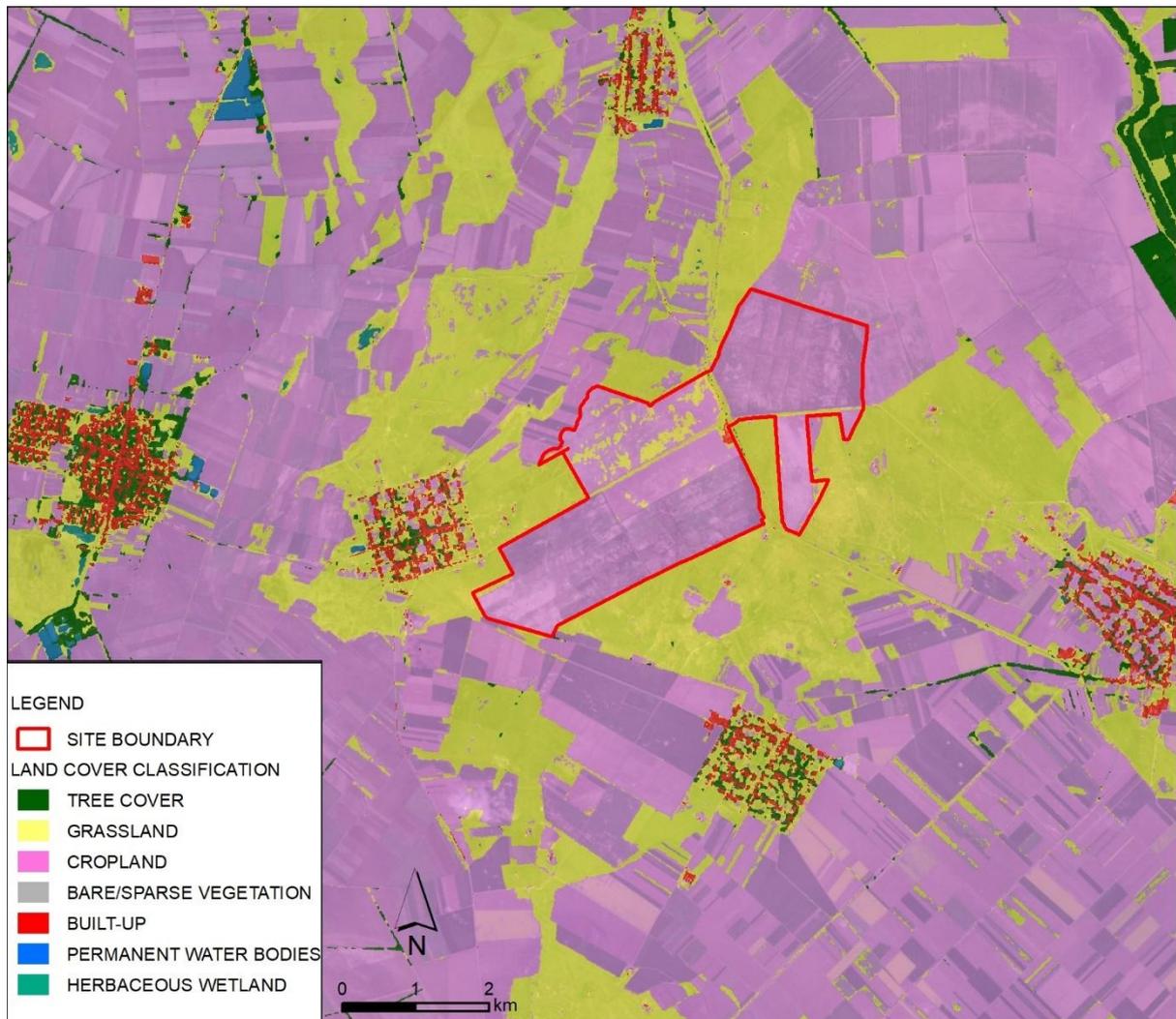
Figure 6-17: Landscape Characteristic Unit map



Source: ERM

Moreover, a Land Cover map was extracted for the area nearby the Project (Figure 6-18). The land within the study area is mainly characterized by cropland and grassland. Near the Project there is the settlement of Graniceri.

Figure 6-18: Land Cover Map



Source: ERM

Given the general homogeneity of the area where the Project will be located, a single Landscape Characteristic Unit (LCU) is proposed.

- Factors affecting the sensitivity of change for landscapes are:
- Importance and rarity of special landscape elements;
- Ability of the landscape to accommodate change;
- Significance of the change in the local and regional context; and
- Maturity of the landscape.

Figure 6-19 provides photos showing some of the main features of the landscape.

Figure 6-19: Photos of Nearby Landscape



Source: ERM

Protected Areas

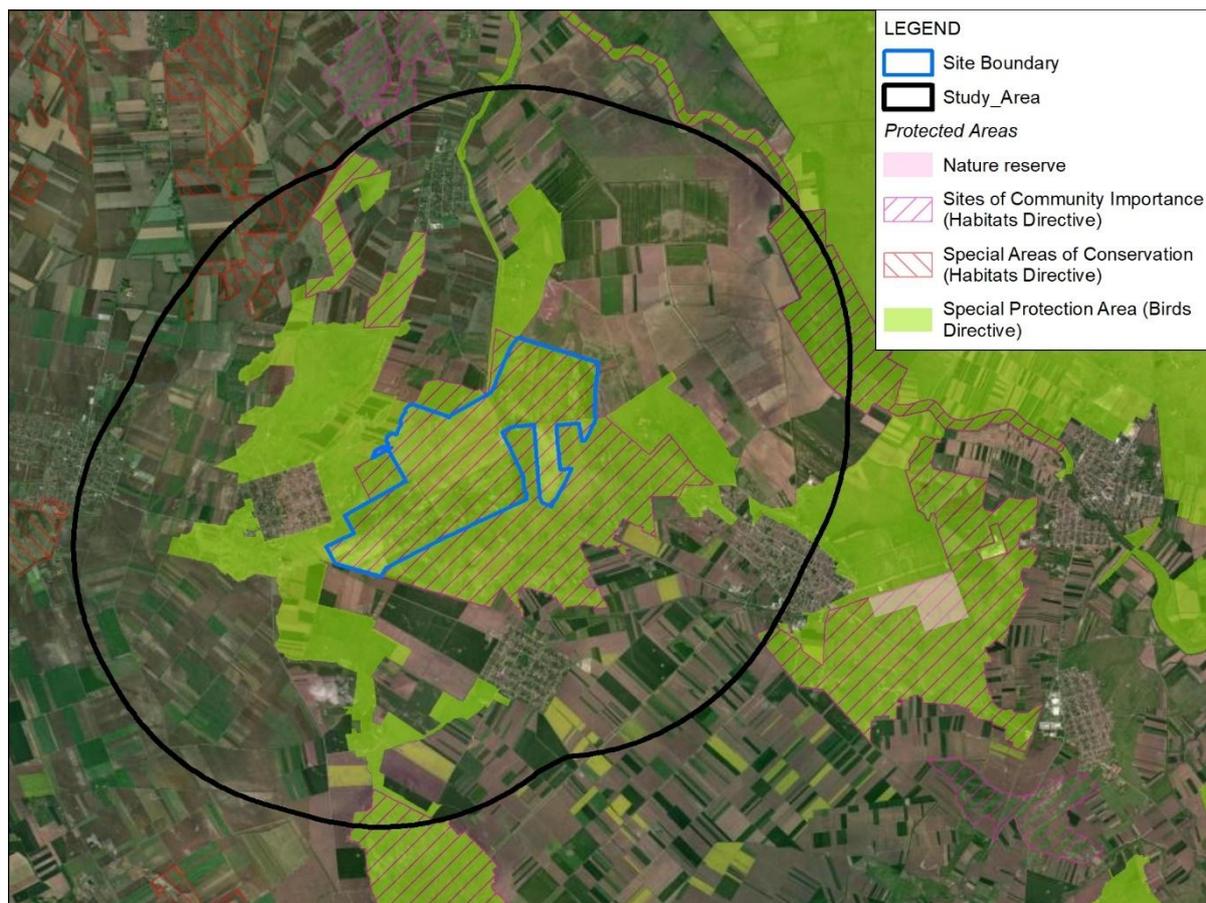
During the desktop baseline review, the following national and international protected areas have been considered:

- National parks, reserve forests and other locally protected areas;
- BirdLife International Important Bird Areas (IBA) and Endemic Bird Areas;
- International Union for Conservation of Nature (IUCN) Protected Areas;
- RAMSAR Wetlands of International Importance;
- United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and Biosphere (MAB) Reserves;
- World Heritage Sites; and
- World Commission on Protected Areas.

Protected Areas include areas that are legally designated or officially proposed for biodiversity protection and conservation, while areas with recognized high biodiversity values are areas that have been voluntarily conserved by local communities through customary laws or other effective means.

- The Project is located within the boundary of two Romanian national Protected Areas (Nature 2000 sites) which are likely to be directly and/or indirectly impacted, including Câmpia Crișului Alb și Crișului Negru (ROSPA0015) and Nădab - Socodor – Vărșad (ROSCI0231), the former also being an identified Key Biodiversity Areas (KBA) and Important Bird and Biodiversity Area (IBA) (Figure 6-20).

Figure 6-20: Protected Areas



Source: ERM

6.2.2.3 Visual Area of Influence

The visual area of influence is defined as the area within which the Project could be discernible by the human eye and could interfere with the main sensitivities identified in the local context.

The site is flat and is located within a wider landscape context that comprises mainly low lying and flat topography. On sites such as this, the effects of natural screening such as woodlands, shrubland and hedgerows etc. has a significant bearing the potential for either landscape or visual effects.

The Zone of Theoretical Visibility (ZTV) has been determined through computer analysis of topographical mapping to establish the theoretical distance from which the solar panels could be visible in each direction.

Arc Map 10.8.2 was used to determine the ZTV for the Project. The current visibility within the ZTV will vary depending on the presence of intervening local topography and other features, such as vegetation

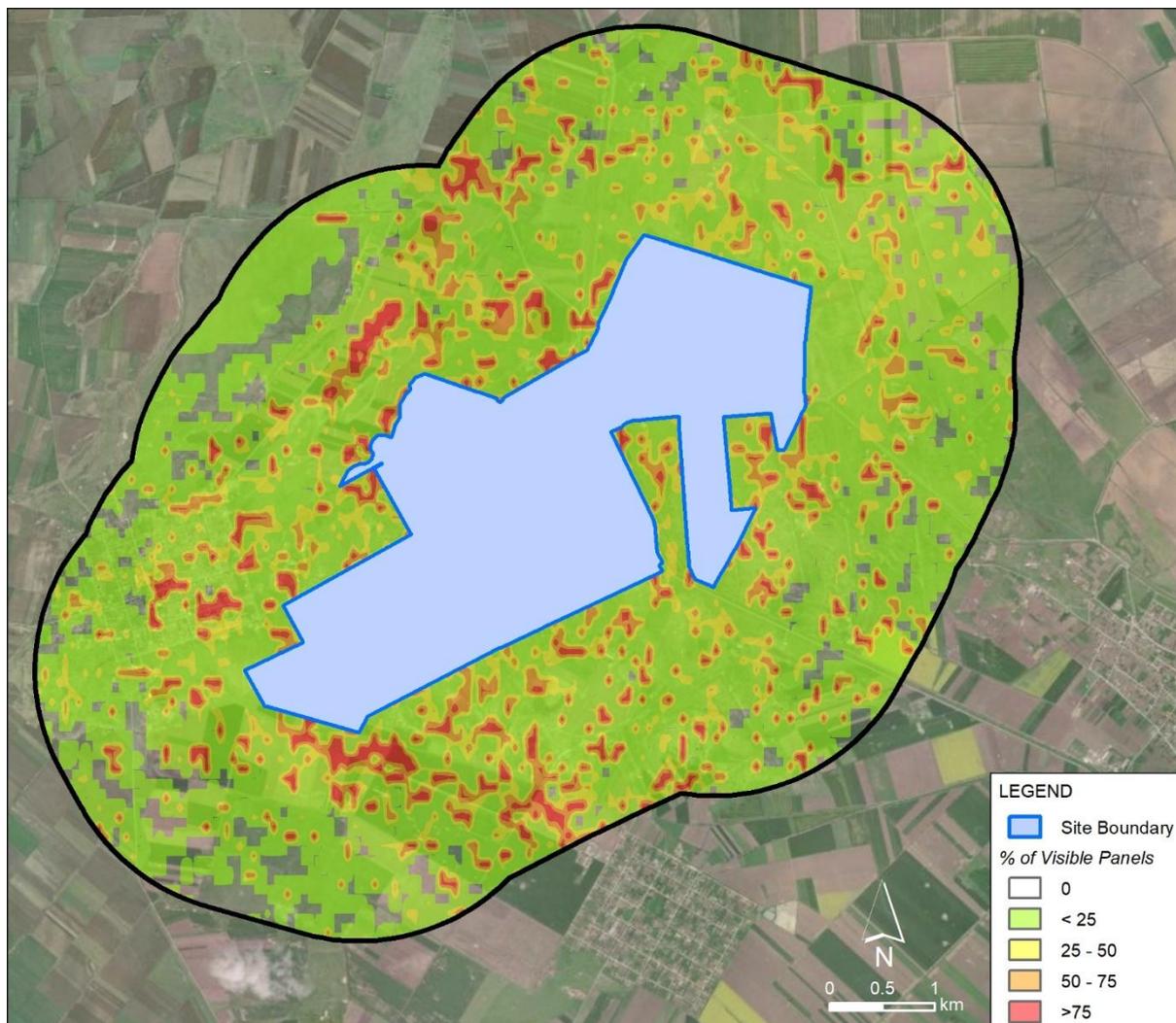
and buildings. The present view shed analysis has been based solely on topography and did not take into account the potential screening granted by the local vegetation patches, which would further reduce the actual view shed. Moreover, it should be highlighted that a typical view shed assessment does not take typical meteorological conditions into account that can result in changes to real visibility. For example, rainfall and other atmospheric conditions (e.g., sand transported by the wind) will alter the visibility of the Project. The diminution of visual clarity brought about by atmospheric conditions also increases with distance, and cloudy days can result in a natural attenuation of the visibility of the Project.

The ZVI (or viewshed) of the proposed solar farm was produced using topographic information.

A height of 4m was used to model onsite infrastructure. This is a realistic approximation of the height of panels and PV containers.

Figure 6-21 shows the ZTV mapping, 100% means all points can be seen and equates to the highest visibility. The lowest score is 0%; none of the points of the infrastructure block can be seen.

Figure 6-21: View shed



Source: ERM

The results of the view shed assessment show that the visibility is influenced by the flat morphology of the area. The flat of the terrain allow to see the panels but not the entire solar plant.

It should be emphasized that intervening vegetation is not included in this mapping and is likely to significantly reduce the visibility of solar panels, in whole or in part, and therefore reduce the impact identified.

Regarding the potential visibility from local communities, solar PV will be visible from Graniceri.

Based on the above, it is reasonable that distances greater than 2 km would result in an insignificant magnitude of visual impact from the solar PV, as a fully visible would be an insignificant element within the landscape.

6.2.2.4 Visual Key baseline conditions

Viewpoints Identification

In order to assess the visual baseline, 11 viewpoints have been identified within the Area of influence. These viewpoints are referred to as Visual Sensitive Receptors (VSRs). They represent points within the view shed from where people will be able (or not) to see the Project, and where the quality of the landscape and visual resources of people could be affected by the presence of the Project.

It should be noted that, in order to screen the potential sensitive receptors, the following criteria have been used to assess the sensitivity of the VSRs:

- Value and quality of existing views;
- Type and estimated number of receiver population;
- Duration of frequency of view; and
- Degree of visibility.

Table 6-10 and Figure 6-22 show the locations of the VSRs as representative of the general landscape character of the area, from locations within the Study Area varying in distance.

Table 6-10 provides the coordinates of the points. The coordinates are expressed in WGS 1984/UTM Zone34N.

Table 6-10: Location of the proposed VSRs

VSR ID	X (East)	Y (South)	Site
VSR1	524248	5146183	Along a road
VSR2	529792	5151234	From road 79A
VSR3	531460	5150448	From road 79A
VSR4	532394	5150950	From Socodor
VSR5	527876	5149479	From Siclau
VSR6	527172	5149414	From a road close to Siclau
VSR7	523327	5148755	Along a road
VSR8	523444	5151284	From Graniceri
VSR9	526165	5157106	From Pilu
VSR10	527078	5157855	From Pilu

Figure 6-22: Location of the proposed VSRs



Source: ERM

6.2.3 Glare

Reflectivity refers to light that is reflected off surfaces (e.g. glazed surfaces or areas of metal cladding). The potential effects of reflectivity are glint and glare. The Federal Aviation Administration's (FAA) 'Technical Guidance for Evaluating Selected Solar Technologies on Airports' provides the following glint and glare definitions:

- Glint – a momentary flash of bright light typically received by moving receptors or from moving reflectors;
- Glare – a continuous source of bright light typically received by static receptors or from large reflective surfaces.

Glint will be witnessed by moderate to fast moving receptors whilst glare would be encountered by static or slow moving receptors with respect to a solar farm. The term 'solar reflection' is used to refer to both reflection types i.e. glint and glare.

In general, solar PV systems are constructed of dark, light-absorbing material designed to maximise light adsorption and minimise reflection. Whilst solar panels vary in their reflectivity with some claiming 'anti-glare' properties, no solar panel absorbs 100% of the incoming light. Therefore, any solar PV panel has the potential to produce a solar reflection.

Solar panels reflect sunlight to varying degrees throughout the day and year, based on the incidence angle of the sun relative to ground-based receptors. PV modules are designed to maximise the absorption of solar energy and therefore minimise the extent of solar energy reflected. PV modules have low levels of reflectivity between 0.03 and 0.20 depending on the specific materials, anti-reflective coatings, and angle of incidence. Lower incidence angles amount to increased reflection.

As such, the amount of light reflected off a solar PV panel surface depends on:

- The amount of sunlight hitting the surface;
- Its surface reflectivity;
- Its geographic location;
- Time of the year;
- Cloud coverage; and
- Panel orientation.

6.2.3.1 Glare Area of Influence

No technical distance limits exist within which solar reflections are possible, the potential or significance of a reflection decreases with distance due to an observer's decreasing field of vision capability with increasing distance, as well as possible obstructions such as shielding caused by terrain and vegetation.

Currently no standards are available to determine the area of influence, but based on best practice adopted in several UK based studies, an appropriate area of influence from 100m to 1km for glint and glare effects on ground-based receptors could be considered as a reasonable conservative area. (Figure 6-23).

As the project is considering fixed panels oriented to the south the reflections towards receptors to the north of the panels are not considered possible at this latitude and therefore the areas to the north of the northernmost panels are removed from the assessment area.

Figure 6-23: Study Area



Source: ERM

6.2.3.2 Glare Key baseline conditions

The Project site is located within a flat rural landscape characterized by the presence of flat cropping and grazing land.

Existing dwellings in the area consist of rural homesteads and residential properties (Figure 6-24).

Figure 6-24: Photo of Dwelling near in the Study Area





Source: ERM

Atmospheric conditions such as cloud cover, dust and haze will impact light reflection, however these factors have not been accounted for in this glare assessment so the glare potential represents a conservative assessment.

Data from the Meteo Station of Szarvas 73 km from the Project site (the available closest meteo station in WindPRO software) are shown in Table 6-11.

Table 6-11 Monthly Sunshine probabilities

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.10	3.52	4.61	6.41	7.57	8.53	9.36	8.88	7.11	5.48	2.88	1.85

- The general layout of the solar farm is as shown in

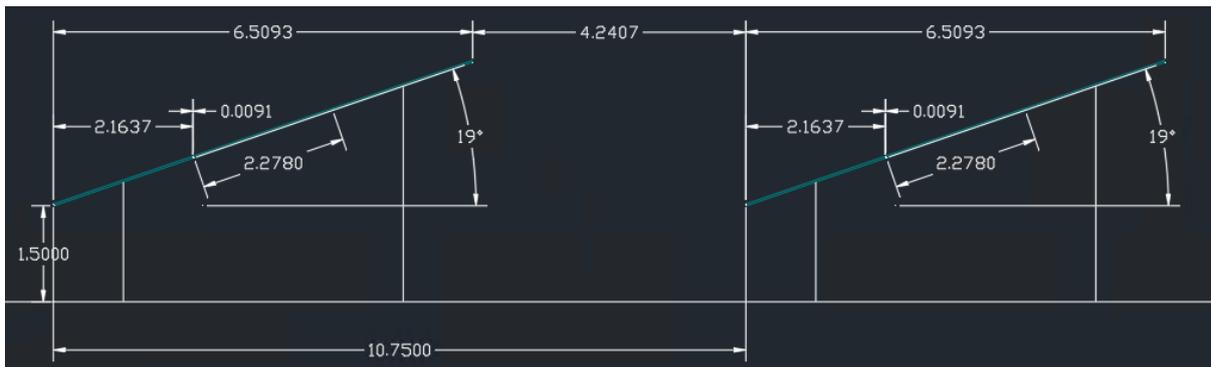
Figure 6-25. The main elements of the Solar Farm with the potential to influence glare are the tilt, orientation, and optical properties of the PV modules in the solar array, and the rotational capabilities of the system. The general technical properties of the main elements influencing glare are described in Figure 6-26 and Table 6-12.

Figure 6-25: PV layout



Source: ERM

Figure 6-26: Solar panel details



Source: ERM

Table 6-12 Panel information

Type	Details
Azimuth angle	180 (south facing)
Elevation angle	19°
Top height	3.75 m agl

Viewshed analysis and Receptors

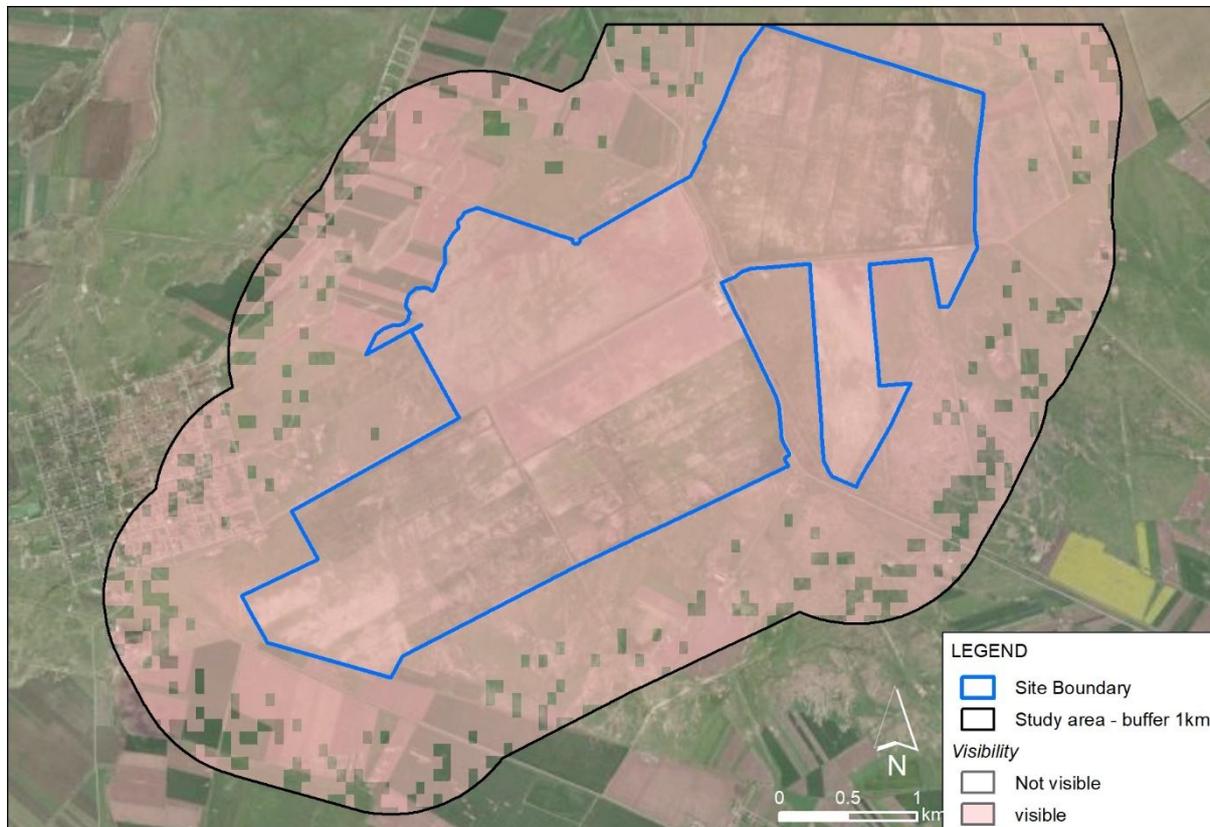
In general, light-sensitive receptors with view of a solar PV development have potential to experience solar reflection. Receptors within the assessment area are identified based on desktop mapping and the field survey of April 2023.

Solar farm are characterized by their low horizontal profile. The major elements of solar farm are the PV models, these are generally 3 or 4 meters above ground level. In this study a maximum height of 4 meters was used in the modelling. At distances greater than 1km a 4 meters high horizontal object in

the landscape becomes visually insignificant when view across a flat plain, therefore the viewshed analysis focused on potential visibility of the project within 1 km of the site.

The result of the viewshed analysis (based on topography) is shown in Figure 6-27.

Figure 6-27: Viewshed analysis



Source: ERM

Arc Map 10.8 was used to determine the ZTV for the Project. The current visibility within the ZTV will vary depending on the presence of intervening local topography and other features, such as vegetation and buildings. The present viewshed analysis has been based solely on topography and did not take into account the potential screening granted by the local vegetation patches, which would further reduce the actual viewshed. Moreover, it should be highlighted that a typical viewshed assessment does not take typical meteorological conditions into account that can result in changes to real visibility.

Dwelling receptors

The analysis has considered dwellings that

- Are within the defined area of influence; and
- Have a potential view of the panels.

In the dense residential areas only the outer dwellings have been considered for assessment, because they will mostly obscure views of the solar panels to the dwellings behind them, which will therefore not be impacted by the proposed development because line of sight will be hidden.

A height of 1.8m above ground level is used in the modelling to simulate the typical viewing height of a ground floor window.

Road receptors

The analysis has considered major national, national, and regional roads that:

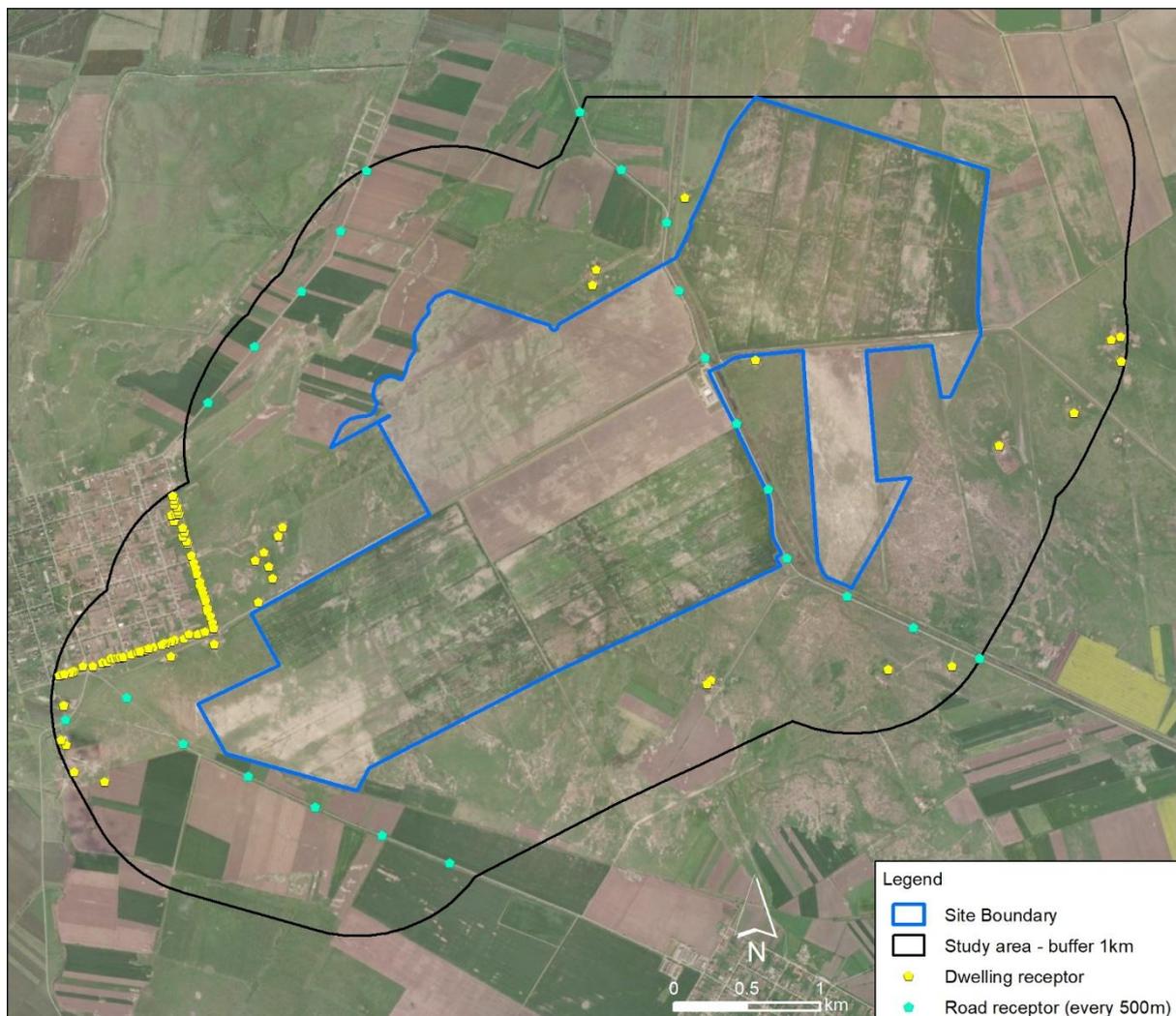
- Are within the defined area of influence; and
- Have a potential view of the panels.

A height of 1.5 metres (car) and 3.0 metres (truck) above ground level has been taken as typical eye level of a road user.

A driver field of view (FoV) of 100° has been applied (50° view angle to left and right). According to the Federal Aviation Administration's (FAA), glare that appears beyond this FOV range is mitigated.

Figure 6-28 shows dwellings and road receptors.

Figure 6-28: Receptors



Source: ERM

6.2.4 Traffic

1.1.1.1 Area of Influence

The traffic and transportation AOI includes local and regional roads that would be used for worker commuting and transport of materials, and routes that would be used to transport components from the selected port—most likely to be the port at Constanța—to the Project site.

The Project site will be reached by means of the existing network of roads and internal Project roads. The internal Project roads will be comprised of newly built access roads and existing local dirt tracks that will be rehabilitated as needed. The existing dirt tracks are located along the drainage channels present on-site. The AOI includes all existing public roads connected to the proposed internal Project roads, including:

- National Road (DN) 79A: Primary access point. DN79A bisects the project site and would have multiple access points.
- County Road (DJ) 709B: one access point south of the project site.
- DJ709J: No direct access points to the project site. Connects to DN79A north of Project site.

DN79A is the key public road linking the local network of public roads. The primary county roads connecting the Project site to the region are DJ709B (south of the Project site) and DJ709J (north and west of the Project site). In addition to the named public roads listed above, internal Project roads would cross and be co-located with unpaved, rural lanes.

No port has been identified as the main point of delivery for the shipment of the solar panel and electricity storage components. Due to the Project's location on Romania's western border, land deliveries of Project components could originate from Hungary or origin points further west.

Rail and air transport are not proposed as part of the Project transportation plans. Marine transportation is not part of the ESIA scope.

6.2.4.1 Key baseline conditions

Road Infrastructure

In 2018, Romania had 86,234 km of roadways consisting of 17,740 km of national roads and 68,484 km of communal roads (Romania National Institute of Statistics 2020). As shown in Table 6.2.3-1, two-thirds of all roads in Romania and nearly all national roads are made of modern surfacing (asphalt or concrete), with the remainder constructed of light asphalt paving or unpaved with an earthen or stone surface. Approximately 38 percent of the modern surfaced road length and 47 percent of the light cover roads were overdue for maintenance (Business Review 2018).

Table 6-13 Roads in Romania by Surface Type, 2020

	Modern surfacing (asphalt and concrete)	Light asphalt paving	Earthen or stone
All roads	43%	25%	32%
National roads	95%	4%	1%
County or communal roads	29%	30%	41%

Source: Romania National Institute of Statistics 2020.

The physical characteristics of the public roads in the AOI are summarized below.

- DN79A is a major east-west route that stretches 127 km from Vărfurile, Romania to the Romania-Hungary border at Vărşand. It passes through Chişineu-Chiş and Socodor east of the project site, and Pilu and Vărşand northwest of the project site. In the area of the Project site, DN79A is a two-lane asphalt road with lane markings and a grass swale on both sides. Total pavement width is approximately 7m. DN79A retains approximately the same dimensions through towns or settlements to the east and northwest of the project area. According to the Mayor of Pilu, Vărşand currently deals with daily queues of trucks waiting to cross the border to Hungary. At peak times, these delays can span many kilometres, disrupting local traffic (see Section 5.2.2 Stakeholder Engagement during Scoping/Summary of Scoping Findings).

- DJ709B extends from the City of Arad south of the Project site to the Romania-Hungary border near Grăniceri west of the project site. DJ709B has a winding route through western Romania and intersects DJ792C in Curtici, DN79A just west of Socodor, and DJ709J in Sânmartin and Grăniceri. The roadway is a two-lane asphalt road with faded lane markings and grass swales on both sides. Total pavement width is approximately 7m. DJ709B retains approximately the same dimensions through towns or settlements to the southwest, east and southeast of the project area with the exception of the stretch between Sânmartin and Socodor where the road is unpaved, unmarked and approximately 5m wide.

DJ709B runs along the south of the Project site solar fields. The underground transmission line from the solar fields to the Grid Connection Substation would be laid under and perpendicular to the roadway.

- DJ709J extends from Sânmartin south of the project site to Grăniceri west of the project site to its connection to DN79A in Pilu northwest of the Project site. DJ709J has no direct access points to the project site but connects to both DN79A and DJ709B. The roadway is a two-lane asphalt road with lane markings and a grass swale on both sides. Total pavement width is approximately 7m.

Other communal and farm roads serve the Project site and are generally one lane, surfaced with worn paving, stone or earth, with narrow or no shoulders.

Road safety

Traffic safety is an important component of overall public health and safety, because road accidents contribute to health consequences such as death, disability, lower quality of life, and an economic burden for victims and their families. Key factors that can increase the risk of traffic-related accidents and injuries include a lack of traffic regulation, adherence, and enforcement, as well as poor road and weather conditions. Romania has national speed limits, a drinking and driving law, and laws requiring motorcycle helmet use, seat-belt use, child restraints, a ban on hand-held mobile phone use, vehicle safety standards, and safe road design standards (WHO 2018). Enforcement of driving regulations, in particular speed limit and seat-belt use, has been ranked 7 on a scale of zero (least effective) to ten (most effective). This is comparable to average rankings across the European Union.

A total of 1,864 deaths occurred in reported traffic accidents in Romania in 2019, resulting in a mortality rate of 96 road deaths per million population, or 2.26 fatalities per 10,000 registered vehicles, the highest mortality rates in the European Union (European Commission 2021). By comparison, the European Union countries overall reported 0.88 road deaths per 10,000 registered vehicles in 2019, while nearby countries (Bulgaria, Hungary, Slovakia) experienced rates lower than 2 fatalities per 10,000 registered vehicles (European Commission 2021). The number and rate of road deaths in Romania decreased by 22 percent between 2010 and 2019. The number of serious injuries from traffic accidents declined by only 4 percent during this time period. Available data for Romania do not provide insight into factors contributing related to traffic accidents (e.g. speeding, drinking, road condition).

Most traffic fatalities and serious injuries in Romania occurred on urban roads as opposed to rural roads or motorways. Pedestrians accounted for 39 percent of road traffic deaths in 2019, followed by passenger car occupants (36 percent), bicyclists (11 percent), truck/bus occupants (6 percent), motorcycles or powered two-wheelers (4 percent), and unknown victims (4 percent) (European Commission 2021). Trends from 2010 through 2019 show an increasing proportion of fatalities among bicyclists and a decreasing proportion among motorcyclists and car occupants.

Arad County had 500 reported road accidents in 2021, resulting in 42 deaths and 639 injuries, roughly 2 percent of the accidents and casualties in Romania, as shown in Table 6.2.3-2 (Romanian National Institute of Statistics 2022). Arad County is one of 41 counties, plus Bucharest. West Romania, one of 8 reporting regions, had 8 percent of the accidents. The incidents occurring in Arad County and the West region reflect the percentages that would be expected if these incidents were proportionately distributed among counties and regions.

Table 6-14 Accident Data 2021

	Reported Accidents	Percent of Accidents	Fatalities	Percent of Fatalities	Injuries	Percent of Injuries
Romania	26,805	100	1,779	100	33,233	100
West Romania	2,066	8	154	9	2,663	8
Arad County	500	2	42	2	639	2

Source: Romanian National Institute of Statistics 2022

6.2.5 Cultural Heritage

6.2.5.1 Introduction

This chapter presents the baseline for Cultural Heritage and assesses the nature, distribution, and value (significance) of Cultural Heritage resources for the construction of the 1065 MW Dama Photovoltaic (PV) Plant (hereafter referred to as “The Project”) within Arad County, Romania.

The project comprises the design, construction, commissioning, and operation of a 1044 MW solar PV plant. The information presented in this baseline chapter draws on desk- based research, historic mapping, and a field trenching investigation in the area carried out by the Arad Museum Complex⁴⁰.

6.2.5.2 Legislative Framework

This report has been prepared taking into consideration:

- National Legislation and regulations of Romania in relation to Cultural Heritage;
- International Treaties signed by the Government of Romania in relation to Cultural Heritage;
- International Environmental Standards for Cultural Heritage:
 - International Finance Corporation Performance Standards for Cultural Heritage (IFC PS8); and
- Recognised Good International Practice.

National Legislation

National legislation relating to the protection of Cultural Heritage in Romania is summarised in Table 6-15⁴¹:

Table 6-15: National legislation in relation to the protection of Cultural Heritage in Romania

Law	Brief Description
No. 1201 / June 6, 2023, Ministry of Development, Public Works and Administration	Strengthening the role of culture and sustainable tourism in economic development, social inclusion, and social innovation and OSI 6.3
Law No 258/2006 - published in the Official Gazette No 603/2006	Governs preventive archaeological research for the discharge of archaeological load and/or archaeological supervision and stipulates it shall be carried out only by specialists certified in archaeology.
Law no. 120 of May 4, 2006 on public monuments The Romanian Parliament	Law regulates the general legal framework for the creation, placement, and administration of public monuments.
Order no. 2682 of June 13, 2003 Official Gazette: 24.06.2003 Date of introduction: 21.03.2005	Approval of the Methodological Norms for the classification and record of historical monuments, the List of historical monuments, the Analytical File for the record of historical monuments and the Minimum File for the record of historical monuments, with subsequent modifications and additions, with subsequent modifications and additions.
Government Decision no. 1430/2003 Historical monuments Date of publication in the Official Gazette: 18.12.2003 Date of introduction: 21.03.2005	Approves the methodological norms regarding the situations in which the Ministry of Culture and Religions, respectively the local public administration authorities, contribute to cover the costs of protection and intervention works on historical monuments, the proportion of the contribution, the procedures, as well as the conditions that must be met by the owner, other than the state,

⁴⁰ Arad Museum Complex (2023) Intrusive Archaeological Diagnostic Report. Piata Ensecu 1 Arad 310131 Romania. And Arad Museum Complex (2022) Theoretical Evaluation Report. Piata Ensecu 1 Arad 310131 Romania

⁴¹ <https://whc.unesco.org/en/statesparties/ao/Laws>. Accessed 31/05/2023

	municipality, city or commune, provided in the annex that is an integral part of this decision.
Minister of Culture, 2392/06.09.2004	Outlines methodology for Archaeological standards and procedures.
Decision no. 610 of May 29, 2003 National cultural heritage Date of publication in the Official Gazette:10.06.2003 Date of introduction: 21.03.2005	Law regarding the procedure for granting credits necessary for carrying out protection works at historical monuments owned by natural or legal persons under private law.
Government Decision no. 493/2004 Category: Historical monuments Date of publication in the Official Gazette:30.04.2004 Date of introduction: 21.03.2005	Approves the Methodology regarding the monitoring of historical monuments included in the World Heritage List
LAW no. 564 of October 19, 2001	According to the law, the repair, current maintenance, enhancement, research, restoration, consolidation and conservation of historical monuments included in the World Heritage List are the responsibility of the owners, administrators or holders of other real rights, as the case may be.
Law 26/2008. Romanian Parliament	This law establishes the general framework necessary for the identification, documentation, research, protection, conservation, promotion, enhancement, transmission and revitalization of intangible cultural heritage elements, a defining characteristic of human communities, as a factor of social cohesion and economic development.
Order of the Minister of Culture and Cults no. 2043/2002 Official Gazette: 29.05.2002 Date of introduction: 21.03.2005	Law regarding the approval of the Regulation on the organization and operation of the National Commission of Historical Monuments. The Department of Historical Monuments and the Financial Budget Department of the Ministry of Culture and Religion, as well as the county departments for culture, cults and national cultural heritage and of Bucharest will implement the provisions of this order. Pursuant to the provisions of art. 32 para. (6) and of art. 36 para. (2) from Law no. 422/2001 regarding the protection of historical monuments, as well as art. 11 paragraph (5) from Government Decision no. 28/2001 regarding the organization and operation of the Ministry of Culture and Religion, with subsequent amendments and additions,
Law No. 422/2001 in in the Official Gazette no. 938/2006,	Protects historical monuments and requires approval from County Directorate for Culture for archaeological investigations. As well as the methods of collection, collection, transfer, use and highlighting of the amounts resulting from its application are regulated by the present methodological norms.
Law no. 182 of October 25, 2000 the Parliament of Romania	This law establishes the legal regime of the goods belonging to the movable national cultural heritage, hereinafter referred to as the national cultural heritage, regardless of their owner, by regulating specific protection activities: record keeping, expertise, classification, research, storage, conservation, restoration and placement in value, with a view to democratic access to culture and the transmission of these values to future generations
Ordinance No 43/2000 published in the Official Gazette No 352/2005	Protects archaeological heritage and the declaration of archaeological sites in areas of national interest.
Law 150/1997	ratification of the European Convention for the Protection of Archaeological Heritage (revised), adopted in Valletta on January 16, 1992

International Treaties

International Treaties relating to the protection of Cultural Heritage in Romania are summarised in Table 6-16:

Table 6-16 International Treaties for the protection of Cultural Heritage in Romania

Title	Description	Ratification/ acceptance date
Valletta Treaty	European Convention for the Protection of Archaeological Heritage	1997
European Framework for Action on Cultural Heritage	Promotes an integrated and participatory approach to cultural heritage, and contributes to the mainstreaming of cultural heritage across European Union (EU) policies, and is supported by EU Parliament, the Council of the EU, Committee of the Regions, and the Economic and Social Committee.	2019
Convention concerning the Protection of the World Cultural and Natural Heritage	Noting that the cultural heritage and the natural heritage are increasingly threatened with destruction not only by the traditional causes of decay, but also by changing social and economic conditions which aggravate the situation with even more formidable phenomena of damage or destruction.	1972
Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property	The States Parties to this Convention recognize that for the purpose of the Convention property which belongs to the following categories forms part of the cultural heritage of each State: (a) Cultural property created by the individual or collective genius of nationals of the State concerned, and cultural property of importance to the State concerned created within the territory of that State by foreign nationals or stateless persons resident within such territory; (b) Cultural property found within the national territory; (c) Cultural property acquired by archaeological, ethnological or natural science missions, with the consent of the competent authorities of the country of origin of such property; (d) Cultural property which has been the subject of a freely agreed exchange; (e) Cultural property received as a gift or purchased legally with the consent of the competent authorities of the country of origin of such property.	1970
Convention for the Safeguarding of the Intangible Cultural Heritage	The purposes of this Convention are: (a) to safeguard the intangible cultural heritage; (b) to ensure respect for the intangible cultural heritage of the communities, groups and individuals concerned; (c) to raise awareness at the local, national and international levels of the importance of the intangible cultural heritage, and of ensuring mutual appreciation thereof; (d) to provide for international cooperation and assistance.	2003
Convention for the Protection of Cultural Property in the Event of Armed Conflict with Regulations for its Execution of Armed Conflict, and resolutions of the Conference	This treaty focuses on the protection of cultural property in armed conflict.	1954
Protocol to the Convention for the Protection of Cultural Property in the Event of Armed Conflict	Each High Contracting Party undertakes to prevent the exportation, from a territory occupied by it during an armed conflict, of cultural property as defined in Article I of the Convention for the Protection of Cultural Property in the Event of Armed Conflict	14 May 1954

<p>Second Protocol to the Hague Convention of 1954 for the Protection of Cultural Property in the Event of Armed Conflict</p>	<p>Amendments to to improve the protection of cultural property in the event of armed conflict and to establish an enhanced system of protection for specifically designated cultural property</p>	<p>26 March 1999</p>
<p>Convention on the Protection and Promotion of the Diversity of Cultural Expressions</p>	<p>Article 1 – Objectives The objectives of this Convention are: (a) to protect and promote the diversity of cultural expressions; (b) to create the conditions for cultures to flourish and to freely interact in a mutually beneficial manner; (c) to encourage dialogue among cultures with a view to ensuring wider and balanced cultural exchanges in the world in favour of intercultural respect and a culture of peace; (d) to foster interculturality in order to develop cultural interaction in the spirit of building bridges among peoples; (e) to promote respect for the diversity of cultural expressions and raise awareness of its value at the local, national and international levels; (f) to reaffirm the importance of the link between culture and development for all countries, particularly for developing countries, and to support actions undertaken nationally and internationally to secure recognition of the true value of this link; (g) to give recognition to the distinctive nature of cultural activities, goods and services as vehicles of identity, values and meaning; (h) to reaffirm the sovereign rights of States to maintain, adopt and implement policies and measures that they deem appropriate for the protection and promotion of the diversity of cultural expressions on their territory; (i) to strengthen international cooperation and solidarity in a spirit of partnership with a view, in particular, to enhancing the capacities of developing countries in order to protect and promote the diversity of cultural expressions.</p>	<p>20 October 2005</p>

International Environmental Standards

The International Finance Corporation (IFC) has developed eight environmental and social Performance Standards (PS) to manage the social and environmental risks and impacts of IFC-financed projects (most recent version from 2012). The IFC PS's and the accompanying Guidance Notes are applicable to this Project⁴².

IFC Performance Standards state that the party responsible for implementing and operating the project must comply with the applicable national laws, including those laws implementing host country obligations under international law. The project operator is also required to meet the requirements of the standards throughout the life of an investment by IFC or other relevant financial institution.

IFC PS 8⁴³ recognises the importance of cultural heritage for the current and future generations. Consistent with the Convention Concerning the Protection of the Worlds Cultural and Natural Heritage, this PS sets out minimum requirements for the protection of Cultural Heritage resources in development projects financially supported by the IFC.

The objectives of the PS8 standard are to:

- protect Cultural Heritage from the adverse impacts of project activities and support its preservation; and

⁴² https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards/

⁴³ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps8

- promote the equitable sharing of benefits from the use of Cultural Heritage.

Key sections within PS8 include the following:

In paragraph 6 it calls for the implementation of international treaties and national laws relating to heritage protection, stating that clients:

'Will identify and protect Cultural Heritage by ensuring that internationally recognized practices for the protection, field-based study, and documentation of Cultural Heritage are implemented'.

In paragraph 7 it adds that:

'Where the risk and identification process determines that there is a chance of impacts to Cultural Heritage, the client will retain competent professionals to assist in the identification and protection of Cultural Heritage'.

In paragraph 9 it is also states that:

'The client is responsible for siting and designing a project to avoid significant adverse impacts to Cultural Heritage. The environmental and social risks and impacts identification process should determine whether the proposed location of a project is in areas where Cultural Heritage is expected to be found, either during construction or operations.'

The standard goes on to specify that Affected Communities and relevant national regulatory agencies should be consulted. It favours the retention of Cultural Heritage in situ (paragraph 12), only permitting exceptions where there is no feasible alternative, and the removal of the resource is carried out 'using the best available technique'.

In paragraphs 13-15, the standard addresses impact on 'critical Cultural Heritage' defined as:

'Recognized heritage of communities who use or have used within living memory the Cultural Heritage for long-standing cultural purposes; or (ii) legally protected Cultural Heritage areas, including those proposed by host governments for such designation.'

The standard states that critical heritage should not be removed unless in exceptional circumstances where impacts are unavoidable. In such cases, external experts should be retained to assist in its protection and assessment. Where there are legally protected sites, the client is required to comply with legal requirements related to their protection, consult stakeholders, and implement additional programmes to promote and enhance their conservation.

Good International Practice

Safeguarding and protecting cultural heritage with the use of innovative approaches, in cooperation with stakeholders is key to appropriately managing and promoting the cultural heritage to the benefit of the country and communities for social cohesion, wellbeing and environmental sustainability.⁴⁴ This baseline for the Project has taken into consideration the following approaches in line with Good International Industry Practice

Precautionary Approach

Good International Practice requires developers to take a precautionary approach to Cultural Heritage protection and safeguarding. Where there is uncertainty about the impact of a development on Cultural Heritage (such as through an insufficient level of information) Good International Practice requires an assumption that a significant adverse impact will occur and require appropriate mitigation for the assumed impact until such a time as further information is available to allow a robust assessment of potential impact. This precautionary approach is relevant to managing risk and impacts to Cultural Heritage and has been applied to this Project, as information about the archaeological sites in Pilu

⁴⁴ <https://www.unesco.org/en/cultural-heritage-7-successes-unescos-preservation-work>

commune sites located outside of the footprint were only provided as point locations with no information about the age, condition, or dimensions of the site were proved by the Arad Museum Complex.

Mitigation Hierarchy

The implementation of the mitigation hierarchy is one of the fundamental objectives of PS8 and is recognised Good International Practice. The project developer should always in the first instance look to avoid any impacts on Cultural Heritage through project redesign. Where avoidance is not feasible, the developer will apply a mitigation hierarchy that minimises as much as possible any adverse impacts on Cultural Heritage. This concept has been applied to the selection of mitigation measures for this Project.

6.2.5.3 Scope

This section assesses the following Project-related activities of the project and associated infrastructure with the potential to impact tangible and intangible Cultural Heritage resources:

- The proposed development and associated infrastructure.
- The Project Area of Influence (AoI)⁴⁵ for the project and associated infrastructure, which is a 2 km buffer from the project elements.

All Cultural Heritage resources identified in the Project AoI with the potential to be directly or indirectly affected were considered (Table 6-17). The extent and value (significance) of archaeological and palaeoenvironmental remains, historic buildings, the built environment and historic landscape were also considered.

Table 6-17: Scope of the Assessment and Project Area of Influence

Project Phase	Activity with Potential Impact	Project Area of Influence (AoI)
Construction	Physical ground disturbance through earthworks Restriction of access Visual, auditory and dust impacts	Direct Impacts: The limits of any associated infrastructure. Indirect Impacts: 2 km from the footprint of the proposed development and associated infrastructure;
Operation	Restricted Public Access Visual and auditory impacts	Indirect Impacts: 2 km from the footprint of the proposed development and associated infrastructure.

6.2.5.4 Limitations

This Cultural Heritage assessment has the following limitations.

- When investigation of a study area is restricted to desk-based research and intrusive archaeological investigation of only known sites there remains uncertainty about buried remains, and it remains important to emphasise that that absence of evidence is not evidence of absence. To alleviate this uncertainty geophysical survey informing additional intrusive investigation to inspect the area for the presence or absence of buried Cultural Heritage within the Project site would be recommended.
- The information from externally procured databases may contain errors. As this data has formed a major component of this baseline any of these errors may also be present in this report but may be mitigated through site visits/survey activities.
- Complete datasets utilised during the desk-based assessment for the Pilu commune listing an additional 40 sites (comprised of sensitive site types such as open settlements and tumuli) were

⁴⁵ According to the definition given in the IFC PS1, the Project Area of Influence includes Area of Direct Impacts (e.g., Project Area), Area of Indirect Impacts, and Area of Cumulative Impact.

not made available to ERM for this assessment and therefore is considered a partial gap in the understanding of archaeology in the region. Only point data and general site type were provided for 36 of the Pilu commune sites located outside of the Project footprint were provided to ERM for this assessment. Six additional site locations were only provided in the form of a paper map, and could only be integrated into this study as indicative locations sites, of these six sites, only two were confirmed to be in the Project Aol (PIL036ASZ and PIL037ASZ) therefore a precautionary approach as discussed above was utilised for sites located outside of the Pilu Project footprint as no essential information about site dimension, condition, or age was available for the writing of this assessment.

- No information on sites that may exist in the Socodor commune were provided to ERM for this assessment, and no information could be identified in secondary source literature. As such this represents a partial gap in the data for this assessment.
- Any additional design changes outside of what was assessed for this chapter, including the introduction of infrastructure elements, will need to be assessed, otherwise it will be considered a gap in the understanding of archaeology in the region.

6.2.5.5 Methodology

Baseline Methodology and Approach

This baseline report is prepared using the draft guidance on Heritage Impact Assessments for Cultural World Heritage Sites (International Council on Monuments and Sites⁴⁶, ICOMOS) and international guidance (ICOMOS and IFC PS8⁴⁷). The national guidance on methodology for assessment of impacts on Cultural Heritage within Romania is covered under the European Council Directive on the environmental impact assessment - EIA Directive 85/337/EC (amended by Directives 97/11/EC and 2003/35/EC).

Cultural Heritage resources were identified through the following:

- Desk-based research.
- Stakeholder Engagement (intangible Cultural Heritage); and
- Field Excavation for tangible.

Desk-based Research

The following information and sources were consulted during desk-based research of the Cultural Heritage for the Project Aol:

- Published and available academic research of the region;
- Publicly available remote sensing data including satellite imagery and historic mapping.

Stakeholder Engagement

Stakeholder interviews were held from 8 May – 12 May 2023 as part of the social survey with the aim to gather information on the following intangible Cultural Heritage:

- Places that might be of historical or archaeological importance, or important to a sense of identity or belonging;
- Active or formal burial sites or cemeteries;

⁴⁶ ICOMOS, 49-51 rue de la Fédération 75015 Paris, France in collaboration with the World Heritage Centre. 2011. Guidance on Heritage Impact Assessments for Cultural Heritage Properties. A publication of the International Council on Monuments and Sites. Available at: icrom.org. Accessed on: 31/05/2023.

⁴⁷ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps8. Access 31/05/2023

- Places that might be of spiritual importance, for example shrines, places of worship, ancestral places etc.
- Traditions, crafts, festivals or rituals in the area that may be impacted;
- Land farmed or managed in a particular way or tradition that is unique to a specific location.

This stakeholder engagement is outlined in Section 5, but did not identify any Cultural Heritage relevant to this report.

Field survey for Tangible Cultural Heritage

A tangible cultural heritage intrusive archaeological diagnostic report was carried out by AMC in May 2023. This comprised of trenching of known archaeological sites identified during the AMC desk-based assessment with the aim to ground-truth the cultural heritage resources identified through the desk-based study to delineate site boundaries and understand the condition of the cultural heritage resources by identifying extant remains.

6.2.5.6 Geographical/Topographic Context

The Project is located in Arad County, Romania approximately 3 km from the Hungarian Border. The Project Aol crosses into three communes Grăniceri, Pilu, and Socodor. The Project is situated on the Crișurilor Plain, located within the Crișuri Watershed area which has 365 surveyed water courses and as such the region is susceptible to year-round flooding events⁴⁸. Archaeological sites in the region are generally located on slightly elevated areas around wetlands that flood more frequently.⁴⁹ This frequent flooding of soils has implications for the archaeological potential of the region because frequently inundated soils often create anaerobic conditions that support the preservation of archaeological remains, especially organic artefacts.

6.2.5.7 Archaeological and Historical Background

Romania and its surrounding environs have been the site of multicultural interactions for thousands of years. Similarly, the Project Aol shows habitation and potential funerary sites of various cultures from the prehistoric to historic eras, forming a mortuary landscape. Mortuary landscapes and mound intervisibility has become an important topic of research in the region over the past decade. The below sections outline the diverse temporal and cultural archaeological remains of the Project Aol. This diversity is critical to our understanding of the area as it highlights the high potential of additional archaeological evidence to be identified in the area.

Prehistoric Periods

Relatively little archaeological evidence from the Palaeolithic period has been identified in Romania. Skeletons roughly 35,000 years old were recovered in Pesteră Cu Oase in 2002 which is roughly 140 km south of the Project, and are some of the earliest hominids currently known in Europe.⁵⁰ More archaeological evidence from later time periods has been found throughout Romania, the earliest known sites within the Project Aol date to the Neolithic period (6600–3500 BC) including site, GRA059ASZ. This site contains Pottery decorated with so-called pinchmarks, are characteristic of the Starčevo-Criș-Körös ceramic style of the 3rd and 4th phases⁵¹. This culture is defined as a group of three Neolithic cultures who practiced farming in the region and are differentiated from other groups by their painted pottery with barbotine vessel surfaces⁵².

⁴⁸ Inundatii.Ro Managementul riscului la inundatii. Crișuri Watershed Area. Available at: [Crișuri Watershed Area - Inundatii](#). Accessed 26/06/2023

⁴⁹ Arad Museum Complex (2022) Theoretical Evaluation Report.

⁵⁰ Zilhão, João (2006), "[Neanderthals and Moderns Mixed and It Matters](#)", *Evolutionary Anthropology*, **15** (5): 183–195, doi:10.1002/evan.20110, S2CID 18565967, retrieved 2008-01-10

⁵¹ Arad Museum Complex (2022) Theoretical Evaluation Report.

⁵² Ruth Tringham (2014). *Hunters, Fishers and Farmers of Eastern Europe, 6000-3000 B.C.* Routledge. pp. 80–. ISBN 978-1-317-59946-3

The introduction of copper to the region signals the end of the neolithic period and signals the beginning of the Enolithic Period (c. 4600/4500 – 3800/3700 BC) followed by the Bronze Age (c. 3200/2700–1100 BC)⁵³. One confirmed site dating to the Enolithic period is within the Project Boundary, PIL035ASZ. This site produced Tiszapolgár style conical lathe ceramics. This cultural complex lived across the Great Hungarian Plain, the Banat, Eastern Slovakia, and Ukrainian Zakarpattia Oblast in Central Europe. Troves of gold from Tiszapolgár culture burial sites have been found elsewhere in Romania such as in that found in Crişana, Romania, 18 km to the northeast of the Project Aol⁵⁴. Four additional Bronze age sites (GRA062TML, GRA056ASZ, GRA057ASZ, and GRA060ASZ) have been identified with the in Grăniceri and the Project Aol, these sites consist of settlements and were identified by artefact scatters consisting of a range of artefact types ranging from gold phalerae to ceramic fragments. There are several undated tumuli also found within the Project Aol and its environs. Tumuli are mounds often associated with burials and nearby settlements that were constructed throughout the prehistoric period but were heavily constructed in Romania during the Bronze Age⁵⁵ and many of which in the region may be associated with the Bronze Age, though they are currently undated. The study of mortuary landscapes created by tumuli in Romania in low-land agropastoral areas and their significance in Romania is currently a major focus of archaeological research as it is only poorly understood how important the intervisibility of the settlements and mounds was in the region⁵⁶.

Historic Periods

The Roman Period (3600 BC – 500 AD)⁵⁷ had significant impact on Romania, the inhabitants of which were then known to the Romans as the Dacians. They introduced Roman-style civilization that was heavily adopted in the region, including styles of dress, metal working and architecture. By 100 AD, Dacian civilisation was at its height, and Rome went through great expenditure to conquer and reconquer the area after it lost and regained control over the years. During this period, and especially from the 4th to 9th centuries the Goths, Visigoths, Huns and Slavs also invaded the lands bringing in additional new lifeways and traditions. From this period four known sites (GRA054ASZ, GRA055ASZ, GRA031TML/ASZ and GRA061ASZ), which are open settlements identified by artefact scatters, have been identified within the Project Aol and Grăniceri. An aerial image of the excavations at GRA054ASZ are shown in Figure 6-29 which shows the current agricultural use of the landscape.

⁵³ Exact dates for these periods are contested

⁵⁴ Aton, Francesca. Trove of Gold Rings is Uncovered in 'Sensational' Prehistoric Grave in Romania. Available at: [Trove of Gold Rings Uncovered in Prehistoric Grave in Romania – ARTnews.com](https://www.artnews.com/story/trove-of-gold-rings-uncovered-in-prehistoric-grave-in-romania-2023-06-26). Accessed 26/06/2023

⁵⁵ Alin Frînculeasa, Mădălina Nicoleta Frînculeasa. The dynamics of prehistoric burial mounds of Ploieşti metropolitan area (Romania) as reflected by cartographic documents of the 18th–20th centuries. The Royal Geographical Society. <https://rgs-ibg.onlinelibrary.wiley.com/doi/10.1111/area.12354>. Accessed 26/06/2023

⁵⁶ Beck, Jess and Horia Ciugudean, and Colin P Quinn. (2020) Bioarchaeology and Mountain Landscapes in Transylvania's Golden Triangle. Bioarchaeology International. Vol 4 Issue 2 pgs 89-110; Gainesville Florida.

⁵⁷ Romania Natural and Cultural. Romania's History. Available at: <https://romaniatourism.com/history.html#ancient>. Accessed: 26/06/2023

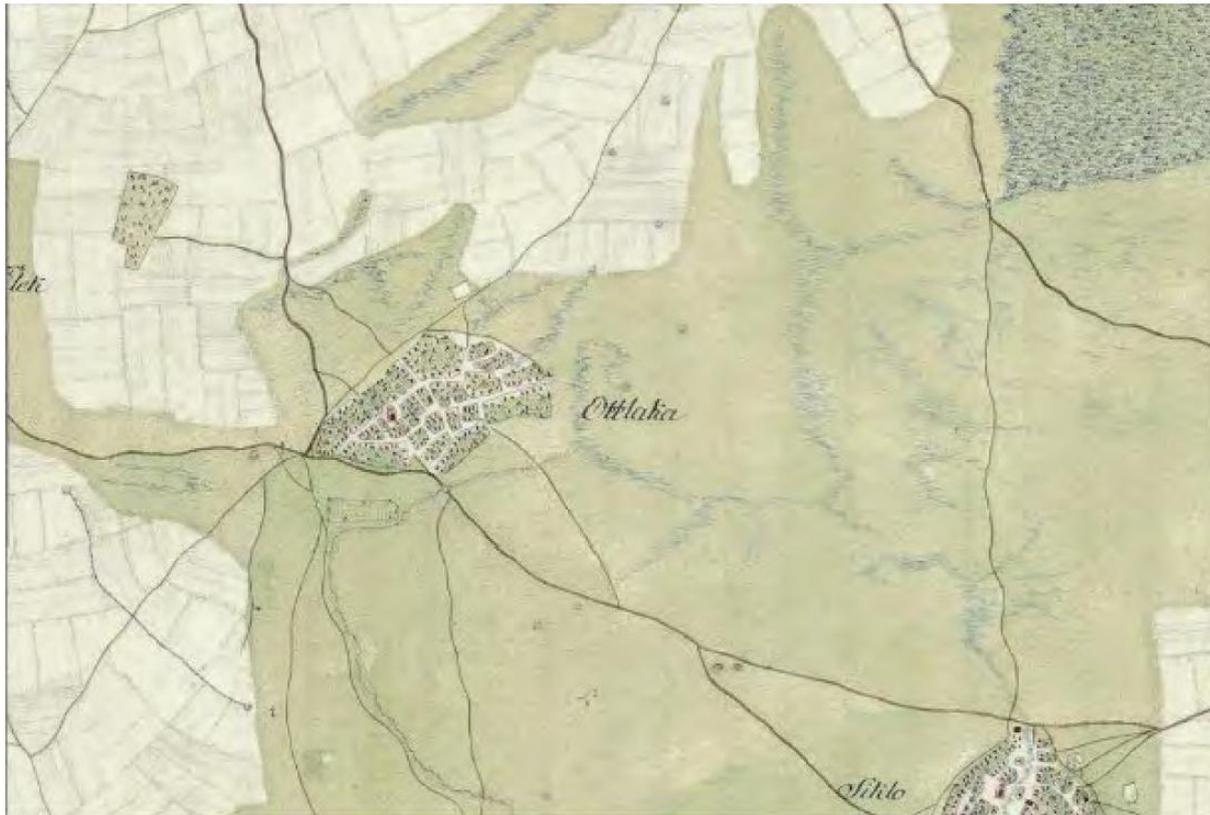
Figure 6-29 Excavations at GRA055ASZ



During the Middle Ages and Medieval periods several other cultures invaded Romania including the Magyars from 896-1100 AD, the Ottoman Empire in 14th-15th century AD. Followed by the Hapsburg Empire in 1699 AD, and Russia in 1821 AD. This of course is a broad statement and should not be considered a detailed history of the area which is outside the scope of this reporting. During this time, it is essential to note there were several unifications and other acts by Romanian inhabitants to establish a unique local identity in the region. However, by the 20th century AD Romania was established as a formal nation and ruled by a monarchy, followed by a dictatorship in 1941, then as a member of the communist bloc of the USSR, and by the 1990's AD a new constitution was developed. Based on historic and modern mapping of the regions, the Project Aol during the 18th through 20th centuries AD largely existed as a rural farming community where people primarily lived in the villages of Otlaka and Siklo⁵⁸ and utilized the Project Aol for agricultural purposes as seen in historical mapping.

⁵⁸ Arad Museum Complex (2022) Theoretical Evaluation Report.

Figure 6-30 The rendering of Grăniceri (Ottlaka) and Şiclău (Siklo) on the Josephine



Topographical Survey (source DVD Az Első Katonai Felmérés. A Magyar Királyság Teljes Területe 965 Nagyfelbontású Színes Térképszelvényen 1782-1785)⁵⁹.

6.2.5.8 Key Baseline Findings

The baseline study identified a total of **62** Cultural Heritage resources, comprised of only Designated Resources within Project Aol.

Each resource is assigned a unique identifier (for example AR_CH_001) and is presented below by Commune. Further details on each Cultural Heritage resource can be found in Appendix G and related maps are in Appendix H.

Grăniceri

Designated Cultural Heritage Resources

A total of 40 Designated Cultural Heritage resources were identified within the Project Aol. The Cultural Heritage resources are presented by 'type' below:

- 30 Barrow/Mounds are listed below. An aerial photo of AR_CH_022 is shown in Figure 6-31 .
 - AR_CH_001 located 1509 m from the Project boundary.
 - AR_CH_002 located 1323 m from the Project boundary.
 - AR_CH_003 located 434 m from the Project boundary.

⁵⁹ Replicated from the Arad Museum Complex (2022) Theoretical Evaluation Report

- AR_CH_004 located 1408 m from the Project boundary.
- AR_CH_006 located 489 m from the Project boundary.
- AR_CH_007 located 395 m from the Project boundary.
- AR_CH_008 located 1590 m from the Project boundary.
- AR_CH_009 located 824 m from the Project boundary.
- AR_CH_010 located 902 m from the Project boundary.
- AR_CH_011 located 1330 m from the Project boundary.
- AR_CH_012 located 759 m from the Project boundary
- AR_CH_014 located 304 m from the Project boundary.
- AR_CH_015 located 1007 m from the Project boundary.
- AR_CH_016 located 308 m from the Project boundary.
- AR_CH_017 located 685 m from the Project boundary.
- AR_CH_018 located within the Project boundary.
- AR_CH_022 located within the Project boundary.
- AR_CH_023 located 205 m from the Project boundary.
- AR_CH_024 located 230 m from the Project boundary.
- AR_CH_027 located 178 m from the Project boundary.
- AR_CH_029 located 85 m from the Project boundary.
- AR_CH_030 located 162 m from the Project boundary.
- AR_CH_031 located 4 m from the Project boundary.
- AR_CH_032 located 126 m from the Project boundary.
- AR_CH_033 located 380 m from the Project boundary.
- AR_CH_034 located 48 m from the Project boundary.
- AR_CH_037 located 5 m from the Project boundary.
- AR_CH_038 located 3 m from the Project boundary.
- AR_CH_039 located 53 m from the Project boundary.
- AR_CH_040 located 619 m from the Project boundary.

Figure 6-31 Areal photo of mound AR_CH_022⁶⁰



- 9 Open Settlements/multi-layered and tell/settlements are listed below . An example of this site type is shown in Figure 6-32.
 - AR_CH_005 a multi-layered tell/settlement located 502 m from the Project boundary.
 - AR_CH_019 an open settlement located within the Project boundary.
 - AR_CH_020 an open settlement located within the Project boundary.
 - AR_CH_021 an open settlement located within the Project boundary.
 - AR_CH_025 an open settlement located within the Project boundary.
 - AR_CH_026 an open settlement located within the Project boundary.
 - AR_CH_028 an open settlement located within the Project boundary.
 - AR_CH_035 an open settlement located within the Project boundary.
 - AR_CH_036 an open settlement located within the Project boundary.

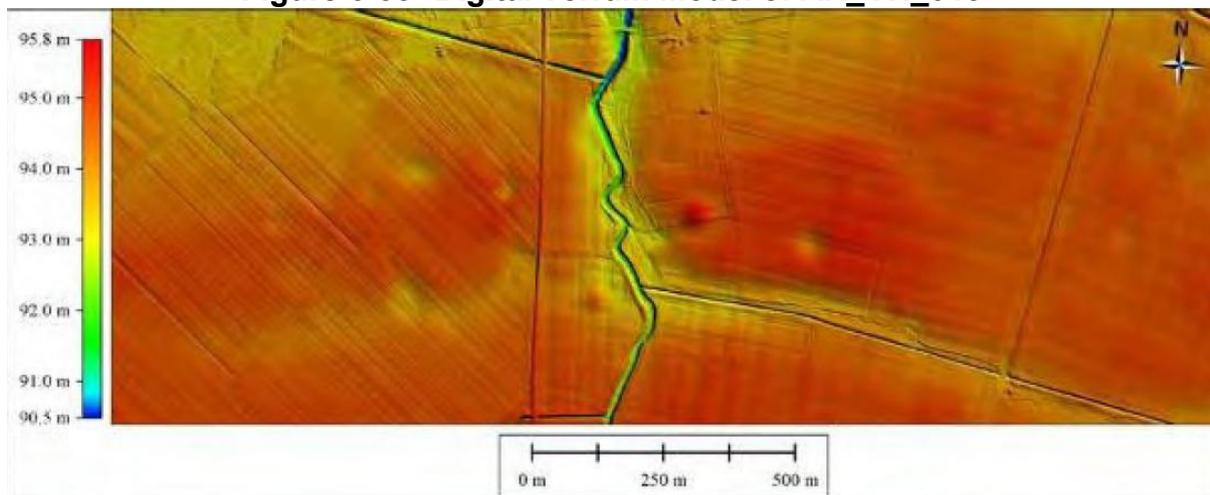
⁶⁰ Image from Arad Museum Complex (2022) Theoretical Evaluation Report

Figure 6-32 Areal photo of tell/settlement AR_CH_005⁶¹



- 1 Mounds/Open Settlement are listed below.
- AR_CH_013 located 640 m from the Project boundary.

Figure 6-33 Digital Terrain Model of AR_CH_013



Non-Designated Cultural Heritage Resources

No non-designated Cultural Heritage resources were identified during field investigations.

Pilu

Designated Cultural Heritage Resources

A total of 22 Designated Cultural Heritage resources were identified within the current Project Aol by the AMC desk-based assessment but only complete information about three sites within the Project Boundary were provided for assessment. Information about the 18 sites located outside of the Project

⁶¹ Image from Arad Museum Complect (2022) Theoretical Evaluation Report

footprint is considered indicative as only point information and general site type was provided. The Cultural Heritage resources within the Project Aol are provided are presented by 'type' below:

- 17 Barrow/Mounds
 - AR_CH_043 located within the Project boundary.
 - AR_CH_044 located 138 m from the Project boundary.
 - AR_CH_045 located 651 m from the Project boundary.
 - AR_CH_046 located 627 m from the Project boundary.
 - AR_CH_047 located 501 m from the Project boundary.
 - AR_CH_049 located 760 m from the Project boundary.
 - AR_CH_050 located 910 m from the Project boundary.
 - AR_CH_051 located 904 m from the Project boundary.
 - AR_CH_052 located 1429 m from the Project boundary.
 - AR_CH_053 located 421 m from the Project boundary.
 - AR_CH_054 located 435 m from the Project boundary.
 - AR_CH_055 located 1390 m from the Project boundary.
 - AR_CH_056 located 543 m from the Project boundary.
 - AR_CH_057 located 686 m from the Project boundary.
 - AR_CH_058 located 684 m from the Project boundary.
 - AR_CH_059 located 721 m from the Project boundary.
 - AR_CH_060 located 898 m from the Project boundary.
- 5 Open Settlements
 - AR_CH_041 located within the Project boundary.
 - AR_CH_042 located within the Project boundary.
 - AR_CH_048 located 522 m from the Project boundary.
 - AR_CH_061 located 121 m from the Project boundary.
 - AR_CH_062 located 535 m from the Project boundary.

Non-Designated Cultural Heritage Resources

No non-designated Cultural Heritage resources were identified during field investigations.

6.2.5.9 Sensitivity/ Value of Receptor

Each identified Cultural Heritage resource has been assigned a sensitivity/ value⁶². There are many factors to take into account when assigning value to Cultural Heritage resource. Values are typically expressed as low, medium, high (and sometimes very high). These can be equated to local, national and international values.

The sensitivity/ value of receptor has been assigned based on desk-based research and the field survey on intangible Cultural Heritage. A cautionary approach has been taken when assigning sensitivity/ value

⁶² The sensitivity/ value of receptor has been assigned based on desk-based research and the field survey on intangible Cultural Heritage. A Cultural Heritage field survey is required to confirm the assigned sensitivities, and based on the field survey results the sensitivity ratings may need to be revised.

of receptor to each Cultural Heritage resource. A Cultural Heritage field survey⁶³ would be required as next step to confirm the assigned sensitivities, and based on the field survey results the sensitivity ratings may need to be revised.

ERM's internal Impact Assessment Standard Criteria for Cultural Heritage Impact Significance is aligned with the IFC PS8 guidance, and assigns a 'Low', 'Medium' and 'High' value to Cultural Heritage resources as set out in Table 6-18 below.

Table 6-18 Criteria for Cultural Heritage Impact Significance

Cultural Heritage Resource Sensitivity		
Low	Medium	High
<p>Defining Characteristics:</p> <ul style="list-style-type: none"> ■ Site is not specifically protected under local, national or international laws or treaties; ■ Site can be moved to another location or replaced by a similar site, or is a type of site that is common in the surrounding region; ■ Site has limited or no cultural value to local, national or international stakeholders; and/or ■ Site has limited scientific value or similar information can be obtained at numerous sites <p>(Replicable Cultural Heritage)</p>	<p>Defining Characteristics:</p> <ul style="list-style-type: none"> ■ Site is specifically or generally protected by local or national laws, but laws allow for mitigated impacts; ■ Site can be moved or replaced, or data and artefacts recovered in consultation with stakeholders; ■ Site has considerable cultural value for the local and/or national stakeholders; and/or ■ Site has substantial scientific value, but similar information can be obtained at a limited number of other sites. <p>(Non-replicable Cultural Heritage)</p>	<p>Defining Characteristics:</p> <ul style="list-style-type: none"> ■ Site is protected by local, national and international laws or treaties; ■ Site cannot be moved or replaced without a major loss of cultural value; ■ Legal status specifically prohibits direct impacts or encroachment on site and/or protection zone; ■ Site has substantial value to local, national and international stakeholders; and/or ■ Site has exceptional scientific value and similar site types are rare or non-existent <p>(Critical Cultural Heritage)</p>

Source: Annex to The ERM Impact Assessment Standard

Tangible Cultural Heritage

Tangible Cultural Heritage refers to physical artefacts, objects or places produced, maintained and transmitted inter-generationally in a society. Evidence for buried archaeology was identified and detailed in the Archaeological and Historical Background **Error! Reference source not found.** Though not identified by this study, there is a residual risk of such additional archaeological buried remains being present. While a fair amount of archaeological work has been undertaken in the area, the history of the area indicates the potential for further archaeological sites to exist below the surface.

Tangible Cultural Heritage resources were assigned the following sensitivity:

⁶³ Previous field investigations by AMC in 2023 did not describe sites located within the current Project Aol and as such represents a gap in understanding of the sensitivity of the surrounding assets to assess how the setting of the resource may contribute to an individual's ability to experience, appreciate, or understand the resource.

High Sensitivity

Grăniceri

The following 40 Cultural Heritage resources can be attributed a High sensitivity (AR_CH_001, AR_CH_002, AR_CH_003, AR_CH_004, AR_CH_005, AR_CH_006, AR_CH_007, AR_CH_008, AR_CH_009, AR_CH_010, AR_CH_011, AR_CH_012, AR_CH_013, AR_CH_014, AR_CH_015, AR_CH_016, AR_CH_017, AR_CH_018, AR_CH_019, AR_CH_020, AR_CH_021, AR_CH_022, AR_CH_023, AR_CH_024, AR_CH_025, AR_CH_026, AR_CH_027, AR_CH_028, AR_CH_029, AR_CH_030, AR_CH_031, AR_CH_032, AR_CH_033, AR_CH_034, AR_CH_035, AR_CH_036, AR_CH_037, AR_CH_038, AR_CH_039, and AR_CH_040)

Pilu

The following 22 Cultural Heritage resources can be attributed a High sensitivity: AR_CH_041, AR_CH_042, AR_CH_043, AR_CH_044, AR_CH_045, AR_CH_046, AR_CH_047, AR_CH_048, AR_CH_049, AR_CH_050, AR_CH_051, AR_CH_052, AR_CH_053, AR_CH_054, AR_CH_055, AR_CH_056, AR_CH_057, AR_CH_058, AR_CH_059, AR_CH_060, AR_CH_061, and AR_CH_062.

Medium Sensitivity

No sites in Pilu or Grăniceri were identified as having a medium sensitivity. While barrow/mounds and settlements are common archaeological features in Romania⁶⁴, their known association with human remains and mortuary landscapes assigns them a higher value as relatively few have been investigated in Pilu and Grăniceri, and therefore have a higher potential to yield significant archaeological information about the prehistoric past in the region.

Low Sensitivity

No sites in Pilu or Grăniceri were identified as having a low sensitivity. While barrow/mounds and settlements are common archaeological features in Romania⁶⁵, their known association with human remains and mortuary landscapes assigns them a higher value as relatively few have been investigated in Pilu and Grăniceri and therefore, have a higher potential to yield significant archaeological information about the prehistoric past in the region.

Intangible Cultural Heritage

Due to the instrumental and artefactual nature of Intangible Cultural Heritage, it is common for Cultural Heritage to have both tangible and intangible value⁶⁶. Intangible Cultural Heritage features may be impacted by restricted access to and use of these sites will be during construction phase and operation phase. However, no Intangible Cultural Heritage resources of High, Medium or Low sensitivity were identified during the stakeholder engagement, desk-based assessment, or fieldwork.

⁶⁴ Diaconescu, Dragos (2020) Step by Steppe: Yamnaya culture in Transylvania. Praehistorische Zeitschrift. Available at: [The distribution of the mound sites from western Transylvania and... | Download Scientific Diagram \(researchgate.net\)](#). Accessed 18/07/2023 and Frinculeasa, Allin and ianca Preda-Bălănică (2015). Pit-Graves, Yamnaya and Kurgans along the Lower Danube: Disentangling IVth and IIIrd Millennium BC Burial Customs, Equipment and Chronology. Praehistorische Zeitschrift 90(1-2). Available at: [\(PDF\) Pit-Graves, Yamnaya and Kurgans along the Lower Danube: Disentangling IVth and IIIrd Millennium BC Burial Customs, Equipment and Chronology \(researchgate.net\)](#). Accessed 18/07/2023

⁶⁵ Diaconescu, Dragos (2020) Step by Steppe: Yamnaya culture in Transylvania. Praehistorische Zeitschrift. Available at: [The distribution of the mound sites from western Transylvania and... | Download Scientific Diagram \(researchgate.net\)](#). Accessed 18/07/2023 and Frinculeasa, Allin and ianca Preda-Bălănică (2015). Pit-Graves, Yamnaya and Kurgans along the Lower Danube: Disentangling IVth and IIIrd Millennium BC Burial Customs, Equipment and Chronology. Praehistorische Zeitschrift 90(1-2). Available at: [\(PDF\) Pit-Graves, Yamnaya and Kurgans along the Lower Danube: Disentangling IVth and IIIrd Millennium BC Burial Customs, Equipment and Chronology \(researchgate.net\)](#). Accessed 18/07/2023

⁶⁶ Intangible Cultural Heritage indicates 'the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their Cultural Heritage' (UNESCO, 2003).

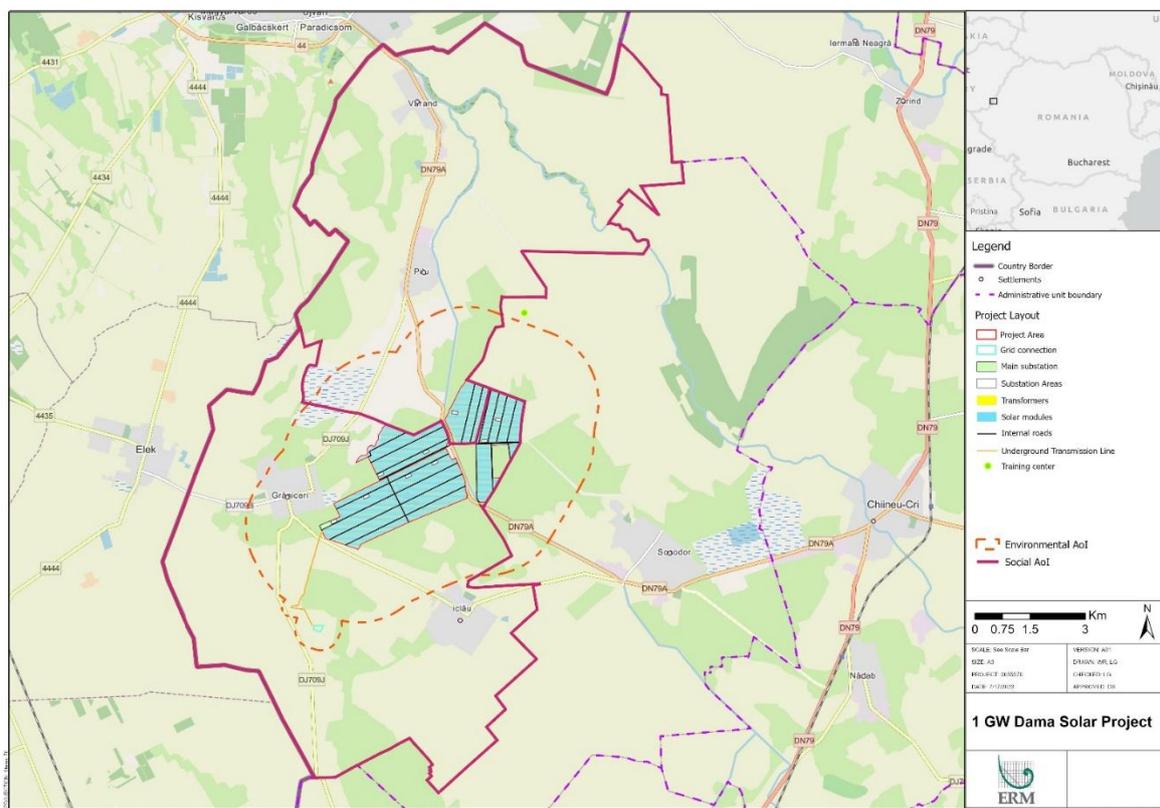
6.2.6 Ecosystem Services

6.2.6.1 Area of Influence

The Project Area of Influence (Aoi) in terms of ecosystem services, was defined as the Wider Regional Area, represented by the Direct Social Area of Influence (Aoi) for any potential impacts due to the construction and operation of the Dama PV plant. This comprises all settlements impacted by land take for the Project components (that belong to the administrative territorial units of Grăniceri and Pîlu Communes), together with the settlements that could be affected by potential temporary impacts during the construction phase and long-term during operations (such as glint and glare effect) located in a 2 km buffer from the PV area.

The study area considered for analyses of ecosystem services is presented on the map in Figure 6-34 below.

Figure 6-34 Project's Social Area of Influence (Social Aoi)



Source: ERM

6.2.6.2 Influencing Factors

The influencing factors affecting ecosystem services in the Project area could be mainly summarized into three types: natural factors, land use factors, and socio-economic factors, as detailed below:

- **Natural Habitats** which include biological factors, soil factors, topographic factors, climate factors, etc. are the natural foundations of ecosystem services.

Based on the results of the Biodiversity Baseline Study, the project will be mainly erected on existing modified habitats (cultivated field, fallow lands and pasture, modified water courses, artificial agricultural drainage canals and roads), however there are semi-natural habitats in the Aoi which includes grasslands / meadows (salt steppes) and wetlands (salt marsh), belonging

to the “Pannonic salt steppes and salt marshes” habitat, which is particularly threatened in Europe given its limited geographical distribution and the high rate of conversion to agricultural use and is, therefore, a Priority habitat in terms of the EU Red List of Habitats.

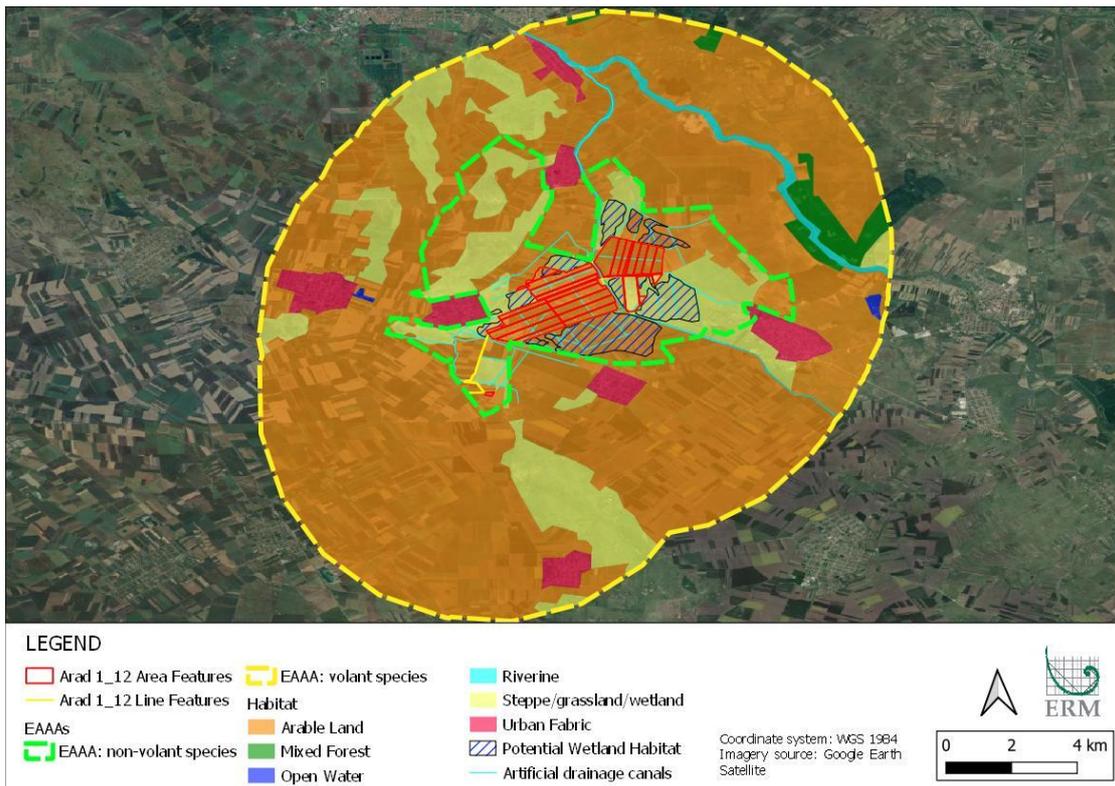
The modified/artificial habitats of the project Aol are largely represented by agricultural land under active cultivation for crops, and grass land. These will be also taken into consideration for evaluating ecosystem services.

Mapping of habitats was undertaken in GIS, using global land cover and the latest available Google Earth™ satellite imagery, with field investigations to identify the distribution of land cover types within the ‘study area’. Land cover types and Habitats classes existing in the study area are shown below.

Table 6-19 Key Land cover/Habitats mapped in the study area

No.	CORINE Land Cover Classification	CLC Code	Description	Extent (ha)	Extent (km ²)	Cover	Habitat Class	Cover
1	Arable land	2.1	<i>Agricultural land under active cultivation for crops.</i>	30 094	30.09	76.9 %	Modified (artificial)	81%
2	Open Water	5.1.2	<i>Natural or artificial water bodies with presence of standing water surface during most of the year.</i>	54	0.05	0.1%		
3	Urban fabric	1.1	<i>Developed areas with built infrastructure (generally residential and roads).</i>	1 598	1.598	4.1 %		
4	Mixed Forest	3.1.3	<i>Dense wooded habitat that is likely closed-canopy mixed forest or slightly more open woodland.</i>	656	0.656	1.7 %	Semi-natural (degraded)	19%

Figure 6-35 CORINE Land cover types mapped in the study area



Source: ERM

The proportion of modified (artificial) habitat equates to an estimated 81% of the study area, with semi-natural / degraded steppe and forest/woodland comprising around 19% of the study area (see map in Figure 6-36).

Figure 6-36 Distribution of Natural vs Modified Habitat in the study area



- **Land use change** on type, intensity, etc. directly affect the level of ecosystem services.

The project area overlaps entirely on arable land where an intensive agriculture is practiced. According to the Wildlife Management Consulting Biodiversity Report⁶⁷, it is expected that the project implementation and the consequent change of land use from agricultural, where fertilizers and pesticides are used, to PV/pasture will lead to an increase in biodiversity, both in number of species and their conservation value.

- **Socio-economic factors**, including the economic level and development, population density, cultural factors, tourism and recreational factors, influence ecosystem services by affecting the intensity use of ecological materials and environmental pollution (Millennium Ecosystem Assessment, 2005⁶⁸).

6.2.6.3 Key baseline conditions

The Project area is currently mainly covered by modified (artificial) agricultural lands under active cultivation for crops. The land use in the Social Aol is characterized by the following:

- all the settlements have a marked rural character.
- across the Direct Aol, arable land represents the major land use, followed by pastures in similar ratios (over 20% and more than the county ratio) and with very limited forested areas (less than 1% compared to approximately 30% at County level).

Ecosystem services, as per IFC PS 6 and EBRD PR6 refer to the benefits that people, including businesses, derive from ecosystems. The IFC PS6 organises the ecosystem services, as per Mapping and Assessment of Ecosystems and their Services (MAES)⁶⁹ and The Common International Classification of Ecosystem Services (CICES)⁷⁰ into 3 types: *provisioning, regulation and maintenance and cultural services*:

- **Provisioning services**: all nutritional, non-nutritional material and energetic outputs from living systems as well abiotic outputs (including water), i.e., goods or products such as food, medicines, fibres, and freshwater.
- **Regulation and Maintenance services**: all the ways in which living organisms can mediate or moderate the ambient environment that affects human health, safety and comfort, together with abiotic equivalents, i.e., benefits obtained from an ecosystem's control of natural processes, such as climate regulation, disease control, erosion prevention, water flow regulation, and protection from natural hazards.
- **Cultural services**: all the non-material, and normally non-rival and non-consumptive, outputs of ecosystems (biotic and abiotic) that affect physical and mental states of people such as recreation and aesthetic enjoyment.

The use of ecosystem services and dependence of local beneficiaries were investigated by the project team through consultation of local communities, observation, and expert opinion during the Social Baseline Study. Based on this, and on studies by the Association of Ecological Agriculture Operators – Bio Romania⁷¹ following types of ecosystems services are considered to be present in the social Aol:

- Agriculture/cultivated crops: Agricultural land provide support for cereal crops on large areas (wheat, rye, barley, oats, corn grains, millet and more), technical plants (sunflower, pulses for

⁶⁷ Final Report on the potential impact of the implementation of the “Graniceri – Pilu Photovoltaic Park”, on Biodiversity, July 2021

⁶⁸ <https://www.millenniumassessment.org/en/index.html>

⁶⁹ <http://biodiversity.europa.eu/maes>

⁷⁰ CICES V5.1, [cices.eu](https://www.cices.eu), on behalf of the European Environment Agency, EEA.

⁷¹ Management Plan for Natura 2000 sites in Bărăgan area (ROSCI088 Gura Vedei-Saica-Slobozia) <https://www.bio-romania.org/wp-content/uploads/2019/10/Plan-de-Management-Gura-Vedei-Saica-Slobozia-si-Ostrovu-Lung-Gostinu.pdf> and accessed on 3 November 2022

grains – peas, beans, grains, soybeans, melons, and tobacco and more), tree fruits (plums, cherries), vines.

- Livestock grazing/husbandry: natural meadows and steppes provide the available pasture for cattle, pigs, sheep herding, and birds (hens, ducks).
- Aquatic ecosystems and fishing: sustainable fishing can be carried out currently on Crisul Alb river. In the past there were ponds for fish farming – in Grăniceri it used to have up to 200 ha, but nowadays they are dried up. Fishing is regulated for the preservation of protected fish species and the provision of food resources for protected bird species. Potential use of water abstracted for irrigation of crops can be investigated, but once again the high salinity could hinder the agricultural productivity of the land.
- Biomass: corn cobs and shrubs and bushes are important as materials from plants which are not further processed and are used as solid fuel for heating and cooking. Wood mass of the forests are used as energy sources for heating.
- Cultural ecosystems: natural and cultural values contribute to development of sustainable tourism, aesthetic enjoyment, birdwatching, and ecological education activities.
 - Natural elements are the interactions with natural landscapes and are represented by the birds protected area Campia Crisului Alb si Crisului Negru, and the wetlands, salt marshes, and saline meadows habitats protected area Nadab-Socodor-Varsand.
 - Cultural elements are associated to recreation, physical and mental health, and are represented by popular traditions and cultural, historical or religious monuments of the area. Since the project footprint and surrounding areas are mainly modified agricultural areas, the supply level of key services linked to cultural use, tourism potential, and recreational use, is assumed to be limited despite being located in a Protected Area.

For evaluating the importance of each specific ecosystem service, following matrix, based on the level of demand by the local communities and level of supply by the ecosystems, was used:

Table 6-20: Ecosystem services rating matrix

		Supply Level				
		Very High	High	Moderate	Low	None/Negligible
Demand Level	Very High	Very High	Very High	Moderate	Low	None
	High	Very High	High	Moderate	Low	None
	Moderate	Moderate	Moderate	Moderate	Low	None
	Low	Low	Low	Low	Low	None
	None/Negligible	None	None	None	None	None

Following table shows the results of the rapid qualitative assessment of the level of importance of each specific ecosystem service identified in the project Aol based on the baseline study:

Table 6-21: Rapid qualitative ecosystem services assessment for the Aol

Ecosystem Services	Description of the service	Potential Supply Level	Potential Demand Level	Overall Perceived Level of Importance
Provisioning Services				
Food	<i>Cereal crops which are currently cultivated on the Project area are a source of food and income to the farmers and local communities</i>	Moderate	Moderate	Moderate

Ecosystem Services	Description of the service	Potential Supply Level	Potential Demand Level	Overall Perceived Level of Importance
Food	<i>Natural steppes and secondary meadows and pastures provide resources for livestock grazing, that are a source of food and revenue for the local communities</i>	Low	Moderate	Low
Raw Materials (Biomass Fuel)	<i>Wooded ecosystems such as forests, woodland and shrublands can provide wood and wood residues used for biomass fuel when harvested and processed. Cereal crops residues can also provide cob for heating.</i>	Negligible	Negligible	Negligible
Water Supply	<i>Water supply is provided by the regional water company (Compania de Apa Arad SA) which has groundwater as a main resource and surface water as a secondary resource. This can be for both potable and non-potable use.</i>	Low	Moderate	Low
Other (NTFPs)	<i>Ecosystems provide several Non-Timber Forest Products (NTFPs). One example is medicinal resources. A low variety of plants can be harvested for traditional medicine. Another example is beekeeping.</i>	Negligible	Low	Negligible
Regulation & Maintenance Services				
Global / local climate regulation	<i>Ecosystems influence climate at local and regional levels. Evapotranspiration from trees, vegetation and soil controls the amount of water vapor entering the atmosphere, influencing atmospheric moisture, rainfall, cloud formation, radiation transfer in the atmosphere and temperature control. Trees also serve to provide shade.</i>	Negligible	Moderate	Negligible
Carbon sequestration	<i>Ecosystems, including vegetation, soils and freshwater systems can store, regulate the climate, and mitigate climate change. Different ecosystems allow for varying degrees of carbon storage.</i>	Low	Moderate	Low
Water Purification	<i>Ecosystems help to regulate water quality by purification and waste treatment, through the trapping of sediments and dilution/removal of harmful nutrients and chemicals. Ecosystems such as wetlands filter effluents, decompose waste through biological activity of microorganisms and eliminate harmful pathogens.</i>	Low	Moderate	Low
Pollination	<i>Insects, wind, birds and bats pollinate plants and trees, which is essential for the development of fruits, vegetables and</i>	Moderate	Moderate	Moderate

Ecosystem Services	Description of the service	Potential Supply Level	Potential Demand Level	Overall Perceived Level of Importance
	<i>seeds. In agro-ecosystems, pollinators are essential for forage production as well as the production of seed for root and fibre crops.</i>			
Pest and disease control	<i>Predators and parasite activities in ecosystems control populations of potential pest and disease vectors, which can impact crops, livestock, water quality and species health.</i>	Low	Moderate	Low
Soil Formation and Quality Regulation	<i>Trees and herbaceous vegetation create the organic matter content of soils through natural decay and soil formation processes. Buffering, filtering, degradation and retention of pollutants and nutrients occurs within soils. This ensures soil fertility is maintained to support vegetation communities and human activities such as crop cultivation.</i>	Low	Low	Low
Nutrient Cycling	<i>Nutrient cycling describes the movement of nutrients between living and non-living organisms in the environment. It is enabled by having a large diversity of organisms and leads to the creation of structures and mechanisms that further regulate nutrient cycling. It underpins all ecosystem services.</i>	Moderate	Low	Low
Water Cycling	<i>Freshwater ecosystems, such as wetlands, rivers and aquifers, are a critical part of the global water cycle – supplying, purifying and protecting freshwater resources.</i>	Low	Low	Low
Habitat maintenance	<i>Habitats provide everything that an individual plant or animal needs to survive: food; water; and shelter. Each ecosystem provides different habitats that can be essential for a species' lifecycle. Some habitats have an exceptionally high number of species which makes them more genetically diverse than others, known as biodiversity hotspots. Habitats also maintain a diversity of complex processes that underpin other ecosystem services. Species are a critical component in the building of habitats, with habitats and species intrinsic to one another's survival.</i>	Low	Moderate	Low

Social & Cultural Services

Ecosystem Services	Description of the service	Potential Supply Level	Potential Demand Level	Overall Perceived Level of Importance
Recreational / tourism related services	<i>Nature-based opportunities for recreation play an important role in maintaining mental and physical health. Enjoyment of cultural and nature heritage and protected values attracts millions of travelers worldwide. This cultural ecosystem service includes both benefits to visitors and income opportunities for nature tourism service providers.</i>	Moderate	Moderate	Moderate
Spiritual, artistic, and symbolic services	<i>History and Nature is a common element in most major religions. Cultural and Natural heritage, spiritual sense of belonging, traditional knowledge, and associated customs are important for creating a sense of belonging.</i>	Moderate	Low	Low
Visual amenity services	<i>Animals, plants and ecosystems inspire art, culture and design.</i>	Negligible	Low	Negligible
Education, scientific & research services	<i>Ecosystems and landscapes provide educational, scientific and research purposes that develop our understanding of the natural world and can lead to important scientific discoveries.</i>	Moderate	Low	Low

In summary, for the entire Project area, following types of ecosystems are considered to supply significant services to the local communities:

- Agricultural activities, mainly arable/agricultural crops providing food and pollination.
- Protected areas, providing environmental regulation and maintenance and cultural services, such as tourism and recreational use.

Based on the above, it can be stated that the Project area ecosystem provide some significant provisioning, regulating and social & cultural services to the local communities.

7. ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Biodiversity

7.1.1 Introduction

Renewable energy projects such as solar farms play an important role in moving towards a more sustainable energy sector that can assist with combating the negative impacts of non-renewable energy on global climate. However, these 'clean' energy projects can also result in unintended negative impacts and consequences to the environment unless carefully planned and managed. This includes risks and potential impacts to biodiversity, which underpins the resilience and functions of ecosystems and the flow of ecosystem goods and services (Bennun *et al.*, 2021).

Biodiversity impact assessment is the process of determining the types and significance of effects a project will have on biodiversity, and the various components thereof, and is the core of the ESIA process (Hardner *et al.*, 2015). Risks and impacts to biodiversity typically vary according to the project being assessed as well as the context of the receiving environment where the project is located. The biodiversity impact assessment that follows has been undertaken specifically for the Arad Solar PV Project in Romania.

7.1.2 Approach & Methods

The approach to the assessment of biodiversity impacts was as follows:

Step 1: Defining the Aol

The Area of Influence (Aol) for the project was defined to include the development footprint and any temporary works infrastructure, operational activities and infrastructure, any offsite facilities (borrow areas for example) as well as areas beyond the immediate area of effect that could be subjected to indirect impacts (e.g. emissions, noise, water quality issues, etc.).

Step 2: Identification of key ecological receptors and describe biodiversity values

Once the Aol had been defined, the biodiversity 'values' (*also termed biodiversity 'features' or 'attributes'*) and ecological sensitivity of the various environmental receptors were identified (i.e. relates back to key habitats and species identified in the baseline biodiversity assessment).

Step 3: Identification of impacts to biodiversity

Potential project impacts to the key ecological receptors and biodiversity values were identified, including site-specific direct, indirect and induced impacts to biodiversity. The following guidelines were also referred to in identifying and describing biodiversity impacts:

- "*Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning*" (Hardner *et al.*, 2015); and
- "*Mitigating biodiversity impacts associated with solar and wind energy development: Guidelines for project developers*" (Bennun *et al.*, 2021).

Step 4: Assessment of impact significance

Biodiversity impact significance is the product of the value or importance of the biodiversity components that will be impacted and the intensity or magnitude (degree and extent of change) of the impact on those resources, systems and/or components. Some regulators, lenders, or corporate standards will use the term "significant" to refer to a threshold of consequence and/or risk that requires management or may not be acceptable. The approach to impact significance assessment is based on the traditional risk assessment formula which rates the **magnitude of effect** as the realistic 'worst-case' consequence or end-point of a project activity based on the perceived **importance and/or sensitivity** of a particular environmental receptor. Separate assessment matrices for habitat and species have been used for the assessment of impact significance, and these are contained in Table 7-1 and Table 7-2, respectively.

Impacts are assessed assuming that the mitigation measures that form part of the project design (embedded measures) are implemented prior to the implementation of any additional measures.

Residual impacts are assessed following the implementation of additional mitigation measures that are considered necessary by this assessment.

Table 7-1 Matrix used to rate Impact Significance Criteria for Habitat

Habitat Importance / Sensitivity		Magnitude of Effect			
		Negligible	Small	Medium	Large
Negligible	Habitats with negligible interest for biodiversity.	Insignificant	Insignificant	Insignificant	Insignificant
Low	Habitats with no or local designation / recognition; habitats of significance for species of Least Concern (LC) on IUCN RDL of Threatened Species; habitats which are common and widespread within the region, or with low conservation interest based on expert opinion.	Insignificant	Insignificant	Minor	Moderate
Medium	Habitats within nationally designated or recognised areas, habitats of significant importance to globally Vulnerable (VU) Near Threatened (NT), or Data Deficient (DD) species, habitats of significant importance for nationally restricted range species, habitats supporting nationally significant concentrations of migratory species and / or congregatory species, and low value habitats used by species of medium value.	Insignificant	Minor	Moderate	Major
High	Habitats within internationally designated or recognised areas; habitats of significant importance to globally Critically Endangered (CR) or Endangered (EN) species, habitats of significant importance to endemic and/or globally restricted-range species, habitats supporting globally significant concentrations of migratory species and / or congregatory species, highly threatened and/or unique ecosystems, areas associated with key evolutionary species, and low or medium value habitats used by high value species.	Insignificant	Moderate	Major	Critical

Magnitude of Effect definitions for habitat receptors:

- **Negligible** - Effect is within the normal range of natural variation.
- **Small** - Affects only a small area of habitat, such that there is no loss of viability / function of the habitat.
- **Medium** - Affects a sufficient proportion of the habitat that the viability/function of part of the habitat or the entire habitat is reduced but does not threaten the long-term viability of the habitat or species dependent on it.
- **Large** - Affects the entire habitat or a significant proportion thereof, to the extent that the viability/function of the habitat is threatened.

Table 7-2 Matrix used to rate Impact Significance Criteria for Species

Species Importance / Sensitivity		Magnitude of Effect			
		Negligible	Small	Medium	Large
Negligible	Species with no specific value or importance attached to them.	Insignificant	Insignificant	Insignificant	Insignificant
Low	Species and sub-species of LC on the IUCN RDL, or not meeting criteria for medium or high value.	Insignificant	Insignificant	Minor	Moderate
Medium	Species listed on IUCN RDL as VU, NT, or DD, species protected under national legislation, nationally restricted-range species, nationally important numbers of migratory, or congregatory species, species not meeting criteria for high value, and species vital to the survival of a medium value species.	Insignificant	Minor	Moderate	Major
High	Species included on the IUCN RDL as CR or EN. Nationally or internationally important populations of Annex II or Annex IV species. Species with restricted ranges or global breeding range for birds of less than 50,000 km ² .) Internationally important concentrations of migratory and/or congregatory species, key evolutionary species, and species vital to the survival of a high value species.	Insignificant	Moderate	Major	Critical

Magnitude of Effect definitions for species receptors:

- **Negligible** - Effect is within the normal range of variation for the population of the species.
- **Small** – Effect does not cause a substantial change in the population of the species, or other species dependent on it.
- **Medium** – Effect causes a substantial change in abundance and / or reduction in distribution of a population over one, or more generations, but does not threaten the long-term viability / function of that population, or any population dependent on it.
- **Large** - 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 from unaffected areas).

Step 5: Impact mitigation and management measures

Appropriate impact mitigation and management measures are recommended to reduce the magnitude (based on aspects that include the scale, probability and intensity of impact) and thereby reduce the significance of the impact consequence to an environmentally acceptable level where possible. The following best/good practice guidelines were referred to closely for informing impact management and the suite of mitigation measures recommended, which builds on the recommendations made in the local EIA and previous ESIA:

- “*Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning*” (Hardner et al., 2015);
- “*Mitigating biodiversity impacts associated with solar and wind energy development: Guidelines for project developers*” (Bennun et al., 2021); and
- “*A cross-sector guide to implementing the Mitigation Hierarchy*” (Ekstrom et al., 2015).

Step 6: Assess residual impacts

The final step is to assess residual impacts, which are those impacts that are likely to persist after taking into account the mitigation and management measures recommended as part of the mitigation strategy for the project, and their likely implementation success.

7.1.3 Biodiversity Impact Assessment**7.1.3.1 Project Aoi**

The Aoi (Area of Influence) of the solar PV project was considered for the construction and operational/maintenance phases of the project and is documented in *Table 7-3*. The reader is also referred to *sections 2.5 and 2.6* of the ESIA for the full detailed description of project facilities and components.

Table 7-3 Defining the Biodiversity Aol for Construction and Operational/Maintenance Components of the Project

Project Component	Habitats	Plants	Terrestrial Fauna (volant)	Terrestrial Fauna (non-volant)	Aquatic Ecosystems	Notes
CONSTRUCTION PHASE						
Internal access roads	350 m	350 m	250 m	250 m	500 m	<ul style="list-style-type: none"> ■ Several aquatic ecosystems (rivers, streams, wetlands) in the Aol. ■ Based on dust emissions (350m) and likely disturbance distance of most sensitive species. ■ Based on literature such as Kwon <i>et al.</i> (2018), there is a strong possibility that species could be disturbed by noise up to a radius of approximately 250m from the construction site, and outside of the 250m, noise level from construction should have been attenuated to background noise levels, with the exception of when piling occurs in which case which the disturbing zone could be larger. ■ Transmission line (TL) impacts to linear ecosystems such as streams/rivers are highly unlikely (small artificial drainage canals crossed by TL, pylons outside of watercourse).
Worker camps						
Laydown areas						
Parking areas						
Concrete batching plant / factory						
Borrow pit						
Transmission lines						
OPERATIONAL / MAINTENANCE PHASE						
Solar panel arrays	350 m	350 m	10 km	250 m	n/a	<ul style="list-style-type: none"> ■ Adjacent areas, including protected areas and key biodiversity areas (to account for potential risks to volant species populations). ■ Transmission line impacts to linear ecosystems such as streams/rivers are highly unlikely.
Internal access roads	350 m	350 m	250 m	250 m	n/a	
Transmission lines	350 m	350 m	10 km	250 m	n/a	
DECOMMISSIONING PHASE						
Removal of site infrastructure	350 m	350 m	10 km	250 m	500 m	<ul style="list-style-type: none"> ■ Similar to construction phase (above). ■ Rehabilitation.

7.1.3.2 Key Receptors & Biodiversity Values

Key ecological receptors and important biodiversity values linked with the AoI for the project include the various habitat types and species identified in the Baseline Biodiversity Assessment (see **Appendix D to the ESIA**). Several medium to high sensitivity ecological receptors and important biodiversity values linked with the project AoI were identified, and these are summarized in **Table 7-4**. Critical habitats identified in the CHA (**Appendix E**) have also been included here, including their value from an ecosystem services perspective.

Table 7-4 Summary of Key Ecological Receptors and Biodiversity Values for the Project area

Biodiversity Values	Features /	Applicability to the Project
Protected Areas & Internationally Recognized Areas		
Protected Areas		The Project is located within the boundary of two Romanian PAs (Natura 2000 sites) which are likely to be directly and/or indirectly impacted: <ul style="list-style-type: none"> Câmpia Crișului Alb și Crișului Negru (ROSPA0015) – SPA Nădab - Socodor – Vârșad (ROSCI0231) - SCI
Key Biodiversity Areas		Câmpia Crișului Alb și Crișului Negru (ROSPA0015)
Important Bird & Biodiversity Areas (IBAs)		Câmpia Crișului Alb și Crișului Negru (ROSPA0015)
Alliance for Zero Extinction (AZE) Sites		N/A - There are no Alliance for Zero Extinction (AZE ⁷²) identified for Romania;
RAMSAR wetlands of international importance		N/A - There are no RAMSAR sites ⁷³ (wetlands of international importance) associated with the Project area or downstream of the site
Ecosystems and Habitats		
Natural habitat		Degraded steppe, degraded wetlands (salt marsh)
Critical habitat		Pannonic salt steppes and salt marshes (EU priority habitat type)
Key ecological processes (e.g. seed dispersal, pollination, primary production, carbon sequestration)		Due to the modified nature of the landscape (agricultural use for growing crops / pasture), there are no appreciable or key ecological processes associated with the site.
Species		
Threatened species: fauna		<p>Birds</p> <ul style="list-style-type: none"> <i>Aquila heliaca</i> (VU) <i>Branta ruficollis</i> (VU) <i>Falco cherrug</i> (EN) <i>Falco vespertinus</i> (VU) <i>Limosa limosa</i> (NT) <i>Numenius arquata</i> (NT) <p>Mammals</p> <ul style="list-style-type: none"> <i>Lutra lutra</i> (NT) <i>Miniopterus schreibersii</i> (VU)

⁷² Alliance for Zero Extinction (AZE) site database. Online at: <https://zeroextinction.org/site-identification/2018-global-aze-map> [Accessed 23-11-2022]

⁷³ RAMSAR Wetlands database of sites. Online at: <https://www.ramsar.org/wetland/uzbekistan> [Accessed 23-11-2022]

	<ul style="list-style-type: none"> • <i>Spermophilus citellus</i> (EN) Herpetofauna <ul style="list-style-type: none"> • <i>Emys orbicularis</i> (NT) Invertebrates <ul style="list-style-type: none"> • <i>Lycaena dispar</i> (NT)
Threatened species: flora	N/A
Priority Biodiversity Features (PBFs)	45 fauna species (NT, LC, DD) qualify as PBFs (mainly bird species) based on their listing in terms of Annex II of the EU Habitats Directive (i.e. the Bern Convention) and/or Annex I of the EU Birds Directive (see the Critical Habitat Assessment for further details): <ul style="list-style-type: none"> • 35 birds • 2 mammals • 4 amphibians • 2 reptiles • 2 invertebrates
Endemic species	N/A
Restricted-range species	N/A
Large or congregatory species populations	N/A
Previously unknown species	N/A
Keystone species performing a key ecological role (e.g. key predator, primary producer)	N/A

Key to table:

IUCN Global Red List status: EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern, DD = Data Deficient

PBF = Priority Biodiversity Feature

7.1.3.3 Identification of Biodiversity Impacts

Detailed information on the Construction and Operational/Maintenance phases of the project (**section 2.6** of the ESIA) were referred to specifically in identifying and assessing biodiversity impacts. The key sources of potential biodiversity impacts identified in the scoping phase (ERM, 2022) include the following:

- Pre-construction activities (surveys, setting-out of works)
- Construction mobilization activities and earthworks
- Temporary works including construction camp sites and material/equipment laydown areas
- Associated facilities such as borrow areas
- Vegetation clearing, topsoil removal, general construction activities associated with access roads
- Construction workers presence (noise, disturbance)
- Waste management
- Unplanned events such as erosion/sedimentation, flooding, accidental oil/fuel/chemical spills
- Water abstraction for construction
- Operation of project, including dual-purpose use (solar farm and potential for grazing livestock)

Maintenance has been included in the operational phase, noting that solar farms typically have relatively low maintenance and servicing requirements (Bennun *et al.*, 2021).

Decommissioning phase impacts are likely be similar to construction phase impacts and have therefore not been assessed directly.

Note that cumulative impacts are addressed later on in the separate Cumulative Impact Assessment (CIA) Report (ERM, 2023), and include cumulative impacts on biodiversity.

Biodiversity impacts identified for the project and related activities and infrastructure have been conceptualized and discussed. Impacts are defined in terms of construction and operational (including maintenance) project phases, and include direct, indirect and induced impacts. Pathways of effect are used to understand how biodiversity may be impacted (e.g. direct habitat loss, indirect habitat loss due to disturbance, increased hunting pressure, etc.).

Impacts associated with the Project are considered to be both 'area based' and 'linear' in nature, and relate to the construction and operation of the solar arrays, the planned electricity distribution network (transmission line), as well as temporary worker camps and equipment laydown areas:

- Biodiversity impacts appear most intimately linked with direct and indirect impacts to species of conservation importance rather than habitat, which is largely modified (under cultivation/pasture);
- Construction-phase impacts will be more temporary in nature (e.g. temporary areas, noise, vibrations and emissions) and therefore considerably less significant in the long-term; and
- There are likely to be a range of permanent operational impacts of lower significance associated with the installation and operation of the solar arrays.

Impacts Screened-out of the Assessment:

Note that the following potential biodiversity-related impacts were initially identified for the project, however a decision was made to exclude them from the assessment of impact significance, with the reasons for excluding impacts provided:

- **Damage or loss of conservation important flora (plants)** – baseline surveys identified no conservation important (threatened/protected) flora in the Project area.
- **Increased risk of fire:** whilst fires can have negative impacts on habitats such as forests that are adapted to lack of fire, the project in itself is unlikely to pose a significant risk of fire. This risk, albeit low, can be readily mitigated through simple controls and preventative measures during construction and operation.
- **Trophic cascade effects:** behavioral changes in species can result in cascading effects on the various trophic levels, however these are typically not well-documented or understood and any species-level effects would be purely theoretical and conceptual at this stage and cannot be determined with any high level of confidence or accuracy/ long-term species monitoring at the site will be required to study such effects of the project.

7.1.3.4 Biodiversity Impact Significance Assessment

Impact 1 Physical Destruction/Disturbance of Vegetation and Habitat

Description of impact:

Construction phase:

The physical footprint of the solar farm will be relatively small in scale, being localized and limited to the actual footprint of infrastructure where vegetation will be cleared and converted to artificial surfaces (i.e. foundations, access roads, substation foundations and transmission line) or maintained as agricultural land/pasture. The following habitat and associated vegetation communities will likely be affected:

- Mixed agricultural land (arable land / pasture)
- Degraded salt steppe
- Degraded salt marsh (wetland)

The perceived importance of the biodiversity loss associated with modified habitat under cultivation is considered low as this type is not representative of the natural reference type (steppe and salt marsh) which would have naturally characterized the region prior to human activity and disturbance. These areas also do not support vegetation communities containing flora of concern nor appreciable levels of fauna of conservation concern.

There are however patches of semi-natural (degraded) salt steppe and salt marsh habitat in the development footprint that could be affected, and despite their degraded status as a result of anthropogenic disturbance, they do constitute critical habitat as these are considered a priority habitat type (Pannonic salt steppes and salt marsh) in terms of the EU Habitats Directive. Given the perceived ecological and functional importance of these habitats (high sensitivity receptors), it is recommended that direct impacts to steppe and salt marsh habitat be avoided.

Operational phase:

The physical destruction/disturbance of vegetation and habitat is primarily a construction-phase impact initiated by construction activities, albeit that the effects will be permanent in many cases where vegetation and habitat is changed. The intended land-use during operation to be pasture for livestock grazing, which will not change the current state of the habitat unless this extends to untransformed salt steppe and marsh habitat, and it is recommended that this be avoided.

Decommissioning phase:

With the intended land-use during operation to be pasture for livestock grazing, impacts during decommissioning of the project infrastructure (demolition and removal of hard infrastructure) is likely to affect the maintained pasture directly, however this will be short-term and recoverable. Pastures are also modified habitats and considered to be of low biodiversity receptor sensitivity/importance.

Impact significance assessment:

Biodiversity Impact 1: Physical Destruction/Disturbance of Vegetation and Habitat

	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	Direct	Indirect	Direct
Receptor	Habitat 1: agricultural land (modified) Habitat 2: degraded salt steppe and salt marsh		
Receptor sensitivity	Habitat 1: Low Habitat 2: High		
Nature of impact	Negative (-)	Negative (-)	Negative (-)
Extent/Scale	Regional	Local / Site Level	Local / Site Level
Duration	Short-term activity	Long-term	Short-term
Frequency	Daily	N/A	Single event
Likelihood	Definite	Possible	Possible
Magnitude of effect	Small	Small	Negligible
Impact Significance (with embedded mitigation)	Minor	Insignificant	Insignificant
Residual impact (after mitigation)	Small to Insignificant	None	None
Irreplaceable loss of resources	None	None	None
Reversibility	Permanent, irreversible	Recoverable	Recoverable
Evaluation of Mitigation Effectiveness	Easy to implement, highly effective	Easy to implement, highly effective	Easy to implement, highly effective
Level of confidence	High	High	High

Recommended mitigation:

- Restrict all activities to modified pasture / agricultural land only.
- Avoid locating permanent infrastructure as well as temporary construction camps and material/equipment laydown areas within or near identified natural or critical habitat (i.e. the semi-natural steppe and salt marsh/wetland habitat).
- Use existing access roads or upgrade existing roads wherever possible before considered new access road construction.
- Properly working machinery must be engaged in the process of land preparation and execution of construction works, and the construction site must be secured in accordance with the conditions of the competent authority in Romania.
- Only the vegetation that is absolutely necessary to be removed for construction purposes may be cleared, and where possible cut vegetation to ground level instead of stripping areas entirely.
- Surrounding vegetation and natural steppe and salt marsh habitat must be protected by employing appropriate barrier fencing and/or other forms of demarcations.
- Demarcate the construction zone or servitude for the Overhead Transmission Line (OHTL) on a map and on the ground clearly using high visibility tape for instance, to avoid impacting on sensitive areas outside of the permitted construction area.

- Implement relevant construction standards to limit the disturbance and erosion potential for soils (e.g. 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' – DEFRA, 2009⁷⁴).
- Compile a suitable post-construction habitat restoration plan for temporary areas used during construction. For salt steppe and salt marsh habitat, habitat restoration and/or rehabilitation activities will need to be informed by the guidelines and recommendations contained in the following documents/guides:
 - Management of Natura 2000 habitats: 1530 *Pannonic salt steppes and salt marshes (Šefferova Stanova *et al.*, 2008⁷⁵)
- Compile a Biodiversity Action Plan (BAP) to support the development of a Biodiversity Management Plan (BMP) for the management of critical habitat in the Project area towards meeting a Net Gain (NG) requirement for critical habitat and No Net Loss (NNL) requirement for other natural habitat.
- Consult with protected areas management authority to ensure activities within designated protected areas (Natura 2000 sites) are permitted by the relevant protected areas management authority.
- Ensure that the project is aligned with the conservation and management objectives of the Natura 2000 protected areas and does not seek to undermine these.

Impact 2: Reduced Habitat Connectivity

Description of impact:

Construction phase:

Whilst indirectly related to the destruction of vegetation and habitat during construction phase of the project, a reduction in habitat connectivity is a long-term and possibly a permanent effect in many cases, extending past construction and into the operational phase.

Operational phase:

New planned access roads can potentially fragment habitats, however given the existing level of habitat fragmentation and the fact that the project is likely to be limited to modified areas under pasture/agricultural use, habitat fragmentation effects are likely to be minimal.

Decommissioning phase:

Not applicable.

⁷⁴Available online at:

https://www.assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf

⁷⁵ Available online at:

https://ec.europa.eu/environment/nature/natura2000/management/habitats/pdf/1530_Pannonic_salt_steppes.pdf

Impact significance assessment:

Biodiversity Impact 2: Reduced Habitat Connectivity

	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	Indirect	Indirect	Indirect
Receptor	Habitat 1: agricultural land (modified) Habitat 2: degraded salt steppe and salt marsh		
Receptor sensitivity	Habitat 1: Low Habitat 2: Moderate		
Nature of impact	Negative (-)	Negative (-)	Negative (-)
Extent/Scale	Site	Site	Site
Scale	Local / Site Level	Local / Site Level	Local / Site Level
Duration	Short-term activity, permanent impact	Long-term	Short-term
Frequency	Immediate	Immediate	Immediate
Likelihood	Unlikely	Possible	Unlikely
Magnitude of effect	Small	Small	Negligible
Impact Significance (with embedded mitigation)	Insignificant	Insignificant	Insignificant
Residual impact (after mitigation)	None	None	None
Irreplaceable loss of resources	None	None	None
Reversibility	Reversible	Reversible	Reversible
Evaluation of Mitigation Effectiveness	Easy to implement, effective	Easy to implement, effective	Easy to implement, effective
Level of confidence	High	High	High

Recommended mitigation:

- The same suite of mitigation measures as for 'Impact 1: Physical Destruction/Disturbance of Vegetation and Habitat' apply here as well.
- In addition, any temporary excavations, fences or stockpiles of soil and materials must be removed from site once construction is complete.
- The use of suitable permeable fencing that allows small mammals and herpetofauna to move across the site is also recommended.

Impact 3: Vehicle Collisions with Fauna

Description of impact:

Construction phase:

Construction vehicles accessing and working within the site pose a risk of colliding with species utilizing the habitats and crossing roads between habitats. Some species may also be attracted to access roads created as easy corridors to move between areas and these animals are likely to be more at risk. Slower moving and more sedentary species such as reptiles (e.g. tortoises / turtles) and amphibians are likely to be at a greater risk of being injured or killed by moving vehicles, even at low speeds, particularly as cold-blooded species such as reptiles may utilize roads for sunning themselves. Given that some of these species are near-threatened species (e.g Pond Turtle, *Emys orbicularis*, Near Threatened status), the ecological importance associated with these species is considered 'Moderate'. Vehicular collisions,

whilst probable, are likely to be localised, manageable and therefore also unlikely to diminish populations of the identified species (magnitude of effect considered 'small').

Operational phase:

n/a

Decommissioning phase:

Impacts during the decommissioning phase of the project will be very similar to the construction phase impacts, but less intense and shorter in duration most likely.

Impact significance assessment:

Biodiversity Impact 3: Vehicle Collisions with Fauna			
	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	Indirect	Indirect	Indirect
Receptor	Herpetofauna (NT)		
Receptor sensitivity	Medium		
Nature of impact	Negative (-)	Negative (-)	Negative (-)
Extent / Scale	Local	Local	Local
Duration	Short-term activity, permanent impact	Long-term	Short-term
Frequency	Immediate	Immediate	Immediate
Likelihood	Possible	Unlikely	Possible
Magnitude of effect	Small	Small	Negligible
Impact Significance (with embedded mitigation)	Insignificant	Insignificant	Insignificant
Residual impact (after mitigation)	None	None	None
Irreplaceable loss of resources	None	None	None
Reversibility	Irreversible	Irreversible	Irreversible
Evaluation of Mitigation Effectiveness	Can be difficult to implement, effective	Easy to implement, effective	Can be difficult to implement, effective
Level of confidence	Medium	Medium	Medium

Recommended mitigation:

- Use existing access roads or upgrade existing roads wherever possible before considered new access road construction.
- Limit vehicle speed on site for construction vehicles and vehicles accessing the site (set speed limit at less than 30 km/hr).
- Place appropriate limits on the number of vehicle movements to and from the construction site.
- Restrict vehicles to the use of only authorised access roads.
- Restrict activities to day-time hours where possible when visibility is good and potential fauna collisions with vehicles can be more easily avoided. Where this is not possible, driver awareness training and reduced speed limits on internal roads will be employed.

Impact 4: Hunting/Poaching

Description of impact:

Construction phase:

Whilst increased human activity in the area could result in increased pressure on local fauna, this will likely be highly localised and relatively short-lived if experienced at all. This impact may possibly occur if not mitigated but is not likely to result in a substantial change in the population of species identified, thus magnitude of effect is likely to be relatively 'small'.

Operational phase:

n/a

Decommissioning phase:

Likely to be the same as for the construction phase, simply shorter in duration and intensity with fewer workers on site.

Impact significance assessment:

Biodiversity Impact 4: Hunting/Poaching					
	Project Phase				
	Construction		Operation	Decommissioning	
Type of impact	Indirect		n/a	Indirect	
Receptor	Threatened species	fauna	n/a	Threatened species	fauna
Receptor sensitivity	Medium		n/a	Medium	
Nature of impact	Negative (-)		n/a	Negative (-)	
Extent/Scale	Local		n/a	Local	
Duration	Short-term activity, permanent impact		n/a	Short-term activity, permanent impact	
Frequency	Infrequent		n/a	Infrequent	
Likelihood	Probable		n/a	Probable	
Magnitude of effect	Small		n/a	Small	
Impact Significance (with embedded mitigation)	Minor		n/a	Minor	
Residual impact (after mitigation)	Insignificant		n/a	Insignificant	
Irreplaceable loss of resources	None		n/a	None	
Reversibility	Irreversible		n/a	Irreversible	
Evaluation of Mitigation Effectiveness	Easy to implement, effective		n/a	Easy to implement, effective	
Level of confidence	Medium		n/a	Medium	

Recommended mitigation:

- Illegal activities such as hunting of wildlife or collecting of indigenous plant species is to be discussed with construction workers and such activities are to be prohibited.

Impact 5: Species Collisions with Solar Panels

Description of impact:

Construction phase:

n/a

Operational phase:

Solar panels reflect horizontal polarized light which might be mistaken as water bodies to the perception of volant fauna and results in collisions as they attempt to land on the solar panels. Waterbirds present in the study area, such as Red-Breasted Goose (*Branta ruficollis*, VU) may therefore be at risk of injury due to collision with the panels, although mortalities are likely to be rare based on the available literature on the subject:

- The nature and magnitude of impacts to volant populations are generally related to the following three primary project-specific factors: location, size, and technology (Walston et al., 2016);
- Solar developments that have large footprints, locating in close proximity to sensitive habitats (e.g., wetlands, riparian vegetation, congregation spots) will pose a greater risk of bird and bat collisions with project structures (Lovich & Ennen, 2011; Walston et al., 2016);
- Information to quantify the mortality rates of bird and bat collision with solar developments has been very sparse in the literature (Kosciuch et al., 2020⁷⁶);
- Bird mortality due to solar farms in general is considered significantly lower than other infrastructure such as wind farms and glass windows in buildings, or the numbers of birds killed annually by domestic cats (Bennun et al. 2021, Bao Nguyen pers. comm., Tu Vuong pers. comm.); and
- Overall, the collision rate of volant fauna with solar developments are largely inconclusive and not currently well-understood.

The impacts of collisions are unlikely to be significant compared to the population sizes of the bird and bat species in the Project area, which were found to be typically common resident and widespread species. The habitats in the Project area also do not provide suitable site for the congregation, feeding or breeding activities of avian species. Hence, magnitude of effect will therefore be 'small' and the overall significance of impact is likely to be relatively minor.

Decommissioning phase:

n/a

⁷⁶ The most comprehensive estimation of bird collision/mortality due to solar farms was provided by Smallwood (2022), who reviewed reports of fatality monitoring from 1982 to 2018 at 14 solar projects in California, the United States. Average bird fatality rate at PV projects was measured to be about 11.6 fatalities/MW/year and bat to be 0.06 fatalities/MW/year. The monitoring results of 14 solar developments showed that while it was more obvious that CSP plants kill more birds and bats than PV plants, there are no clear patterns in the relationship between the locations / habitats where the projects are located, size of the projects and the mortality rates. Most birds killed at solar projects were small-bodied, passerine birds (63% were less than 100g and only 22% were at least as large as rock pigeons), whereas water-dependent bird species (e.g., waterfowl) that have been considered vulnerable to PV array fatality due to the lake effects only represented about 11.2% of all fatalities (Kosciuch et al. 2020; Smallwood 2022).

Impact significance assessment:

Biodiversity Impact 5: Avifauna Collisions with Solar Panels

	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	n/a	Indirect	n/a
Receptor	n/a	Threatened bird species	n/a
Receptor sensitivity	n/a	Medium	n/a
Nature of impact	n/a	Negative (-)	n/a
Extent/Scale	n/a	Local / Site	n/a
Duration	n/a	Long-term activity, permanent impact	n/a
Frequency	n/a	Immediate	n/a
Likelihood	n/a	Possible	n/a
Magnitude of effect	n/a	Small	n/a
Impact Significance (with embedded mitigation)	n/a	Minor	n/a
Residual impact (after mitigation)	n/a	Small to Insignificant	n/a
Irreplaceable loss of resources	n/a	None	n/a
Reversibility	n/a	Irreversible	n/a
Evaluation of Mitigation Effectiveness	n/a	Can be difficult to implement, effective	n/a
Level of confidence	n/a	Medium	n/a

Recommended mitigation:

- To avoid attracting prey species, vegetation within the solar farm should be cleared regularly and maintained as relatively short cover in order to discourage burrowing animals and other prey for birds.
- Monitoring would be required to better understand behaviour and potential impacts on avifauna to inform suitable mitigation for the operational phase. It is recommended that an adaptive management and monitoring plan be prepared, with annual bat/bird carcass monitoring to take place (for at least the first year of solar farm operation), to determine whether and where additional mitigation may be necessary (such as the use of various type of deterrents, including visual, acoustic and chemosensory deterrents).
- Compile a Biodiversity Action Plan (BAP) to support the development of a Biodiversity Management Plan (BMP) for the management of Priority Biodiversity Features (PBFs) associated with the project area that include several species of birds (including water birds), towards meeting at least a No Net Loss (NNL) requirement for PBFs.

Impact 6: Species Collisions with Transmission Lines

Description of impact:

Construction phase:

n/a

Operational phase:

Collisions with the earth wire of transmission lines (which is typically quite poorly visible to avifauna) may lead to injury or even fatalities in bird and bat species. Overhead Transmission Lines (TL) projects can also result in electrocution when birds or bats earth live elements of the line, which is particularly relevant for larger species (with large wing spans). Electrocution risk is relevant to the transmission lines and substations.

Birds:

For larger voltage lines, electrocution risk will be minimized as live elements will be placed at a distance from each other such that the chance of birds completing the live circuit will be negligible. However, the lower voltage distribution lines (e.g. 35 kV and 115 kV) that are more compact in design may present a risk of electrocution for perching and low-flying birds with larger wingspans. Electrocution risk is also typically quite species-specific and may disproportionately affect species that utilise the pylons as perches when hunting or for nesting purposes, and this is most significant for raptors and other larger perching birds with large wing spans (Bennun *et al.*, 2021). There is therefore some level of risk posed to the larger species of raptors and waterbirds, also perching birds, for which utility and service lines are known to be key threats according to the IUCN. This includes several raptors and waterbirds of lesser concern (non threatened), but most significantly threatened raptor species such as as *Aquila heliaca* (VU), *Falco cherrug* (EN) and *Falco vespertinus* (VU) and threatened waterbirds such as Red-Breasted Goose (*Branta ruficollis*, VU), for which receptor sensitivity would be 'Medium-High'.

Although the incidence of collisions of raptors per kilometer of power line is typically quite low in general, collisions are more likely where species are more abundant and in areas with higher flight activity. The results of baseline surveys conducted suggest that common resident raptor species of Least Concern (LC) are most abundant, with no migratory species detected.

Bats:

There is limited evidence of risks posed by transmission lines to bats (Bennun *et al.*, 2021). Since the bat species recorded are largely small insectivores of LC, bat collisions with the transmission lines and possible electrocution risks are considered largely insignificant for this project. They have therefore been scoped out of assessment for collision with overhead lines.

Decommissioning phase:

n/a

Impact significance assessment:

Biodiversity Impact 6: Avifauna Collisions with Transmission Line

	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	n/a	Indirect	n/a
Receptor	n/a	Threatened bird species	n/a
Receptor sensitivity	n/a	Medium-High	n/a
Nature of impact	n/a	Negative (-)	n/a
Extent/Scale	n/a	Site/Local	n/a
Duration	n/a	Long-term activity, permanent impact	n/a
Frequency	n/a	Infrequent	n/a
Likelihood	n/a	Possible	n/a
Magnitude of effect	n/a	Small	n/a
Impact Significance (with embedded mitigation)	n/a	Minor - Moderate	n/a
Residual impact (after mitigation)	n/a	Small to insignificant	n/a
Irreplaceable loss of resources	n/a	None	n/a
Reversibility	n/a	Irreversible	n/a
Evaluation of Mitigation Effectiveness	n/a	Easy to implement, effective	n/a
Level of confidence	n/a	Medium	n/a

Recommended mitigation:

- Implement safe distribution lines, with insulation and spacing of conductors that eliminate electrocution risk for birds and bats. Allow for a minimum spacing of 1m between power cables to safeguard bird and bat species from electrocution risk.
- Monitoring would be required to better understand behaviour and potential impacts on avifauna to inform suitable mitigation for the operational phase. It is recommended that an adaptive management and monitoring plan be prepared, with annual bat/bird carcass monitoring to take place (for at least the first year of solar farm operation), to determine whether and where additional mitigation may be necessary for transmission lines (such as the use of various type of deterrents such as coloured balls attached to conductors to improve visibility for birds where necessary and technically feasible, see comments below as well).
- Installing flight diverters (hanging or spiral diverters) along transmission line routes in the vicinity of natural habitat and in areas where birds are likely to move locally, with spacing according to international good practice guidance (e.g. APLIC, 2012). It is recommended that a pragmatic approach be taken, such as the approach taken by 'LIFE ENERGY'⁷⁷ in Slovakia's lowlands, whereby the most dangerous sections of TL are identified through field assistant monitoring and flight diverters installed in the hazardous sections.
- Provide deterrents at key positions along the transmission lines where visibility is poor and particularly where less disturbed habitats are encountered. This will also be based on an adaptive management approach and implemented on a case-by-case basis for specific

⁷⁷ LIFE ENERGY: Protecting birds from the dangers of power lines. Online article available at: https://www.cinea.ec.europa.eu/news-events/news/protecting-birds-dangers-power-lines-2021-09-01_en

sections of powerline where high fauna mortalities due to collisions are recorded in long-term annual monitoring.

- Compile a Biodiversity Action Plan (BAP) to support the development of a Biodiversity Management Plan (BMP) for the management of Priority Biodiversity Features (PBFs) associated with the project area that include several species of birds (including water birds), towards meeting at least No Net Loss of PBFs.
- National environmental laws for PBF Species/Habitats, EU Habitats Directive and EU Birds Directive to be complied with.

Impact 7: Barriers to Species Movement

Description of impact:

Construction phase:

n/a

Operational phase:

The solar farm will not pose a significant barrier to the movement and mobility of volant species such as birds and bats, however any fencing of the site may restrict the movement of low-flying species and especially small mammals and reptiles in particular. Still, given the limited extent of the project, with most of the conservation important species (such as European souslik) located outside of the actual development site, it is unlikely that Project will have any appreciable negative influence or population-level effect on species movement (magnitude of effect will therefore be 'small').

Decommissioning phase:

n/a

Impact significance assessment:

Biodiversity Impact 7: Barrier to Species Movement

	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	n/a	Indirect	n/a
Receptor	n/a	Threatened mammal/herpetofauna species in particular	n/a
Receptor sensitivity	n/a	Medium	n/a
Nature of impact	n/a	Negative (-)	n/a
Extent/Scale	n/a	Local	n/a
Duration	n/a	Long-term activity, semi-permanent impact	n/a
Frequency	n/a	Daily	n/a
Likelihood	n/a	Possible	n/a
Magnitude of effect	n/a	Small	n/a
Impact Significance (with embedded mitigation)	n/a	Insignificant	n/a
Residual impact (after mitigation)	n/a	None	n/a
Irreplaceable loss of resources	n/a	None	n/a
Reversibility	n/a	Recoverable	n/a
Evaluation of Mitigation Effectiveness	n/a	Difficult to implement, effective	n/a
Level of confidence	n/a	Medium	n/a

Recommended mitigation:

- Avoid placing impermeable fences that could interfere with species movement.
- Develop an adaptive plan if operational monitoring results show that any site fences present a physical barrier to faunal movements, which include the use of mesh or other materials with appropriate spacing to replace old mesh at strategic sections.
- Develop protocols for the shepherding of any wild animals found in construction areas where these unable to exit the construction site by themselves. Species considered to be dangerous or poisonous/venomous to be handled by professionals.
- Investigate opportunities to conserve, better manage or create suitable alternative habitats or enhancement of existing ones to support displaced species where applicable. This will be informed by operational phase monitoring of species.
- Compile a Biodiversity Action Plan (BAP) to support the development of a Biodiversity Management Plan (BMP) for the management of Priority Biodiversity Features (PBFs) associated with the project area that include several species of birds (including water birds), towards meeting a No Net Loss requirement for PBFs.

Impact 8: Dust Pollution

Description of impact:

Construction phase:

Construction activities and operations are known to increase levels of dust due to vehicles travelling on informal dirt roads and through the creation of bare surfaces where vegetation clearing and bulk earthworks take place. Where large quantities of dust are released, this can smother plant parts and reduce photosynthetic activity, however this is likely to be a highly localised impact. Faunal impacts are also likely to be insignificant. Impacts of increased dust will also be limited to particularly windy periods and when vehicles drive along dirt roads, and the magnitude of effect is therefore likely to be 'negligible'.

Operational phase:

n/a

Decommissioning phase:

Likely to be the same as for the construction phase, simply shorter in duration and intensity with fewer workers and vehicles on site.

Impact significance assessment:

Biodiversity Impact 8: Dust Pollution			
	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	Indirect	n/a	Indirect
Receptor	Flora & habitat	n/a	Flora & habitat
Receptor sensitivity	Low	n/a	Low
Nature of impact	Negative (-)	n/a	Negative (-)
Extent/Scale	Local	n/a	Local/Site
Duration	Short-term activity	n/a	Short-term activity
Frequency	Regular	n/a	Infrequent
Likelihood	Likely	n/a	Possible
Magnitude of effect	Negligible	n/a	Negligible
Impact Significance (with embedded mitigation)	Insignificant	n/a	Insignificant
Residual impact (after mitigation)	None	n/a	None
Irreplaceable loss of resources	None	n/a	None
Reversibility	Recoverable	n/a	Recoverable
Evaluation of Mitigation Effectiveness	Easy to implement, effective	n/a	Easy to implement, effective
Level of confidence	Medium	n/a	Medium

Recommended mitigation:

- Reduce the risk of fugitive dust emissions through:
 - minimizing the surface clearing to minimum required for operations,
 - Avoiding earthworks during particularly windy periods
 - minimizing the size of material/spoil storage piles,
 - covering soil stockpiles during windy periods with appropriate cover materials.
 - restricting the unnecessary traffic,
 - using a suitable cover/tarp when transporting soil/sand liable by truck that could be liable to spillage or dust pollution.
 - minimizing and strictly regulating the offsite hauling of debris,
 - using the truck bed covers when hauling materials,

- using gravel for the access roads,
- employing suitable dust suppression on bare soil surfaces exposed to wind and dirt roads used by heavy construction vehicles, and/or
- planting vegetation where relevant.

Impact 9: Water and Soil Pollution

Description of impact:

Construction phase:

Fuels, oils and other chemical substances required by construction crews operating at the site of the WF will be liable to potential accidental spillage, and even improper disposal, unless this is carefully managed. Whilst watercourses and aquatic biodiversity are typically most sensitive and prone to pollution impacts, these are absent from the site and surrounds. That being said, terrestrial habitats and soils that have been subject to pollution could hinder natural plant growth. While the likelihood of significant spills occurring for a project of this nature can be considered low typically, where spills of hydrocarbon products and other hazardous substances do happen these can be particularly devastating and long-lasting and may require considerable remediation efforts.

Operational phase:

This impact may be relevant to maintenance activities, but these are likely to be limited, with insignificant quantities of fuel, oil, etc. stored and handled during the operational phase.

Decommissioning phase:

Likely to be similar to the construction phase.

Impact significance assessment:

Biodiversity Impact 9: Water and Soil Pollution

	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	Indirect	n/a	Indirect
Receptor	Salt marsh (wetlands)		
Receptor sensitivity	Medium-High		
Nature of impact	Negative (-)	n/a	Negative (-)
Extent	Surrounding area	n/a	Surrounding area
Duration	Potentially long-term	n/a	Potentially long-term
Scale	Local / Site Level	n/a	Local / Site Level
Frequency	Infrequent	n/a	Infrequent
Likelihood	Possible	n/a	Unlikely
Magnitude of effect	Small	n/a	Negligible
Impact Significance (with embedded mitigation)	Minor	n/a	Insignificant
Residual impact (after mitigation)	Insignificant	n/a	None
Irreplaceable loss of resources	None	n/a	None
Reversibility	Recoverable	n/a	Recoverable
Evaluation of Mitigation Effectiveness	Easy to implement, effective	n/a	Easy to implement, effective
Level of confidence	High	n/a	High

Recommended mitigation:

- Disposing of waste into the environment is prohibited. Waste products to be transported to registered waste facilities only for proper disposal.
- Waste generated during the construction works (concrete, metal, plastics, cables) must be collected and submitted to collectors for each type of waste separately.
- Establish a secured designated fuel and chemical storage area, with an impervious cover and sufficient containment volume for the storage of all chemicals.
- Restrict refueling of vehicles or equipment to impermeable hard-standing areas with strict spill controls.
- Always use drip trays when temporarily storing or handling fuels or when servicing/repairing vehicles on site.
- Employ best practice measures in handling and storing fuels, oils and chemicals liable to spillage.
- Develop procedures for emergency/spill response and for the storage and handling of fuels, construction materials and wastes.
- Emergency spill kit provision and training.
- Clean-up any spills immediately.
- Remediate any soils or habitats where spills take place.
- Inform the relevant authorities as soon as any significant or major spill event takes place.
- Check hoses and valves regularly for leaks ensure they are turned off and securely locked when not in use.
- Make sure to have recipients that can collect fuels in case of leaks as well as a minimum of 3 kg of environmentally friendly substances able to absorb fuel and other spills.

- Conduct regular inspections of construction vehicles to identify and repair leaks or damaged fuel/lubricant lines.
- Restrict refuelling of vehicles or equipment to impermeable hard-standing areas with strict spill controls.
- Place diesel pumps and similar items on drip trays to collect minor spillages. Check trays regularly and remove any accumulated oil.

Impact 10: Disturbance caused by Noise, Light, Vibration

Description of impact:

Construction phase:

General nuisance and disturbance as a by-product of construction activities, including that associated with increased noise / vibrations from heavy construction machinery and artificial light. There are few studies available on the distance to which fauna are typically displaced during the construction phase of projects, however based on literature such as Kwon *et al.* (2018), there is a strong possibility that species could be disturbed by noise up to a radius of approximately 250m from the construction site, and outside of the 250m, noise level from construction should have been attenuated to background noise levels, with the exception of when piling occurs in which case which the disturbing zone could be larger. The displacement of fauna during construction is considered to be mostly associated to noise (for birds and non-volant mammals) and vibrations (herpetofauna). Locally common species are likely to be less sensitive to noise/light disturbance can probably become habituated at the site. Given that the existing land use is agricultural, with high levels of existing disturbance and human activity, any additional disturbance during construction will be short-term and will unlikely increase the effect of the magnitude of impact to fauna, which are most likely already adapted to the modifications at the site.

Operational phase:

Artificial light impacts during operation are likely when specific facilities such as substations may need to be well-lit for safety and security purposes. This can also attract certain species of insects, which can lead to increased activity by insectivorous species such as bats and small reptiles. Noise and visual disturbance from operating solar farms may not pose as much immediate risks to non-volant fauna, so they show less avoidance behaviors and can be habituated to the disturbances quite easily (Kopucki & Mróz, 2016). The potential use of the land as pasture during operation/post-decommissioning will also result in some disturbance by grazing livestock, however the magnitude of effect is likely to remain 'small' given the low intensity of operational activities anticipated.

Decommissioning phase:

Impacts during the decommissioning phase of the project will be very similar to the construction phase impacts, but less intense and shorter in duration most likely.

Impact significance assessment:

Biodiversity Impact 10: Disturbance caused by Noise, Light, Vibration

	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	Indirect	Indirect	Indirect
Receptor	Threatened fauna species		
Receptor sensitivity	Medium		
Nature of impact	Negative (-)	Negative (-)	Negative (-)
Extent/Scale	Site/Local	Site	Site
Duration	Short-term	Long-term	Short-term
Frequency	Daily	Infrequent	Daily
Likelihood	Highly likely	Possible	Likely
Magnitude of effect	Small	Negligible	Small
Impact Significance (with embedded mitigation)	Minor	Insignificant	Insignificant
Residual impact (after mitigation)	Insignificant	None	None
Irreplaceable loss of resources	None	None	None
Reversibility	Reversible	Reversible	Reversible
Evaluation of Mitigation Effectiveness	Easy to implement, effective	Easy to implement, effective	Easy to implement, effective
Level of confidence	High	High	High

Recommended mitigation:

- In order to protect the existing species of bats, it is necessary to reduce the intensity of construction works in the period from dusk to dawn (in the period April-October), when the activity of bats is at its highest. During this period, artificial lighting should be restricted only to the construction works zone, with the possibility of encasing the floodlights by protective lids in order to prevent the diffusion of light.
- In order to reduce the levels of noise, equipment which is not being used must be turned off.
- The Project Developer is obliged to monitor and keep in proper working condition all installed equipment, devices and work resources.
- Staff and visitors must be warned not to disturb birds, especially during the nesting period where nests occur on the site or surrounds.
- Place information signs along the road in order to inform people of noise disturbance during working hours.
- Monitoring: monthly noise measurement with adequate phonometers.
- Limit construction activities to day-time hours to limit impacts to any nocturnal species as far as possible, otherwise limit night-time activities to only essential works so as to reduce disturbance.
- Maintain vehicles and equipment in good working condition.
- Use noise minimizing technology where possible.
- Aim lights away from any adjacent sensitive habitats. Use of directional lighting to reduce light spill and prevent light increases in adjacent sensitive habitats such as bushes and wooded habitats.
- Use low intensity lights where possible.

- Use appropriate lighting that minimises ecological and physiological effects on wildlife and also limits attraction of insects e.g. use of long-wavelength (warm white, orange, red and infra-red) light instead of short-wavelength (UV, cool white, blue and green LEDs)⁷⁸.
- Enforce good conduct by construction workers, including prohibition of hunting, trapping, fishing, and general harassment of wild animals.

Impact 12: Introduction/Spread of Invasive Alien Plants

Description of impact:

Construction phase:

The movement of vehicles, people and equipment into and through the project area may facilitate the introduction of Invasive Alien Plants (IAPs) to the area, or contribute to the spread of existing IAP species, primarily through the transport of seed attached to machinery, soils, clothing, etc. Local site conditions generally determine the susceptibility of a site to invasion and in this sense, certain land use types and particularly agriculture favor the presence and dominance of IAPs. The disturbance created by vegetation clearing and earthworks may also create suitable conditions for IAPs and weeds to become established and possibly spread into adjacent habitats. IAPs can have far reaching detrimental effects on native biota and are widely accepted as being a leading cause of biodiversity loss. Given that the habitats likely to be affected are primarily agricultural land under crop production/pasture, receptor sensitivity is low and the impact is unlikely to be of much significance as a result.

Operational phase:

The introduction of invasive alien plants into the lesser disturbed and ecologically important forest ecosystems can have a significant and lasting negative effect on the habitat and plant communities, that can extend well past the construction phase unless controlled. However, with mitigation this will probably be localised and therefore the magnitude of effect is considered 'small'.

Decommissioning phase:

Impacts during the decommissioning phase of the project will be similar to the construction phase impacts.

⁷⁸ According to the research of Longcore et al. (2018), filtered yellow-green and amber LEDs are recommended and predicted to have lower ecological and physiological effects on wildlife (compared with high pressure sodium lamps, while blue-rich lighting would have greater effect). Also, as a general rule insects are more sensitive or attracted to short-wavelength (UV, cool white, blue and green LEDs) than long-wavelength light which is recommended (warm white, orange, red and infra-red).

Impact significance assessment:

Biodiversity Impact 11: Introduction/Spread of Invasive Alien Plants

	Project Phase		
	Construction	Operation	Decommissioning
Type of impact	Indirect	Indirect	Indirect
Receptor	Habitat 1: agricultural land (modified) Habitat 2: degraded salt steppe and salt marsh		
Receptor sensitivity	Habitat 1: Low Habitat 2: Moderate		
Nature of impact	Negative (-)	Negative (-)	Negative (-)
Extent/Scale	Local	Local	Local
Duration	Short-term	Long-term	Short-term
Frequency	Regular	Regular	Regular
Likelihood	Probable	Possible	Possible
Magnitude of effect	Small	Small	Negligible
Impact Significance (with embedded mitigation)	Insignificant	Insignificant	Insignificant
Residual impact (after mitigation)	None	None	None
Irreplaceable loss of resources	None	None	None
Reversibility	Reversible	Reversible	Reversible
Evaluation of Mitigation Effectiveness	Easy to implement, effective	Easy to implement, effective	Easy to implement, effective
Level of confidence	Medium	Medium	Medium

Recommended mitigation:

- Minimise the need to introduce foreign soils to the site that may carry foreign plant material.
- Compile a suitable Invasive Alien Plant (IAP) species control plan and programme to eradicate dense colonies of alien plants and control the spread of minor species and weeds.
- Implement an IAP species control plan and monitoring programme.
- Monitor IAPs to inform further management actions as required.

7.2 Climate Change

7.2.1 Introduction

The aim of this Climate Change Risk Assessment (CCRA) Project is to conduct a Physical CCRA to assess the potential impact of climate change on the operational and decommissioning phases.

It is to be noted that the construction phase has been planned for a period of 2.5 years, starting early 2024. Hence, this CCRA has not included the construction phase because in terms of physical climate risks it will be very close to the baseline.

The objectives of this CCRA are to:

- Review the potential existing extreme weather that may affect the Project;
- Undertake a high-level assessment of the way in which these physical hazards may become more intense and/or frequent as a result of climate change;

- Identify the climate risks facing the Project over the operational and decommissioning phases as a result, and
- Provided recommended actions that may assist the Client in reducing the level of climate-related risk, e.g., through implementing mitigation / adaptation measures.

ERM utilise the latest climate data available from world-leading scientific organisations when assessing the impact of climate change on climate hazards for any given location. As is standard practice when undertaking climate risk assessments, scenarios, which are considered plausible future pathways, are selected on the basis of their appropriateness for any given assessment. This assessment applies:

- SSP1-2.6, which envisions a central pathway in which trends continue their historical patterns without substantial deviations, and
- SSP5-8.5, which describes a 'business-as-usual' scenario, where global emissions continue to rise unabated. Implied warming may increase by 4.4°C (very likely range of 3.3°C to 5.7°C) by end of 21st century, with many physical climate risks (e.g., cyclones) increasing in frequency and severity.

The time horizons used in this assessment are selected to best align with the expected schedule of the operational and decommissioning phases of the Project. The 2030 time horizon is considered as an insight to the potential climate trends that may impact the beginning of the operational stage, whereas 2050 are used to provide insight as to how these climate trends may affect the full operational stages of the Project and the possible start of the decommissioning phase.

7.2.2 Potential Impacts

7.2.2.1 Operation & Decommissioning

The CCRA has been completed via the following main steps:

- Review of Site's Exposure;
- Climate Risk Assessment;
- Mitigation / Adaptation / Recommendations, and
- Review Material Risks in Light of Proposed Mitigations / Adaptations.

After the desktop review of all the data for Arad PV Plant, the following climate hazards have been deemed to have the potential to impact the site, during either/both operational and decommissioning phases:

- Extreme Heat;
- River Flooding & Extreme Rainfall Flooding;
- Wildfires, and
- Water Stress & Drought.

The potential risk items are analysed against the site aspects for each of the material climate hazards. Based on this, the following are considered material physical risks for Arad PV Plant (for both operational and decommissioning phases):

- Extreme Heat causing heat stress to various steel infrastructure, overheating of electricity storage units, inverters, substations, and transformer, could delay operations, damage infrastructure and prolonged heat causing fatigue, sunstroke, and other related health issues for staff.
- Flooding leading to damage to equipment and possible washing away of equipment, damage various steel infrastructure, damage to electricity storage units, inverters, substations, and transformer, damage infrastructure, could delay operations and risk of injuries.

- Wildfires causing damage to various steel infrastructure, electricity storage units, inverters, substations, and transformers, could delay operations, damage to buildings, damage infrastructure, may result in impacts on safety to livestock and impacts on health and safety of staff.
- Water Stress & Drought may lead to water shortages, withdrawal of more water operations, instability and erosion of ground (soil) can lead to potential damage or becoming unstable to various operations and structures which limit access to a specific area for the livestock for grazing due to repairs and loss of vegetation due to lack of water.

7.2.3 Assessment of Impacts

The impacts from Climate Change will range from “**Minor to Major Negative Impacts**” on the site pre-mitigation (refer to Table 7-5).

Table 7-5 Impact Assessment from Climate Change on the site (pre-mitigation)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Range from local to regional	The spatial dimension of the potential effects of Climate Change will be effects that are limited to the project site, adjacent properties and communities/properties at a regional scale (with implications for the project).
Duration	Range from short to long term	Climate Change will affect the Project from ‘one day to one week’ to a maximum of ‘longer than one month’.
Scale	Maximum: Notably altered	Project functions and/or processes will be notably altered due to Climate Change, e.g.: flooding results in a one-day shutdown.
Frequency	From ‘Occurs once in one to five years’ to ‘Occurs once in ten years or more’.	Climate Change events will vary but will depend on how the severity of a particular hazard will evolve over time.
Likelihood	Possible to Likely	Climate Change events do currently occur during normal operating conditions and will continue into the future & the events will result in one or more potential consequences for the Project.

Magnitude

May Range from Small to Medium Magnitude

Vulnerability of the Resource/Receptor

May Range from Low to High Vulnerability

The site, during operational and decommissioning phases, will potentially be exposed to climate events and so it is necessary to develop a list of potential risk items for each of the hazard types.

Significance Rating Before Mitigation

May Range from Minor to Major Negative Impacts

The impacts from Climate Change can range up to Major significance for the Project during both the operational and decommissioning phases.

7.2.4 Mitigation measures

Within the CCRA report, under each Hazard there is an overview of ERM's high-level mitigation/adaptation measures and / or recommended appropriate next steps/considerations for all risk areas that have been identified within the 'Risk Review' section as being 'Likely Material'. The recommended next steps within each Hazard section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

In summary, there are several measures that could be implemented to reduce the risk profile for the Project, including implementation or enhancement of flood defences, development of robust health and safety policies for workers, training of workers, control water use and monitoring of extreme events to enable preparedness.

ERM recommends that Actis takes into consideration the potential changes in intensity and/or frequency of Extreme Heat, Wildfires, River Flooding, Extreme Rainfall Flooding and Water Stress and Drought that will affect both operational and decommissioning phases of the Project. Hence, the key recommendation from this Physical Climate Change Risk Assessment is for Actis to inspect, incorporate and monitor meteorological elements during operation, decommissioning phases of the Project to better understand the potential risks posed by these physical hazards, but also to implement any additional proactive adaptation / mitigation measures.

7.2.5 Residual Impact Significance

Based on the implementation of the proposed mitigation measures, the significance of the impacts from Climate Change will be a range from "**Negligible to Moderate Negative Impacts**" on the site post mitigation (refer to Table 7-6).

Table 7-6 Impact Assessment from Climate Change on the site (Post-Mitigation)

Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Range from local to regional	The spatial dimension of the potential effects of Climate Change will be effects that are limited to the project site, adjacent properties and communities/properties at a regional scale (with implications for the project).
Duration	Range from short to long term	Climate Change will affect the Project from 'one day to one week' to a maximum of 'longer than one month'.
Scale	Maximum: Notably altered	Project functions and/or processes will be notably altered due to Climate Change, e.g.: flooding results in a one-day shutdown.
Frequency	From 'Occurs once in one to five years' to 'Occurs once in ten years or more'.	Climate Change events will vary but will depend on how the severity of a particular hazard will evolve over time.

Likelihood	Possible to Likely	Climate Change events do currently occur during normal operating conditions and will continue into the future & the events will result in one or more potential consequences for the Project.
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Magnitude

May Range from Negligible to Medium Magnitude

Vulnerability of the Resource/Receptor

May Range from Low to High Vulnerability

Significance Rating After Mitigation

May Range from Negligible to Moderate Negative Impacts

7.3 Groundwater and surface water

7.3.1 Introduction

This assessment identifies potential impacts on water resources (groundwater and surface water) as a result of Dama Project. Impacts will occur largely during the construction phase, and primarily relate to potential contamination.

The direct AoI for groundwater and surface water include the temporary and permanent Project components and facilities footprint, as well as any other areas in which the groundwater/surface water could experience significant impacts from the Project.

7.3.1.1 Receptors

Receptor	Impact	Sensitivity	Vulnerability	Integral indicator
Shallow aquifer ROCR01 and deep aquifers ROCR07 and ROCR08.	Groundwater contamination	High <ul style="list-style-type: none"> Groundwater in continuity with nearby surface water; Shallow aquifer uses: drinking, irrigation, industry; Deep aquifer uses: drinking, irrigation, industry, pisciculture, zootechnics. 	High <ul style="list-style-type: none"> Shallow groundwater depth <10 m bgl; 	High
Poganieru, Morilor and Buderiu channels	Surface water contamination	High <ul style="list-style-type: none"> Surface waters are used for recreational fishing; 	High <ul style="list-style-type: none"> Surface waters are adjacent and downgradient of the site boundary; 	High

7.3.1.2 Potential Impacts

This section analyses the potential impacts of the Project's construction, operation and decommissioning activities to the water resources (both surface water and groundwater).

Activities causing potential impacts to water resources during construction phase, include:

- Land preparation and civil works;
- Central power collection station/substation, underground cable lines, laydown area and office construction;
- Waste and Wastewater management from construction activities and workers activities;
- Hazardous storage and handling.

Activities causing potential impacts to water resources during the operation and decommissioning phases are likely to have an insignificant impact on water quality and quantity.

7.3.2 Assessment of Impacts

Construction activities would generate various types of hazardous waste, including oil, lubricants and diesel leaked from vehicles and construction equipment in the areas already subject to vegetation clearance, site preparation, and heavy vehicle movement over unpaved roads and areas that are near surface water bodies. A summary of impacts related to surface water and groundwater contamination during construction due to accidental leaks/spills is detailed in the tables below.

Surface Water Contamination during Construction

Table 7-7 Impact Assessment: Surface Water Contamination during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of surface water contamination due to accidental leaks/spills of fuel, oil, and hazardous materials/waste - affect the surface waters adjacent to the Project sites (Morilor, Poganieru and Buderiu channels).
Duration	Temporary	The impacts are short-term during the construction phase (approx. 30 months).
Scale	Large	The scale of the impact depends on the quantity of spilled material and area affected by the spill. Surface water contamination is typically associated with significant consequences.
Likelihood	Unlikely	Accidental spill events may occur throughout the construction phase, however the likelihood of the pollutant reaching surface water is unlikely, as there are no construction activities that will take place directly on/over surface water. As groundwater is in continuity with nearby surface waters, contamination may also migrate from accidental spills occurring on soil.

Magnitude

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

Sensitivity of the surface waters near the Project sites (Buderiu, Morilor and Poganieru channels) is determined as high because the water bodies are used for recreational purposes (fishing) and the water bodies are adjacent to the Project site.

Significance Rating Before Mitigation

Moderate Negative Impact

Considering the high sensitivity of the receptors and potential scale, extent, duration and likelihood, impact significance is considered to be moderate.

Groundwater Contamination during Construction

Table 7-8 Impact Assessment: Groundwater Contamination during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of groundwater contamination due to accidental leaks/spills of fuel, oil, and hazardous materials/waste - affect the groundwater below the Project sites: shallow aquifer ROCR01 and deep aquifers ROCR07 and ROCR08.
Duration	Temporary	The impacts are short-term during the construction phase (approx. 30 months).
Scale	Large	The scale of the impact depends on the quantity of spilled material and area affected by the spill. Groundwater contamination is typically associated with significant consequences.
Likelihood	Possible	Accidental spill events may occur throughout the construction phase and it is possible in this event that the pollutant reaches the shallow aquifer, as baseline investigations show the groundwater level to be as high as 1.8 m below ground level.

Magnitude

Medium Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

According to Crisuri Water Basins Management Plan draft (2021), the shallow aquifer is used for drinking, irrigation, industry.

Significance Rating Before Mitigation

Major Negative Impact

Considering the high sensitivity of the receptors and potential scale, extent, duration and likelihood, impact significance is considered to be major.

Water use during Construction

Table 7-9 Impact Assessment: Water use during Construction

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts to water availability outside the Project area due to water consumption during construction phase.
Duration	Temporary	The impacts are short-term, during the construction phase (approx. 30 months).
Scale	To be determined	As the final design is still in progress, and an EPC contractor has not yet been appointed, specific details about water usage and sourcing are not available at this time. The EPC contractor would be required to obtain water during construction from a legal source, with consumption measurements and reporting in place. Typical water uses during the construction phase include: water for concrete, cleaning, damping gravel road, clearing main roads. Drinking water will be supplied to the site in bottles.
Frequency	30 months	Daily during construction.

Magnitude

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

As no specific details are available, use of groundwater abstraction wells/surface water is not excluded during construction. Therefore, sensitivity is considered high.

Significance Rating Before Mitigation

Moderate Negative Impact

Water use during Operation

Table 7-10 Impact Assessment: Water use during Operation

Type of Impact

Indirect Negative Impact

Rating of Impacts

Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts to water availability in the Project area due to water consumption during operation phase.
Duration	Long-term	The impacts will continue for the life of the Project.
Scale	Low intensity	During operation, drinking water will be supplied to the site in bottles. Sanitary wastewater generated on-site will be collected in mobile sanitary units and collected by certified wastewater disposal companies. Once the operation stage begins, dry cleaning methods (embedded mitigation) will be employed for the panels to avoid any potential soil contamination or water-related issues.
Frequency	Daily during operation	Daily during operation, for drinking and sanitary purposes.

Magnitude

Negligible Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

Significance Rating Before Mitigation

Negligible Negative Impact

Hydrology and erosion changes during Operation

Negative impacts of site hydrology due to utility-scale solar energy are considered in the table below.

Table 7-11 Impact Assessment: Hydrology changes during Operation

Type of Impact

Direct Negative Impact

Rating of Impacts

Characteristic	Designation	Summary of Reasoning
Extent	Local	The addition of an impervious surface (PV panels) to the Project site could alter the hydrology of the site area through increase water runoff and splash erosion.
Duration	Long-term	Impact should cease after removal of PV panels (at decommissioning).
Scale	Large	Project areas covered by PV panels, interspace between solar farm panels and adjacent surface waters.
Frequency	Annually, September to February	Most intense during periods with higher precipitation.

Magnitude

Medium-High Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

Significance Rating Before Mitigation

Moderate-Major Negative Impact

Increase water runoff and splash erosion may cause warping/blockage of existing on-site water drainage channels and increase of sediment flow directed into the surface water bodies (Budieru, Morilor and Poganieru channels).

Surface Water Contamination during Operation

Table 7-12 Impact Assessment: Surface Water Contamination during Operation

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of surface water contamination due to regular inspections, maintenance and repair (O&M activities), and accidental leaks/spills of fuel, oil and hazardous materials/waste - are focused on the Project sites and facilities and the road system already be in place.
Duration	Temporary	The impacts are short-term during every inspection, maintenance and repair activity; but will take place over the entire operation phase (up to 25 years).

Scale	Large	The scale of the impact depends on the quantity of spilled material and area affected by the spill. Given no relevant hazardous liquids storages associated with the Project, during operations potential spills may occur from equipment and/or vehicles are typically minor with minor to moderate consequences (pending on response measures).
Likelihood	Unlikely	The likelihood of potential occurrence of surface water contamination events is unlikely but may occur at some time over the entire operation phase. There are no O&M activities that will take place directly on/over surface water.

Magnitude

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

According to Crisuri Water Basins Management Plan draft (2021), the shallow aquifer is used for drinking, irrigation, industry.

Significance Rating Before Mitigation

Moderate Negative Impact

Considering the high sensitivity of the receptors and potential scale, extent, duration and likelihood, impact significance is considered to be Moderate.

Groundwater Contamination during Operation

Table 7-13 Impact Assessment: Groundwater Contamination during Operation

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of groundwater contamination due to regular inspections, maintenance and repair (O&M activities), and accidental leaks/spills of fuel, oil and hazardous materials/waste - are focused on the Project sites and facilities and the road system already be in place.
Duration	Temporary	The impacts are short-term during every inspection, maintenance and repair activity; but will take place over the entire operation phase (up to 25 years).
Scale	Large	The scale of the impact depends on the quantity of spilled material and area affected by the spill. Given no relevant hazardous liquids storages associated with the Project, during

		operations potential spills may occur from equipment and/or vehicles are typically minor with minor to moderate consequences (pending on response measures).
Likelihood	Unlikely	The likelihood of potential occurrence of groundwater contamination events is unlikely but may occur at some time over the entire operation phase.

Magnitude

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

According to Crisuri Water Basins Management Plan draft (2021), the shallow aquifer is used for drinking, irrigation, industry.

Significance Rating Before Mitigation

Moderate Negative Impact

Considering the high sensitivity of the receptors and potential scale, extent, duration and likelihood, impact significance is considered to be moderate.

Water Contamination and Water Use during Decommissioning

Impacts on water resources (surface and groundwater) during Decommissioning phase are likely to be similar in character and significance to those identified for the construction phase, but likely of shorter duration and with a much lower volume of works.

It is assumed that the risk of accidental spills (such as oils, transformer oils, equipment lubricants, fluids and solvents, etc.) will be expected during the decommissioning phase. Likewise, the mitigation and management measures outlined for the construction phase in relation to accidental spills and waste management will be applicable to the decommissioning phase as well. For additional information on decommissioning/demolition waste impacts & mitigation and management measures, consult Chapter 7.7 Waste Management.

7.3.3 Mitigation Measures

- Construction Scheduling: Ensure that construction activities are completed as quickly as possible, so that the time that soil is left exposed and vulnerable to erosion is reduced. A phased approach of project construction is recommended, rather than starting construction/topsoil removal in the entire Project areas at once.
- To protect the infrastructure against flooding, ensure foundation heights of substations, PV panels, buildings is at least 0.7 m above ground level.
- Stormwater management: Implement a comprehensive Stormwater Management Plan to control runoff and minimize erosion during and after construction. Implement control measures during construction to minimize soil runoff and sedimentation in nearby water bodies. This can include:
 - Structural stormwater management: use of silt fences and straw wattles;

- Establishing a vegetation cover in the interspace between solar panels where possible runoff generation and splash erosion is more likely and also planting shade tolerant vegetation under solar panels.
- Chemical Management: ensure proper handling, storage, and disposal practices to prevent contamination. A Pollution Prevention and Control Plan for construction and operation should be developed and included in the Project ESMP. Mitigation measures regarding chemical and waste management are included in sections 7.4.3 and 7.7.2.2.
- Regularly inspect all control measures, replace or repair damaged components, and remove accumulated sediment as needed.
- Water use: EPC contractor should be required to obtain water during construction from a legal source, with appropriate permitting, consumption measurements and reporting in place.

7.3.4 Residual Impact Significance

Based on the successful implementation of the mitigation and management measures described above, the residual impact on water quality and quantity is anticipated to be of xxx significance as shown in the table below.

Table 7-14 Pre and Post Mitigation: Groundwater and Surface Water Impacts

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Surface Water Contamination	Construction	Moderate	Negligible
Groundwater Contamination	Construction	Major	Negligible
Water Use	Construction	Moderate	Negligible
Water Use	Operation	Negligible	Negligible
Hydrology and erosion changes	Operation	Moderate-Major	Minor
Surface Water Contamination	Operation	Moderate	Negligible
Groundwater Contamination	Operation	Moderate	Negligible

7.4 Geology and soil

This chapter discusses the potential impacts that the construction, operation and decommissioning phases of the Project will have on geology and land/soil condition. Where required, appropriate mitigation measures have been set out to limit any identified significant impacts, and/or monitoring programs to inform on any mitigation needed to reduce potential residual impacts.

The assessment identifies potential impacts to geology and land/soil resources resulting from the Project. Impacts will occur mainly during the construction phase, as a result of Project site activities, including vegetation clearance, site preparation, excavation and heavy vehicle movement over land and unpaved roads.

The Aol for geology and soil include the temporary and permanent Project components and facilities footprint, as well as any other areas in which the geology and land/soil could experience significant impacts from the Project.

According to the information provided by Client, this includes:

- 1,061 ha of land for the PV area
- 5.6361 ha of land required for the Grid Connection Substation 400 kV and the underground transmission line, comprising of:
 - 1.44 ha – total surface affected by the underground transmission line, to be temporarily affected during construction;
 - 0.9 ha – total surface affected by the required upgrade works to DE 553/1;
 - 3.3 ha – surface permanently occupied by the 400kV substation.
- In addition to the 1,066 ha project footprint, upgrades of agricultural and communal roads of Graniceri, Pilu and Socodor will be performed. Road consolidation works required are to be determined as route surveys are determined in the next stages of Project development.

Site preparation works are anticipated to include vegetation clearance and land levelling, pending final project design.

7.4.1.1 Receptors

Receptors of impacts on geology and topsoil will be topsoil of the Project area and quaternary sediments lying underneath.

The sensitivity of topsoil to physical impact during removal for site preparation and for contamination is similar (medium) for all soil types. Conversely, importance of topsoil is different for various soil types being high for Cambisols that are most suitable for agriculture, medium for Vertisols and Pelosols, and low for soils with high groundwater levels and salinized soils like Stagnosols and Solonetz (Table 7-15). Quaternary deposits underlying the topsoil are of low sensitivity and importance.

Thus, sensitivity, vulnerability, importance of Cambisols, Vertisols and Pelosols is medium; that of Stagnosols and Solonetz, as well as quaternary deposits is low.

Table 7-15 Sensitivity, vulnerability, importance of Receptors to impacts on topsoil and geology

Receptor	Impact	Sensitivity	Vulnerability/Importance	Integral Indicator
Topsoil (Cambisols)	Topsoil removal, contamination	Medium	High	Medium
Topsoil (Vertisols and Pelosols)	Topsoil removal, contamination	Medium	Medium	Medium
Topsoil (Stagnosols and Solonetz)	Topsoil removal, contamination	Medium	Low	Low
Quaternary deposits	Topsoil removal, disturbance, contamination	Low	Low	Low

The situation of the land by categories of use for the communes⁷⁹ in which the Project is located is presented in the table below:

Table 7-16 Pilu and Graniceri land use by categories

Land use	Graniceri Commune	Pilu Commune
Arable land	4,350 ha	4,121 ha
Pastures	2,650 ha	2,106 ha
Hay fields	161 ha	174 ha
Vineyards	1 ha	-
Orchards	0 ha	0 ha
Total agricultural:	7,162 ha	6,401 ha
Forest, total	17 ha	9 ha
Water	250 ha	382 ha
Roads	143 ha	119 ha
Constructions	212 ha	247 ha
Non-productive	116 ha	19 ha
Total non-agricultural:	738 ha	776 ha
Total General:	7,900 ha	7,177 ha

The PV area belongs 87% to the Graniceri Commune (924.53 ha) and 13% to the Pilu Commune (136.61 ha). For the Grid Connection works, the total surface required for the works is 5.6361 ha, comprising:

- 1.44 ha – total surface affected by the underground transmission line, to be temporarily affected during construction);
- 0.9 ha – total surface affected by the required upgrade works to DE 553/1;
- 3.3 ha – surface permanently occupied by the 400kV substation.

All of the Project area with the exception of Grid Connection is located on arable land. The Grid Connection area is located on non-productive land.

7.4.1.2 Potential Impacts

Topsoil loss

Topsoil loss during the construction phase is associated with site preparation works and earthworks for construction of Project facilities.

⁷⁹ According to Graniceri and Pilu General Urban Plans; land use as recorded 15.05.2000.

No topsoil loss will occur during operations stage of the Project.

The assessment of topsoil loss within the project footprint warrants a conservative approach to ensure comprehensive evaluation. Although it is acknowledged that not all areas within the footprint will be subject to clearance, we have considered the entire project area as potentially affected by topsoil loss for the purpose of our assessment. This cautious approach allows us to account for potential impacts and mitigating measures more comprehensively, providing a conservative estimate of the potential environmental consequences.

The following types of soil will be impacted by the Project activities and hence will be the receptors:

Table 7-17: Areas of topsoil loss

#	Types of soil	Proportion of area	Land use classification	Proportion of area from Graniceri Commune, by Land Use	Proportion of area from Pilu Commune, by Land Use
PV area					
1	Topsoil (Cambisols)	10%	Arable	21.2 %	3.3 %
2	Topsoil (Vertisols and Pelosols)	55%	Arable		
3	Topsoil (Stagnosols and Solonetz)	35%	Arable	16.45 %	NA
			Non-Productive		
Grid Connection area					
4	Non-productive	100 %	Non-productive	4.8 %	NA
Source: Pedological Study performed by The Arad Office for Pedology and Agrochemical Studies;					

According to the Pedological Study performed by The Arad Office For Pedology And Agrochemical Studies⁸⁰ had classified the overall soils in the Project area as quality class IV, which is defined as “lands with poorly fertile soils, frequently skeletal or with hard rock, at a shallow depth, with varied texture (coarse to fine), strongly affected by degradation phenomena (salination, acidification, erosion, active landslides, excess moisture, etc.), in climatic conditions less favourable for agricultural crops”.

Soil Contamination

Accidental spills or leaks of fuel, lubricants, or chemicals used in construction and operation can contaminate the soil. The following potential impacts have been considered:

- Pre-construction activities and construction phase:
 - Accidental leaks/spills of fuel, oil and hazardous materials/waste from equipment during construction phase, that might contaminate soil.
- Operation phase:
 - Accidental leaks/spills of fuel, oil, chemicals and hazardous materials from Operation and Maintenance (O&M) activities that might contaminate soil.
- Decommissioning phase:
 - Leaks/spills of fuel, oil and hazardous materials/waste from equipment during decommissioning phase, that might contaminate soil.

⁸⁰ The Arad Pedological and Agrochemical Studies Office is a public institution under the Arad Directorate for Agriculture.

7.4.2 Assessment of Impacts

7.4.2.1 Topsoil Loss – Construction Phase

Table 7-18: Significance of topsoil loss

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The loss of topsoil will not go beyond the project footprint. The extent of this impact is <i>onsite</i> .
Duration	Medium-term	The period over which topsoil is affected directly depends on the duration of the Project construction and operation. ■ Land affected only during the project construction (30 months).
Scale	Medium for Arable (21.2% Graniceri and 3.3% Pilu) Medium for Non-Productive (21,2%% Graniceri)	The scale of the impact depends on the area of disturbed land, i.e. the area on which the topsoil resource is affected. For a conservative assessment, that the scale will include the entire footprint of the project area (1,066 ha). Topsoil loss out of Arable land (Cambisols, Vertisols and Pelosols) represents 21.2% of the total arable land of Graniceri commune and 3.3% of the total arable land of Pilu commune. Topsoil loss out of Non-Productive land (Stagnosols and Solonetz) represents 21.2% of the non-productive land of Graniceri commune.
Frequency	Single/one time during construction	The periodicity of the impact directly depends on the duration of the Project construction and operation. Land affected only during the project construction. As this impact occurs once during the Project implementation (during the construction stage), frequency is single/one-time.

Magnitude

Medium Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Medium Sensitivity (Arable lands)

Low Sensitivity (Non-productive lands)

Considering the predominant soil quality in the Project area (10 % Cambisols, 55% Vertisols and Pelosols, and 35% Stagnosols and Solonetz), the Sensitivity of the receptor is Medium for Arable lands and Low for Non-productive lands.

Significance Rating Before Mitigation

Moderate Negative Impact (Arable lands Cambisols, Vertisols and Pelosols)

Minor Negative Impact (Non-productive lands - Stagnosols and Solonetz)

7.4.2.2 Soil Contamination – Construction Phase

Construction activities would generate various types of hazardous waste, including oil, lubricants and diesel leaked from vehicles and construction equipment in the areas already subject to vegetation clearance, site preparation, and heavy vehicle movement over unpaved roads.

Based on the specific construction activities, estimated areas to be affected by construction works, and duration of works, a summary of impacts related to *soil contamination during construction* is detailed in the Table 7-19 below.

Table 7-19 Impact Assessment: Soil Contamination (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of soil contamination due to accidental leaks/spills of fuel, oil and hazardous materials/waste - affect the Project sites that will be cleared of vegetation and levelled for construction, and also due to heavy vehicle movement over land and unpaved roads.
Duration	Short term	The impacts are short-term during the construction phase (approx. 30 months).
Scale	Large	The scale of the impact depends on the quantity of spilled material and area affected by the spill. Soil contamination is typically associated with significant consequences.
Frequency	Intermittent	The frequency is intermittent and considered to be associated with accidental spill events that may occur throughout the construction phase.
Magnitude		
Medium Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium-Low Sensitivity		
Considering the predominant soil quality in the Project area (55% Vertisols and Pelosols and 35% Stagnosols and Solonetz), the Sensitivity of the receptor is Medium-Low.		
Significance Rating Before Mitigation		
Moderate Negative Impact		

7.4.2.3 Soil Contamination – Operation Phase

The Project sites would be visited regularly during the operation phase for inspections, maintenance and repair (O&M activities). These activities would generate minimal effects on land/soils, since the Project facilities and the road system will already be in place.

Solid waste generated by the O&M team, including organic waste, plastic, glass, etc, and accidental leaks/spills of fuel, oil, chemicals and hazardous materials – were considered the main sources that might contaminate the land/soil during the operation phase.

Based on the specific O&M activities, the areas to be affected by inspections, maintenance and repair works, and the expected operation of the PV plant, up to 25 years, a summary of impacts related to *soil contamination during operation* is detailed in the Table 7-20 below.

Table 7-20 Impact Assessment: Soil Contamination (Operation)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of soil contamination due to regular inspections, maintenance and repair (O&M activities), and accidental leaks/spills of fuel, oil and hazardous materials/waste - are focused on the Project sites and facilities and the road system already be in place.
Duration	Short-term	The impacts are short-term during every inspection, maintenance and repair activity; but will take place over the entire operation phase (up to 25 years).
Scale	Moderate	The scale of the impact depends on the quantity of spilled material and area affected by the spill. Given no relevant hazardous liquids storages associated with the Project, during operations potential spills may occur from equipment and/or vehicles are typically minor with minor to moderate consequences (pending on response measures).
Frequency	Intermittent	The frequency of potential occurrence of soil contamination events is intermittent/occasional over the entire operation phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium-Low Sensitivity		
Considering the predominant soil quality in the Project area (55% Vertisols and Pelosols and 35% Stagnosols and Solonetz), the Sensitivity of the receptor is Medium-Low.		
Significance Rating Before Mitigation		
Minor Negative Impact		
The impact significance of soil contamination due to accidental leaks/spills of fuel, oil and hazardous materials/waste from equipment, is considered to be Minor.		

7.4.2.4 Soil Contamination – Decommissioning Phase

A summary of impacts related to soil contamination during decommissioning phase is detailed in the Table 7-21 below.

Table 7-21 Impact Assessment: Soil Contamination (Decommissioning)

Type of Impact
Direct Negative Impact

Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of soil contamination largely affect the Project sites and facilities and the road system in place, as result of to leaks/spills of fuel, oil and hazardous materials/waste from vehicles and equipment.
Duration	Short-term	The impacts are short-term during the decommissioning phase (potentially 12 months) and will cease upon completion of decommissioning activities.
Scale	Moderate	Impacts of soil contamination largely affect the Project sites and facilities (permanent sites and facilities) and the road system. The scale is considered moderate.
Frequency	Intermittent	The frequency of potential occurrence of soil contamination events is intermittent/occasional throughout the entire decommissioning phase.

Magnitude

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Medium-Low Sensitivity

Considering the predominant soil quality in the Project area (55% Vertisols and Pelosols and 35% Stagnosols and Solonetz), the Sensitivity of the receptor is Medium-Low.

Significance Rating Before Mitigation

Minor Negative Impact

7.4.3 Mitigation measures

Soil protection:

- Establish vegetative cover, such as grass or leguminous cover crops, to protect the soil from wind and water erosion. In addition, in order to maintain appropriate humidity of the soil that would prevent cracks forming in the soil, the Geotechnical study performed for the project recommends to maintain the existing topsoil by sowing it with grass.

Construction Practices:

- Develop and implement a Soil Management Plan that includes clear guidelines for construction activities to prevent unnecessary disturbance to topsoil.
- Use proper machinery and equipment with low ground pressure to minimize compaction and disturbance to the soil structure.
- Store topsoil in designated areas and use it for site restoration after construction is completed.

Revegetation and Restoration:

- Develop a re-vegetation and restoration plan that includes the use of appropriate native plant species to stabilize the soil and restore ecosystem functions.
- Apply soil amendments or organic matter to enhance soil fertility and promote vegetation establishment.

Monitoring and Maintenance:

- Establish a monitoring program to assess the effectiveness of mitigation measures and identify any potential issues related to topsoil loss.
- Implement regular inspections and maintenance activities to ensure erosion control measures are functioning properly and make necessary adjustments as required.

Mitigations to address soil contamination impacts:

- Contract a licensed contractor to collect, transport and treat domestic, construction and hazardous wastes from Project sites.
- Prohibit landfilling any types of solid waste to the soil, or burning of waste.
- Ensure that hazardous materials are stored in designated areas that are designed with impermeable floor, inflammable walls and accessible to authorized personnel.
- Hazardous waste shall be properly managed in accordance with existing legislation on hazardous waste, as follows:
 - Hazardous waste is prohibited to be illegally disposed into the ground.
 - All workers shall be trained on hazardous and non-hazardous waste classification and their handling methods.
 - Proper facilities shall be supplied and areas for hazardous waste storage in the construction sites should be clearly determined according to the law.
 - Appropriate licensed entities shall be contracted to periodically transport and dispose hazardous waste.
 - A record of hazardous waste should be documented to allow monitoring volume of hazardous waste generated and disposed of by licensed contractors. The numeric data in the record must be consistent in order to ensure that no improper disposal is made in the Project area or other locations.
- Restrict execution of maintenance works to specifically-designated platforms/locations provided with strict control of accidental spills.
- Provide spill kits at all work locations.
- Develop and implement procedures for responding to emergencies / accidental spills of hazardous materials, fuel and handling, and waste management.
- In case of accidental spillage, the contaminated soil should be immediately collected and stored as hazardous waste.

7.4.4 Residual Impact Significance

Based on the successful implementation of the mitigation and management measures described above, the residual impact on soil quality due to topsoil loss and contamination is anticipated to be of minor significance as shown in the table below.

Table 7-22 Pre and Post Mitigation: Geology and Soil Impacts

Impact	Project Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)	Impact (Post-mitigation)
Topsoil loss	Construction	Major-Moderate	Minor	
Topsoil loss	Operation	Major-Moderate	Minor	
Soil Contamination	Construction	Moderate	Negligible	

Soil Contamination	Operation	Minor	Negligible
Soil Contamination	Decommissioning	Minor	Negligible

7.5 Noise and vibration

7.5.1 Introduction

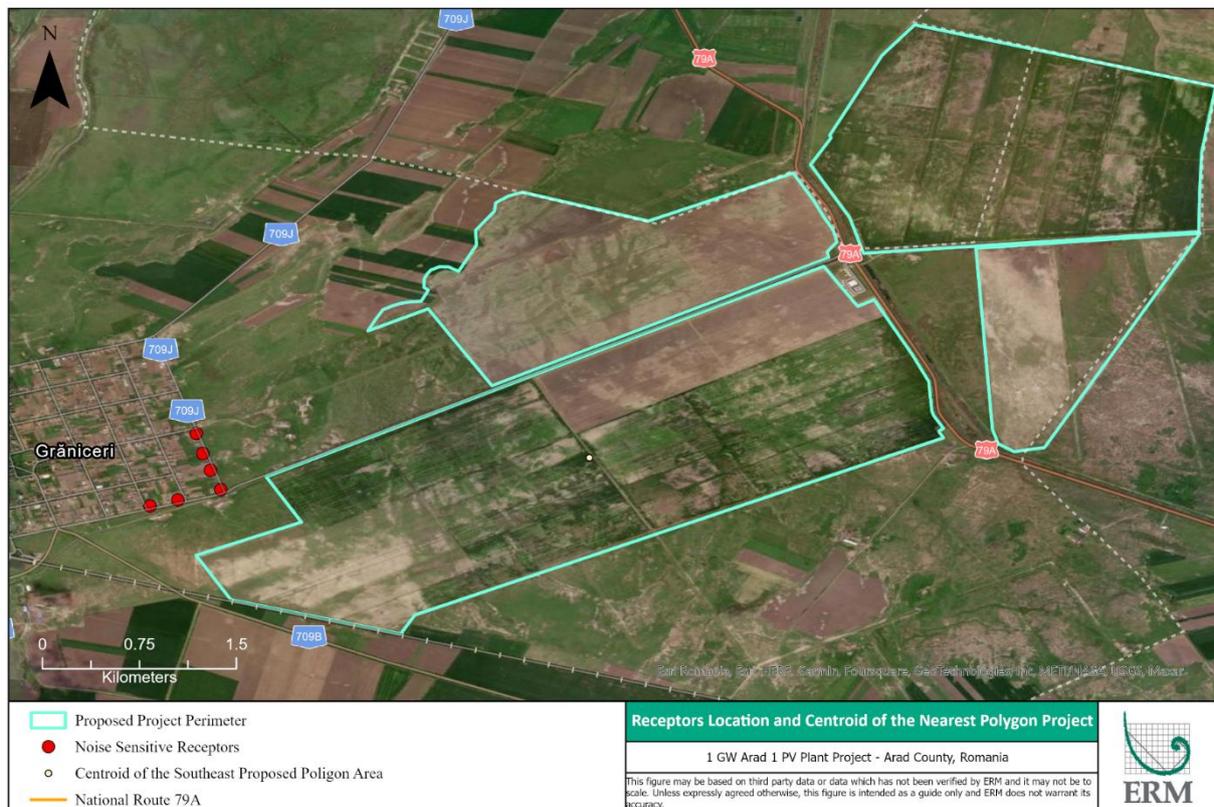
The following sections are a summary of the standalone Noise Impact Assessment (NIA). For detailed view on criteria and regulations for construction noise, modeling methodology and noise impact assessment, please consult Appendix I.

The NIA presents a comprehensive evaluation of the potential noise impacts that may arise from the construction of the Project. The impact assessment is based on the Romanian noise standards presented in section 6.1.4, but also refers to the British Standards for Construction Noise. The Romanian standards were utilized to determine the level of significance of noise generated during the construction phase of the Project.

7.5.2 Noise Sensitive Receptors

The nearest Noise Sensitive Receptor (NSR) is located 270 meters of the southeast Project boundary in Grăniceri village. However, it is not expected that Site Preparation and Establishment (S1) and Construction of Infrastructure and PV Modules Installation (S2) activities will occur simultaneously at this specific location. This study has predicted the average noise levels at the nearby NSRs for the construction period, using the average distance, approximately 2000 meters, between the nearest NSR to the centroid of nearest polygon area (the southeast polygon in the figure below).

Figure 7-1 Noise Sensitive Receptors



Source: ERM 2023

7.5.3 Assessment of Impacts

The assessment assumes that the construction activities related to earthworks and site clearance, and infrastructure assembly will generate the highest levels of noise. These activities have been divided into two scenarios: Site Preparation and Establishment (S1) and Construction of Infrastructure and PV Modules Installation (S2). Additionally, it is expected that these two scenarios will progress in stages throughout the construction period. S2 will begin in areas that have already been prepared, while S1 continues in other areas. As a result, there will be instances where S1 and S2 activities overlap in time across the proposed construction area of approximately 1000 hectares.

Predicted distances at which noise criteria will be met for different Construction scenarios is shown in Table 7-23.

Table 7-23 Distance at Which Criteria Will be Met

Scenario	Criteria (Day time), dB(A)	Distance (m)
S1	55	630
S2		440
S1+S2		730

ERM 2023

The findings indicate that the average noise levels during the construction period will result **Negligible** significance impacts. However, during the period that construction activities will be located at the shortest distance to the NSRs, **Minor to Moderate** significance impacts have been predicted. Even though, the duration of these impacts is anticipated to last a short period of time, ERM recommends implementing mitigation measures and develop regular noise monitoring when construction activities are carried out in the southeast area. This will help to minimize the impacts and ensure compliance with noise regulations and standards.

7.5.4 Mitigation Measures

The following mitigation measures should be used where necessary to keep the noise levels below the applicable standards at the closest sensitive receptors to the source:

- Where practicable, stationary noisy equipment will be sited as far away as possible from receptors and orientated away from the receptors.
- Construction contractors will use alternatives to audible reversing alarms, such as visual and/ or broadband noise emitting models, that provide a safe system of work; or configuring the Project work sites to maximize forward movements of mobile plant.
- Where practicable, alternatives to noisy diesel and petrol engines and pneumatic units will be used, such as hydraulic or electric-controlled units.
- Where practicable, stationary equipment (such as compressors, generators etc.) will be fitted with acoustically treated enclosures.
- Throttle settings will be reduced and equipment and plant turned off, when not being used.
- Onsite chutes and bins will be lined with damping material.
- Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked. Equipment will not be operated until it is maintained or repaired, where maintenance or repair would address the annoying character of noise identified.
- Storage of excavated material between the construction site and the sensitive use building to form a noise barrier (with cover to avoid dust erosion) or installation of other (temporary) noise barriers.
- Minimizing drop height of materials.

- Taking advantage of the natural topography for noise shielding.
- Implementation of speed limits (50 km/h) for trucks while travelling to and from construction sites (within Buildings and on village roads of poor condition: 30 km/h).
- Reducing Project traffic routing through community areas wherever possible.
- Limiting hours of operation for specific equipment or operations (e.g. trucks or machines operating in or passing through community areas).
- Where practicable, earth mounds or rock piles between the construction activity and the NSRs.

7.5.5 Residual Impact Significance

Based on the successful implementation of the noise control mitigation and management measures described above, it is expected that a reduction of more than 5 dBA in overall noise from construction activity can be achieved.

If a reduction of 5 dBA is achievable, the predicted noise levels at the nearest NSR would decrease from 61 dB(A) to 56 dB(A) for scenario S1 and from 58 dB(A) to 53 dB(A) for scenario S2. Consequently, these reduced levels indicate a reduction in the significance of impacts, changing from **Minor - Moderate** to **Negligible-Minor**.

For a reduction greater than 5 dBA, noise shielding measures are required, such as workers' containers, noise screens, earth mounds, or rock piles may be necessary. These measures can typically provide a reduction of up to 15 dBA.

Table 7-24 Pre and Post Mitigation: Noise Impacts

Impact	Project Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)	Impact (Post-mitigation)
Noise	Construction	Minor - Moderate	Negligible-Minor	

7.6 Air Quality

7.6.1 Introduction

The assessment of potential impacts to air quality is limited to the assessment of dust generated during construction from both construction traffic movements and earthworks/construction works.

The Aol for air quality impacts during the construction stage is defined as a 500-meter radius around the construction site and transportation routes. Solar power plants at operational stage are typically not associated with significant air quality impacts. Therefore, no significant air quality impacts are expected at the operational stage and hence Aol has not been defined for the operational stage of the Project.

7.6.1.1 Receptors

The receptors of the air quality impact will be the Project construction personnel, residents of the nearest settlements, as well as the vegetation cover and terrestrial fauna of the Project area. The contribution of dust to impacts on biodiversity is discussed in Chapter 7.1.3.4.

The vulnerability of the Project personnel and local residents to air quality impacts, as well as their importance, are high, given the known data on the effects of air pollution on human health, as well as the generally recognized value of human life and health. The sensitivity of the Project staff to impacts on atmospheric air quality is medium, taking into account worker's health compliance with selection criteria. As of now, no information is available on involvement of persons who is highly sensitive to air pollution as construction workers.

Thus, the integral sensitivity, vulnerability and importance of the Project staff is medium, and that of the local residents is high.

Table 7-25: Sensitivity, vulnerability, importance of Receptors to air quality impacts

Receptor	Impact	Sensitivity	Vulnerability/ Importance	Integral indicator
Project personnel	Air pollution	Medium	High	Medium
Local residents	Air pollution	High	High	High

7.6.1.2 Potential Impacts

Construction

The Project will primarily impact air quality during the construction stage. The main sources of atmospheric emissions during the construction will be associated with:

- Site preparation activities;
- General construction activities for Project infrastructure;
- Vehicle movement over unpaved surfaces, and in particular heavy vehicles;
- Vehicle exhaust emissions; and
- Potential power generation utilising fossil fuels.

The soils on the Project Site have been subjected to loosening through sustained cultivation over a long period, and have weakened the soil structure, leaving these soils highly susceptible to both wind and water erosion, leading to an increased risk of elevated dust levels.

Atmospheric emissions (specifically dust) from the aforementioned sources will be short-term and of a nuisance nature only. Periodic construction traffic along unpaved surfaces and/or during site preparation activities can cause significant local nuisance to receptors in the AoI and immediate surrounds, increasing the already high nuisance and respirable dust baseline. This will be managed through dust suppression techniques detailed below and taken onboard as management arrangements in the Project ESMP.

Operation and Decommissioning impacts are considered insignificant.

7.6.2 Assessment of impacts:

7.6.2.1 Construction dust

Construction will occur over a period of approx. 2.5 years from financial close. The construction will be carried out in three stages, with the first section put into operation after 10 months from the start of the works. Works are expected to start in Autumn 2023. During periods with higher precipitation (September to February), conditions at the Project Site are not conducive for *dust generation*. In addition, emissions will not be even throughout the construction period, rather emissions will be higher during Site clearance and upon delivery of construction material, panels and mounting structures.

Graniceri village is located within 500 m of the Project Site. In several areas within 200m of the project infrastructure, sheepfolds and pasture areas were identified.

These communities will have a high sensitivity to nuisance dust, especially during the dry season. The impact duration will be temporary (approx. 30 months). The impact magnitude is considered medium-high.

On this basis, the impact on local ambient air quality due to dust emissions on surrounding receptors is considered to be of major significance for any receptors within 200 m of the source. Details of impact assessment due to dust emissions during Construction is detailed in Table 7-1 below.

Table 7-26 Impact Assessment: Air Quality – Dust Emissions during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Air quality impacts will remain within 500 m of the Project Site
Duration	Short term	Overall, the impact duration is considered to be short term (only during construction – 30 months). In addition, given the phased construction approach, the areas where potential for dust is present will shift every 10 months.
Scale	Small	Based on the above the impact scale is considered small.
Frequency	Occasional	During the dry season there is the potential for dust on a daily basis, however, this is less likely during the rainy and snowy seasons (September to February).
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium-High Sensitivity		
The sensitivity is considered medium due to the distance to the sensitive receptors (residential structures) within 500 m of the Site (closest being approx. 270 m west of the project boundary in Graniceri village), their location (receptors are concentrated in the area west of the project) and due to the phased construction process (it is likely that construction dust will impact the sensitive receptors within 500 m of the Project only during the one of the construction phases).		
Significance Rating Before Mitigation		
Minor to Moderate Negative Impact		
The impact is considered to be of High significance within the 0 - 100m from the Project Site, Moderate significance within 100 – 200 m and of Minor significance at a distance greater than 200m.		

7.6.2.2 Construction traffic

The project developer does not have detailed information regarding truck traffic, as the route surveys and construction equipment requirements are determined in the next stages of Project development. Estimations were made by ERM in collaboration with the developer for heavy duty vehicles during Project Construction (see Table 7-16 below). These estimations are subject to change once the route surveys and more detailed construction equipment requirements are determined in the next stages of Project development.

Table 7-27 Estimated Truck Equipment for Project Construction

Construction Scenario	Description	Equipment	Quantity	Activity on-time (% of hour)
S1	Site Preparation and Establishment	Excavator	4	75%
		Concrete agitator truck	2	50%
		Water truck	2	50%
		Concrete pump truck	2	50%
		Roller	3	75%
		Grader	4	75%
		Loader	4	75%
		Heavy (Tippers, lorries, etc)	Vehicle loading	6
S2	General Construction of Infrastructure and PV Modules Installation	Bored Piling Rig	4	75%
		Grader	1	50%
		Roller	2	75%
		Loader	1	50%
		Crane (mobile)	2	50%
		Water truck	2	50%
		Forklift	4	75%
		Telehandler	2	50%
		Heavy (Tippers, lorries, etc)	Vehicle loading	5

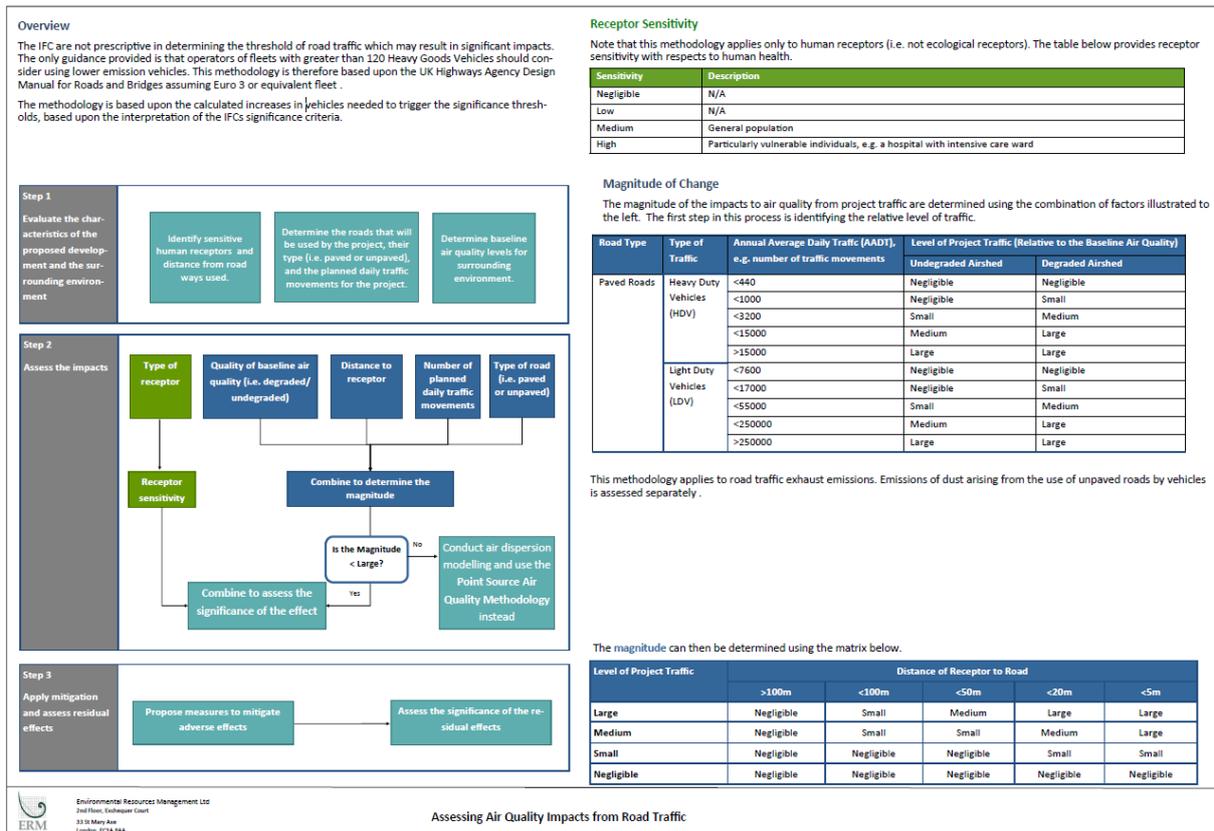
ERM 2023, Based on data provided by the Client.

Figure 7-2 below sets out the process for screening of construction traffic impacts. This methodology is used in the absence of detailed traffic numbers for the Project.

It is estimated that annual average daily traffic would not exceed 1000 (which, according to the screening methodology, results in negligible magnitude - considering level of project traffic relative to an undegraded airshed).

During peak periods, truck deliveries would be more frequent, although the extent of peak-period Project traffic has not yet been determined.

Figure 7-2 Construction traffic impacts screening process



Source: ERM

Based on the screening methodology presented above in Figure 7-2 and the ESIA Impact Assessment methodology described in section 4.3, the impact of traffic during construction is detailed in Table 7-28 below:

Table 7-28 Impact Assessment: Air Quality – Traffic during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Air quality impacts remain within 500 m of the Project Site.
Duration	Short term	The impact duration is considered to be short term (only during construction – 30 months). In addition, given the phased construction approach, the areas where potential for dust is present will shift every 10 months.
Scale	Small	Based on the above the impact the scale is considered small.
Frequency	Occasional	During construction.
Magnitude		

Negligible Magnitude

The magnitude is negligible, as the number of estimated daily traffic movements by heavy duty vehicles is <1000 and the baseline condition of the airshed is undegraded.

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Medium Sensitivity

The sensitivity is considered medium due to the distance to the sensitive receptors (residential structures) within 500 m of the Site (closest being approx. 270 m west of the project boundary in Graniceri village), their location (receptors are concentrated in the area west of the project) and due to the phased construction process (it is likely that construction dust will impact the sensitive receptors within 500 m of the Project only during the one of the construction phases).

Significance Rating Before Mitigation

Minor Negative Impact

Based on the high sensitivity of the receptors and on the negligible magnitude determined, the significance of air quality impacts from road traffic emissions is considered Minor to Moderate.

Operation – N/A

Solar power plants harness renewable energy and rely on the direct conversion of sunlight into electrical energy. Consequently, during the operational stage of solar power plants, there is no reliance on fossil fuels. There will not be any combustion processes and there will be no emissions resulting from heating. As a result, the operation of Dama Solar Project is not anticipated to cause air emissions and have any adverse impact on local air quality.

Decommissioning – N/A

During the closure phase, potential sources of emissions are likely to be similar to those associated with construction. There may be some dust, generated during the decommissioning of the proposed project, however, this will not be to the same extent as during the construction phase, as there will be less soil moving required. Thus, a significant amount of emissions is not expected to be generated during the closure phase of the Project. The closure phase is not anticipated to have an adverse impact on local air quality.

7.6.3 Mitigation Measures

The construction of the project requires mitigation in order to render impacts as negligible or at worst minor. Recommended mitigation at the construction stage encompasses a wide range of measures summarized in the sections below. The following mitigation measures will be implemented by the EPC Contractor to control nuisance dust and particulate emissions.

7.6.3.1 Construction Traffic

- A speed limit of 30 km/h on unpaved surfaces, especially the access road to the site, to be enforced and the national speed limits on public roads should not be exceeded;
- All construction vehicles must be regularly maintained to minimise exhaust emissions;
- When not in use, vehicles will be switched off, unless impractical for health and safety reasons (for example, maintenance of air conditioning);
- Exercise traffic planning and control: avoid driving through settlements and close to residential areas, travel planning to minimise congestions, etc.

- Perform proper fleet management: use modern vehicles meeting up to date emission limits, routine maintenance, use of low sulphur fuels.

7.6.3.2 Construction Dust

- Restrict the area for the removal of vegetation and soil cover to that only necessary for the Project;
- Land clearance should be sequential and where ground and earthworks are undertaken the smallest possible area for working will be exposed;
- Stripping of topsoil will not be conducted earlier than required (maintain vegetation cover for as long as possible) in order to prevent the erosion (wind and water) of organic matter, clay and silt.
- Access road is to be wetted, especially during the dry season, and when construction activities are in progress, and especially in those areas in close proximity to residential homesteads (< 200 m).
- All transported bulk materials must be covered with tarpaulins to prevent fugitive dust emissions;
- Stockpiles stored longer than six weeks should be vegetated to reduce soil loss from wind or storm water runoff;
- Stockpiles will be located as far away from receptors as possible;
- Any air quality related grievances received from neighbours must be reported to the HSE Officer or to the CLO, through the established Community Grievance Mechanism;
- Grievance mechanism to be implemented for operation and decommissioning phase.

7.6.4 Residual Impact Significance

With the application of the mitigation measures during Construction, the residual impact on air quality due to dust and construction traffic emissions is anticipated to be of minor significance as shown in Table 7-29 below:

Table 7-29 Pre and Post Mitigation: Air Quality Impacts

Impact	Project Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Construction dust	Construction	Minor - Moderate	Minor
Construction traffic	Construction	Minor	Negligible

7.7 Wastewater/ Waste management

This chapter assesses Dama Project' expected generation of solid waste and small quantity of wastewater during the construction and operational phases. It does not consider the significance of impacts with respect to a specific receptor (i.e., soil or groundwater quality); as such, impacts to soil or groundwater quality with respect to solid waste and wastewater have been assessed in the respective Geology and Soil (Section 7.4), and Groundwater and Surface water (Section 7.3) sections of this ESIA.

The primary purpose of this chapter is to identify specific management measures with regard to solid waste and wastewater generation as result of the Project. These measures can be adopted in the construction and operational phases ESMS' in order to ensure compliance with applicable regulations and standards.

7.7.1 Area of Influence (Aol)

The Area of Influence for solid waste and wastewater generation and management is represented by the direct environment and social Aol, understood as the study area for the environmental and socio-economic impacts, which comprises:

- Project's permanent and temporary sites, components and facilities, and
- all settlements on the administrative territorial units of Graniceri and Pilu communes, potentially impacted by the Project.

7.7.2 Potential impacts

Several types of hazardous and non-hazardous waste (expecially domestic), will be generated by the construction, operation and closure activities of the Dama PV Project. Construction activities will involve generation of solid hazardous and non-hazardous waste, as well as potential wastewater resulting mainly from sanitary waste streams. During the construction phase, waste generation is expected to be more substantial in terms of the impacts.

In general, improper management of waste may result in the following general impacts:

- Loss of material that may be reused/ recovered/ recycled;
- Visual nuisance;
- Disturbance of biodiversity components, considering that the project is located within a natural protected area;
- Soil, surface water and groundwater contamination;
- Potential degrading impacts on perssonel or public health (odour).

7.7.2.1 Assessment of the impacts

Construction phase

Solid waste

During construction of Dama PV plant, waste will be generated by earthworks, concrete foundation works, construction of fences, paths, arrangement of existing roads and construction of new access roads, electro-mechanical works, underground power lines / cable installation, etc.

Anticipated solid waste generated from construction activities of Dama PV Project will include the following:

- *Non-hazardous waste*, such as:
 - Waste related to construction processes, including earthworks (such as rubble, soils and potentially rock), installation (such as bolts, rebars, etc);
 - Paper/cardboard, plastics, packaging, plastic bottles, glass, scrap metal, excess fill materials, sand, gravel, ballast, excess construction materials, concrete, subsoil and rock (not contaminated);
 - Domestic waste generated by the construction workforce (e.g. food/organic waste, paper trash, cardboard, aluminium, plastic).
- *Hazardous waste*, such as:

- Batteries (unused), chemical drums, aerosol cans, contaminated metals, empty containers, expired and unused chemicals, adhesives, machinery lubricants, clean-up materials such as rags, containers and tins (with remains of hazardous substances), used spill kits and clean-up materials;
- Residual materials from electrical equipment installation, such as Waste Electrical Equipment (WEE).

Wastewater

Wastewater generated from construction activities of Dama PV plant will include the following:

- Sanitary and domestic wastewater generation;
- Wastewater from washing and cleaning of vehicles or equipment;
- Liquid hazardous waste such as fuels, chemicals, paints, lubricants, solvents, waste oil, hydraulic fluid, resins, waste solvents and thinners, etc.;
- Concrete

It is understood that licensed waste management operators will be engaged for the collection, transportation and disposal of wastes generated at the site(s). At this stage, the licensed facilities where solid and liquid waste will be disposed of by licensed contractor has not yet been determined.

Operational Phase

The operational phase of Dama Photovoltaic Plant will result in the production of few waste streams from the maintenance activities, with the vast majority of these streams being non-hazardous, and such waste will be generated in minimal quantity. Other than that, small amounts of non-hazardous domestic waste from the operation of the administration facilities and from employees activities.

Decommissioning Phase

During decommissioning of the photovoltaic plant, there is a potential for inert demolition waste and materials such as steel reinforced bars, broken concrete, cabling, transformer oils etc. Prior to decommissioning, it is expected that all oils will be drained. This will minimize the risk for accidental spills and leaks during removal from equipment from the site.

The decommissioning of the photovoltaic park provides significant opportunity for resource efficiency and material reuse/recycling. All demolition work will be carried out with reference to IFC EHS Guidelines 1.6 Waste Management, IFC EHS Guidelines 1.5 Hazardous Materials Management, IFC PS3 on Resource Efficiency and Pollution Prevention, and EBRD PR3 on Resource Efficiency and Pollution Prevention and Control.

7.7.2.2 Mitigation Measures

The major waste and wastewater mitigation and management approach considered for the Project was focused on:

- Waste Characterization management measure,
- Waste Management Hierarchy measure,
- Construction Phase mitigation and management measures,

Different types of waste require different management and disposal techniques according to the potential risk that the material poses to human health or the environment. For Dama Project, waste has been considered classified into three main categories, as defined in the Table below.

Table 7-30 Waste Characterization

Waste Classification	Description
Domestic Waste	Household, commercial, agricultural, governmental, industrial and institutional waste, which have chemical and physical characteristics similar to those of household such as garbage, paper, cardboard, plastic,

	cans, etc. Disposal of such waste can generally be routed to municipal recycling or disposal facilities.
Industrial Waste	Non-hazardous waste that have physical and chemical characteristics that are different from domestic waste such as construction waste, glass, scrap metal, wood, used containers etc. This waste generally poses little risk to the environment and can be disposed to normal municipal facilities after waste minimisation options are exhausted and before obtaining approval.
Hazardous Waste	Hazardous waste is classified because of its concentration; physical, chemical or infectious characteristics, which may pose a present or potential threat to human health or the environment and/or may cause an increase in serious irreversible or incapacitating reversible illness or contribute to an increase in mortality. Under the Basel Convention, hazardous waste is as any waste (i.e. solid, liquid or gaseous) having the following properties: Explosive; Radioactive; Ignitable or flammable substances; Poisons with acute and chronic (delayed) toxicity; or Substances that by interaction with water might become spontaneously flammable or give off flammable gases. Hazardous waste must be segregated, stored, transported and ultimately treated and disposed of by a certified waste services provider.

Waste management Hierarchy for Waste Management

The waste hierarchy illustrates good practice for waste management by ensuring consideration of the most sustainable available application for waste management in preference of disposal and eventual contribution to adverse environmental and economic impacts associated with landfill.

The hierarchy as illustrated in the Figure below should form a key element of the waste management strategy, and if implemented effectively will achieve maximum reduction on waste quantities combined with the limited use of resources and fill space. The waste management hierarchy also has the potential to reduce costs that may be incurred by the main contractor or the proponent for handling, transportation and the disposal of waste.

Figure 7-3 Waste Hierarchy

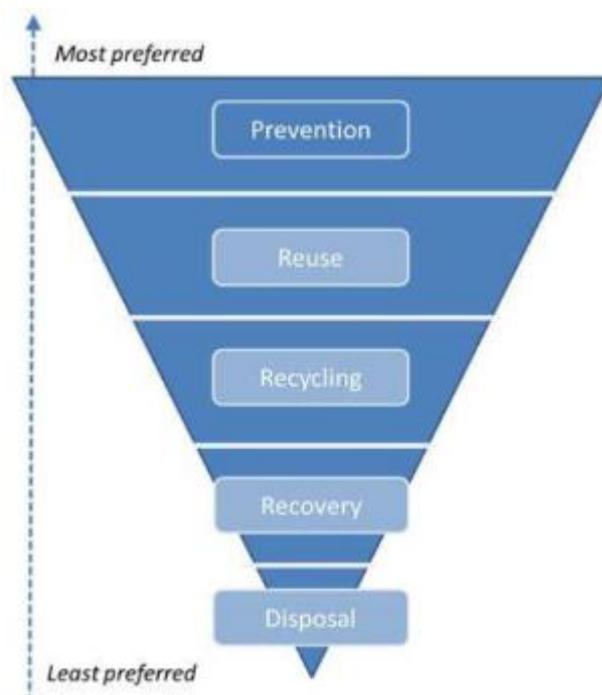


Figure 7-4 Waste & Wastewater Mitigation and Management Measures – Construction Phase

Impact/Source	Mitigation and Management Measures
<p>Inappropriate handling, storage, transport and disposal of solid non-hazardous waste</p>	<ul style="list-style-type: none"> - The project will develop and implement a Project specific Construction Waste Management Plan (CWMP) in line with committed mitigation measures in this ESIA report. - Domestic solid waste to be segregated and identified from the other waste streams into separate waste containers/skips clearly to facilitate recycling and reuse. - Waste containers/skips will be clearly labelled and placed in designated waste storage locations. Labels will be waterproof, securely attached, and written in Romanian. - For litter (food waste, domestic waste), an adequate number of covered bins will be strategically placed throughout the sites at locations where staff consume food. These will be regularly collected and taken to the waste storage area / landfill. - Food waste must be stored within a sealed metal or plastic skip or bin, in order to prevent pests gaining access. - Heavy waste may be contained within an open skip, provided that segregation occurs effectively enough to remove all lightweight material that could be blown away. - Waste generated during construction will be recycled and reused until reduced to as low as practicable, prior to collection for disposal by an appropriately licensed waste contractor. - Only licensed waste transporters and waste management facilities will be engaged. - Develop and maintain a waste inventory to document and track domestic solid waste generated, segregated, reused and consignments. - Completed waste record reports are required to show the chain of custody of the waste generated on site, its transportation and treatment/disposal. All records will be maintained on site. - Mandatory training program for employees to increase their awareness of waste management protocols including proper handling and storage of waste, recycling waste, reusing plastics, wood & other reusable non-hazardous materials. - Identification of recycling companies in Arad County or in the the region in order to implement the recycling of waste.
<p>Inappropriate/uncontrolled handling, storage, transport and/or disposal of solid hazardous waste</p>	<ul style="list-style-type: none"> - Develop and maintain a hazardous waste inventory to document and track hazardous wastes generated, segregated, reused and consignments. - Segregate and identify hazardous waste from the other waste streams into separate signed and labeled waste containers/skips. - Store hazardous waste in allocated hard standing areas in sealed containers stored with impermeable bases, sufficient containment and separation capacity, sun/rain shelter, separate drainage system, good ventilation and equipped with spill kits & spill response procedures. This area must be placed away from any sources of ignition.

	<ul style="list-style-type: none"> - Hazardous waste storage area will be constructed away from drainage system and a rain shelter will be provided to avoid any potential instance of runoff, or leakage of runoff. - Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and safety precautions. Labels will be waterproof, securely attached, and written in Romanian. Wherever possible, chemicals will be kept in their original container. - Hazardous waste storage areas will be located away from any ignition sources or fire hazards.
<p>Inappropriate/uncontrolled handling, storage, transport and/or disposal of sanitary wastewater</p>	<ul style="list-style-type: none"> - Contractor to develop and implement a Project specific Construction Waste Management Plan (CWMP) in accordance with committed mitigations measures in this ESIA report. - Develop and maintain a hazardous waste inventory to document and track sanitary waste generated and segregated. - Sanitary wastewater tanks to be properly maintained and inspected to ensure tanks do not overflow. - Site inspections to be carried out regularly to ensure that all wastewater generated is properly managed, and no leakages or spill occur. In the event of a spill or overflow, immediate action will be taken in accordance with spill containment procedures and clean up procedures. - Engage a licensed waste/wastewater contractor for the periodic removal of septic tanks. - In common with the IFC EHS Guidelines, effort will be made in training construction personnel to minimise water consumption for hand washing or showering and to ensure an understanding of water resource and wastewater issues.
<p>Inappropriate handling of concrete washout</p>	<ul style="list-style-type: none"> - Concrete washout will only be undertaken in designated and signed areas to prevent leaks or spread of wastewater. - The concrete washout area will be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations. - The concrete washout area will have an impermeable surface with dedicated drainage systems. - The removal of any sludge residues as solid hazardous waste will be undertaken by a licensed waste/wastewater contractor and handled as a hazardous waste.
<p>Medical Waste</p>	<ul style="list-style-type: none"> - Any generated medical waste will be stored in appropriate medical waste containers. - All medical waste will only be handled by trained personnel. - Removal of any medical waste from the site for appropriate treatment, disposal/incineration will only be conducted by a licensed contractor.

7.7.2.3 Residual Impact Significance

The residual adverse impacts of Solid Waste and Wastewater Management, after application of mitigation and management measures, are anticipated to be of minor significance during construction, and of negligible significance during both the operation and decommissioning phases, as presented in the Table below.

Figure 7-5 Pre- and Post-mitigation: Inadequate Waste and Wastewater Management during Construction, Operation and Decommissioning Phases

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Inadequate Waste and Wastewater Management	Construction	Moderate	Minor
Inadequate Waste and Wastewater Management	Operation	Minor	Negligible
Inadequate Waste and Wastewater Management	Decommissioning	Minor	Negligible

8. SOCIAL IMPACT ASSESSMENT

8.1 Socio-Economic Impact Assessment Methodology

8.1.1 Impact Categorization

Following terms will be used for the categorization of socio-economic impacts.

Table 8-1 Impact Characteristics Terminology

Characteristics	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect)	<ul style="list-style-type: none"> ■ Direct ■ Indirect ■ Inducted
Extent	The “reach” of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc)	<ul style="list-style-type: none"> ■ Local—impacts that affect an area in a radius of 20 km around the development Site ■ Regional—impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem. ■ International—impacts that cross national borders, affect an area that is nationally important/or have macro-economic consequences.
Duration	The time period over which a resource/receptor is affected.	<ul style="list-style-type: none"> ■ - Temporary—impacts are predicted to be of short duration and intermittent/occasional. ■ - Short-term—impact that are predicted to last only the duration of the construction period. ■ - Long-term—impacts that will continue for the life of the Project but ceases when the Project stops operating. ■ - Permanent—impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of ecological habitat) that endures substantially beyond the Project lifetime.
Scale	The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	(no fixed designations; intended to be a numerical value or a qualitative description of “intensity”)
Frequency	A measure of the constancy or periodicity of the impact	(no fixed designations; intended to be a numerical value or a qualitative description)

Table 8-2 Designation Definitions

Designation	Definition
Type	
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).

Induced	Impacts resulting from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large workforce).
Extent	
Local	Impacts that affect an area in proximity to the development area within an area defined on a resource/receptor-specific basis.
Regional	Impacts occurring at a regional scale as determined by administrative boundaries or which affect regionally important resources or ecosystems.
International	Impacts that extend across international boundaries or affect resources such as features, resources or areas protected by international conventions
Duration	
Temporary	Impacts are predicted to be short duration (in the order of days) and/or intermittent/occasional.
Short-term	Impacts that are predicted to last only for the duration of the construction period (i.e.—8 to 9 months).
Medium-term	Impacts that will continue for a period of 5 to 10 years following the completion of the construction phase e.g., where the impact may reverse or affected resources or receptors recover within this period of time.
Long-term	Impacts that will continue for the life of the Project, but will either cease when the Project stops operating or is decommissioned, or where the impact may reverse or the affected resource/receptor recovers or reverts to a near-natural state after 10 or within 20 years following the completion of the construction phase.
Permanent	Impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of the ecological habitat) that endures substantially beyond 20 years following the completion of the construction phase.

8.1.2 Impact Assessment

The assessment of the final impact significance will be based on the magnitude of the impact and the sensitivity of the receptor.

8.1.2.1 Impact Magnitude

The magnitude of an impact can be characterised according to the definitions included in

Table 8-3 Magnitude definitions

Negligible	Very minor alteration to one or more characteristics or elements.
Low	Minor alteration to one or more characteristics or elements.
Medium	Partial damage to key characteristics or elements, not affecting integrity.
High	Severe damage to key characteristics or elements, loss of resource and/or quality and integrity of receptor.

In case of positive impact, magnitude is not classified.

8.1.2.2 Receptor Sensitivity

For receptor sensitivity, considered as vulnerability, importance and/or rarity, following designations are used:

- Low: low importance and rarity at local scale
- Medium: medium importance and rarity at regional scale; limited potential for substitution.
- High: high importance or rarity at national or international scale; very limited potential for substitution.

8.1.2.3 Evaluating Impact Significance

The final impact **significance** (before mitigation) of **negative impacts** will result from combining sensitivity and magnitude levels in **negligible**, **minor**, **moderate** or **major**. For **positive impacts**, significance is assessed as “**positive**” regardless of the levels of magnitude and sensitivity – see Tables below.

Table 8-4 Impact Significance Matrix

		SENSITIVITY		
		Low	Medium	High
MAGNITUDE	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	High	Moderate	Major	Major
	Positive Impacts			
	Positive	Positive Impact		

Table 8-5 Significance Definitions

Negligible significance	An impact of negligible significance (or an insignificant impact) is where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be `negligible` or `imperceptible` or is indistinguishable from natural background variations.
Minor significance	An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and will within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate significance	An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that `moderate` impacts are being managed effectively and efficiently.
Major significance	An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the ESIA process 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 has been applied). An example might be the visual impact of a development. It is then the function of regulators and stakeholders weigh such negative factors against the positive factors such as employment, in coming to a decision on the Project.
Positive	Significance of positive impacts is assessed as “positive”, independently of the level of magnitude and sensitivity.

8.2 Livelihood

8.2.1 Introduction

The following actions will generate impact factors on the land and livelihood component:

- Land acquisition for permanent project components, requiring change of land use:
 - 1,061 ha for the PV area, owned and exclusively used by Agricola Grăniceri Managing SRL;
 - 3.3 ha of land for the grid connection substation, owned by Grăniceri Commune and not used currently, as classed as unproductive land;
- Easement and right of use agreements for land temporarily required during construction, not requiring land use change:
 - 14,440 m² for the construction of the approximately 3.6 km underground transmission line along existing technological/ agricultural roads and pastureland. All land
 - 8,961 m² for the construction consolidation of the DE 553/1 connecting the grid connection substation to the county road DJ 709J;
 - Exploitation roads to be consolidated for site access (in Socodor and Grăniceri communes).

8.2.1.1 Land to be permanently occupied by the Project

Where transactions are purely voluntary, the livelihood impacts on land users other than the land owner (even if they are informal) need to be considered, as the presence of such users would trigger the application of PR5 (EBRD PR5, IFC PS5).

The 1,061 ha of arable land is privately owned and was farmed exclusively by Agricola Grăniceri Managing SRL since 2005. No informal users for this plot of land are recorded. The land was solely used by Agricola Grăniceri for crop production and no additional land users of the land were recorded.

Additional to crop production, the Agri company was running a cereal storage and drying facility with a 12t capacity, which was reported to be used by some local farmers during the key informant interviews conducted during the ESIA process. Given the stopping of the crop culture activity, the business is planning to also close their storage component, confirming it was used for their own harvest in most part.

The 3.3 ha of land to be used for the substation is unproductive land owned by Grăniceri commune and is not used by the commune or informally as it is unproductive land not suitable for farming. The land was secured via a 49 years concession agreement with Grancieri Commune, owner of the land plot.

8.2.1.2 Land to be temporarily occupied by the Project

The land to be temporarily occupied for the transmission line totals 14,440 m² according to the technical documentation elaborated for permitting purposes and it's constituted by technological/ farming roads, and includes crossings over drainage channels, county road 709B, railway and a limited area of pastureland (approx. 1.75 ha).

Less than 1 ha of land will be required for consolidation of the technological road connecting to the Grid Substation, which was secured via right of use and easement agreement with Grăniceri Commune.

Road consolidation agreements were concluded with Grăniceri, Pilu and Socodor Communes via right of use agreements for technological and communal rods consolidation, however detailed design and confirmation of routes are to be confirmed once the EPC contractor is on board.

8.2.1.3 Land to be still secured by the Project

Additionally, land will be acquired for the Administration Area for the Project, on the premises currently owned by Agricola Grăniceri Managing SRL. Land agreements are not yet concluded, and the

required areas are to be secured upon appointment of the EPC contractor and confirmation of required areas for use during construction and operation.

In conclusion, no households or built structures will be physically displaced. All land acquisition agreements were concluded on voluntary basis. No private landowners, other the Agricola Grăniceri Managening SRL, were involved in the Project land acquisition process.

Table 8-6 below presents a summary of key impacts related to each project component.

Table 8-6 Required land take for the Project and associated impacts

Component	Land required	Land owner	Duration	Land owners and users prior to Project land take	Potential impacts	Receptors
PV area	1,060 ha	Agricola Grăniceri Managening SRL	Permanent	<ul style="list-style-type: none"> Arable land exclusively farmed by Agricola Grăniceri Managening SRL 	<ul style="list-style-type: none"> Dual use – additional grazing area potentially available for local shepherders during operations/ local beekeepers/ local farmers Potential accidental damage to neighbouring arable plots if grazing will be allowed on site Layoffs due to the agribusiness closing down 	<ul style="list-style-type: none"> Local sheep farmers currently leasing pastureland around the PV area Local beekeepers Farmers of neighbouring plots Agricola Grăniceri Managening employees losing their jobs
Grid connection substation 400 kV	3.3 ha	Grăniceri Commune	Permanent	<ul style="list-style-type: none"> Unproductive land owned by Grăniceri Commune and not used currently 	<ul style="list-style-type: none"> Accidental crop damage to neighbouring crops 	<ul style="list-style-type: none"> Farmers of neighbouring plots
Administrative area	Up to 4 ha	Agricola Grăniceri Managening SRL	Temporary/ Permanent	<ul style="list-style-type: none"> Administrative area used exclusively by Agricola Grăniceri Managening SRL 	<ul style="list-style-type: none"> Layoffs due to the agribusiness closing down 	<ul style="list-style-type: none"> People interested in professional training and reconversion Beneficiaries of the Community Centre
Consolidation of access roads to grid substation	8,961 m ²	Grăniceri Commune	Temporary	<ul style="list-style-type: none"> Technological roads owned by Grăniceri Commune and used by neighbouring arable plots 	<ul style="list-style-type: none"> Access restrictions for users of the technological road Accidental crop damage 	<ul style="list-style-type: none"> Farmers of neighbouring plots
Underground transmission line (3,450 m)	1.44 ha	Grăniceri Commune	Temporary	<ul style="list-style-type: none"> Technological roads owned by Grăniceri Commune and used by neighbouring arable plots 	<ul style="list-style-type: none"> Access restrictions for users of the technological road Accidental crop damage to neighbouring arable plots 	<ul style="list-style-type: none"> Farmers of neighbouring plots Shepherd(s) leasing the pastureland area between the PV area and DJ709B

Component	Land required	Land owner	Duration	Land owners and users prior to Project land take	Potential impacts	Receptors
					<ul style="list-style-type: none"> Pasture fragmentation and lack of access to 1.75 ha of pasture during works on the transmission line 	
Consolidation of access roads from Socodor	Surface is not yet determined	Socodor Commune	Temporary	<ul style="list-style-type: none"> Technological roads owned by Socodor commune 	<ul style="list-style-type: none"> Access restrictions for users of the technological road crossing the pastureland in Socodor 	<ul style="list-style-type: none"> Socodor shepherders leasing the pastureland crossed by the technological road

8.2.2 Potential impacts

Economic displacement results from an action that interrupts or eliminates people's access to productive assets, even without physical displacement (IFC PS5).

Potential livelihood impacts are to be expected during construction stage. Approx. 133 ha are expected to be impacted by construction works, displacing the respective land area from the grazing surface available prior to the Project.

Table 8-7 Potential impacts land-related impacts by Project's phase

Project phase	Potential Impact
Construction	Loss of jobs by Agricola Grăniceri Managening SRL employees
Construction, decommissioning	Accidental damage to neighbouring plots
Construction, decommissioning	Access restrictions to agricultural plots
Operation	Additional farming opportunities resulting from dual-use strategy

Similar impacts will be experienced during decommissioning, however it is not possible to assess impacts to land use at this stage because there is insufficient information about the decommissioning activities.

The Project will assess impacts and opportunities associated to decommissioning on the basis of detailed plans and updated socioeconomic baseline. The assessment will also need to consider legal requirements in force at that time and feedback from ongoing engagement with local communities and stakeholders.

The Project will aim to identify post-closure land use through engagement with the local stakeholders. As the Project closes, Project facilities would be removed, terrain would be restored, and the land would be revegetated to comparable prior conditions.

8.2.2.1 Impacts during Construction

Loss of jobs by Agricola Grăniceri Managening SRL employees

According to the representatives of the Agri company interviews conducted during the ESIA process, the land proved in time, since its conversion to arable use in 2005, that it has a very low productivity, with soil drainage issues that the company could not address. The area is declared as disadvantaged area by Agency for Payments and Intervention in Agriculture (APIA).

Additionally, the land was evaluated by the Ministry of Agriculture to low quality – category IV (low fertility, degraded land).

For these reasons, the farming activity was deemed to be uneconomical and alternative land uses were explored, leading to the voluntary lease of the land to West Power Investments for the purposes of building the Project.

Due to the crop production business ending in 2023, the activity of Agricola Grăniceri Managening SRL will stop, thus triggering the dismissal of its six employees of their local operations.

This will be a direct negative impact – see Table 8-8 below for details.

Table 8-8: Impact Assessment: Loss of jobs

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Closure of Agricola Grăniceri Managing will result in the dismissal of its six full time employees, with no other dismissals generated by closure of farming and cereal storage facility.
Duration	Permanent	The impact will be permanent .
Scale	Low	The dismissal process will only affect six full time employees, thus the scale of the impact will be low.
Frequency	Constant	The frequency will be constant, as the dismissal will be permanent.
Magnitude		
Low		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High (for vulnerable employees)		
The employees include agricultural and security staff from Pilu commune, who may be potentially vulnerable and lack capacity to find alternative employment in the local area given the very limited agricultural jobs available.		
Significance Rating Before Mitigation		
Moderate		

Accidental damage to neighbouring plots

The construction activities relating to the PV area are naturally bordered by drainage channels and although still existing, the risk for accidental damage to neighbouring plots is limited.

The construction activities associated with the approximately 3.6 km transmission line will require using/establishing tracks along the existing technological road network.

Although the public domain of Grăniceri Commune will be affected by the works, it can however be estimated that crops will be damaged.

All cultivated arable land benefits from subsidies, averaging 1,300 RON (equivalent of 260 Euro) per ha per year, depending on the type of crop. Subsidies are paid by the National Agency for Payments in Agriculture (APIA) and a tele-detection system is applied by APIA for monitoring the accuracy of declared surfaces, leading to fines and even cancellation of all subsidies when more than 30% of the declared surface is not handled according to the farmers statements.

In addition to the crop damage, the construction activities including establishing and using access tracks may also damage the local infrastructure such as existing roads/tracks, drainage channels and rail tracks.

Table 8-9 Accidental damage to neighbouring plots

Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The impact will be local as it will be limited to the number of farmers currently farming land along the route of the transmission line, planned along existing technological roads in Grăniceri.

Duration	Short term/ mid term	The impact is expected to last throughout the construction phase of the transmission line, when presence of construction workforce and machinery may affect the neighbouring arable plots.
Scale	Low	Depending on the detailed scheduling of construction works, scale of impact will be low, as the potential for accidental damage will be mostly applicable to construction of the transmission line. Tendency is that impact is local, rare and affects a small proportion of farmers at a time.
Frequency	Constant	The frequency is expected to be constant during construction.

Magnitude

Low

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Medium/ High for Small farmers

The farmers active in the Aol include small-scale and older farmers who may be potentially vulnerable and suffer significant loss if a larger surface of their plot is affected by construction works on the road consolidation/ transmission line.

Significance Rating Before Mitigation

Moderate

Access restrictions to agricultural plots

The construction activities relating to the transmission line and grid connection substation can potentially block local roads and routes particularly because transmission line laying is a linear activity.

Over 20 arable plots are adjacent to the planned route of the underground transmission line and road consolidation works associated with the grid connection.

Additionally, the first 200 m of the transmission line connecting from the PV area will cross pastureland, raising additional access limitation to the pastureland area to East from the line (approximately 1.78 ha). Depending

Figure 8-1 Pastureland area potentially severed by the construction of the transmission line



Source: ERM 2023

In the case of Dama Project, the approximately 1,000 ha of land where the PV area is located is naturally bordered by drainage channels and was not accessed by other farmers, thus no severance of access between plots is triggered by the construction of the Project.

Additionally, required road consolidation works on agricultural roads in Grăniceri and Socodor will restrict use by current users.

Any such disturbance to the local community can also result in disruption of the construction works.

Table 8-10 Impact assessment – Access restrictions

Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The impact will be local as it will be limited to the number of farmers accessing farming land along the route of the transmission line and the estimated road consolidation works.
Duration	Mid-term	The impact is expected to last throughout the construction phase of the transmission line and the roads consolidation, when presence of construction workforce and machinery may limit or stop access of additional farming machinery.
Scale	Medium	Depending on the detailed scheduling of construction works, scale of impact will be low to medium, as the access restrictions could extend for longer periods, leading the required farming works impossible to conduct for some farmers..
Frequency	Constant	The frequency is expected to be constant during construction.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium		

The farmers benefit from potential alternative routes that, albeit requiring longer access routes, could be used for the temporary period in which constructions/ consolidation works take place.

Significance Rating Before Mitigation

Moderate

8.2.2.2 Impacts during Operation

Additional farming opportunities resulting from a dual-use strategy

The Project team aims to return an area as large as possible to pasture at the end of the Project and to use grazing for vegetation management and community support during the operations phase. Additional agrivoltaic potential uses include medicinal plants crops and beekeeping, as options to be used in conjunction with grazing activities.

The environmental permit obtained for the Project bans further use of pesticides and confirmed the use of sheep grazing for vegetation control. Grazing on site is only to be allowed following a study on its carrying capacity and is to be conducted in rotation, on the N/S or E/W axis. Additionally, no grazing is allowed between 01 April and 20 July, which is the breeding season for most birds and during 01 December – 28 February.

Access to additional grazing areas was reported during the ESIA engagement to be an important Project benefit for the sheep farmers active in the area. This is of particular importance, considering the legacy issues connected to the loss of pastureland in 2005, when approximately 1,000 ha of pastureland were converted to arable land by Agricola Grăniceri owner at the time.

Engagement with local authority representatives and local farmers of Grăniceri and Pilu communes highlighted the estimative number of sheepherders using the pastureland around the Project site, whilst data on the Socodor sheepherders is to be collected at later stages, as necessary. Socodor farmers were not engaged during the ESIA process, as it is estimated that grazing on the Project area will be offered to sheepherders from Grăniceri and Pilu communes, where the Project is located.

The concession contracts for the pasture are subject to change on a yearly basis depending on various factors, however the lease agreements are signed for 7 – 10 years. The exact size of pastureland plots and number of sheep was not collected at this stage of the assessment, as this allocation could look different by the time grazing on (parts) of the PV will be possible, following construction completion and suitable revegetation levels on the site.

A general mapping was conducted in collaboration with local authorities' representatives, resulting in a current estimate of 10 sheepherders in Grăniceri and Pilu that are using the pastureland around the Project footprint

According to information collected during the ESIA Baseline engagement, in Grăniceri there are currently 15,000 sheep, while in Pilu 9,000, competing for limited pastureland of low quality. As such, additional grazing land available from the end of July until November would greatly benefit the sheepherders currently using pastureland bordering the PV area – see Figure 8-2

Figure 8-2 Users of pastureland bordering the Project site



Source: ERM 2023, based on information collected during the ERM Field Survey

Beekeeping is also an option the Project team considers for the site. According to National Agency for Breeding and Reproduction in Zootechnics, there were 759 authorised beehives in Arad County in 2022. Beekeeping was confirmed as a livelihood activity in the Aol, practiced by a limited number of beekeepers. Numbers of beekeepers estimated by local authorities representatives were less than ten in each commune.

Agrivoltaic projects are still to prove feasible in Romania, however a growing body of successful applications in Europe and globally can provide valuable learning for Dama Project. In June 2023, SolarPower Europe has published “Agrivoltaic Best Practice Guidelines,”⁸¹ a new guide for the deployment of agrivoltaic projects, outlining best practice for both EPC and O&M contractors to consider in implementation of such systems.

Table 8-11 Impact Assessment – dual use of the Project site

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local - Regional	Although a particular focus will be placed on providing grazing opportunities for sheepherders and beekeepers in the direct Social Aol, other beekeepers in the wider Arad County could take part in the Project.
Duration	Long term	The dual use is expected to be implemented as early as possible in the operations phase of the Project, providing the soil and biodiversity enhancement conditions are conducive to a successful application of such strategy.
Scale	Medium	The large are to be considered for dual use could potentially have a medium scale impact on local farmers and further inspire

⁸¹ Source: https://api.solarpowereurope.org/uploads/1523_SPE_Agrivoltaic_report_02_db69f1fcd6.pdf

		and motivate such applications by other PV projects in the County and in Romania.
Frequency	Constant	The dual use is expected to last throughout the whole operational phase.

Sensitivity / Vulnerability / Importance of the Resource / Receptor

Moderate

Given the limited amount of pastureland available, the sensitivity of this impact's receptors is considered moderate, bringing about not only an immediate increase of grazing areas during operations, but also the potential for additional innovations such as beekeeping or dedicated crops suitable to the soil and shading conditions.

Significance Rating Before Mitigation

Positive Impact

8.2.2.3 Mitigation measures

Mitigation measures for Construction

According to the IFC PS5, the Project should develop a Land Acquisition Plan (the contents of a Livelihood Restoration Plan are typically assimilated within this plan), that will outline the Project's commitment to mitigate adverse socioeconomic impacts from land acquisition or restrictions on affected persons' use of or access to land and livelihoods, to be developed prior to construction.

There are several key elements to this mitigation approach including:

- Ensuring appropriate disclosure of information, consultation, and the informed participation of those affected; as such, the community will be informed about the nature of construction activities and possibility of any blocked route; alternate routes will be identified with the help of local/affected community. Duration of such blockage will be minimized to the extent possible.
- All land users shall be duly identified and compensated for potential reduction in subsidies, including both formal and informal land users and prior to accessing the land;
- The crop damages caused by the establishing and or using access tracks will be compensated by paying cash compensation equivalent to value of crops for the number of seasons the works are reducing their cultivated area. The Community Grievance Mechanism, established through the SEP, will include provisions for dealing with accidental damage claims and blockage of access routes.
- Improving or, at a minimum, restoring the livelihoods and standards of living of affected persons to pre-project levels, so as to facilitate sustainable improvements to socio-economic status;
- Paying particular attention to the needs of vulnerable groups – a.i. older farmers, small-scale farmers, who are typically less resilient to change and may be made more vulnerable to Project impacts.
- Members of vulnerable groups may require special or supplementary assistance because they are less able to cope with change than the general population.
- An Accidental Damage Compensation Procedure is to be developed as part of the Project ESMS and used to guide compensations during the Construction and Operation of the Project.
- The Project will assist Agricola Grăniceri Managing employees who lost their jobs through livelihoods restoration programs, including support measures to access training and job opportunities with the Project.

Enhancement measures for Operation

Develop a Land Management / Dual Use Strategy, with consideration of ecosystem services enhancement objectives, in partnership with local authorities, local farmers and other interested stakeholders.

The installation of Agri-PV systems requires unique EPC and O&M considerations, with implications on the design, installation, and operation of both the solar system, and the agricultural process. As such, the Dual Use Strategy should include provisions for the contractors to design, install, and operate in a way which allows the free and safe movement of farm machinery, farm workers, and livestock, while ensuring sufficient transmission of light and rainwater and safety of the equipment:

- the size and the height of Agri-PV systems should be adapted to the agricultural activity that will be carried out on the plot of land
- ensure the PV system does not endanger workers, livestock or machinery;
- choose the appropriate installation technique

8.2.2.4 Residual impact significance

For Construction, the impact is classified with Moderate Significance before mitigation. The project is expected to have a residual impact of **Minor Significance** if the LAP (including the LRP) and associated engagement are conducted effectively.

The sensitivity of land users (farmers, shepherds) to Project land take is overall considered medium, but high for vulnerable groups. Households with particularly low incomes, access to limited areas of land, whilst presenting a high land dependency for subsistence and income generation will be the most vulnerable to this impact.

For Operations, no residual impact is applicable as impact is evaluated to be positive.

8.3 Economy, Employment, and Income

8.3.1 Introduction

In 2021, the active population of Arad County was approximately 411,746 people and included 187,100 people in employment, according to the National Institute of Statistics. Manufacturing sector has the largest employment base, followed by Trade, with a relatively balanced distribution across genders. Agriculture (where 57% of the total number of employees are men) and Transportation sectors (88% of the employees are men) are following in terms of most employees registered.

Construction sector ranks 5th as total number of employees (13,900) and is very male dominated with 90% of all employees being represented by men. 900 people (out of which 78% men) were employed in Electricity, Gas, Steam and Air Conditioning Supply Sector in 2021 in Arad County.

In 2021 the unemployment rate in Arad County was at 1.6, significantly lower than the national rate of 5.6.

Agriculture is the main livelihood activity in the two communes in the direct Social Aol, however the number of employees in the sector is limited, due to the mechanisation of the sector, the seasonal nature of work and the involvement of family members as unpaid agricultural workers. The main employment sectors include public administration and education, with a limited number of jobs available in local retail sector. In 2021 there were 170 people formally employed in Grăniceri Commune and 205 in Pîlu Commune, with total number of registered employees presenting a decreasing trend between 2017 and 2021.

Manufacturing sector is not represented in the two ATUs in the Direct Social Aol, but the well-developed and growing manufacturing sector in Chisineu-Cris and Nadab (approximately 20 km from Grăniceri and Pîlu) provides employment for residents of both Grăniceri and Pîlu communes.

In 2021, there were 22 registered unemployed in Grăniceri commune and 49 in Pîlu commune, however numbers decreased to 16, respectively 29 in 2022. The number of registered unemployed is balanced in terms of gender in Pîlu, but in Grăniceri only 3 out of the 16 unemployed people in 2022 were women.

The international temporary migration recorded in 2021 in Arad County totalled 4,697 individuals, evenly distributed between urban and rural areas. Only 40% of the temporary emigrants were women, and of them 55% were from rural areas. The seasonal migration for temporary work in Hungary or other countries in the EU is a phenomenon highlighted by KII in both communes, however more clear numbers were not available on these potential workers.

In terms of local authority budgets, these were reported to be a challenge in both communes by local authority representatives, with the majority of the contribution being property, including land taxes and very limited income tax registered due to the low local economic activity.

8.3.2 Potential Impacts

The activities related to each Project's phase will require the engagement of number of employees, as well as the procurement of goods - often from local and regional sources – therefore potentially directly and indirectly affecting both temporary employment and income in the Social Aol and the wider Arad County and the West Region. The Project will also have a potential long-term impact on the Social Aol, increasing Local Councils' revenue through tax payments for construction and operation stages.

Table 8-12 summarises the potential sources of economy, employment, and income impacts associated with each Project's phase.

Table 8-12 Potential impacts on economy, employment, and income by Project's phase

Project phase	Potential Impact
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Construction	Increase in direct employment levels in the Social AoI and the wider Arad County
	Economic benefits on indirect and induced employment, and Project procurement
	Increase in Local Councils' revenue from payment of taxes by the Project
Operation	Increase in direct employment levels in the Social AoI and the wider Arad County
	Increase in Local Councils' revenue from payment of taxes by the Project
Decommissioning	Increase in direct employment levels in the Social AoI and the wider Arad County
	Economic benefits on indirect and induced employment, and Project procurement

8.3.2.1 Impacts during Construction and Decommissioning

Increase in direct employment levels in the Social AoI and the wider Arad County

The need for construction workers can partially be met through a direct employment in the Social AoI and the wider area of Arad County and the West Region. It is assumed that the Project will employ daily up to 500 people for the duration of construction phase, currently estimated to last approximately 2.5 years. However, in case the Project timeline is accelerated at a later planning stage, there may be a need to engage additional workforce.

The Project will appoint an Engineering, Procurement and Construction (EPC) Contractor, who will be responsible for the Project hiring and will include an employer requirement for the EPC to use local resources, wherever feasible.

In this regard, Rezol Energy set up a partnership with RenewAcad – Academy for Renewable Energy Sources, a renewables training provider with more than 10 years experience in professional training for the wind and solar industry in Romania. The Academy trains annually more than 2,000 trainees, is internationally certified and implements the latest quality standards and knowledge in the field of renewables. For Dama Project, Rezolv and RenewAcad aim to build a training facility in the Administrative Area of the PV Plant for multipurpose use both for the community and for the company, by using highly skilled personnel in the renewable energy field.

More than supporting the successful staffing for Dama Project, the Dama Project Training Center for Renewable Energy will facilitate employment in other energy companies for the persons that go through professional reconversion.

Three categories of potential Project's employees can be distinguished: low-skilled, skilled, and expatriates. With around 14,000 people already possessing experience in construction works, there is a possibility that the Project's construction phase will attract some skilled workers from the local and County communities. Also, it is expected that the Project will source its low-skilled employees from local workforce, given the associated reduction in cost of workforce accommodation and travel.

It is worth noting that the positive impact of the Project induced employment may be limited for the local community due to mismatch between required skill sets and the education or training of locally available workforce. To address this, the Investor is proposing to establish the Training Centre and provide professional training and re-conversion to all those interested to access these opportunities, with a particular focus on the direct Social AoI. This can be most impactful at the construction stage and during the transition from the construction to the operation phase.

The impact of the Project on direct employment during construction and decommissioning will be regional, potentially affecting the workforce in the whole Arad County – depending on the existing skills within local community and the number of migrant workers which will be hired for the Project. Its duration

will mostly be medium term (about 2 years) and will cease after the construction and decommissioning phases.

The scale of the impact will be high, and its frequency will be constant, with around 500 workers employed for the whole duration of the Project’s construction phase (considering a construction period of up to 24 months), with majority probably sourced from local or regional workforce. The vulnerability is considered high due to existing unemployment and risk of poverty in the Social Aol.

Overall, the Project will have a positive impact on local and regional communities. The impact of the Project on direct employment levels in the Social Aol, as well as the wider Arad County, during the construction and decommissioning phases, is summarized in Table 8-13: Increase in direct employment levels during construction– Impact Assessment below.

Table 8-13: Increase in direct employment levels during construction– Impact Assessment

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	The increase in direct employment will concern the workforce in the wider Arad County. It will be of a significant importance for both the labour force which already possess the specific skills and the population ready to undertake appropriate training.
Duration	Medium term	Construction-related employment is estimated at 3-5 years and will cease once the construction phase is completed. Only a small proportion of jobs will be retained during the operation stage.
Scale	High	The project will have a high demand of workers on site (expected around 500 workers or more in peak construction periods), whose major part will be probably covered by local/regional workforce (although this will depend on the company finally in charge of the construction works). Local hiring can be increased by means of previous training of local workforce for, e.g., civil works, photovoltaic modules installer.
Frequency	Constant	The construction-related employment is expected to last throughout the whole phase.

Sensitivity / Vulnerability / Importance of the Resource / Receptor

High

Given the existing unemployment and risk of poverty in the region, the sensitivity of this impact’s receptors is considered high, bringing about not only an immediate increase of employment during construction (and in less degree during operation), but also professional experience for future projects of similar character.

Significance Rating Before Mitigation

Positive Impact

Economic benefits on indirect and induced employment, and Project procurement

The influx of workers and a potential increase in income of the local community will indirectly benefit the service and supply sectors where local citizens may be able to find at least temporary jobs. Indirect and induced employment will particularly provide more opportunities to women, as opposed to direct employment in construction works, where more men are anticipated to be involved.

What is more, the wages earned by construction and decommissioning workers can be spent in the vicinity of the Project’s activities, therefore further feeding the local economy. The Restaurant sector is represented in Pilu commune by two operational restaurants, therefore the potential of the Project’s

workforce use of such facilities and accelerated growth of this sector of local economy is expected to be significant for local small and medium enterprises (SMEs).

In case the temporary accommodation facility is provided to non-local construction workers on the Project site, the impact of the Project on indirect employment in the hospitality and renting sectors will be reduced. On the other hand, if a construction camp is not the selected option, the influx of the workforce to local settlements in close proximity to Project sites will cause a temporary increase in demand for rentals, boosting the incomes of potential lenders. The impact of the workforce accommodation will be dependent on the number of local workers versus non-local employees.

Additionally, the Project is expected to locally source part of the construction materials and supplies, having a positive impact on the local economy. Procurement will be the scope of the EPC contractor and details regarding the suppliers are not available at this stage of the assessment. Procurement will include, among others, heavy equipment for earth works, structures and foundations materials, logistic services to transport project components and other materials, as well as workers. Since the main project components (modules, inverters, substations, cable) will most likely be procured from outside of Romania, the potential impact associated to the increased production of these components on the local workforce is excluded.

There is also a potential for local citizens to be employed as drivers. In 2021 there were around 14,000 people employed in the transport and storage sector in Arad county. Additionally, small transport companies are registered in Pilu and Grăniceri communes, with skills that can be transferable to the Project's needs.

The Project will potentially induce indirect employment and procurement of goods at a regional to a national extent. The hospitality, logistics, service, and raw materials supply (metal, aggregates) sectors are expected to benefit most from the increased revenue due the influx of workers and the project activities requirements.

The duration of the impact will be medium and will strongly decrease once the construction phase is over. Considering the number of local and regional companies involved in the transport and production of the construction materials, as well as depending on whether workers' accommodation is provided, the scale is expected to be relatively high. The frequency of the impact will be constant, as workers are expected to use local services throughout the whole construction stage with a high vulnerability and a positive significance. The Project will positively increase local and regional revenue from the procurement of goods, as well as the usage of local services and transportation. The indirect and induced employment associated with the Project will benefit local communities through increased household income.

The impact of the Project on indirect and induced employment levels and procurement of goods, during the construction and decommissioning phases, is summarized in Table 8-14 below.

Table 8-14: Impact Assessment: Economic benefits of indirect and induced employment, and Project procurement

Type of Impact		
Indirect Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional to national	Project procurement is expected to involve national, regional, as well as local companies. At the same time, the local community will experience boost in their economy associated with indirect and induced employment in service and supply sectors.
Duration	Medium term	Most of the workers influx and Project's procurement will occur during construction stage.

Scale	Medium to high	The scale of the impact will depend on a number of factors. In case there is no workers' accommodation camp provided, the impact is expected to be of medium scale. Similarly, the procurement of goods will have a medium to high scale, depending on the number of goods sourced from local and regional companies.
Frequency	Constant	The local and regional procurement of goods is expected to mostly take place at the beginning of construction works (and during the pre-construction phase), however the impact on direct and indirect employment will be constant, as workers will benefit from services available locally throughout the construction stage.

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High

There is a high unemployment level in the direct Social AoI, therefore any additional income will have a strong impact on local society's economy and spending.

Significance Rating Before Mitigation

Positive Impact

Increase in Local Council's revenue from payment of taxes by the Investor

During the construction phase, taxes will be paid on profits (corporate income tax), labour income (contributions to the national budgets for health and pensions so own employees), and value added tax for fuel, and purchase of other goods and services.

The total estimated value of the Dama Project investment is 800 million euros. According to the Romanian Law, the tax for issuing the construction building permit amounts to 1% of the authorised value of the works (without VAT), to be paid to the emitting authority. Grăniceri and Pilu communes, as issuers of the building permits for Dama Project, are the recipients of this tax.

Building permits were issued as follows:

- four Building Permits issued by Pilu Commune for the PV area objectives located on the territory of the Administrative Territorial Unit (ATU);
- 26 building permits issued by Grăniceri Commune for the PV area objectives located on the territory of the ATU;
- one building permit issued by Grăniceri Commune for the Grid Connection Substation and the underground transmission line, located on the territory of the ATU.

Preliminary estimates indicate that the Project is expected to generate significant fiscal benefits for the affected administrative units through construction-related taxes and associated contributions. As of 2023, approximately EUR 1.47 million was paid prior to the issuance of the building permit, comprising the following:

- 1% construction tax paid to the local city hall prior to obtaining the building permit;
- 0.05% contribution paid to the Romanian Order of Architects (Ordinul Arhitecților din România).

Prior to opening the construction site, additional mandatory payments were made to the State Construction Inspectorate (Inspectoratul de Stat în Construcții – ISC), consisting of:

- 0.1% tax to the County Construction Inspectorate;
- 0.5% ISC contribution, of which 50% is payable at the opening of the construction site and 50% prior to project commissioning/reception.

At the end of construction, the investment value is recalculated based on actual expenditure. If the final value exceeds the initial estimate, the difference in construction taxes is paid to the relevant authorities. If the final value is lower, no reimbursement is provided.

Similar beneficial impacts on the tax revenue will take place further down in the supply chain and resulting from induced activities, enabling the local authorities to spend more on public infrastructure, public services and programs, and potentially increase investment in economic development. These spill-over effects could benefit transportation, education, health care, social programs, and security.

Concurrently with Project employment and procurement opportunities, the higher tax revenue during the construction phase will temporarily support the local and county economies. However, the magnitude of this effect will depend on the priorities and ability of the local authorities to manage this revenue in the best public interest.

Table 8-15: Impact Assessment: Increase in local council’s revenue from Project authorisation taxes.

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Taxes related to the Projects operation boost the revenue of local councils.
Duration	Temporary	The income from the Project’s authorisation tax is a one-off payment (updated once works are finalised, if the case)
Scale	Large	The tax represents a high income for both communes. The scale of the impact is significantly large for Grăniceri.
Frequency	One-off	The taxes will be paid by the Investor one time, upon receiving the Building Permit.
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
The local authorities’ budgets are limited due to the high reliance on property tax and reliance on grants and subsidies from the central government. Any additional revenue will potentially allow them to redirect the money to address social issues and public services.		
Significance Rating Before Mitigation		
Positive Impact		

8.3.2.2 Impacts during Operation

Increase in direct employment levels in the Social Aol and the wider Arad County

It is assumed that the Project will employ up to 50 people for the duration of operations phase of the Project.

Employment during this period will consist in workers dedicated to the operation of the PV and workers periodically contracted for maintenance activities, including skilled and semi-skilled labour (such as electrical and mechanical technicians) and unskilled labour (such as security personnel or other administrative staff) for a duration of 25 years. Workers in this phase will be, to the extent possible, hired from local communities.

For Dama Project, Rezolv and RenewAcad aim to build a training facility in the Administrative Area of the PV Plant for multipurpose use both for the community and for the company, with the aim to provide the adequate training for all interested people in the Aol to access training required to allow them to

access temporary jobs during construction, but also to allow them to build the expertise required for accessing permanent jobs which will become available during the Project operation stage.

The impact of the Project on direct employment during operation will be regional, potentially affecting the workforce in the whole Arad County – depending on the existing skills within local community following the implementation of the renewables training programme by the Investor. Its duration will be long term (minimum 25 years).

The scale of the impact will be medium for the Direct Social AoI, and its frequency will be constant, with around 50 workers employed for the whole duration of the Project's operation phase, with majority probably sourced from local or County workforce. The vulnerability is considered high due to the existing unemployment and risk of poverty in the Social AoI.

The impact of the Project on direct employment levels in the Social AoI, as well as the wider Arad County, during the operation phase, is summarized in Table 8-16 below.

Table 8-16: Increase in direct employment levels – Impact Assessment

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	Although a particular focus will be placed on maximising employment opportunities for the residents in the direct Social AoI, the increase in direct employment will concern the workforce in the wider Arad County.
Duration	Long term	Construction-related employment is estimated at 3-5 years and will cease once the construction phase is completed. Only a small proportion of jobs will be retained during the operation stage.
Scale	Medium	The project will have a demand of up to 50 workers during operations, major part will be probably covered by local/regional workforce (although this will depend on the O&M contractor). Local hiring is to be increased by means of training of local workforce by the Rezolv/ Renew Acad Training Centre. Considering that registered employment in each commune was 200 people or less in 2022, the scale of this opportunity is considered medium.
Frequency	Constant	The operations-related employment is expected to last throughout the whole phase.

Sensitivity / Vulnerability / Importance of the Resource / Receptor

High

Given the existing rates of unemployment and risk of poverty in the region and the limited number of job opportunities in the Direct Social AoI, the sensitivity of this impact's receptors is considered high, bringing about not only an immediate increase of employment during operations, but also transferrable professional experience for future projects of similar character.

Significance Rating Before Mitigation

Positive Impact

Increase in Local Councils' revenue from payment of taxes by the Investor

The Investor is expected to pay taxes associated with the operation of the renewable energy sources. This will help increase local councils' revenue, as this income can be invested in the development of public services or the education system or addressing the needs of vulnerable groups.

During the operations phase, taxes will be paid on profits, labour income (contributions to the national budgets for health and pensions by own employees), and value added tax for fuel, and purchase of other goods and services.

Beneficial impacts on the tax revenue will also take place further down in the supply chain and resulting from direct and indirect workers spending their income. As for direct tax contributions, indirect tax revenue will have beneficial impacts on government funded infrastructures, services, and programs. Together with Project employment and procurement opportunities, these revenues will have a positive impact on the local and economies.

As outlined in Table 8-17, the impact on the increase in the council's revenue will be local in extent, long-term in duration (considering the 25 years estimated operations phase) and regular in nature of income payments. The sensitivity of local councils is assessed as high since there are a limited number of companies registered locally that contribute with taxes to the local budgets.

The overall impact of the Project on local councils' revenue is positive.

Table 8-17: Impact Assessment: Increase in local council's revenue from Project's taxes.

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Taxes related to the Projects operation are expected to boost the revenue of local councils.
Duration	Long term	The income from the Project's taxes will last during the construction and operation stage.
Scale	Medium	Relative high income from regular taxes on economic activities.
Frequency	Regular	The taxes will be paid by the Investor on the regular basis
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
The local authorities mostly rely on grants and subsidies from the central government and any additional revenue will potentially allow them to redirect the money to social issues and public services, for example reducing the impact of inadequate waste management system.		
Significance Rating Before Mitigation		
Positive Impact		

8.3.2.3 Enhancement Measures

The measures recommended below are relevant for both construction and operations phases.

Enhancement measures for Increasing the direct employment levels in the AoI

- Assuming the implementation of the Training Centre Rezolv/ Renew Acad on the immediate vicinity of the Project footprint and the explicit requirements to the EPC contractor in terms of prioritising local workforce in their recruitment efforts, the Project's impacts on the local economy and employment are expected to be positive, to a greater or lesser degree, depending on the extent of this involvement.
- In support of this, the Client is to develop and implement a Worker Management and Recruitment Management Plan that should specifically include commitments to, among others:
 - **Recruitment measures:**

- Establish measures that will ensure prioritisation of people from the Project Social AoI as well as from surrounding ATUs and the wider Arad County for employment, e.g., include clear commitments for minimum local labour content involved in the project, as part of the EPC contract / employer requirements.
- Embed commitments to transparent recruitment process, based on merit and free of discrimination. This is to be reflected in:
 - Selection criteria, job profiles, and number of workers for the construction phase with specific attention to the enhancement of the local community, women, and vulnerable groups' employment.
 - Description of the Worker's Code of Conduct, highlighting labour conditions with an aim to reduce the risk of gender-based violence and harassment.
 - Details of worker's grievance mechanism that will be disclosed during the recruitment process and the employment period.
 - Documentation that will outline labour rights, such as the working hours, compensations for overtime, and any additional employee benefits. The documentation will also highlight the workers' right to self-organisation and collective agreements.
 - Use inclusive vocabulary in job descriptions in order to encourage women and other vulnerable groups to apply.
- Collaborate with relevant local organisations to develop the process by which employment positions will be advertised by these institutions, as well how candidates will be identified:
 - Collaborate with the county-level unemployment agencies to facilitate reaching out to women and members of other vulnerable groups (particularly Arad County Agency for Employment, Local Employment Agency Chisinau-Cris);
 - Engage with training institutions to provide training programs and skills upgrading;
 - Offer apprenticeship and partner with local contractors to provide apprenticeship programs;
 - Offer scholarships to encourage high school graduation and encourage interest in the industry (particularly with the Technological High School Chisineu-Cris);
 - Frequently and in advance, communicate (local radio, Facebook, local online media, or other media) within Arad County, Chisneu-Cris and specifically, within the Social AoI, the Project schedule, the type and jobs to be offered at the Project, education and skill requirements/ qualification criteria, and information on how to apply for jobs to increase local interest;

■ **Worker Training and Management measures:**

- Confirm training and re/up skilling programmes available for the local workforce. This is to include:
 - Identification of entry-level jobs that do not require prior experience and education, and provide on-the-job training;
 - Develop career plans and skill upgrading for hired employees to help them advance and reach more skilled and senior positions and to enable progress from construction to O&M jobs;
- Monitor gender breakdown of training and employment as part of annual monitoring to measure gender balance;
- Ensure equality in remuneration for workers of the same skill level, regardless of gender, age, sexual orientation, religion, or nationality;

- Follow established policies and internal best practices to promote harassment free workplace; health, safety, and security; and multi-cultural and individual considerations;
- Clearly and frequently, communicate labour rights;
- It is important to engage the local communities of Grăniceri, Pilu and extend to Socodor, Chisineu-Cris, Simand, Macea ATUs in the preparation and implementation of training and education programme.

As such, the expectation of maximising local employment will be fulfilled in cooperation with local communities through the implementation of the Stakeholder Engagement Plan, which will outline how the Project will ensure regular, open and transparent communication with all stakeholders.

- To provide clear information on the number, type and limited timescales of employment opportunities.
- To ensure information on the employment and the procurement strategies is disclosed at all settlements within the Aol.
- Continuing to engage local people in the employment opportunities and work with suppliers to enable capacity building, procurement, employment and contracting opportunities at a settlement-level, as part of maximizing the positive benefits.
- As part of the SEP, a Community Grievance Mechanism will be implemented to ensure that individuals who have concerns or complaints about the Project or wish to report their potential expectations or concerns related to local economy and employment can communicate directly with the Project.

Enhancement measures for economic benefits on indirect and induced employment, and Project procurement

- Embed the following specific commitments regarding procurement into the Worker Management and Recruitment Management Plan:
 - Advertise contracting opportunities well in advance in the Aol and at county level;
 - Whenever possible, identify local vendors and focus on maximizing procurement opportunities for local businesses.
 - Host local supplier workshops to provide information on the tender requirements and qualifications needed;
 - Whenever possible, adopt a policy for preferential selection of local suppliers from the Aol communities, if assessed as qualified and having prices competitive with other suppliers;
 - Identify and look for opportunities to reduce barriers to entry for local businesses (e.g. offer smaller contracts, split contracts into several parts; allow businesses to collaborate on contracts);
- Implement the Stakeholder Engagement Plan and Grievance Mechanism in line with the commitments set forth in the SEP:
 - Monitor grievances in relation to access to procurement opportunities;
 - Report on initiatives to empower local suppliers to access procurement opportunities with the Project.

Enhancement measures for impact on Local Council revenue increase from Project taxes

The management of revenues from payment of taxes by the Project is primarily the responsibility of the local authorities of Pilu and Grăniceri Communes. The Client is not able to interfere or influence government allocation of tax and revenue payments.

However, the Client will consider adopting the *publish what to pay initiative*⁸² adopted by the extractive industry which advocates for publishing tax contributions. Such a commitment will however give due consideration of any relevant confidentiality aspects and engagement with Grăniceri and Pilu communes.

8.3.2.4 Residual Impact Significance

Not applicable for positive impacts.

⁸² Source: *Publish what you pay* website, accessed at <https://www.pwyp.org/about/>

8.4 Education and Training

8.4.1 Introduction

In hiring local workforce, the Project will contribute to their professional development and capacity building as a result of their involvement in the project activities in the different project phases, but specially during the intense 2 years of the expected time of construction. In addition to the on-the-job training effect, specific technical and HSE trainings will have to be imparted to the workforce to comply with the quality and HSE project requirements, developing the job skills of the local workforce and increasing their professional competitiveness for the future in similar projects and in general.

The Technological High School Chisineu-Cris offers, among others, the following educational paths which could be relevant for the Project workforce requirements during construction and operation:

- Technological specialties (4 years high school cycle)
 - Mechatronic technician;
 - Ecological technician and environmental quality protection;
- Vocational specialties:
 - Motor mechanic.

Additional to that, the workforce currently engaged in the Construction and Manufacturing sectors in the wider Arad County may be willing to follow professional re-conversion/ upskilling programmes for accessing potential jobs available.

8.4.2 Potential Impacts

Possible employment of the local workforce during all phases of the Project's life-cycle will increase the local population's knowledge and skills, allowing them to undertake similar employment opportunities in the future.

This impact will be further facilitated in the case of specific training provided by the Investor to the local community. To enable this, Rezolv Energy partners with RenewAcad for setting up a Local Public information & Education Center inside Dama PV Project, planned to be the largest Photovoltaic Plant in Europe. The Center aims to:

- Train and reconvert technical personnel from other industries and areas in the field of renewable energy sources.
- Offer training stages and new jobs for up to 500 full time equivalent (FTE's);
- Help develop the indirect Aol by implementing a long-term program for training and professional reconversion.

The Centre is to become active in the early stages of contracting and preparation for construction and facilitate professional re-conversion and upskilling via dedicated and programmes of up to six weeks, including internship programmes for youth in the Project area interested to build expertise and a career in the renewable energy industry.

Table 8-18 summarises the potential sources of education and training impacts associated with each Project's phase.

Table 8-18 Potential impacts on education and training by Project's phase

Project phase	Potential Impact
Construction, Operation, Decommissioning	Improved levels of education and skills which can be transferred to future employment opportunities

8.4.2.1 Impacts during Construction, Operation, and Decommissioning

Improved levels of education and skills

The local pool of workers can be enhanced through appropriate training prior to, and during employment in each Project phase. The training provided by the Investor will benefit local community and equip it with a set of skills that can be applied in similar jobs or further access the jobs available for the operation and maintenance of the Project.

The Project will impact the whole Arad county and potentially surrounding counties through increased level of education and skills of the workforce employed in the construction, operation, and decommissioning of the PV Plant, therefore the extent of this impact is assessed as regional.

This effect will be long-term, as the trained labour force will retain their skills and knowledge for possible similar future employment, moreover in the planned Nadab 1 (370 MW) and Nadab 2 (310 MW) PV Projects and Chisineu-Cris (50 MW) PV Project. Since a significant level of local involvement is expected, the effect of an increased level of education and skills will be at medium scale, while the learning process will have a continuous character. The sensitivity of the local receptors is considered high and the overall impact on local communities, positive. The results of the assessment are summarised in Table 8-19 below.

Table 8-19: Impact Assessment: Increased level of education and skills

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	The hiring of the local workforce is expected to occur both at the local and regional level.
Duration	Long term	The acquired knowledge and expertise will remain after the project is finished.
Scale	Medium	A relatively significant level of local involvement is expected.
Frequency	Constant	Learning process will have continuous character.
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
The level of renewables skills in the Social Aol is considered to be currently low, with a lack of specific skills which are need in the labour market. Additionally, vulnerable groups in the Aol (e.g., young workers, women, people with disabilities, migrant workers and refugees, workers engaged by third parties and workers in the client's supply chain) may face additional barriers in accessing the available training opportunities.		
Significance Rating Before Mitigation		
Positive Impact		

8.4.2.2 Enhancement Measures

- A training program shall be developed considering the training needs of the local workforce, according to the project requirements. In addition to the on-the-job learning effect, topic-specific training measures will enhance the professional development of the workforce, ensuring at the same time the required work quality and environmental and H&S project compliance. Apart from the technical trainings, the training program shall cover the required H&S method statements, H&S risks, and environmental site management, among others.
- Consider support measures for women and other vulnerable groups in order to enable their participation in the skills development:

- Consider timelines and schedules to enable those currently in employment to access the training programmes – include evening/ weekend courses.
- Free transportation provided for trainees in the Social Aol who may have difficulties traveling to the training centre given the lack of public transportation available in the Aol.
- Childcare support/ provision for enable young mothers to access dedicated training.
- Accessibility support for people with disabilities that may still benefit from training and employment opportunities.

8.4.2.3 Residual Impact Significance

Not applicable for positive impacts.

8.5 Infrastructure and Public Services

8.5.1 Introduction

There are limited number of households in the direct Social Aol which are not connected to electricity. In most houses wood is used for heating, while cooking is mostly done with a use of liquified petroleum gas tanks. There are also known challenges in the Social Aol regarding the infrastructure for water supply and sanitation, and waste management practices do not include selection waste collection and recycling.

8.5.2 Potential Impacts

The influx of workers, particularly associated with the construction and decommissioning works, will potentially put pressure on existing infrastructure and utilities (such as health services, water and sanitation etc.), limiting their accessibility for local citizens. Additionally, in case of lack of a dedicated workers camp, the incoming workforce will be allocated in the locally available accommodation, reducing the number of apartments available to the community and potentially further affecting the housing market.

In addition, the transportation of machinery, components and materials, as well as the workers with cars will potentially result in higher road congestion (the impact of Project on traffic is described in detail in a separate section).

Table 8-20 summarises the potential impacts on the infrastructure and public services associated with each Project's phase.

Table 8-20 Potential impacts on infrastructure and public services

Project phase	Potential Impact
Construction and Decommissioning	Increased demand on public services, potentially reducing availability for existing local users
	Pressure on housing stock through the influx of non-local workers

8.5.2.1 Impacts during Construction and Decommissioning

Increased demand on public services

An influx of the non-local workforce may put a strain on public services, such as medical services, increasing the waiting lines and general effectiveness of healthcare, local administration, and supply of food, electricity, and other commodities. It is expected that the Project will employ 500 workers throughout the construction phase who may require similar use of public services as local citizens, particularly in the case where worker's accommodation camp is not provided, including health services on site.

The Social Aol is characterised by inadequate wastewater treatment system and low quality of the water supply. Without a good management system and the quick rise in number of newcomers, which is expected at the commencement of the construction work, the impact of the waste on the environment and surrounding landscape will possibly be higher than usual in the area.

The increased demand on public services related to the influx of construction workers will be experienced at the local level on a medium scale (proportionately to the size of the affected communes) and with medium term duration throughout the construction period and in cases of emergency. The increase in the number of public services' users will be most felt at the beginning of the construction phase, however the presence of additional users of public services will be constant. The magnitude of

this impact is assessed as medium, with medium vulnerability based on some present issues with waste, water supply and wastewater collection systems in certain parts of the Social Aol. The overall significance of the Project's effect on public services is evaluated as moderate.

Table 8-21 below summarizes the impact assessment of the Project on public services.

Table 8-21: Impact Assessment: Increased demand on public services

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The high influx of workers will potentially impact the public services of the Direct Aol, since many public services will be available locally. Some additional services may originate from outside the direct Social Aol, moreover in Chisineu-Cris Town and Arad City.
Duration	Medium term	The impact is expected to last throughout the construction phase; however, it will be mostly felt at the beginning of this stage and in cases of emergency.
Scale	Medium	Given the high influx of workers expected (ca. 500) in two communes of about 2,100 habitants, the scale of the impact is proportionally to the local conditions considered medium. In addition, as the availability of different types of local public services is limited, the impact of any additional users will be noticeable by the local citizens.
Frequency	Constant	The increase in the number of public services' users will be constant and will cease with the outflux of the Project's workers from the Social Aol at the end of the construction works.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium		
Although overall general public services are provided to the local communities, there is some inadequate management of waste and wastewater in parts of the Social Aol. Access to public services as health may be limited for vulnerable groups, such as the elderly or the Roma citizens.		
Significance Rating Before Mitigation		
Moderate		

Pressure on housing stock through influx of non-local workers

The expected influx of non-local workers during the construction phase will have an effect on the local housing stock in case no accommodation camp is provided by the Investor. Although some of the short-term workers may be placed in available hotels/ motels in Arad County, it is to be expected that most non-local construction workers will look for long-term rentals, most probably as close as possible to the Project site.

The housing stock in the direct Aol consists largely of detached brick houses with one or two storeys and with variable front and back gardens and is in private property, with home rental not being reported to date due to lack of demand. However, leasing of rooms or entire properties for the potential migrant workforce cannot be excluded.

In 2021, the following number of private houses was reported for the Aol (National Institute of Statistics , 2023):

- Grăniceri Commune: 1086
- Pîlu Commune: 802

There is a visible investment in the housing stock in the countryside of the Social Aol, with housing/rooms that potentially could be rented for the time of construction period. As a result, the local citizens will possibly experience a temporary increase in house prices which may benefit landlords/ homeowners but could impact other more vulnerable groups in the Aol who may currently lease properties.

The extent of the Project's impact on housing stock through the influx of non-local workers will be regional (including Grăniceri and Pîlu communes, but also Socodor Commune and Chisineu-Cris and other surrounding ATUs in Arad County), and mostly experienced in areas close to the construction sites. It will last throughout the construction stage, therefore its duration is assessed as medium term, while frequency will be constant. The impact's scale will be medium due to relative high number of contracted workers during construction, estimated to reach up to 500. Due to an uneven effect of possible increase in rental prices, the vulnerability is evaluated as medium resulting in moderate impact significance before mitigation.

Table 8-22: Impact Assessment: Pressure on housing stock through the influx of non-local workers

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	The pressure on housing stock will be mostly felt in the areas near the Project's construction sites, however will most probably extend to Chisineu-Cris and other surrounding ATUs.
Duration	Medium term	Workers will need to be accommodated throughout the construction phase.
Scale	Medium	The housing stock in the Aol includes both uninhabited houses and well-maintained properties that may be available for leasing by the potential migrant workforce. The scale of impact on housing stock is considered medium due to the relative high influx of workers expected.
Frequency	Constant	The pressure on housing stock and rental prices will be felt throughout the construction phase.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium		
In general, there seems to be sufficient housing stock in the area with new housing investments under completion, however vulnerable groups can be impacted by induced higher rental prices.		
Significance Rating Before Mitigation		
Moderate		

8.5.2.2 Mitigation Measures

The Investor will ascertain, prior to the construction phase, whether the local services are sufficient for workforce influx and, where appropriate, will liaise with relevant authorities to limit the negative impact of the Project on local users' access to public services.

As part of the Worker Management and Recruitment Management Plan:

- Assess the housing stock and develop a workforce housing plan that will ensure that availability of housing for the general population is not adversely affected. This may include providing a mix of workforce accommodation facilities, management housing complexes, and use of existing housing stock.
- Where workforce housing is constructed, this should be designed and developed within a longer term plan of the infrastructure becoming part of the overall housing stock.
- Consider providing favourable financing options for local residents to develop and/or improve hostels/ accommodation facilities.

Residual Impact Significance

After the implementation of mitigation measures the residual impact significance is expected to be **minor**.

8.6 Community Health and Safety

8.6.1 Introduction

The main objective of community health and safety is to achieve zero harm from the project's activities to the local community, manage risks and improve overall community health and well-being. Community health and safety management should integrate local citizens into the Project environment, providing them with transparent and reliable information.

The overall access to first health and safety services in the direct Social AoI is considered sufficient, with emergency and most healthcare services being free of charge. Each ATU has a dedicated family doctor practice, which represents the first contact with the medical health system. There is one doctor in each commune.

As mentioned in the baseline description section, inhabitants generally travel to Arad for specialised health care and medical investigations, however medical screening and dedicated investigations are also organised locally. The ambulance service from Chişineu-Criş, where there is an emergency substation, takes about 15 minutes to arrive in the AoI. Based on this, access to health services can be difficult for vulnerable groups. Another local challenge is the aging local population.

8.6.2 Potential Impacts

The community health and safety impacts can occur during numerous project activities throughout its life cycle and may be associated with project infrastructure, public accessibility, and general life safety. During the construction and decommissioning phase, the use of heavy transportation, together with the construction works, emits noise and pollutants which deteriorate air quality. This impact may further affect the overall well-being and health of a local community, especially of vulnerable groups, such as people with respiratory diseases or learning difficulties. Additionally, the influx of the workforce, which may potentially need medical assistance, puts pressure on existing health and emergency facilities, resulting in longer waiting times for doctor's appointments, increased public spending on healthcare, and generally decreased access of the local population to medical services. The presence of a non-local workforce can also result in increase of the infectious diseases incidence rate, as well as the rate of crimes, alcoholism etc. Land clearing can also lead to spread of infectious diseases, however since the land clearing required for the project will be very little and limited to the construction of the grid connection line, this is not considered relevant for the project.

The impacts on community health and safety can also be distinguished during the operation phase of a project. The reflection of the sunlight from the PV modules surface can cause a significant glint and glare impact on residents in surrounding dwellings, road users, train drivers and aviation pilots. The latter is particularly true for projects located near airports, military low-flying zones, or known flight paths. In addition, depending on the significance of unaltered viewscape to local communities and tourism, given the size of the project, the PV field can be considered as visual disruptors, creating unpleasant changes in the landscape.

Table 8-23 summarises the potential impacts on community health and safety related to a PV plant:

Table 8-23 Potential impacts on community health and safety by project's phase

Project phase	Potential Impact
Construction	Impact on air quality and noise
	Impacts related to workforce influx
	Impacts caused by project related traffic and transportation.
	Changes in landscape and visual disruption.

Operation	Glint and glare related disturbance on residents, drivers, road users, train drivers and aviation pilots, causing mental and/or physical distress and increase the risk of accidents.
	Changes in landscape and visual disruption.
Decommissioning	Impact on air quality and noise
	Impacts related to workforce influx
	Impacts caused by project related traffic and transportation.
	Changes in landscape and visual disruption.

Impacts on local communities due to project related **traffic** (i.e., increased safety risks on public roads), **glint and glare** effect (i.e., disturbance on road users, train drivers and aviation pilots, due to the incidence of the sunlight reflected by the PV modules surface) and **landscape and visual** disruption are covered in separate, dedicated sections below.

Impacts during Construction and Decommissioning

Impact on air quality and noise

Although PV plants are generally spoken a non-polluting source of energy, there may be a temporary increase in pollution during the construction period due to the usage of heavy vehicles for construction materials' transportation. Most of components (e.g., PV modules, inverters, transformers) and materials (e.g., substructures, cables) are expected to be sourced from other countries and transported via national, regional and communal existing roads. In addition, local roads will also be used for the transportation of workers or smaller construction materials. This traffic will affect local communities, particularly those with existing diseases, reducing the effectiveness of their medical treatments, as well as the overall health and well-being of residents. The use of heavy machinery and increased traffic will also affect the level of noise present in the community throughout the duration of the construction phase. Additionally, noise associated with construction activities such as ramming, trench excavation, installation of inverter / transformer station foundations, can further influence the quality of life in settlements located near the Project's sites.

Table 8-24: Impact Assessment: Impact on air quality and noise

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The noise and pollution impacts will be reduced to areas of the Social Aol within proximity to the construction site and access roads. The nearest settlement, Grăniceri, is 250 m from the project area.
Duration	Medium term	Disruptive effects associated with noise and pollution from transportation will be temporary and will be greatly reduced at the end of the construction period.
Scale	Medium	Although a number of citizens inhabiting areas near the transportation roads can be affected, this impact will mainly occur in relation to increased traffic during the transportation of materials and workforce, which will peak at the beginning of the construction process and then decline with time.

Frequency	Daily	The transportation of materials, as well as the construction works are expected to occur daily throughout the construction stage.
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Magnitude

Medium

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High

Respiratory disease is the second biggest cause of death in the local community.

Significance Rating Before Mitigation

Major

Impacts related to workforce influx

For the construction phase, a workforce of about 500 workers is estimated, being expected to be mostly covered by non-local employees which will settle in the Social Aol, potentially resulting in numerous negative social and health outcomes. Firstly, this influx may cause a spread of infectious diseases (such as COVID-19) as well as other sexually transmitted diseases (such as human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), either through insufficient waste collection system or through direct contact between workers and citizens. This will affect the availability and effectiveness of local medical resources (see Chapter 8.5 on access to public services).

Additionally, the presence of newcomers may lead to an increase in crime and violence levels, particularly if they become unsatisfied with the lack of employment opportunities after the termination of their contract. The arrival of jobseekers in the settlements will potentially cause social tensions with local citizens since immigrants may be regarded as a form of competition for newly created jobs at the Project's construction site.

Finally, since the workers influx is expected to mainly consist of male workers, the incidence of gender-based violence in the area may increase compared to the current, baseline rate incidence.

The impacts' significance is rated as moderate since the increasing tensions between local communities and non-local workers may arise quickly and the general perception of migrant workers by citizens can be easily altered with a small number of incidents.

Table 8-25: Impact Assessment: Impacts related to workforce influx

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The workforce influx, and the associated impacts, is expected to occur mainly in larger settlements with relatively close proximity to the construction sites and with good access to roads.
Duration	Medium term	The highest worker numbers are expected during the construction phase (estimated in 2.5 years), while workforce quantity will be reduced at the operation stage.
Scale	Small	The number of local citizens affected by crimes or disease related to the presence of external workforce is not expected to be high.
Frequency	Sporadic	The impacts associated with the presence of non-local employees will persist throughout the construction phase, however particular incidents related to crime or spread of disease will occur sporadically.

Magnitude**Low****Sensitivity/Vulnerability/Importance of the Resource/Receptor****High**

The perception of local communities of the negative impact associated with workers' influx may be influenced with a small number of incidents related to crime or an increase in infectious disease rate. Additionally, there is only one family doctor in each commune of the AoI, hence any sudden escalation in number of incidents may lead to its overburdening. On the other hand, the level of healthcare provided in the Arad County is satisfactory, with several state-owned hospitals and medical dispensaries and ambulance service.

Significance Rating Before Mitigation**Moderate**

8.6.2.2 Mitigation Measures

The proposed mitigation measures follow the recommendations of the World Bank Group's General Environmental, Health, and Safety (EHS) Guidelines and Good International Industry Practice (GIIP).

For the **glint and glare** effect, the Investor will consult with relevant aviation authorities and follow air traffic safety regulations. Additionally, the PV modules will be equipped with anti-reflection coating to minimize the reflection rate. Further measures expounded in "Glint and Glare" section below are to be considered.

To mitigate the negative **air quality and noise** related impact on the local communities, the measures defined in the environmental impact sections apply.

The impacts associated with the **workers' influx** will be alleviated through Investor's actions outlined below:

- Enhancement of local employment through sourcing employees from the direct Social AoI and limiting the numbers of non-local workers.
- Enforcement of Workers' Code of Conduct containing a set of rules on behavioural standards and cultural awareness requirements for all employees (including security personnel)
- Preparation of the Community Health and Safety Plan outlining measures to be undertaken to avoid a spread of communicable diseases.
- Collaboration with local health and safety services to sustainably manage the pressures put on security and medical units during accidents, as well as during unacceptable social behaviour.
- Specific training for all workforce on gender awareness.

8.6.2.3 Residual Impact Significance

With the implementation of the mitigation measures proposed in this report, air pollution, noise, and workers influx are considered to have a minor impact on the H&S of the local communities.

8.7 Labour and working conditions

8.7.1 Introduction

The international standards on labour and working conditions highlight that employment creation and income generation should be accompanied by the protection of the fundamental rights of workers, as guided by the ILO and UN conventions applying to the Project. Romania joined ILO in 1919, and then again in 1956, ratifying the main conventions, including 8 out of 10 fundamental conventions.

8.7.2 Potential Impacts

The construction, operation, and decommissioning works are associated with a number of hazards that may negatively affect the workforce's health and safety, especially in cases where the labour and working conditions are not sufficient. This can be further exacerbated if adequate accommodation is not provided for the non-local workers. The H&S risks can also exist indirectly, affecting the supply chain's labour force.

Table 8-26 summarises the potential impacts on labour and working conditions, including occupational health and safety.

Table 8-26 Potential impacts on workers labour and working conditions by project phase

Project phase	Potential Impact
Construction	Inadequate working and/or workforce accommodation conditions
	Indirect impacts on the health and safety of supply chain workers
	Workers' health and safety impacts due to incidents during construction activities.
Operation	Workers' health and safety impacts due to incidents during operation activities
Decommissioning	Inadequate working and/or workforce accommodation conditions
	Indirect impacts on health and safety of supply chain workers
	Workers' health and safety impacts due to incidents during construction activities

8.7.2.1 Impacts during Construction and Decommissioning

Inadequate working and/or workforce accommodation conditions

In case no adequate accommodation and working conditions are provided, the workforce can be exposed to health and safety risks, such as fire, electrical safety, theft, and other crime, as well as poor sanitation and food quality, and mental distress due to insufficient welfare conditions. Additionally, migrant workers contracted by 3rd parties (subcontractors and workers engaged by primary suppliers) and not familiar with national and international requirements can be more prone to inadequate working conditions, such as long hours or lack of appropriate safety equipment and procedures.

The extent of the inadequate working and/or workforce accommodation conditions will be local with medium scale, limited to the Project's sites and/or the labour force's place of residence. If mitigation measures are not undertaken, the impact will be constantly present during the construction stage with medium to long term duration in case of serious and permanent injuries to employees. The magnitude of the impact is as medium given the large number of construction workers (around 500) to be involved in the project. The vulnerability of the workforce to such unfavourable conditions is high due to the possibility of irreversible injuries as a result and the importance of preserving the good health and

wellbeing status of construction workers. The overall significance of the is assessed as major negative (see Table 8-27 below for more details).

Table 8-27: Impact Assessment: Inadequate working and/or workforce accommodation conditions

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The inadequate working conditions will be closely associated with the construction site and/or place of workers' accommodation.
Duration	Medium to long term	Although the inadequate working and/or accommodation conditions will affect the workers only during the construction period (2.5 years), the damage that may result can cause permanent injury to the health and well-being of workers.
Scale	Medium	About 500 workers on site will be potentially exposed to inadequate working and accommodation conditions.
Frequency	Constant	In case inadequate working and/or workforce accommodation conditions are in place, the impact on the health and safety of employees will have continuous character, without interruptions, throughout the employment contract.

Magnitude

Medium

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High

The vulnerability is assessed as high, as the health and safety of contracted workers are a priority, and inadequate conditions may potentially lead to irreversible changes in the labour health and wellbeing status.

Significance Rating Before Mitigation

Major

Indirect impacts on the health and safety of primary supply chain workers

Indirect involvement of supply chain workers in the Project-related increased production of components and materials may leave them prone to inadequate occupational health and safety conditions. This effect is exacerbated by the fact that supply chains are global, managed by 3rd parties and have a large number of employees. Particularly vulnerable are migrant workers, who work in a country other than their mother country and may not be informed about their labour rights and work long hours in conditions that are dangerous to life and health, which leads to their overexploitation.

Due to the sourcing of materials for PV plants construction from different countries, the indirect impact on the health and safety of supply chain workers will be global in its extent. Its scale will be medium as the number of workers employed in the material production and provision of services will be significant. The impact's duration is considered medium term with regular frequency, as the supply chain workers will be exposed to H&S risks when manufacturing and delivery Project components and materials which will most likely take place throughout a long part of the construction period. The magnitude of the impact will be medium. The vulnerability of supply chain workers, on the other hand, is high – any incidents that may occur during project work can potentially leave the employees with permanent injuries or lead to death. As outlined in Table 8-28, the significance of the impact is major.

Table 8-28: Impact Assessment: Impact on the health and safety of supply chain workers

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Global	The Project will source the majority of main PV components from other countries.
Duration	Medium term	The impact will be present during the direct and indirect engagement of supply chain workers in the Project's activities. The duration of this engagement will vary depending on the type of activity, however generally it is expected to last a big part of the construction phase, since the components and materials will be most likely manufactured and delivered by batches throughout a big part of the construction period as project makes progress.
Scale	Medium	Considering the number of materials that will need to be procured, the number of workers involved in the supply chain may be fairly significant.
Frequency	Regular	The impact will be present during the direct and indirect engagement of supply chain workers in the Project's activities.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
If not properly managed and monitored possible injuries caused during the engagement in Project-related supplies may result in irreversible injuries, affecting future employability and the quality of life of the supply chain workforce.		
Significance Rating Before Mitigation		
Major		

Worker's health and safety impacts due to incidents during construction activities

The construction of photovoltaic power plants, with core activities like ground excavations, working with electrical equipment, and daily pose several health and safety (H&S) risks to the workers present on site. Contractors and subcontractors must put in place an effective H&S management system, obliging all employees to comply with the applicable H&S plans and procedures, adjusted to the specific work tasks and activities, to prevent injuries and casualties. The proper monitoring of subcontractors' and primary suppliers' H&S management and performance on site is of utmost importance since the presence of workers from different cultures and with different languages might increase the possibility of accidents at work.

Incidents and accidents are expected to be small in scale and linked to the project site and its facilities like workers camps and other accommodation places, and access and local roads for workers' daily commuting. Although the duration of the impact is assessed as medium, fatalities are irreversible and serious accidents may leave long term effects on workers' health and wellbeing, being the exposure to these risks of daily nature during the whole construction phase. Taking the large number of workers to be involved in the construction phase, the magnitude of the impact is assessed as medium. Given the potential severity, even fatality, of accidents, the vulnerability is considered high, especially for those workers with unfamiliar work conditions that are not properly trained. Based on the above, the impact assessment results in major significance. The impact assessment's results are summarised in Table 8-29 below.

Table 8-29: Impact Assessment: Impact on workers' health and safety associated with incidents during construction.

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The possibility of injury or death from construction related activities on workers daily or frequently present on site will be linked to the Project's site and its facilities, and the local roads used for workers' commuting.
Duration	Medium to long term	The possibility of injury or death in relation to construction activities will be present throughout the duration of works. However, fatalities are irreversible and in case of serious accident, the related injury may cause long term or permanent workers' disability.
Scale	Medium	About 500 workers on site will be potentially exposed to the risk of injuries and fatalities.
Frequency	Daily	Work related risk of injuries and casualties are linked mostly to daily construction related activities.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
General risk of injuries and, even, fatalities, due to work related incidents and accidents is considered high if effective preventive measures are not implemented. In addition, the influx of workers with different levels of experience and from different cultures and different languages may leave them highly susceptible to any injury in relation to construction activities, which they may not be familiar with if they are not properly trained.		
Significance Rating Before Mitigation		
Major		

8.7.2.2 Impacts during Operation

Worker's health and safety impacts due to incidents during operation activities

Although the operation stage is generally perceived as involving less-hazardous activities than the construction phase, there is still a high possibility of incidents occurring during servicing and maintenance tasks in a PV plant, such as electrocutions. This impact will be of local extent, closely linked to the Project's operation and maintenance sites. The risk of incidents will exist during the everyday activities and, given the length of the operation phase for over 20 years, its duration will be long term. The number of staff employed at this phase of the Project will be limited (about 50 employees), therefore the scale of a possible incident will be low. The magnitude of the impact is assessed as small, with high vulnerability of the receptor due to the possibility of permanent injury to the workers' health and wellbeing. As a result, the significance of the Project-related incidents' effect on worker's health and safety is assessed as moderate (Table 8-30).

Table 8-30: Impact Assessment: Impact on workers' health and safety associated with incidents during operation

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The possibility of injury or death will be linked to the Project's operation and maintenance sites and local roads.
Duration	Long term	The possibility of injury or death in relation to operation activities will be present throughout the duration of works.
Scale	Low	The possibility of injury or death will be linked to the Project's operation and maintenance (O&M) sites where limited number of employees will be present.
Frequency	Daily	The risk of injury or death will be associated with daily operation and maintenance activities.
Magnitude		
Low		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
Accidents can be fatal and severe incidents may leave permanent injuries to the O&M workers, affecting their employability and the quality of life.		
Significance Rating Before Mitigation		
Moderate		

8.7.2.3 Mitigation Measures

The proposed mitigation measures are in line with the provisions of the ILO and specific UN conventions on labour and working conditions, as well as with GIIP. In order to maximise the safety of workers, the Investor will:

- Provide workers with protective personnel equipment (PPE), appropriate to the specific activities, to prevent occupational health issue and reduce the number of accidents at work.
- Provide regular training on first aid and safety responses in order to limit accidents' impact on workers' health.
- Provide H&S specific training for all H&S risky activities.
- Only qualified trained people will perform qualified tasks.
- Hold safety briefings with the employed labour force to ensure greater attention to detail and safety, especially when performing work activities in dangerous environments, i.e., working with electrical equipment or driving inside and outside the project site.
- Implement the Human Resource Policy reflecting national and international (IFC PS2 and ILO) requirements. The document will outline the Investor's commitment to ensuring equal treatment for all individuals as well as preventing and addressing child and forced labour, and harassment at work. The Policy will apply to all contractors involved in the Project.
- Develop the Workforce Management Plan which will include, amongst other, the general requirements for good working conditions, terms of employment, and the right of workers to self-organisation.

- Develop the Occupational Health and Safety Plan prior to the commencement of work. The Plan will apply to all contractors of the Project and will be disseminated to the local community. The Plan will include:
 - Project safety principles and philosophy
 - H&S policies and commitments
 - Project H&S objectives
 - Project H&S challenges
 - Project H&S management system structure
 - H&S leadership, organization, competence, communication
 - H&S contractors management
 - PPE requirements and enforcement
 - Incident reporting, investigation, and monitoring of non-conformances
 - Risk profiling and emergency preparedness and response planning
 - H&S audit & review
 - H&S performance monitoring / improvement
 - Management of change

- Develop as a minimum following H&S subplans:
 - Labour and working conditions management plan
 - Worker accommodation management plan
 - Subcontractors and suppliers management plan
 - Traffic and transportation management plan
 - Training management plan
 - Hazardous materials management plan

- Ensure that the appropriate accommodation is provided to all workers, in line with IFC PS2 and national requirements.

In addition, a grievance mechanism will be available to the employees. The potentially affected workforce will be able to raise any concerns/problems through such mechanisms, while the Investor will commit to a timely response to submitted issues.

8.7.2.4 Residual Impact Significance

After the implementation of the mitigation measures outlined above, the residual impact significance is expected to be **minor**. Nevertheless, the Investor will undertake additional monitoring measures to ensure that all health and safety recommendations are implemented on-site. All incidents will be appropriately reported, and specific steps will be introduced to avoid further accidents of similar nature to the reported one.

8.8 Human Rights

The Equator Principles Association recognises that financial institutions and their clients have a responsibility to respect Human Rights in line with the United Nations Guiding Principles on Business and Human Rights (UNGPs). This is done by carrying out human rights due diligence on the Projects.

The Guidance Note on Implementation of Human Rights Assessments under the Equator Principles provides practical guidelines which are the core reference for this session, along with the UNGPs.

8.8.1 Methodology

The methodology used to assess the human rights risks related to the Project is closely referencing the UN Guiding Principles on Business and Human Rights (UNGPs) and the Guidance Note on Implementation of Human Rights Assessments under the Equator Principles.

The human rights risk topics here assessed are those identified as relevant to the Project in the scoping report and along the development of the Project in line with Equator Principles Guidance Note, the risk topics were grouped in the following categories:

1. Labour
2. Civil and political
3. Economic, social and cultural
4. Group rights for groups with higher risk of vulnerability
5. Environmental related risks

The risks are assessed based on Severity and Likelihood. Severity is defined based on Scale, Irremediability and Scope. Details of the definitions and designations is available in the table below:

	Characteristics	Definition	Designations
Severity	Scale, Irremediability	<ul style="list-style-type: none"> ■ Scale: how serious are the impacts for the victim? ■ Irremediability: Will a remedy restore the victim to the same or equivalent position before the harm; how easy or difficult would it be for the victim to get a remedy? 	<p>Low</p> <ul style="list-style-type: none"> ■ unlikely to cause body or psychological harm / change in standard of living ■ remediation will return the victim to the same or equivalent position <p>Medium</p> <ul style="list-style-type: none"> ■ may cause body or psychological harm / change in standard of living ■ remediation may return the victim to the same or equivalent position <p>High</p> <ul style="list-style-type: none"> ■ may result in death or irreversible loss of physical or mental abilities / significant disruption in standard of living ■ remediation will not return the victim to the same or equivalent position"
	Scope	<ul style="list-style-type: none"> ■ How many people could be affected by the harm? 	<ul style="list-style-type: none"> ■ Low: 1 to 9 people potentially affected

			<ul style="list-style-type: none"> Medium: 10 to 99 people potentially affected High: 100 to 999 people potentially affected Very high: >1000 people potentially affected
Likelihood	<ul style="list-style-type: none"> What is the likelihood of the impact occurring? 	<ul style="list-style-type: none"> Low: Unlikely to happen. Medium: The impact is possible to happen. There is a 50% or greater chance it will occur. High: The impact will probably / almost certain or is already occurring. 	

By combining these parameters, the associated **inherent risk** is calculated.



As a next step, by combining the inherent risk and the implemented mitigation measures, the **residual risk** is calculated.



In this report, the residual human rights risks have been evaluated with the assumption that the mitigation measures defined in the Project's ESMS and the additional ones here proposed have been adequately applied. The classification is divided between:

	Inherent Risk	Residual Risk
Low	Project and local contexts provide for a low inherent risk.	Risks are in place, but it is expected that the Project's Environmental and Social Management System (ESMS) standard measures will be sufficient for mitigation and remedy.
Medium	Project and local contexts provide for a medium inherent risk.	Risks are in place and the ESMS standard measures may not be sufficient for mitigation and remedy.
High	Project and local contexts provide for a high inherent risk.	ESMS standard measures will not be sufficient for mitigation and remedy. Further assessment and an in-depth analysis are required. These risks are expected to impact people significantly and to cause a delay, reputational risk, or breach of national or lender requirements for the Project.

8.8.2 Local context and international human rights benchmark

Romania has ratified most of the main international instruments for the protection of human rights, including eight of the ten fundamental Conventions and all priority governance Conventions of the International Labour Organization (ILO), as well as most of the International Human Rights Treaties. A full list of ratified conventions and international treaties is available in the SBS of this Project.⁹⁷

In addition as an EU Member country, Romania has been translating European conventions and related treaties into national laws. These have been voluntarily and democratically approved by all EU countries. Considering international conventions and national legislation related to protecting human rights, a benchmark was defined against which the Project information was evaluated. In October 2022, the UN General Assembly elected Romania as a member of the UN Human Rights Council for 2023-2025.

As part of the assessment, the local context has also been considered, including at country, region, and county level of the Project's Aol, to best understand the potential for human rights risks related to different rights holders.

It is important to note that the legal context has been considered with regards to existing national legislations relevant to protecting human rights. However, the effectiveness of the implementation of these legal instruments could be evaluated up to a limited extent, due to partial statistical data and publicly available relevant information.

8.8.3 Assessment of Human Rights risks

Rights Category	Human Rights Issue	Rightsholder Affected	Human Rights Context in Romania and in the Project Area	Inherent Risk level	Mitigation measures	Residual risks
Labour	Child Labour	Worker	<p>Under the protection of fundamental rights in the Constitution of Romania, Article 49 point 3, the exploitation of minors, their employment in activities that might be harmful to their health, or morals, or might endanger their life and normal development are prohibited.</p> <p>Furthermore, minors under the age of fifteen may not be employed in any paid labour.⁸³ Minors between the ages of 15 and 18 may work a maximum of six hours per day and no more than 30 hours per week, provided their school attendance is not affected. The ministry of Labour and Social Protection may impose fines and close businesses if exploitation of child labour is confirmed.</p> <p>In 2022, the National Authority for the Protection of the Rights of the Child and Adoption (ANPDCA) within the ministry, has reported concerns of lack of law enforcement on child labor in rural areas with mostly agricultural households and lack of welfare services. According to ANPDCA, 304 children were subject to child labor in 2021 in both rural and urban areas. Children most vulnerable to child labor were ages 10 to 13 (33.5 percent), 14 to 17 (27.6 percent), and 3 to 6 (16.1 percent). Incidents of child labor were widely believed to be much higher than official statistics.⁸⁴</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures Contractor and Supplier Management Plan Construction Labour and Working Conditions Management Plan, incl. Workers Code of Conduct (CoC) <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> Human Resources Policies to include minimum age restrictions in compliance with national law 	Minor
	Collective bargaining and Freedom of association	Worker	<p>The Romanian Constitution under Article 37.1. protects the right of association of all citizens to freely associate into political parties, trade unions and other forms of association. Under Article 38.5 the right to collective labour bargaining and the binding force of collective agreements is protected.⁸⁵ According to Article 7 in the Labour Code: The employees and employers may freely associate to defend their rights and professional, economic, and social interests. Additionally,</p>	Minor	<p>Mitigation measures integrated into Project's ESMS:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures- 	Minor

⁸³ The constitution of Romania, available at: The Constitution of Romania, accessed Aug 2023

⁸⁴ Country Reports on Human Rights Practices for 2022 – Romania, Bureau of Democracy, United States Department of State, available at: [ROMANIA 2022 HUMAN RIGHTS REPORT \(state.gov\)](https://www.state.gov/reports/country-reports-on-human-rights-practices/romania-2022), accessed Aug 2023

⁸⁵ [ibid. Ref. 56](#)

		<p>within the main rights and obligations of the employee, the right to collective and individual bargaining is clearly stated.⁸⁶⁸⁷</p> <p>The national law prohibits antiunion discrimination and allows workers fired for union activity to challenge their dismissal in court for reinstatement. The law provides for protection of freedom of association and collective bargaining; however, complaints have been reported by unions that there was little enforcement to protect against violation of these rights. The Romanian government enacted Social Dialogue Law 367 on December 19, 2022, stating that those with individual labour contracts, most civil servants, members of cooperatives, farmers, and independent workers could join unions. A union may be established by at least 10 workers from the same employer or 20 workers from a group of employers belonging to the same collective bargaining sector. To register as a union, founding members must submit a decision letter, a copy of the union's statute, and a list of union management members.⁸⁸</p> <p>According to the international Human Rights Practices report, published in 2022 by the United States Bureau of Democracy, Human Rights and Labour, reports of antiunion discrimination incidents were minimal. The government and employers generally respected the right of association and collective bargaining. However, it is difficult to prove legally that employers laid off employees in retaliation for union activities.⁸⁹</p>		<ul style="list-style-type: none"> Construction Labour and Working Conditions Management Plan Contractor <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures to ensure communication procedures upon employment, providing sufficient information of employee rights and obligations, especially with regards to non-local workforce 	
Modern Slavery (Forced Labour) -	Worker	<p>The prohibition of any form of forced labour is part of the Constitution at Article 42 and the Criminal Code Article 212, which criminalises the act of compelling a person to work against their own will or into forced or compulsory labour.</p> <p>Article 4 of the Labour Code also addresses the topic of forced labour and prohibits any work or service imposed on a person under threat or for which they did not freely express their consent.</p> <p>Nevertheless, there were reports that practices of involuntary labour may occur, often involving minorities, such as Roma people, people</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures, i.e., employee contracts and mandatory introduction of CoC Monitoring indicators and timeline for the 	Minor

⁸⁷ Labour Code of Romania, available at: <https://www.ilo.org/dyn/travail/docs/1630/>, accessed Aug 2023

⁸⁸ Country Reports on Human Rights Practices for 2022 – Romania, Bureau of Democracy, United States Department of State, available at: ROMANIA 2022 HUMAN RIGHTS REPORT (state.gov), accessed Aug 2023

			<p>with disabilities, and children. The government, reportedly, did not effectively enforce the law and took limited measures to prevent forced or compulsory labour⁹⁰.</p> <p>The national law criminalizes forced labour, and penalties for violations were commensurate with those of other serious crimes, such as kidnapping, but were not evenly applied in all sectors.</p> <p>According to the Ministry of Internal Affairs, 16 percent of human-trafficking victims officially identified in 2020 were exploited specifically for labour purposes. In 2019 organized-crime investigators detained five individuals on charges of modern slavery. The individuals were accused of having kidnapped and detained several persons with a vulnerable background or mental-health problems; the victims were used for agricultural work without pay, starved, and forced to live in inadequate farm annexes. This case remained pending as of December 2021. Men, women, and children were subjected to labour trafficking in agriculture, construction, domestic service, hotels, and manufacturing.⁹¹</p>		<p>recruitment process and management of the workforce</p> <ul style="list-style-type: none"> • Transparent and comprehensive introduction of internal grievance mechanism <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures to ensure communication procedures upon employment, providing sufficient information of employee rights and obligations, especially with regards to non-local workforce • Provide transparency in recruitment process and ensure monitoring of third-party recruitment agencies and their processes, especially for foreign seasonal workforce; 	
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⁹⁰ ibid.

⁹¹ Country Reports on Human Rights Practices for 2021 – Romania, Bureau of Democracy, United States Department of State, available at: https://www.state.gov/wp-content/uploads/2022/03/313615_ROMANIA-2021-HUMAN-RIGHTS-REPORT.pdf, accessed Aug 2023

	Grievance Mechanism and Remedy	Worker & Community	<p>In December 2022, a new Law “on the protection of whistle-blowers in the public interest” was adopted. The law would replace the 2004 legislation and represented Romania’s transposition of the European Union’s 2019 Whistleblowing Directive.⁹²</p> <p>Local Community</p> <p>As part of the Stakeholder Engagement Plan (SEP) and in line with EP 4 Guidance Note a Community Grievance Mechanism (CGM) has been developed for the Project. The CGM provides a transparent and predictable process of submitting complaints and guaranteeing anonymity to the complainant. The CGM is publicly available to the local community, and communication tools such as flyers and posters, in Romanian and English are distributed to inform the local population on how to submit a complaint with regards to the Project during both construction and operation phase. Detailed information of the CGM complaint submission and process flow is available in the SEP, as a standalone document of this ESIA</p>	Minor	<p>Mitigation measures integrated into Project’s ESMS:</p> <ul style="list-style-type: none"> • Construction Labour and Working Conditions Management Plan • Community Grievance Mechanism (CGM) • Workers Grievance Mechanism (WGM) • Details of worker’s grievance mechanism will be disclosed during the recruitment process and the employment period. <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> • The CGM and the WGM shall be aligned to the UNGPs, Principle 29 and 31, in line with EP 4 Guidance and as international best practice. • Periodic monitoring of CGM and WGM effectiveness is to be conducted and complaints submissions and resolutions shall be kept on file 	Minor
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⁹² Amnesty International, “The state of world’s Human Rights (Romania)”, 2021, available at: <https://www.amnesty.org/en/documents/pol10/5670/2023/en/>, accessed Aug 2023

	Job Security /Right to Work	Worker	<p>According to the national Labour Code, Art. 3. [right to work]: (1) The right to work is guaranteed by the Constitution. The right to work may not be abridged; (2) A person shall be free to choose his/her job and profession, trade or activity to perform; (3) No one may be forced to work or not to work at a specific workplace or in a specific profession, whichever they may be</p> <p>According to Art. 6. of the Labour Code, under employee protection: An employee engaged in an occupation shall enjoy working conditions adequate to the activity carried out, social protection, health and safety at work, and respect of his/her dignity and conscience, without discrimination.</p> <p>International Human Rights Reports, express concerns on the informal employment sector, which remains to be a pressing national issue. Informal employment continues to affect employees in Romania especially in retail, agriculture, hospitality, and construction sectors. Recently, the government declared to target limiting undeclared work, by imposing labour taxes and social contributions on employers also for part-time employees. Minorities, such as Roma people remain especially vulnerable to this risk, due to their lack of personal identifications documents and remaining “invisible” to the system, and unable to receive social benefits, access health insurance, secure property documents, and participate in the labour market⁹³ In 2021 approximately 62000 Romanian citizens above the age of 14 did not poses personal identification documents, the main reason being they reside in informal settlements and housing.</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS:</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures • Contractor and Supplier Management Plan. • HR Department to ensure that workers understand the terms of their employment. This will include regularly informing workers of the short-term nature of their contract. 	Minor
	Non-discrimination	Worker	<p>Despite the strong regulatory framework discrimination prevails as one of the societal issues that need to be systemically addressed. Gender, ethnicity, sexual orientation and physical or mental disability are among some of the main basis for discrimination that require greater attention in the country.</p> <p>According to ACCEPT a local NGO specialised in LGBTQI+, hate crimes were severely underreported and authorities have not initiated prosecution in any reported LGBTQI+ hate crime case since 2006. The law prohibits discrimination based on sexual orientation, however the allegations of the NGO sector, raise concerns of such practices being present.</p>	Major	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures • Employment contracts to include a non-discrimination clause, respecting 	Minor

⁹³ Country Reports on Human Rights Practices for 2021 – Romania, Bureau of Democracy, United States Department of State, available at: https://www.state.gov/wp-content/uploads/2022/03/313615_ROMANIA-2021-HUMAN-RIGHTS-REPORT.pdf, accessed Aug 2023

			<p>Ethnic minorities, most notably the Roma community, is another target of discrimination. Negative stereotypes and discriminatory language regarding Roma were widespread. Researchers and activists reported a significant number of the remaining Romani Holocaust survivors who applied for pensions were denied because of unreasonable administrative barriers raised by the pension offices, problematic standards, lack of knowledge regarding the Holocaust and Roma, and other burdensome requirements. Additionally, Roma groups complained that there were instances of police harassment and brutality.</p> <p>Citizens with disabilities are reportedly, not able to access education, health services, public buildings, and transportation on an equal basis with others. Laws and regulations require such access, but the government did not fully implement the law, and discrimination against persons with disabilities remained a problem. There was no systemic integration of persons with disabilities into the workforce, and public bias against persons with disabilities persisted.</p> <p>Art. 78, Law no. 448/2006, requires companies or institutions with more than 50 employees to fill at least 4 percent of their positions with workers with disabilities. Many companies chose to pay the fine for noncompliance rather than meet the human resources requirements but may redirect half of penalties incurred to purchase goods and services from “protected” or “social” enterprises employing persons with disabilities or at-risk groups.</p> <p>Gender based discrimination is present among female population, where women experienced discrimination in marriage, divorce, child custody, employment, credit, pay, owning or managing businesses or property, education, the judicial process, and housing. Segregation by profession existed, with women overrepresented in lower-paying jobs. There were reports of discrimination in employment. Women experienced discrimination in access to pension benefits and retirement.</p>		<p>the right of non-discrimination</p> <ul style="list-style-type: none"> • Periodic training to be provided to both Project management and workers, to raise awareness on discriminatory practices • Workforce Management Plan <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> • Comply with the national quota established of Art. 78, Law no. 448/2006, on employing people with disabilities, if Project falls under scope of the law. 	
Occupational health and safety	Worker		<p>As for Occupational Health and Safety (OHS), the legislation hierarchy is a three-layer structure with Constitution and Labour Code at the top. The Law no.319 of 2006 on Safety and Health at Work and the Methodological Norms for its application, provides the main legal framework for OHS. The Government Decisions are, in general, transpositions of different EU Directives on different OSH matters</p>	Major	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Health and Safety Policy - Ensure an occupational health and safety policy is 	Minor

			<p>such as types of hazards, protective or work equipment, among others.</p> <p>The Ministry of Labour, through the Labour Inspectorate, is responsible for enforcing the law on working conditions, hours, minimum wage rates and OSH, though enforcement was not always effective. Penalties for violations were commensurate with those for similar crimes but were only applied sometimes against violators. Labour inspectors have the authority to make unannounced visits and initiate sanctions, but the number of inspectors has been insufficient to enforce compliance in all sectors. Additionally, the Labour Inspectorate collaborates with the National Authority for Fiscal Administration to conduct joint operations to check employers in sectors prone to underreported labour, including the textile, construction, security, cleaning, food preparation, transportation, and storage industries. These investigations often focused on underpayment of taxes rather than workers' rights.</p> <p>According to the US States Department Human Rights Reporting from 2021, union leaders often claimed labour inspectors only superficially investigating workplace accidents, including ones involving fatalities, and that inspectors often wrongly concluded that the victims were at fault in most fatal accidents. In 2019 the country reported three deaths per 100,000 employees resulting from accidents at work.</p> <p>The construction, agriculture, and small manufacturers sectors were particularly problematic sectors for both labour underreporting and neglecting health and safety standards. The government did not effectively enforce occupational safety and health laws</p>		<p>in place, and staff are trained and practise requirements, especially for extreme working conditions during construction.</p> <ul style="list-style-type: none"> Occupational Health and Safety Plan applicable to contractors of the Project Human Resources Policies and Procedures Provide workers with safety equipment to prevent occupational health issue and reduce the number of accidents at work; Provide regular training on first aid and safety responses in order to limit accidents' impact on workers' health; Workers Grievance mechanism 	
	Wages equity, standard of living)	Worker	<p>The Constitution provides for protection on equal rights between men and women at the workplace, stating that men and women should be provided with equal pay for equal work.</p> <p>In April 2023, the European Council adopted the Pay Transparency Directive, introducing measures to ensure that women and men in the EU receive equal pay for equal work. This directive aims to address the gender pay gap in the EU.</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures Employment contracts 	Minor

		<p>According to Eurostat reports the pay gap between men and women in the country was 2.4 percent in 2020, down from 3.3 percent in 2019. While the law provides female employees re-entering the workforce after maternity leave the right to return to their previous or a similar job, pregnant women and other women of childbearing age still suffered unacknowledged discrimination in the labour market. In one case from March 2021, CNCD concluded an employer failed to provide a wage increase when a female worker returned from maternity leave taken for a disabled child.</p> <p>The cost of living varies from region to region and depending on the place where citizens live (urban or rural). According to the National Institute of Statistics press release on household income and expenditure in Q4 2021, the structure of total consumption expenditure broken down by use indicates that most expenses (32.3 %) relate to the purchase of agri-food products and non-alcoholic drinks.</p> <p>Every year the Government sets the compulsory gross minimum wage (RON 2 550 as from 01 January 2022). A minimum gross monthly basic salary is also separately established and applies to the construction sector, agriculture and the food industry in the amount of RON 3 000 (approx. EUR 610).⁹⁴</p>		<ul style="list-style-type: none"> • Workforce Management Plan • Workers Grievance Mechanism <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> • Ensure gender equity in remuneration. Gender pay gap should not be larger than 5% between male and female employees, in line with the EU Pay Transparency Directive 	
Working hours	Worker	<p>Working hours are limited to 8 hours per day and 40 hours per week; for young people under the age of 18 working hours are limited to 6 hours per day and 30 hours per week.</p> <p>In the case of shift work, working time may exceed 8 hours per day and 48 hours per week. Working time, including overtime, may exceptionally exceed 48 hours per week, provided that the average number of working hours, calculated for a reference period of 3 calendar months, does not exceed 48 hours per week.</p> <p>Under the Labour Code, the following rest periods are granted to employees: lunch break, daily rest, weekly rest and public holidays.⁹⁵</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures • Employment contracts • Workforce Management Plan • Workers Grievance Mechanism 	Minor

⁹⁴ EURES, Living and working conditions in Romania, 2023, available at: https://eures.ec.europa.eu/living-and-working/living-and-working-conditions/living-and-working-conditions-romania_en#living-conditions, accessed Aug 2023

⁹⁵ ibid.

Civil and Political	Freedom of expression	Worker & Community	<p>In May 2021, the European Court of Human Rights (ECtHR) ruled against disproportionate restrictions to spontaneous protests. The ECtHR ruled that Romania violated the rights to freedom of expression and peaceful assembly in relation to a fine given for a spontaneous protest against a mining Project. It found that, by applying the three days' notification requirement for assemblies to a small group protest lasting only a few minutes, authorities disproportionately restricted the protesters' rights and created a potentially chilling effect on public discourse.⁹⁶</p> <p>In December, a new Law "on the protection of whistleblowers in the public interest" was adopted. The law would replace the 2004 legislation and represented Romania's transposition of the European Union's 2019 Whistleblowing Directive</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures • Stakeholder Engagement Plan • Workforce Management Plan • Community and Workers Grievance Mechanisms 	Minor
	Right to life and security of person	Worker & Community	<p>Impunity was a significant problem in the security forces, particularly among police and gendarmerie. Police officers were frequently exonerated in cases of alleged beatings and other cruel, inhuman, or degrading treatment. Prosecutors were responsible for investigating abuses.</p> <p>The Directorate for Internal Review within the Romanian Police could conduct, under prosecutorial supervision, criminal investigations of abuses committed by members of the police as well as internal administrative investigations. The government took steps to increase respect for human rights by security forces. For example, the police and gendarmerie received training on a wide range of human rights issues, including gender equality, abuse against children, prevention of torture, gender-based violence, and preventing discrimination.</p>	Major	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Security Personnel Management Plan • Enhancement of local employment through sourcing employees from the direct Social Aoi and limiting the numbers of non-local workers <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> • Training to security personnel on proportionate use of force and human rights 	Minor

⁹⁶ Amnesty International, "The state of world's Human Rights (Romania)", 2021, available at: <https://www.amnesty.org/en/latest/research/2022/03/annual-report-202122/>, accessed Aug 2023

Economic Social and Cultural	Social Insurance	Worker	<p>Relevant laws and government decisions include Law no. 62/2011 regarding social dialogue; Law no. 263/2010 on public pension system, where the right to social security is guaranteed by the state and is exercised, under the conditions of this law, through the public pension system and other social security rights; Law no. 319/2006 on health and safety at the workplace-;</p> <p>The territorial labour inspectorates have duties in the field of labour relations and labour health and safety, their main objectives include controlling the manner in which the legal provisions are observed regarding labour relations, labour safety and health, protection of employees working in special conditions and legal provisions regarding health insurance and workers' rights.¹¹⁴</p> <p>Social contributions and payroll tax are calculated, retained and paid by the employer. Workers in certain fields of the construction sector, agriculture and the food industry are exempt from income tax and health insurance contributions and benefit from reduced pension contributions (from 25 % to 21.25 %). These concessions shall apply until 31 December 2028. The income tax is 10 %.⁹⁷</p> <p>According to international Human Rights Reports on the country, a pressing national issue remains the informal employment sector. Informal employment continues to affect employees in Romania especially in retail, agriculture, hospitality, and construction sectors. Recently, the government declared to target limiting undeclared work, by imposing labour taxes and social contributions on employers for part-time employees⁹⁸</p> <p>In 2013 undeclared work represented 18.9 percent of total labour output in the private sector. In 2019 some 25 percent of Romanians admitted they had engaged in undeclared work and 44 percent knew someone who had engaged in undeclared labour.</p> <p>The construction sector has a higher minimum gross wage (3,000 lei or \$728) and is exempt from income tax and health and pension mandatory contributions</p>	Minor	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures • Worker Grievance Mechanism • Labour and Working Conditions Management Plan • Contractor and Supplier Management Plan 	Minor

⁹⁷ EURES, Living and working conditions in Romania, 2023, available at: https://eures.ec.europa.eu/living-and-working/living-and-working-conditions/living-and-working-conditions-romania_en#living-conditions, accessed Aug 2023

⁹⁸ Country Reports on Human Rights Practices for 2022 – Romania, Bureau of Democracy, United States Department of State, available at: https://www.state.gov/wp-content/uploads/2022/03/313615_ROMANIA-2021-HUMAN-RIGHTS-REPORT.pdf, accessed Aug 2023

	Right to Land	Community	<p>The Constitution and the Land Circulation Law (Law no. 54/1998) contain a number of special rules covering ownership of plots of land, including the right of ownership (freehold); various usage rights (lease, usufruct, superficies); and rights under a concession. According to the Law a due diligence process applies, when acquiring or leasing agricultural land for the process of construction.</p> <p>The Project affects the Land rights of the local communities, as individuals or groups may lose the right to occupy, use, access, control and transfer land during construction and operation phase.</p> <p>The Project site/s and interconnection line is mainly utilized as pastures for raising cows and sheep, and on a small proportion for farming activities. On the Project area there are four to six husbandry larger farms. The commune has approximatively 9,000 sheep and 3,000 cattle, utilizing approximatively 430 ha of pastureland. Arable land constitutes around 7,300 ha. Several farmers cultivate 100 – 200 ha, however there are farmers cultivating smaller plots of 2-3 ha.</p> <p>Land acquisition and land rental for the Project will result in occasional restrictions on land use and economic displacement.</p> <p>The Project takes into consideration limiting fenced sections, which have been determined in response to requests by landowners of agricultural plots to the north and west of the area. The considerations have been made keeping in mind the fencing may prevent cattle from grazing and access to farmers' crops.</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Project Land Acquisition Plan (LAP) • Livelihood Restoration Plan (LRP) • All land users shall be duly identified and compensated for reduction in subsidies, including both formal and informal land users and prior to accessing the land • Providing compensation for loss of assets at replacement cost; • Ensuring appropriate disclosure of information, consultation, and the informed participation of those affected 	Minor
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Group Rights / Heightened Risk of Vulnerability	Disability Rights	Worker	<p>The rights of disabled people are provided under the Romanian constitution and the Law no. 448/2006 Regarding the Protection and Promotion of the Rights of Disabled Persons.¹¹⁵</p> <p>The law regulates the rights and obligations of disabled persons granted for the purpose of social integration and inclusion. According to Article 4 in the Law, all the legal representatives in charge of promotion, observation and guarantee of the rights of disabled persons, shall ensure their application, established according to the provisions of the European social Chart, adopted in Strasbourg on 3rd of May 1996, ratified by Law no. 74/1999, and to the other internal and international documents in this field.</p> <p>According to Art. 78, Law no. 448/2006, disabled persons may be employed according to their professional background and labour capacity. All public or private employers having at least 50 employees, shall hire disabled persons representing at least 4% of the total number of employees. Not performing under this obligation is a subject to financial penalties.¹¹⁶</p> <p>As identified in the Non-discrimination Human Rights Issue of this assessment, people with mental or physical disabilities are subject to continuous discrimination in their daily lives and more often than not, prevented on participating in the labour market, as well as provided appropriate education levels.</p> <p>There seems to be no systemic integration of persons with disabilities into the workforce, and public bias against persons with disabilities persists. While NGOs worked to change attitudes and assist persons with disabilities in gaining skills and employment, the government lacked adequate programs to prevent discrimination.</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Human Resources Procedures and Policies • Construction Labour and Working Conditions Management Plan <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> • Code of Conduct to include commitment on non-discrimination and inclusivity also with regards to mental and physical disabilities • Asses if in scope to comply with the national quota established of Art. 78, Law no. 448/2006, on employing people with disabilities, if Project falls under scope of the law. 	Minor
	Migrant's Rights	Worker	<p>Official statistics show a steady increase in the number of third-country nationals (TCNs) in the country, observed in the period between 2013 and 2020. The increase is mostly due to the increase in the number of migrant workers.</p> <p>Relevant legislations on the topic on migrant workers include Emergency ordinance no 194/2002 on the regime of aliens in Romania, as the regulatory framework for the entry, stay and exit of foreigners. It also defines their rights and obligations, as well as specific measures to control immigration; Law no. 122/2006 on asylum, establishes the legal status of aliens who are applying for protection in Romania and of persons granted subsidiary or</p>	Major	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures • Code of Conduct • Worker Grievance Mechanism • Contractor and Supplier Management Plan 	Minor

		<p>international protection; and the government decision no. 1.521/2006 to approve the methodological norms for the enforcement of Law no 122/2006 that regulates the rights, obligations and assistance for asylum seekers and persons granted protection.⁹⁹</p> <p>According to NGOs, several incidents of harassment, discrimination, abuses against refugees and migrants, pushbacks, and deviations from asylum procedures at border areas occurred throughout the year, although most incidents were not reported because of fear, lack of information, inadequate support services, and inefficient redress mechanisms. Discrimination against migrant workers also occurred.¹⁰⁰</p> <p>It can be expected that a large portion of the workforce recruited for the Project will be recruited from abroad and contracted by a 3rd party. This heightens the possibility of placing migrant's rights at risk.</p>		<ul style="list-style-type: none"> Construction Labour and Working Conditions Management Plan <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures to ensure communication procedures upon employment, providing sufficient information of employee rights and obligations, especially with regards to non-local workforce 	
Women's Rights & Gender Equality	Worker & Community	<p>The Constitution provides for protection on equal rights between men and women at the workplace, stating that men and women should be provided with equal pay for equal work. Law No.211/2004 protects victims from sexual violence, Law No.217/2003 covers domestic violence and intimate partner violence. The Romanian law on the prevention and fight against domestic violence was revised in 2012, expanding the definition of violence as well as the rights of victims.</p> <p>According to Government Ordinance 137/2000 republished in 2014 concerning preventing and sanctioning all discrimination forms, without any discrimination, each person who performs work must benefit from good working conditions, social protection, health and safety at work, with respect for their dignity and personal beliefs. Sexual harassment at work is a form of discrimination (Law 324/2006 Anti-discrimination Law, Article 2(5)) and is also defined in the Criminal Code, punishable by prison from three months to two years or fine.</p>	Moderate	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures Code of Conduct Construction Labour and Working Conditions Management Plan Workers and Community Grievance Mechanism Provide periodic GBVH training to all 	Minor

¹⁰⁰ [ibid.](#)

		<p>In August, the ECtHR found that Romania violated the right to private life when authorities failed to adequately investigate and ensure justice in the case of a woman applicant who, in 2017, filed a criminal complaint of sexual harassment against her boss. This was the first case in the history of the ECtHR to conclude that an inadequate response to alleged sexual harassment constituted a violation of the right to private life. As such, it represented an important milestone.¹⁰¹</p> <p>A 2022 to 2027 national strategy for the promotion of equal opportunities between women and men and the prevention and combating of domestic violence, which had been under public consultation since March 2021, was adopted in December.</p> <p>In the Social AoI it may be expected that the influx of male non-local workforce may increase the risk of GBVH incidents.</p>		workers, incl. own workers, contactors, subcontractors, and core suppliers	
Human Rights in the Supply Chain	Worker (in the supply chain)	<p>Human rights risks might be present throughout the Project supply chain. It is expected that severity and probability increase further in the supply chain where visibility and monitoring processes are reduced. Those potentially impacted are individuals performing work in the supply chain, regardless of the existence or nature of any direct contractual relationship with that Project.</p> <p>The production of PV panels and its supply chain has gained international attention in the recent years, mainly due to its connections to allegations of forced labour practices in the People's Republic of China (PRC). The report <i>In Broad Daylight: Uyghur Forced Labour and Global Solar Supply Chains</i>¹⁰² provides the context of such allegations, highlighting that the companies that are potentially affected by forced labour in the PV panels supply span the globe. Researchers have identified 90 Chinese and international companies whose supply chains are affected.</p> <p>The core allegations refer to the polysilicon production, a core raw material for PV panels. The solar industry is particularly vulnerable given that: (a) 95% of solar modules rely on solar-grade polysilicon</p>	Major	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> Supplier Code of Conduct <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> Supply Chain Screening and Management Program – Project requiring suppliers to provide transparency of raw material sources, verifying suppliers capacity to monitor human rights risks in the supply chain 	Moderate

¹⁰¹ Amnesty International, „The state of world's Human Rights (Romania)”, 2021, available at: <https://www.amnesty.org/en/latest/research/2022/03/annual-report-202122/>, accessed Aug 2023

¹⁰² Helena Kennedy Centre for International Justice, „In Borad Daylight: Uyghur Forced Labour and Global Solar Supply Chains”, 2021, available at: <https://www.shu.ac.uk/helena-kennedy-centre-international-justice/research-and-Projects/all-Projects/in-broad-daylight>

		<p>supply (b) almost 75% of the global production of polysilicon is currently being produced in PRC, of which, the combined output from the four primary producers located in Xinjiang constitutes approximately 45%. This impressive market share was attained within a span of merely 15 years, with a particularly rapid surge in growth observed over the last five years of this period.¹⁰³</p> <p>Project Depending on the PV technology, the type of metals used vary. The World Bank estimates a 300% rise in demand for other key minerals used in PV Panels, including aluminum, chromium, copper, iron, lead, manganese, molybdenum, neodymium, nickel and zinc.¹⁰⁴ Cases of human rights violations have been reportedly connected to these minerals, requiring companies to conduct appropriate supply chain due diligence.¹⁰⁵</p> <p>On February 23rd, 2022, the European Commission presented its proposal for a law on corporate sustainability obligations - the Corporate Sustainability Due Diligence Directive (CSDDD) and the European member countries agreed on an EU-wide supply chain law in December 2022. The directive will require companies to conduct environmental and human rights due diligence across their value chain. The most recent movement towards final adoption was the European Parliament adoption of its final position of the CSDDD Draft. Next steps are expected in the near future.</p> <p>As an EU member country, Romania will have two years to translate the Directive into national law and seek compliance of the undertakings in the defined scope.</p>		(with additional efforts in the PV supply chain) and take proportionate actions based on the findings	
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¹⁰⁴ „The Growing Role for Minerals and Metals in the Low Carbon Future”, World Bank Group, 2017, available at: <https://documents1.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, accessed Aug 2023

¹⁰⁵ „Human Rights in the Mineral Supply Chains of Solar Panels - Business & Human Rights Resource Centre (business-humanrights.org), available at: <https://www.business-humanrights.org/en/from-us/briefings/transition-minerals-sector-case-studies/human-rights-in-the-mineral-supply-chains-of-solar-panels/>, accessed Aug 2023

Environmental related Risks	Right to clean environment and access to resources	Worker and Community	<p>Provided under Romanian Constitution 35 Article: “The State recognizes the right of everyone to a healthy environment and ecologically balanced”, and establishes the duty natural and legal persons have to protect and improve the environment.</p> <p>To meet legal commitments entered internationally, Romania has ratified a number of 36 governmental and ministerial treaties in force in environmental protection and water management. EU environmental acquis covered over 450 directives, regulations and decisions, which are horizontal legislation and sectorial legislation on environmental protection.¹¹³</p> <p>A detailed analysis of the risks and potential impacts related to the right to clean environment and access to resources, including, but not limited to, air quality, noise, hazardous waste management etc. has been provided in the previous chapters of this Environmental Impact Assessment of this ESIA.</p>	Major	<p>Mitigation measures integrated into Project’s ESMS</p> <p>See EIA mitigation measures</p>	Minor
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8.8.4 Summary and conclusion

In the national context, many human rights risks persist across Romania, particularly with regards to occupational health and safety practices, discrimination against gender, ethnicity and disability, abuse of force of national and private security, gender equality and migrants' rights. However, within the context of the Project, we consider that these risks can be adequately mitigated and addressed through the existing or planned procedures and plans of the ESMS and the additional mitigation measures listed in this report.

The results of the Human Rights Risk Assessment have not identified any residual 'High' risks which require further investigation and detailed assessment. After the implementation of mitigation measures outlined in Chapter 8.10.4 the residual risk significance is expected to be medium or low. However, ERM recommends an Assessment of the Implementation of Mitigation Measures. This will allow the Project to evaluate the effectiveness of the mitigation measures applied. In case of not sufficient effectiveness, the residual risk level should be adjusted, and additional measures should be defined. It is important to note that the screening and monitoring of the PV supply chain have been reportedly challenging. Therefore, the Project should pay special attention to the level of effectiveness of such measures so that it can adapt its risk level and related actions where needed.

8.9 Visual

8.9.1 Introduction

Baseline data was collected through desktop studies and the field survey. This information, as described in Chapter 6.2.2.2 – Key baseline conditions, has been utilised to identify and guide the assessment of potential impacts.

8.9.2 Potential Impacts

8.9.2.1 Landscape Value

Landscape sensitivity can be assessed by the ability of a particular landscape character to absorb aesthetic alterations. Landscape impacts may occur upon a landscape characteristic as a direct result of the presence of the Project within an area of a particular landscape character. The area identified for the Project has a predominant abundance of cropland and grassland.

The presence of the solar PV is likely to cause impacts to landscape value. The Project key activities that are likely to have negative impacts on landscape include site preparation, vegetation clearance and excavation.

8.9.2.2 Visual Value

Visual impacts refer mainly to the visual character changes of available views resulting from project development, such as obstruction of existing views; removal of screening elements, thereby exposing viewers to unsightly views; the introduction of new elements into the views; and intrusion of foreign elements into the viewshed of landscape features.

The presence of the solar PV is likely to cause impacts to visual.

8.9.3 Assessment of impacts:

8.9.3.1 Landscape Value Construction Phase

The potential impacts from the construction phase likely to have negative impacts on landscape, will include mainly vegetation clearance and site preparation. Impacts will be limited to areas adjacent to the Project (Table 8-31).

Table 8-31: Impact Assessment: Landscape Value (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of landscape are largely focused on the Project sites that will already be cleared of vegetation for construction
Duration	Short term	The impacts are short-term during the construction phase (approx. 30 months) and will cease upon completion of construction.
Scale	Small	Impacts of landscape are focussed on the Project sites that has been prepared for construction. The scale is considered small.
Frequency	Intermittent	The frequency is intermittent over the construction phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
The sensitivity of the landscape resource is expected to be medium because, although the presence of protected areas, the identified character type has been modified to some degree by human activities and is expected to have a good capacity to absorb the type of change envisioned by the Project.		
Significance Rating Before Mitigation		
Minor Negative Impact		
The impact significance of landscape is considered to be Minor.		

8.9.3.2 Landscape Value Operational Phase – N/A

8.9.3.3 Landscape Value Decommissioning Phase

Project decommissioning will take place upon ceasing of operation of the solar PV and will likely generate impacts on landscape associated with land restoration works, similar to activities developed during the construction phase. Overall, it is assumed that decommissioning will result in impacts similar in character and significance to those identified for the construction phase, but likely of shorter duration and with a lower volume of works.

Table 8-32: Impact Assessment: Landscape Value (Decommissioning)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of landscape are largely focused on the Project site that will already be cleared of vegetation for decommissioning
Duration	Short term	The impacts are short-term during the construction phase (approx. 30 months) and will cease upon completion of construction.

Scale	Small	Impacts of landscape are focused on the Project site on which land/soil restoration works will be carried out. The scale is considered small.
Frequency	Intermittent	The frequency is intermittent over the decommissioning phase.

Magnitude

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Low Sensitivity

The sensitivity of the landscape is expected to be Low, due to the general use of lands as pasture for animal husbandry and agriculture.

Significance Rating Before Mitigation

Negligible Negative Impact

The impact significance of landscape is considered to be Minor.

8.9.3.4 Visual Construction Phase

The visual impact is a product of the magnitude of change to the existing baseline conditions, the landscape context, and the sensitivities of Visual Sensitive Receptors.

Construction of the solar PV is likely to generate visual impacts associated with panel installation and vehicle movement.

Table 8-33: Impact Assessment: Visual (Construction)

Type of Impact

Direct Negative Impact

Rating of Impacts

Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of visual affected an area in a radius of 2 km around the development Site
Duration	Short term	The impacts are short-term during the construction phase (approx. 30 months)
Scale	Small	Impacts on visual are focused on the Project site on which solar panel will be installed
Frequency	Intermittent	The frequency is intermittent over the construction phase.

Magnitude

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Low to Medium Sensitivity

The sensitivity of the visual resource is expected to be Low to Medium, depending on whether they are places of residence or routes of passage.

Significance Rating Before Mitigation

Negligible to Minor Negative Impact

The impact significance on visual is considered to be Minor.

8.9.3.5 Visual Operational Phase

When determining the significance of visual effects, the following is taken into account:

- Large scale changes which introduce new discordant or intrusive elements into the view are more likely to be significant than small changes or changes involving features already present in the view;
- Changes in views from recognized and important viewpoints or amenity routes are likely to be more significant than changes affecting less important paths and roads; and
- Changes affecting large numbers of people are generally more significant than those affecting a relatively small group of users. However, in wilderness landscapes the sensitivity of the people who use the areas may be very high and this will be reflected in the significance of effect.

The visual impact is a product of the magnitude of change to the existing baseline conditions, the landscape context, and the sensitivities of Visual Sensitive Receptors (VSRs).

The visibility analysis shows that the proposed solar farm could potentially be visible in nearby areas, although not entirely.

Specific considerations were made for each VSR, and the impact significance, receptor sensitivity, and impact magnitude is summarized in Table 8-35.

Table 8-34: Impact Assessment: Visual (Operational)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of visual affected an area in a radius of 2 km around the development Site
Duration	Long term	The impacts are long-term during the life of the Project.
Scale	Medium	Impacts of landscape are focussed an area in a radius of 2 km around the development Site. The scale is considered medium.
Frequency	Intermittent	The frequency is intermittent over the operational phase.
Magnitude		
Negligible to Low Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low to Medium Sensitivity		
The sensitivity of the visual resource is expected to be Low to Medium, depending on whether they are places of residence or routes of passage.		
Significance Rating Before Mitigation		
Negligible to Minor Negative Impact		
The impact significance of landscape is considered to be Negligible to Major, depends on the VSR		

Table 8-35: Summary of Visual Impact

VSR	Site	Sensitivity receptor	of Magnitude of visual effect	Significance of visual effect	of
VSR1	Along a road	Low	Negligible	Negligible	
VSR2	From road 79A	Low	Negligible	Negligible	
VSR3	From road 79A	Low	Negligible	Negligible	
VSR4	From Socodor	Medium	Negligible	Negligible	
VSR5	From Siclau	Medium	Negligible	Negligible	
VSR6	From a road close to Siclau	Low	Negligible	Negligible	
VSR7	Along a road	Low	Negligible	Negligible	
VSR8	From Graniceri	Medium	Low	Minor	
VSR9	From Pilu	Medium	Negligible	Negligible	
VSR10	From Pilu	Medium	Negligible	Negligible	

A selection was made from the VSRs considering distances and receptor type, and photomontages are visible in the figures below, where in yellow is highlights the footprint of the project in the field of view (Figure 8-3, Figure 8-4, Figure 8-5).

Figure 8-3: VSR2 Photosimulation



Coordinate System WGS84 - Zone 34N
X - 500213 Y - 4975067

VSR2

View direction: 268 degree
Distance to Solar PV

The view is taken along a road, the sensitivity level is therefore considered to be Low.

Sensitivity	Magnitude	Significance
Low	Negligible	Negligible

Figure 8-4: VSR5 Photosimulation



Coordinate System WGS84 - Zone 34N
X - 500213 Y - 4975067

VSR5

View direction: 325 degree
Distance to Solar PV

The view is taken from the outskirts of Siclau, the sensitivity level is therefore considered to be Medium.

Sensitivity	Magnitude	Significance
Medium	Negligible	Negligible

Figure 8-5: VSR8 Photosimulation



Coordinate System WGS84 - Zone 34N
X - 487964 Y - 4988325

VSR8

View direction: 101 degree
Distance to Solar PV

The view is taken from the outskirts of Graniceri, the sensitivity level is therefore considered to be Medium.

Sensitivity	Magnitude	Significance
Medium	Low	Minor

8.9.3.6 Visual Decommissioning Phase

Project decommissioning will take place upon ceasing of operation of the solar farm and will likely generate impacts on visual associated with panel removal, similar to activities developed during the construction phase.

Overall, it is assumed that decommissioning will result in impacts similar in character and significance to those identified for the construction phase, but likely of shorter duration and with a lower volume of works.

Table 8-36: Impact Assessment: Visual (Decommissioning)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of visual affected an area in a radius of 30 km around the development Site
Duration	Short term	The impacts are short-term during the decommissioning phase (approx. 12 months)
Scale	Small	Impacts on visual are focused on the Project site on which panel removal works will be carried out. The scale is considered small.
Frequency	Intermittent	The frequency is intermittent over the decommissioning phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low Sensitivity		
The sensitivity of the visual is expected to be Low, due to the general use of lands as pasture for animal husbandry and agriculture.		
Significance Rating Before Mitigation		
Negligible Negative Impact		
The impact significance on visual is considered to be Negligible.		

8.9.4 Mitigation Measures

8.9.4.1 Landscape Value

In order to mitigate the landscape impacts, there are different actions that should be considered, especially during the construction phase, such as:

- Demarcate construction boundaries and minimize areas of surface disturbance;
- Where possible, locate laydown areas and construction camps in areas that are already disturbed or cleared of vegetation;
- For the construction site maintenance, conduct good housekeeping on site to avoid litter and minimize waste;

- Use existing tracks/roads for access, where possible; and
- Within the environmental management system, prepare a restoration management plan including replanting indigenous species, and landscaping and rehabilitating construction yards.

8.9.4.2 Visual

The following identifies mitigation measures to be applied for visual impacts, including:

- Where possible, locate laydown areas and construction camps in areas that are already disturbed or cleared of vegetation;
- For the construction site maintenance, conduct good housekeeping on site to avoid litter and minimize waste;
- Minimize night lighting while guaranteeing the minimum safety level;
- Use of materials that will minimize light reflection should be used for all Project components; and
- Existing vegetation should be retained to the greatest extent possible. Vegetation should be retained along roads, and other Project infrastructure.

8.9.5 Residual Impact Significance

Table 8-37 shows the residual adverse impacts on landscape and visual, with application of the mitigation measures.

Table 8-37: Pre- and Post-mitigation: Landscape and visual

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Landscape value	Construction	Minor	Minor
Landscape value	Operation	NA	NA
Landscape value	Decommissioning	Negligible	Negligible
Visual	Construction	Minor	Minor
Visual	Operation	Negligible to Minor	Negligible to Minor
Visual	Decommissioning	Negligible	Negligible

8.10 Glare

8.10.1 Introduction

The following sub-sections present the modelling results as well as the significance of any predicted impact. Modelling outputs are included as Appendix J.

Currently there are no national requirements and thresholds related to the assessment of the glare impact. International standards such as IFC has not yet identified a threshold value to assess the solar reflection. Only few countries have adopted guidelines to inform the project development and project design. Some of them taken from the European Context are reported in the following table.

Table 8-38 Examples of Existing Guidelines

Type	Germany	UK	Switzerland	France
Intensity	<100,000 cd/m ²	-	Sun irradi <120 W/m ²	<20,000 cd/m ²

Type	Germany	UK	Switzerland	France
			Reflection <30 W/m ² Reflection <50,000 cd/m ²	<10,000 cd/m ²
Duration	<30 min/day <30 h/y	<60 min/day <90 d/y	<30 min/day <60 min on 60d/y <120min on 20 d/y <50 h/y	-
Location	East or west of PV South only with PV-facades	Receptors to the North of a south-facing panel area are generally excluded	-	-
Distance	<100 m for small PV	<1000 m for small PV	<100m residencial zone <50m commercial zone	< 3000 m from runway < 400 m from touch-down
Applicability	Dwellings, school, offices, not built-up estates (also used for traffic)	Dwellings, schools, offices, roads, airports	Dwellings	Airports

Currently, Romania has not defined national legislation or guidelines to assess glare and there are no international guidelines on standards to be followed. At European level, not all countries have set specific guidelines for solar reflection assessment on human receptors. Based on a review of the most adopted ones, UK and German, it should be noted that both are similar (accounting for the same factors into consideration when assessing glare towards dwellings), with the UK guidance being more conservative about the conditions when glare should be assessed, and the German guidance more conservative regarding the duration of glare.

Based on recent review of such guidelines, the UK ones have been used in this assessment.

8.10.2 Potential Impacts

Local residents are a key stakeholder within the local environment when proposing a solar PV development. This is because residents will be living in close proximity to the solar PV development whilst also potentially having views of the solar panels for its lifetime. Where a view of the solar panel exists, a solar reflection may be possible which may impact upon residential amenity.

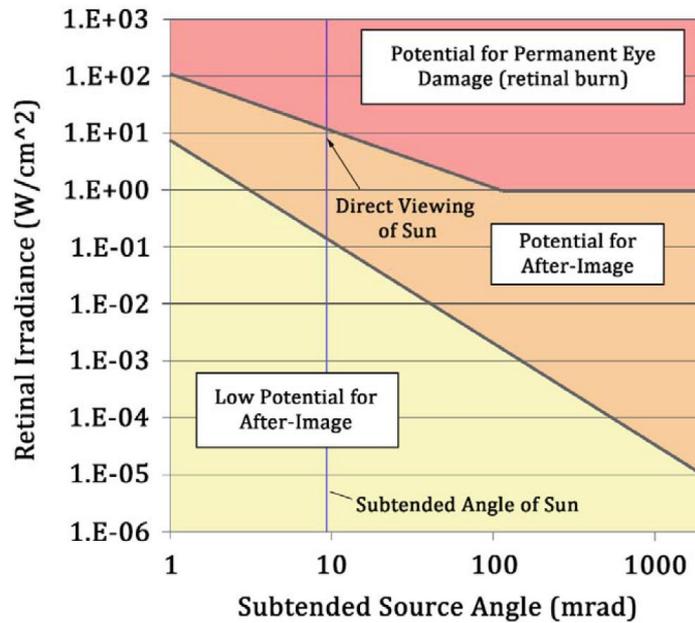
Locating a solar PV development next to a road is often essential due to access requirements. The possibility of glint and glare effects from the proposed solar PV development can however lead to concerns with respect to the possible impact upon road safety especially if the solar PV development is to be located next to a road with fast moving and/ or busy traffic.

The amount of light reflected from a PV module depends on the amount of sunlight hitting the surface, as well as the surface reflectivity. The amount of sunlight interacting with the PV module will vary based on geographic location, time of year, cloud cover, and PV module orientation.

The potential hazard from solar glare is a function of retinal irradiance (power of electromagnetic radiation per unit area produced by the sun) and the subtended angle (size and distance) of the glare source. Glare can be broadly classified into three categories (Figure 8-6):

- low potential for after - image;
- potential for after - image, and
- potential for permanent eye damage.

Figure 8-6: Glare Intensity Categories



1000W/m² is generally used in most countries as an estimate of the solar energy interacting with a PV module when no other information is available. Flash blindness for a period of 4-12 seconds (i.e. time to recovery of vision) occurs when 7- 11 W/m² (or 650-1,100 lumens/m²) reaches the eye.

In a fixed PV solar array, the angle of incidence varies as the sun moves across the sky, that is the angle of incidence are at their lowest around noon where the sun is directly overhead, and increase in the early mornings and late evenings as the incidence angles increase.

While there is no specific guidance on glare impact significance evaluation or limits, the following approach is used in line with best available practice guidance/recommendations.

Table 8-39 Dwelling Significance Methodology

Type	Details
No Impact	Solar reflection is not geometrically possible or will not be visible from the assessed receptor.
Minor	Glare occurs for less than 60 minutes per day and for less than three months per year. Mitigation is not required.
Moderate	Glare occurs for longer than 60 minutes or for more than 3 months per year. Mitigation may be required at planner’s discretion.
Major	Glare occurs for longer than 60 minutes per day and for more than 3 months of the year. Mitigation will be required.

Table 8-40 Road Significance Methodology

Type	Details
No Impact	Solar reflection is not geometrically possible or will not be visible from the assessed receptor.
Minor	Glare predicted towards a road and originates outside of 50° relative to the direction of travel. Mitigation is not considered necessary.
Moderate	Glare predicted towards a road and it originates within 50° relative to the direction of travel under mitigating circumstances (e.g. duration of glare, vehicle speed, length of road affected, etc).

Type	Details
	Mitigation may be required at regulator's discretion.
Major	Glare predicted towards a road and it originates within 50° relative to the direction of travel without mitigating circumstances. Mitigation recommended.

8.10.3 Assessment of impacts

The likelihood and duration of the glare effect depends upon a number of factors, including:

- The amount of sunlight hitting the surface;
- Its surface reflectivity;
- Its geographic location;
- Time of the year;
- Cloud coverage; and
- Panel orientation.

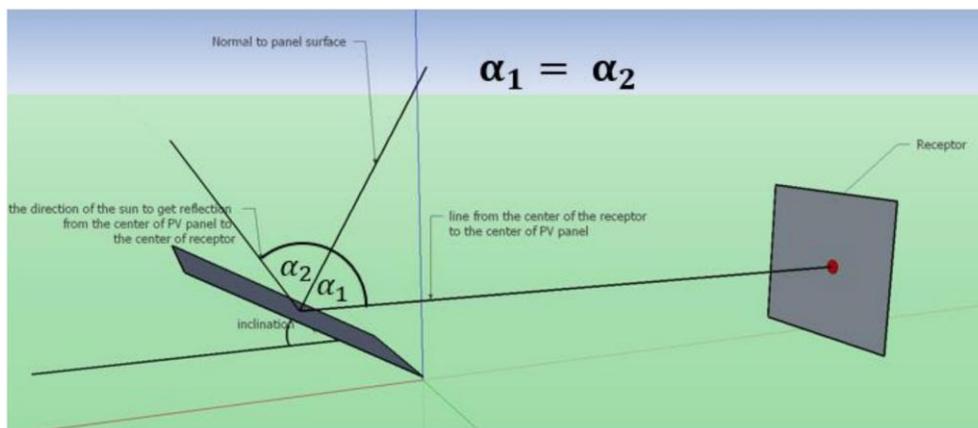
In general, glare occurs during clear sky conditions. As the sun angle changes throughout the year, the locations experiencing the phenomenon changes, so specific glare receptors can be affected in different periods.

The theoretical number of hours of glare experienced annually at a given location can be calculated using modelling packages incorporating the sun path over the solar farm, and panel details such as inclination.

This assessment has been undertaken using WindPro 3.6©; a computer package widely used in the renewable industry. The software package includes a Glare Module that allow to quantify how much glare a neighbour will receive and when.

The model calculates outputs according to the principles presented in the following Figure 8-7.

Figure 8-7: Glare Geometry of the Calculation



The calculations are modelled without parameters that characterize local settings and project-specific characteristics. The following assumptions have been considered in the modelling setting:

- Local topography has been obtained from SRTM DTM;
- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;

- The presence of physical barriers, natural vegetation screening is not considered;
- Glare receptors are modelled as follow:
 - Dwelling: each receptor will face all directions (visibility 360 degrees) and height set at 1,8m
 - Road: a diver field of view of 100° (50° view angle to left and right) and height set at 1,5m

Table 8-41 WindPro Glare Module Inputs

Inputs	Dwelling	Road
Panel dimension	See Figure 6-26	See Figure 6-26
Panel type	Antireflection coating, smooth glass	Antireflection coating, smooth glass
Cloud Cover	Not considered	Not considered
Physical Barriers	Not considered	Not considered
Glare not considered if angle between reflection and the sun is less than	0°	0°
Time step for calculation	1 minute	1 minute
Height contour	SRTM DTM 1 arc-second	SRTM DTM 1 arc-second
Eye Height	1.8 m	1.5 m, 3.0 m

8.10.3.1 Model results - Dwelling receptors

The modelling has shown that solar reflections are geometrically possible towards dwelling receptors assessed.

The reflections will be predicted to be experienced for more than 60 minutes per day but for minor than 3 months per year, the impact significance is moderate.

As outlined above, the real case is still affected by conservative results. Specific considerations were made within each group of dwellings that allow to re-evaluate the significance value given by the model, and the results can be viewed in the graphic sheets presented below (from Figure 8-9 to Figure 8-16) and summarized in Table 8-42.

Table 8-42 Dwelling Significance

Dwellings	Group	Model Significance	Assessment Significance
D01 - D15	Graniceri – Area 1	Moderate	Minor
D16 - D32	Graniceri – Area 2	Moderate	Minor
D33 - D50	Graniceri – Area 3	Moderate	Minor
D51 - D62	Graniceri – Area 4	Moderate	Minor
D63 - D66	Area North	Moderate	Moderate
D67 - D80	Area West	Moderate	Minor
D81 - D85	Area East	Moderate	Moderate
D86 - D89	Area South	Moderate	Moderate

The graphic sheets are organized as presented in Figure 8-8:

1. Receptor location map;
2. Receptors name

3. Model results map, where in yellow are highlighted the panel with possible glare
4. Assumption and model results assessment
5. Significance.

Figure 8-8 Graphic sheets - legend

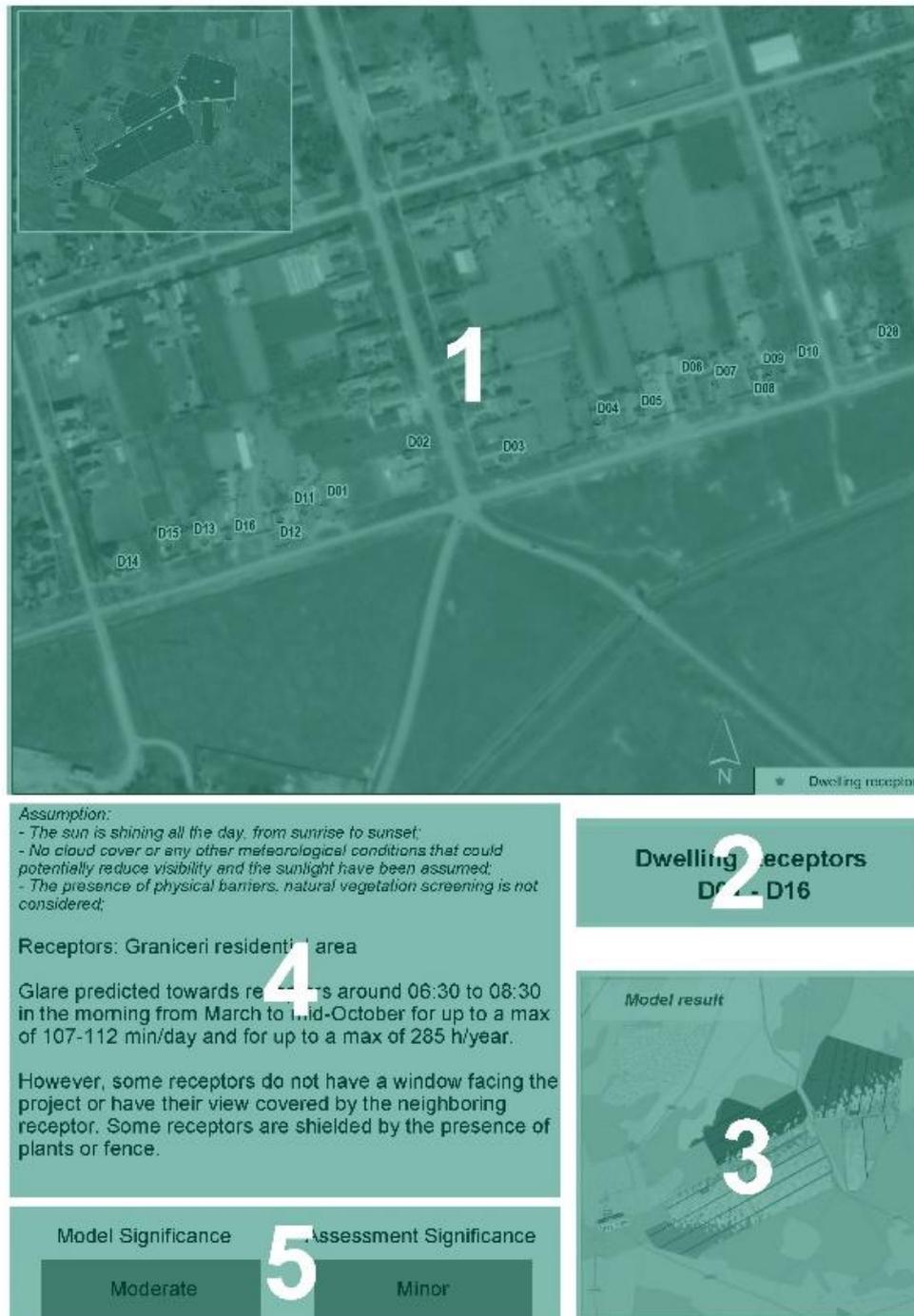


Figure 8-9: Dwelling Receptors – D01 – D15



Assumption:

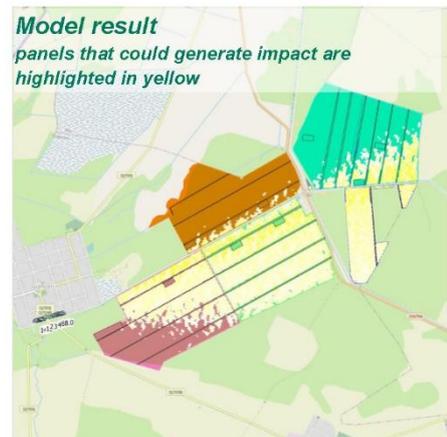
- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- The presence of physical barriers, natural vegetation screening is not considered;

Glare predicted towards receptors around 06:30 to 08:30 in the morning from March to mid-October for up to a max of 107-112 min/day and for up to a max of 285 h/year.

However, some receptors not have the window facing the project or have their view covered by the neighboring receptor. Some receptors may be hidden by the presence of plants or fence.

The model results are overestimated and due to the distance of some panels and the presence of barriers along the line of sight, the significance is reduced from Moderate to Minor.

**Dwelling Receptors
D01 - D15
Graniceri Residential Area - 1**



Model Significance	Assessment Significance
Moderate	Minor

Figure 8-10: Dwelling Receptors – D16 – D32



Assumption:

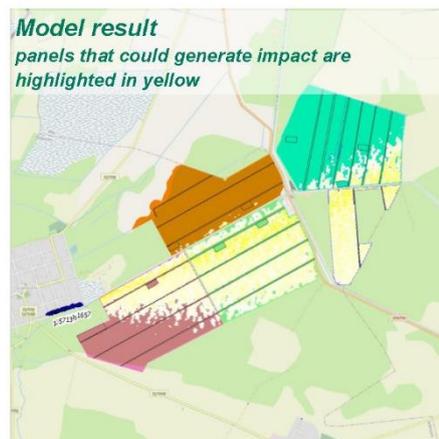
- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- The presence of physical barriers, natural vegetation screening is not considered;

Glare predicted towards receptors around 06:30 to 08:30 in the morning from March to mid-October for up to a max of 109-114 min/day and for up to a max of 285 h/year.

However, some receptors not have the window facing the project or have their view covered by the neighboring receptor. Some receptors may be hidden by the presence of plants or fence.

The model results are overestimated and due to the distance of some panels and the presence of barriers along the line of sight, the significance is reduced from Moderate to Minor.

**Dwelling Receptors
D16 - D32
Graniceri Residential Area - 2**



Model Significance

Moderate

Assessment Significance

Minor

Figure 8-11: Dwelling Receptors – D33 – D50



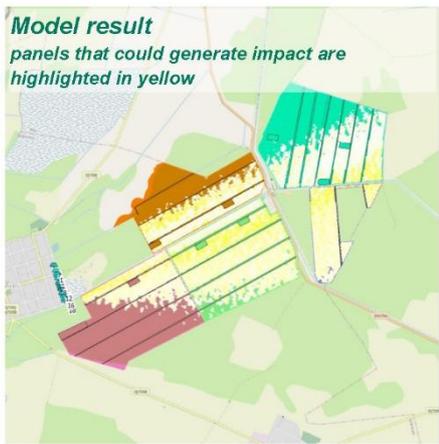
Assumption:

- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- The presence of physical barriers, natural vegetation screening is not considered;

Glare predicted towards receptors around 06:30 to 08:30 in the morning from March to mid-October for up to a max of 104-114 min/day and for up to a max of 292 h/year.

The model results are overestimated and due to the distance of some panels and the presence of barriers along the line of sight, the significance is reduced from Moderate to Minor.

**Dwelling Receptors
D33 - D50
Graniceri Residential Area - 3**



Model Significance	Assessment Significance
Moderate	Minor

Figure 8-12: Dwelling Receptors – D51 – D62



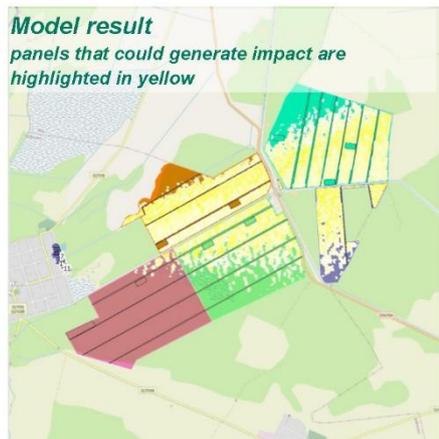
Assumption:

- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- The presence of physical barriers, natural vegetation screening is not considered;

Glare predicted towards receptors around 06:30 to 08:30 in the morning from March to mid-October for up to a max of 102-114 min/day and for up to a max of 301 h/year.

The model results are overestimated and due to the distance of some panels and the presence of barriers along the line of sight, the significance is reduced from Moderate to Minor.

**Dwelling Receptors
D51 - D62
Graniceri Residential Area - 4**



Model Significance	Assessment Significance
Moderate	Minor

Figure 8-13: Dwelling Receptors – D63 – D66



Assumption:

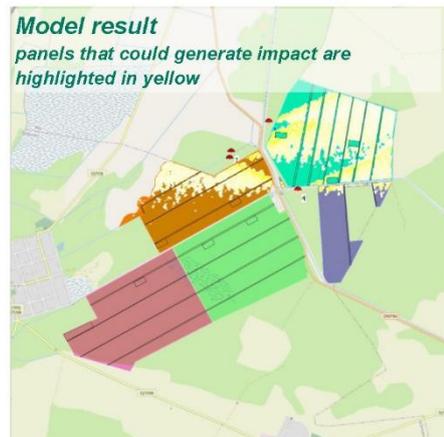
- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- The presence of physical barriers, natural vegetation screening is not considered;

Glare predicted towards receptors mainly around 06:30 to 08:30 in the morning from March to mid-October for up to a max of 91-111 min/day and for up to a max of 501 h/year.

However, some receptors not have the window facing the project or have their view covered by the neighboring receptor. Some receptors may be hidden by the presence of plants or fence.

The significance is Moderate.

**Dwelling Receptors
D63 - D66
North Area**



Model Significance

Moderate

Assessment Significance

Moderate

Figure 8-14: Dwelling Receptors – D67 – D80



Assumption:

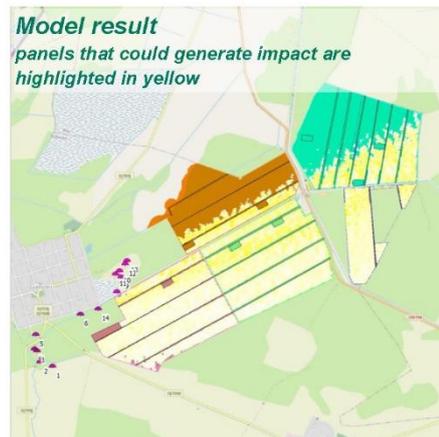
- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- The presence of physical barriers, natural vegetation screening is not considered;

Glare predicted towards receptors around 06:30 to 08:30 in the morning from March to mid-October for up to a max of 99-113 min/day and for up to a max of 289 h/year.

However, some receptors not have the window facing the project or have their view covered by the neighboring receptor. Some receptors may be hidden by the presence of plants or fence.

The model results are overestimated and due to the distance of some panels and the presence of barriers along the line of sight, the significance is reduced from Moderate to Minor.

**Dwelling Receptors
D67 - D80
West Area**



Model Significance

Moderate

Assessment Significance

Minor

Figure 8-15: Dwelling Receptors – D81 – D85



Assumption:

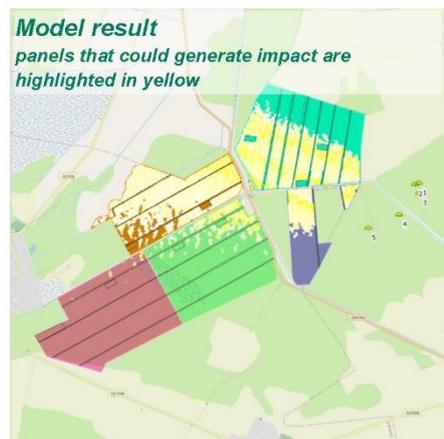
- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- The presence of physical barriers, natural vegetation screening is not considered;

Glare predicted towards receptors around 06:30 to 08:30 in the morning from March to mid-October for up to a max of 97-111 min/day and for up to a max of 286 h/year.

However, some receptors not have the window facing the project or have their view covered by the neighboring receptor. Some receptors may be hidden by the presence of plants or fence.

The significance is Moderate.

**Dwelling Receptors
D81 - D85
East Area**



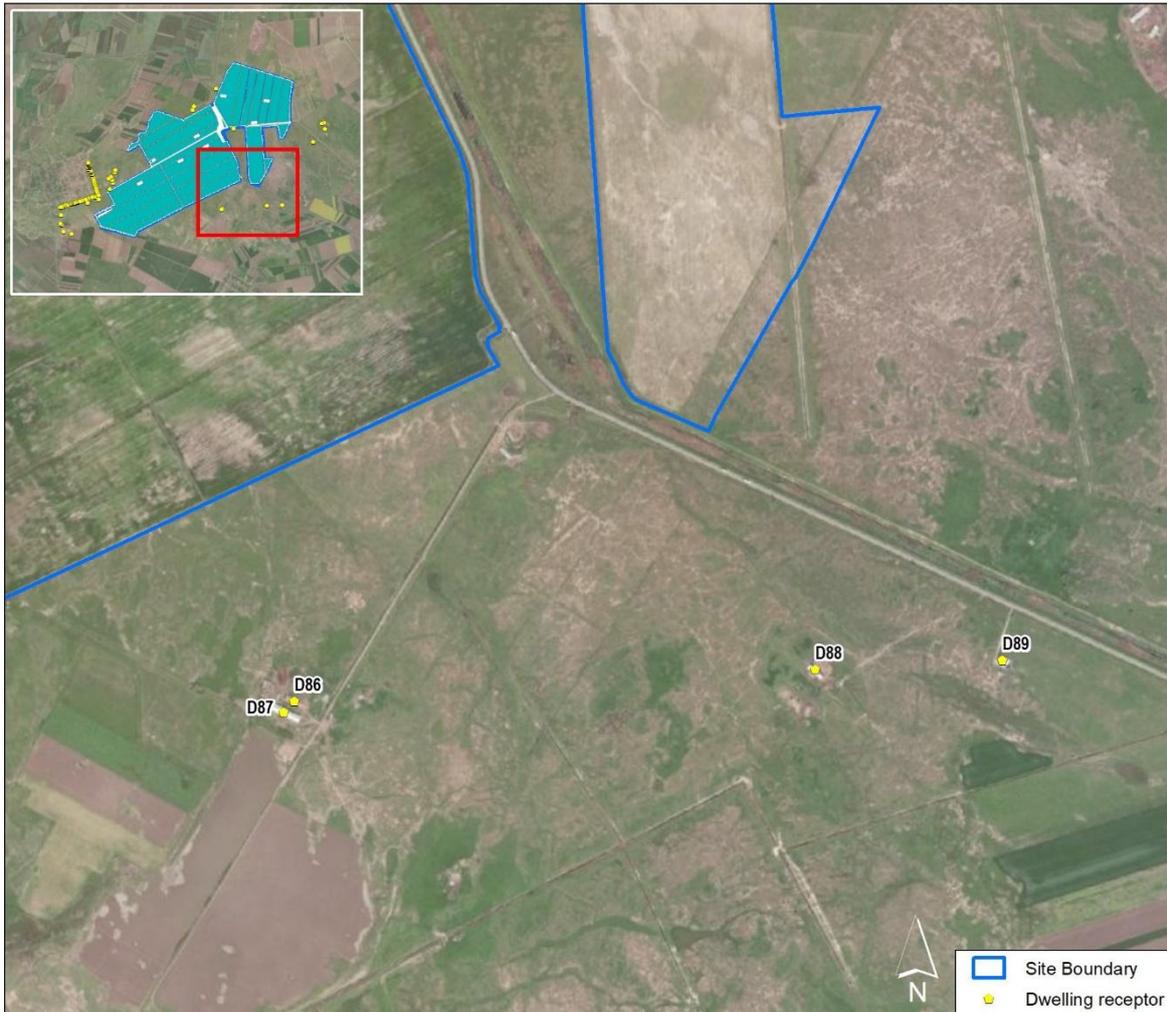
Model Significance

Moderate

Assessment Significance

Moderate

Figure 8-16: Dwelling Receptors – D86 – D89



Assumption:

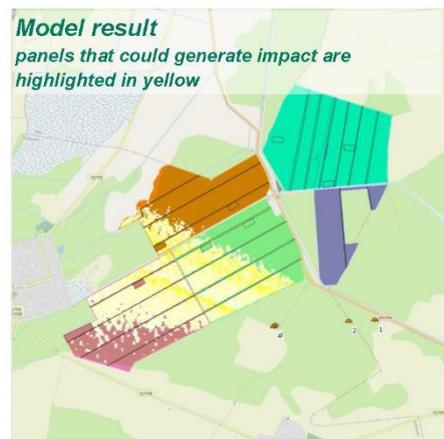
- The sun is shining all the day, from sunrise to sunset;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- The presence of physical barriers, natural vegetation screening is not considered;

Glare predicted towards receptors around 06:30 to 08:30 in the morning from March to mid-October for up to a max of 93-111 min/day and for up to a max of 286 h/year.

However, some receptors not have the window facing the project or have their view covered by the neighboring receptor. Some receptors may be hidden by the presence of plants or fence.

The significance is Moderate.

**Dwelling Receptors
D86 - D89
South Area**



Model Significance

Moderate

Assessment Significance

Moderate

8.10.3.2 Model results - Road receptors

The modelling has shown that solar reflections are geometrically possible towards 14 of the 33 assessed road receptors along approximately 10.7km of road (Figure 8-17 and Figure 8-18). A review of the available imagery has shown that some views of the reflecting panels from these sections of road will not be screened by existing vegetation.

The key considerations for quantifying impact significance for road users are:

- Whether a reflection is predicted to be experienced in practice;
- The location of the reflecting panel relative to a road user's direction of travel.
- Where reflections are predicted to be experienced from inside of a road user's field of view the impact significance is Moderate.

Figure 8-17: Glare Road Receptors Results – Car

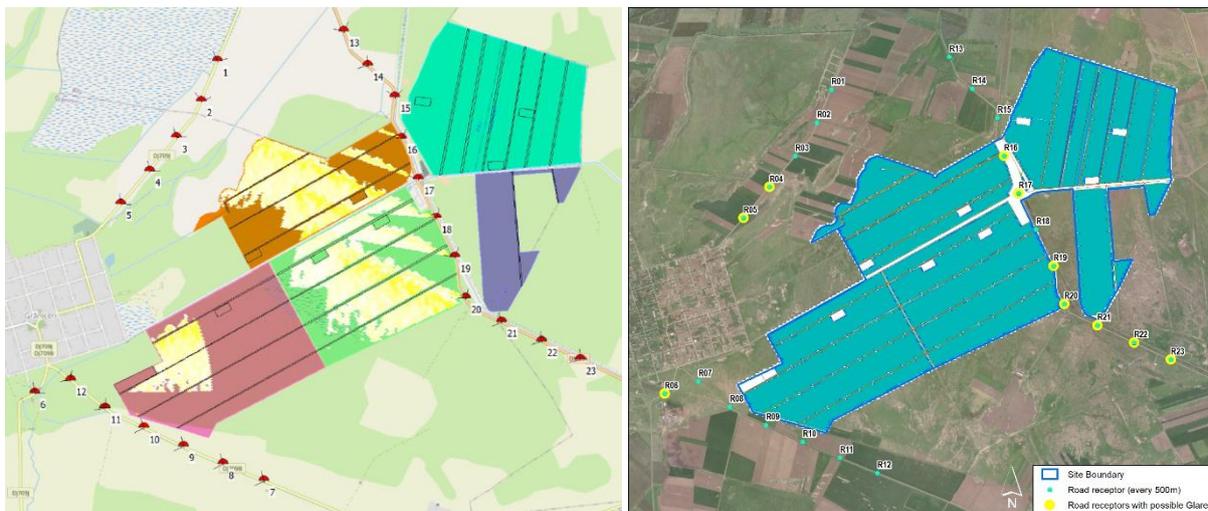
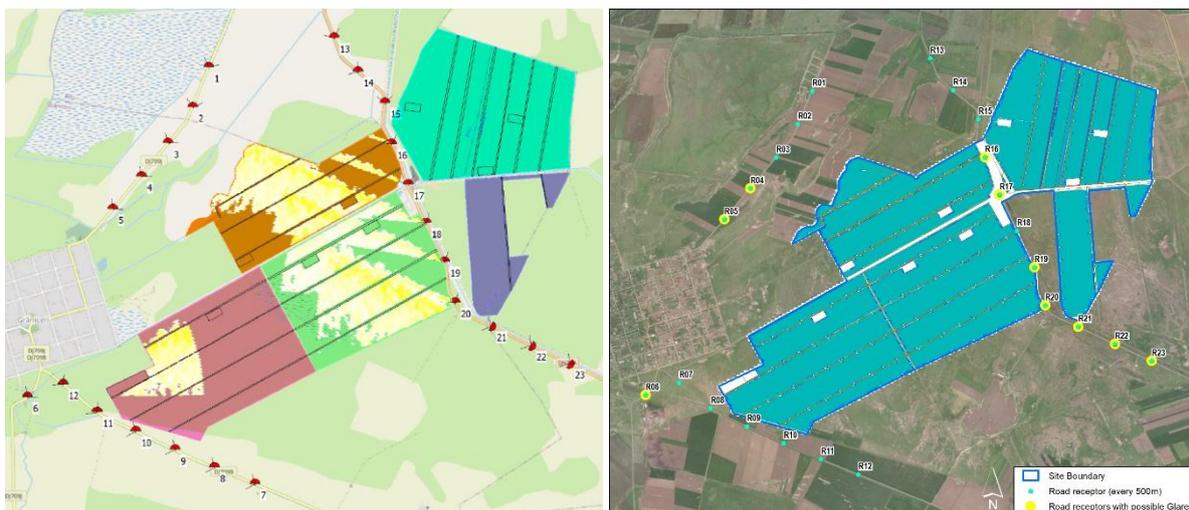


Figure 8-18: Glare Road Receptors Results - Truck



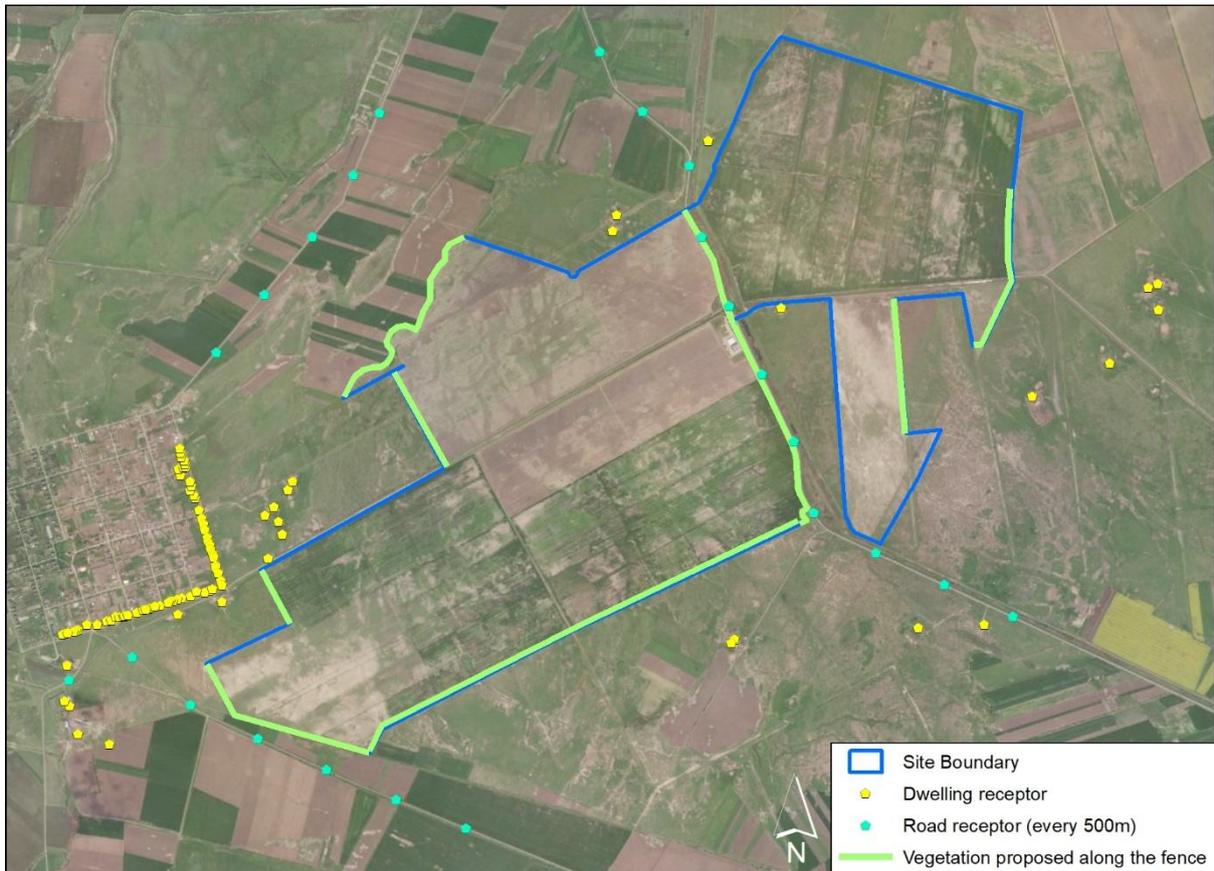
8.10.4 Mitigation Measures

Assessment of the following mitigating factors is required to determine the requirements:

- The separation distance to the panel area – larger separation distances reduce the proportion of an observer's field of view that is affected by glare;

- Whether the dwelling appears to have windows facing the reflecting area – factors that restrict potential views of a reflecting area reduce the level of impact;
- Whether the solar reflection originates from directly in front of a road user – a solar reflection that is directly in front of a road user is more hazardous than a solar reflection to one side.
- The proposed screening (green area) are shown in Figure 8-19.

Figure 8-19: Mitigation proposed



8.10.5 Residual Impact Significance

Table 8-43 shows the residual adverse impacts on landscape and visual, with application of the mitigation measures.

Table 8-43 Residual Impact Significance

Receptor	Before Mitigation	After Mitigation
Dwellings	Minor to Moderate	Negligible to Minor
Road	Moderate	Negligible to Minor

8.11 Traffic

8.11.1 Introduction

As described in Section 6.2.3.1, the Aol for traffic includes county and communal roads that cross or border the Project site; internal Project roads, which would be comprised of newly built access roads and existing local dirt tracks located along the drainage channels on-site; local roads likely to be used for worker commuting; regional roads likely to be used for transport of materials; and routes from the ports that would be used for transport of internationally-sourced components. Rail and air transportation are not proposed for this Project. Sea freight may be used to bring internationally sourced components to Romania; however, impacts on marine transportation are not within the scope of this ESIA.

8.11.2 Potential Impacts

Project-related traffic on communal, county, and national roads could potentially affect transportation safety, traffic function, severance issues, and transportation infrastructure (From Table 4-1 Scoping Summary).

- Transportation safety refers to increased safety risks on public roads due to Project-related traffic.
- Traffic function refers to the capacity of the public road system to accommodate the traffic volumes generated by the Project, and the likelihood of traffic congestion or delays.
- Severance issues refer to the potential for transportation infrastructure and impacts caused by its location and use to reduce communities' ability to access goods, services, and people.
- Transportation infrastructure refers to the physical ability of existing and proposed public roads to accommodate Project activities, and the likelihood of infrastructure experiencing deterioration or damage.

Table 8-44 summarises the potential sources of transportation impacts associated with each Project phase.

Table 8-44 Traffic Impacts by Project Phase

Project phase	Activity with potential impact
Construction	Transport of components to the Project site, including PV modules, mounting systems, inverters, transformers, cabling, battery storage components, and substation components.
	Daily movement of construction workers to and from the Project site
	Delivery of construction equipment, fuel, water, concrete, gravel, and other supplies to Project site
Operation	Travel to the Project area by employees for inspection and maintenance
	Transport of equipment or components needed for maintenance or repairs
	Clearing roads to the Project site of snow or ice to provide site access during winter
Decommissioning	Transport of dismantled materials from the site; movement of construction workers during the decommissioning process

8.11.3 Assessment of impacts

8.11.3.1 Construction Phase

Project construction will require the movement of Project components, construction supplies, equipment, and materials to produce concrete. Project components will be transported by ship to the selected port and from the port will be transported by truck to the Project sites. Materials such as fuel,

water, concrete (or supplies for an on-site concrete plant) and gravel are assumed to be sourced from western Romania.

The route from the Port of Constanța or other selected port to the Project site would utilize routes to be identified by the applicant based on dimensions and weight of the load and current traffic conditions.

During construction, the Project will have two access points as described in Section 2.3.2; the first, from road DN79A to access the west side of the Project site, and the second, from a local dirt track, to access the east side of the Project site. Trucks would travel to locations within the Project sites via internal roads comprised of newly built access roads and existing local dirt tracks as described in Section 2.5.6. The existing dirt tracks are located along the drainage channels present on-site. Bridges over waterways and culverts will be upgraded as required. The internal roads would not be available for public use, other than by shepherds working with the Project team to provide vegetation management.

Construction is anticipated to take 2.5 years (30 months) and would be completed in three Phases. Some overlap between the start and ending of Phases would occur. Construction would not occur during the months of January and February due to winter weather conditions.

Project-specific estimates of the number of truck deliveries needed for components, equipment, concrete, gravel, water, fuel, and general supplies, are not yet available. Project-specific descriptions of the types and sizes of trucks used for component deliveries is also not yet available.

Impacts on Road Safety

Routes for deliveries of Project components from the selected port to the Project sites have not been identified. Nonetheless, many regional roads within Romania are two lanes without shoulders and, especially within towns or villages, include sharp turns or roundabouts, and have structures located close to the travel lanes. There is a potential risk to road users and property depending on the route selected and extent of advance planning. A local dirt track would be used to access the eastern portion of the site during construction. The presence of construction vehicles along a new route could present a safety hazard. Table 8-45 summarizes impacts on road safety during construction.

Routes for deliveries of Project components from the selected port to the Project sites have not been identified. In the absence of selected routes, this assessment notes that many regional roads within Romania are two lanes without shoulders and, especially within towns or villages, include sharp turns or roundabouts, and have structures located close to the travel lanes. There is a potential risk to road users and property depending on the route selected and extent of advance planning. Table 8-45 summarizes impacts on road safety during construction.

Table 8-45 Impact Assessment: Traffic—Road Safety (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local, Regional and International	Project-related construction travel will affect local travelers and is also regional and international due to deliveries from ports and suppliers that have not yet been identified and due to the Project's proximity to the Hungarian border.
Duration	Short term	Impact will be limited to the construction period.
Scale	Medium	Moderate increases in road safety hazards will result from the increase in total traffic volumes on local roads due to Project construction; the significant increase in the number of heavy truck deliveries in the local area, delays, possible lane closures, and slow moving traffic resulting from large delivery trucks. Major increases in road safety hazards could result if large trucks must travel and make turning movements on roads with insufficient clearance. Collisions of large freight with property and other vehicles could result from inadequate planning and preparation for movement of large delivery trucks.
Frequency	Daily	Construction traffic will occur daily throughout the year, except January and February.

Magnitude

Medium Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Medium Sensitivity

The sensitivity is considered medium. Road users and residents will not be accustomed to the large delivery trucks, heavy truck traffic or local patterns of commuting to the Project sites but can adjust their driving behaviours to safely accommodate these traffic patterns. Communities close to the Project site lack alternative travel routes or detour options to avoid Project traffic or lane closures.

Significant Rating Before Mitigation

Moderate Negative Impact

The impact is potentially considered to be of moderate significance, primarily due to the potential for property damage and serious injury from crashes involving Project vehicles (especially trucks), and the lack of detour options for communities close to the Project site.

Impacts on Road Function and Congestion

Project construction could generate substantial new traffic volumes, especially for worker trips to and from the site, in addition to deliveries of Project components, materials, and supplies. During peak periods, truck deliveries would be more frequent, although the extent of peak-period Project traffic has not yet been determined. While traffic volumes on DN79A and DJ709J are unknown, the Project's peak-period daily trips are likely to represent a meaningful increase in existing volumes. More important, Project construction would likely result in a notable increase in the number and proportion of large trucks on those roads, as compared to current traffic. Project truck deliveries would result in frequent, temporary periods of traffic slow-downs and backups during the 2.5-year construction period. Workers driving to and from the Project site would also generate traffic on public roads. These workers would travel to the Project site daily from farms and towns within commuting distance of the site resulting in additional trips on DN79A and DJ709J.

A traffic flow of up to 1,300 passenger cars per lane per hour is considered low to moderate flow conditions (i.e., somewhat congested) on a paved, two-lane road in good condition (AASHTO 2018). Congestion would occur at lower volumes within towns with multiple intersections, on narrower or

unpaved roads, or along road segments with sharp turns and curves. No information is available on the current traffic volume or level of congestion for roads within the AoI, however, substantial traffic congestion and back-ups occur on DN79A typically from the Hungarian border to Pilu, approximately 6 kilometres away. Backups can occasionally extend to the Agricola Graniceri facility at the Project site, approximately 11 kilometres south of the border on DN79A. Such backups would directly affect the ability of deliveries or workers to reach the Project site. In addition, trucks and workers leaving the Project site and travelling north on DN79A could contribute to the congestion. A local dirt track would be used to access the eastern portion of the site during construction which could reduce the number of trips for construction vehicles along DN79A west of DN79A Socodor.

Daily Project worker trips added during commuting hours could create new peak hour congestion and would contribute incrementally to existing congestion at intersections and road segments that already experience congestion at times of peak traffic volumes. This could include congestion on DN79A at the border crossing if workers are commuting from Hungary.

Project construction would result in traffic on the internal Project roads. However, these roads will not be open for use by the public. Table 8-46 summarizes impacts on road function, congestion and delay during construction.

Table 8-46 Impact Assessment: Traffic—Road Function (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristics	Definition	Designations
Extent	Local, Regional and International	Project deliveries will originate at ports (for PV Module, battery storage, and cabling components) and unknown regional sources (for various construction equipment, supplies and components). Project traffic may affect or be impacted by the traffic at the border crossing with Hungary.
Duration	Short term	Construction-related travel will cease upon completion of construction (up to 30 months)
Scale	Medium	Project-related truck and employee trips will result in a measurable and noticeable increase in delays on local and regional roads as trucks will take curves and turns more slowly than smaller vehicles and large truck movements may result in lane closures for manoeuvring on narrow roads. Project traffic may contribute to existing congestion on DN79A near the border with Hungary. Worker commuting during construction may contribute to local road congestion.
Frequency	Daily	Daily truck and worker travel is anticipated during construction.

Magnitude

Medium Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

Potential receptors for the Project’s traffic-related impacts include users of and residents near the roads within the Traffic AoI, and users of the local internal roads within and around the Project site. Receptor sensitivity is considered to be High. DN 79A is the primary route for communities in Vărşand and Pilu to access locations to the north and south. Vărşand currently deals with daily queues of trucks at the Hungary border crossing to its north. DJ709J could be used as an alternative local route to DN 79A around the Project site to the south; however, it would be a long and circuitous detour. Regional roads along the route from Constanța would experience higher volumes than usual of heavy truck traffic. Road users and residents would not be accustomed to the project-related heavy truck traffic but could adjust their driving practices and expectations to accommodate these vehicles. Road users and residents would be accustomed to the type of passenger vehicle traffic that would be generated by worker commuting.

Significance Rating Before Mitigation**Moderate Negative Impact**

The impact is considered to be of moderate significance along the travel routes from the port for Project components, along the routes where supplies travel to the Project area (not yet determined), and along DN79A and local routes used to reach the access points to the internal Project roads. The impact could potentially be major if Project traffic interacts with and significantly contributes to traffic congestion and delays at the DN 79A Hungarian border crossing.

Impacts on Severance

Severance issues refers to the potential for transportation infrastructure to reduce communities' ability to access goods, services, facilities, and people. Traffic due to construction would increase the number of vehicles on the roadways from Constanța to the Project site and also on county and communal roads near the Project site. Increased traffic could result in travel delays and road closures. Additionally, communities near the Project site have limited detour options to DN79A, with DJ709J providing a circuitous route around the Project site. Frequent travel delays and road closures could impact community interaction and individuals access to goods, services, and people. Table 8-47 summarizes impacts on community severance during construction.

Table 8-47 Impact Assessment: Traffic—Severance (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local, Regional, and International	DN79A is the direct route that connects communities north of the Project site (Vârșand, Pîlu) with those south and east of the Project site (Socodor, Chișineu-Criș). Road closures and excessive traffic slow-downs, related to construction-related traffic, could restrict movement between communities and limit access to goods, services, and facilities. Routes have not been defined between the port(s) where Project components and equipment would be received and the Project site.
Duration	Short-term	The effect on severance between communities will be short-term and should subside following construction.
Scale	Moderate	The size of the Project site and proposed length of construction time would result in moderate community severance, depending on the frequency of road closures and excessive traffic slow-downs. The overall scale is moderate due to the total volume of heavy truck traffic anticipated, the lack of detailed information on truck routes or volumes and the lack of detour options near the Project site.
Frequency	Intermittent	Construction-related traffic that could result in severance between communities would occur during times of traffic delays due to heavy truck traffic or Project-related congestion.

Magnitude**Medium Magnitude****Sensitivity/Vulnerability/Importance of the Resource/Receptor****Medium Sensitivity**

The sensitivity is considered medium due to the ability of community members along transportation routes to adjust their driving habits based upon road conditions. Local communities near the Project site would have less detour options.

Significant Rating Before Mitigation**Moderate Negative Impact**

The negative impact is considered to be of moderate significance.

Impacts on Road Condition

The wear and tear of multiple heavy truckloads, such as those associated with delivery of components, equipment, and supplies, would degrade road infrastructure, leading to conditions such as pitted, cracked or crumbling asphalt, and trenches, ridges and ditches on dirt and stone road surfaces. A road surface in poor condition results in additional wear on vehicles, lower travel speeds, safety risks and stress for road users. The number of truckloads using DN 79A would result in substantial wear to the road surface during the 36 months of construction. The county and communal roads that are unpaved or have light asphalt and may already need maintenance would be likely to experience pitting and severe deterioration.

Project construction would improve existing dirt tracks within the Project site. Table 8-48 summarizes impacts on road condition during construction.

Table 8-48 Impact Assessment: Traffic—Road Condition (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local, Regional, and International	Roads within the immediate area of the Project will receive the greatest wear from multiple heavy truck deliveries; however, the selected routes from ports or supply sources to the local area will also experience wear from truck travel and could be in neighboring countries. Supply sources for concrete, equipment, fuel, and other construction supplies have not been identified but would result in heavy wear on local and regional roads.
Duration	Permanent	The effect on road condition will be permanent if maintenance and repairs do not occur.
Scale	Major	The number of heavy truck deliveries would result in moderate to major wear to road surfaces, depending on each particular road's share of truck traffic or type of surface. The overall scale is major due to the total volume of heavy truck traffic anticipated, the predominance of unpaved or light asphalt roads surfaces within the Aol, and the reliance on DN79A to access the Project site.
Frequency	Daily	Construction-related traffic would occur on most days.

Magnitude**Large Magnitude****Sensitivity/Vulnerability/Importance of the Resource/Receptor****Medium Sensitivity**

The sensitivity is considered medium due to the ability of road users to adjust their driving habits based upon road conditions and the presence of alternate routes for many of the regional roads. Drivers near the Project site would have fewer alternative routes.

Significant Rating Before Mitigation**Major Negative Impact**

The negative impact is considered to be of major significance, primarily due to the major scale of impacts on road condition.

8.11.3.2 Operational Phase

A limited number of people would be required to at the Project site during the Operational Phase. The Project site would be visited regularly during operations for inspections, maintenance, and repair; however, these activities would generate minimal traffic volume. While the frequency of site visits has not been specified, ongoing Project inspection, maintenance, and repair would have a negligible impact on road safety, road function, or community severance. Ongoing monitoring and repair or restoration of local, unpaved, or lightly paved roads may be necessary following the movement of heavy trucks related to repairs. Table 8-49 summarizes impacts on road function, condition, and safety during operations.

Table 8-49 Impact Assessment: Traffic—Road Safety, Road Function, Community Severance, and Road Condition (Operations)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Operations would result in regular traffic within the local area. Regionally, operational traffic would not be discernible from the background traffic levels except possibly for occasional large delivery trucks.
Duration	Long term	The impact duration would continue through the operational period.
Scale	Small	Based on the anticipated traffic generated by a limited number of workers and periodic repairs, the scale is considered small.
Frequency	Daily	A low level of regular worker traffic is anticipated, with less frequent periods of higher volume traffic for a few days for repairs or maintenance.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
Local road users and residents have medium sensitivity to traffic volumes and types. They depend upon local roads for transportation but can adjust to changing traffic. Alternative local routes are limited.		
Significant Rating Before Mitigation		
Minor Negative Impact		
The impact of traffic for project operations and maintenance is considered to be of minor significance. Traffic generated from the Project site would be minimal with a limited number of workers required to ensure operational maintenance.		

8.11.3.3 Decommissioning Phase

Decommissioning will likely generate traffic associated with worker movements, disassembly components, cabling, and storage systems, and transport of materials away from the site, along with temporary or permanent road infrastructure improvements necessary to facilitate those activities. Overall, it is assumed that decommissioning will result in impacts similar in character and significance to those identified for the construction phase, but likely of shorter duration and with a lower volume of heavy truck trips. Table 8-50 summarizes impacts on road function, condition and safety during decommissioning.

Table 8-50 Impact Assessment: Traffic— Road Safety, Road Function, Community Severance, and Road Condition (Decommissioning)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local, Regional, and International	Travel would be regional or international due to equipment deliveries from unidentified suppliers and material transports to recycling and disposal facilities.
Duration	Short term	Impact will be limited to the decommissioning period.
Scale	Medium	Road function, condition and safety impacts would result from the temporary increase in heavy truck movements on local roads and to a lesser extent on regional roads. The volume of deliveries would be lower than during construction, and components could be dismantled on-site to avoid the need for large delivery trucks, resulting in a medium scale of impact.
Frequency	Daily	Decommissioning traffic would occur daily.
Magnitude		
Medium Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
Road users and residents would not be accustomed to the project-related heavy truck traffic and would need to adjust their driving practices and expectations to accommodate these vehicles. Road users and residents would be accustomed to the type of passenger vehicle traffic that would be generated by worker commuting.		
Significant Rating Before Mitigation		
Moderate Negative Impact		
The impact is considered to be of moderate significance.		

8.11.4 Mitigation Measures

The recommended mitigation measures below are divided into measures that address road safety, function, condition, and potential for community severance, although there is some overlap in the effects of these measures. Each mitigation is identified by phase.

8.11.4.1 Mitigations to Address Road Safety

As part of the TMP, address transportation safety risks of Project traffic, including (but not limited to) truck routes, hours of transport, community notification, signage, education, and other measures to minimize safety hazards (construction, decommissioning).

- Complete a road transport route study that evaluates routes to be used for large delivery trucks, identifies any hindrances or necessary road alterations, and identifies mitigations for hazards to roadside structures or property. Obtain permits and implement alterations prior to deliveries (pre-construction, construction, decommissioning).
- Plan truck routes for delivery trucks using roads with adequate geometrics and load-bearing capacity for safe passage (pre-construction, construction, operations, decommissioning).
- Consider community schedules that result in higher levels of local traffic, school schedules, or community events. Schedule truck traffic outside of these times in addition to avoiding periods of peak traffic volumes (construction, operations, decommissioning).

- As part of a Project-related public engagement programme, regularly inform, educate, and update stakeholders about Project construction traffic, large vehicle movements, and related safety considerations (pre-construction, construction, decommissioning).
- Establish and implement standards addressing the following (constructions, operations, decommissioning):
 - Training and accreditation for project drivers, including contractors.
 - Driver fitness standards, including mandatory rest periods and prohibition of drug/alcohol use.
 - In-vehicle monitoring systems to monitor vehicle speed and location (Project vehicles and contractors).
 - Project and contractor standards for vehicle safety and maintenance.
 - Security response for vehicle incidents.
 - Load stability standards.

8.11.4.2 *Mitigations to Address Road Function Impacts*

- Prepare and implement a Transportation Management Plan (TMP) that addresses the other mitigations listed below, provides a detailed plan for Project deliveries, and incorporates the results of stakeholder and community engagement (construction, operations, decommissioning).
- Work with local authorities in scheduling truck deliveries, especially large truck deliveries, to reduce impacts on road function and safety. Specifically:
 - Where safe and feasible, schedule deliveries to minimize travel impacts for other road users based upon local conditions and the results of stakeholder engagement. Consider scheduling deliveries during non-peak hours and at intervals to avoid queuing of delivery vehicles along public roads near the access points to internal Project roads (construction, operations, decommissioning).
 - Consider scheduling deliveries in convoys of multiple trucks at one time to reduce the frequency of road travel interruption and delays (construction, decommissioning).
 - Consider movement of large or escorted delivery trucks at night, if feasible and safe, to reduce impact to road function (construction, operations, decommissioning).
- As part of a Project-related public engagement programme, regularly inform, educate, and update stakeholders and communities close to transport routes about Project traffic, especially about the safety issues and scheduling associated with movement of heavy and large delivery trucks on public roads (construction, decommissioning).

8.11.4.3 *Mitigations to Address Road Condition Impacts*

- Obtain necessary permits and implement all necessary road improvements or alterations prior to use of the routes for large Project shipments (construction, operations, decommissioning).
- Restore signs, street lights, and other street furniture removed for or damaged by the movement of Project-related trucks (construction, operations, decommissioning).
- Survey the condition of roads to be used for concrete, supply, equipment, and component deliveries prior to construction and submit reports to local road authorities (pre-construction).
- Repair road damage resulting from construction traffic during the 3-year construction period (construction).
- Upon completion of the construction and decommissioning phases, work with local road authorities to identify damage to and restore county, communal, and agricultural roads used for Project-related heavy truck traffic. Coordinate with national road authorities (the Romanian National Road

Infrastructure Company, or CNAIR) to coordinate and contribute to repair and maintenance of national roads damaged by construction (construction, decommissioning).

- Upon completion of construction, in coordination with local road authorities and stakeholders, establish a schedule to be implemented by the Proponent and other stakeholders for maintenance of roads within the Project area during operations (construction).

8.11.4.4 Mitigations to Address Community Severance Impacts

- As part of a Project-related public engagement programme, regularly inform, educate, and update stakeholders about Project construction traffic, large truck movements, and related safety considerations (pre-construction, construction, decommissioning).
- Where safe and feasible, schedule deliveries to minimize travel impacts for other road users based upon local conditions and the results of stakeholder engagement. Consider scheduling deliveries during non-peak hours and at intervals to avoid queuing of delivery vehicles along public roads near the access points to internal Project roads (construction, operations, decommissioning).
- Plan truck routes for delivery trucks using roads with adequate geometrics and load-bearing capacity for safe passage (pre-construction, construction, operations, decommissioning).
- Consider community schedules that result in higher levels of local traffic, school schedules, or community events. Schedule truck traffic outside of these times in addition to avoiding periods of peak traffic volumes (construction, operations, decommissioning).

8.11.4.5 Residual Impact Significance

With the application of mitigation measures, the residual adverse impacts on roads and traffic are anticipated to be of minor significance during construction and decommissioning, and negligible significance during operations, as detailed in Table 8-51 below. With negligible adverse impacts, the overall impact on road function and condition during operations would be positive, due to the presence of new local roads constructed and maintained by the Project proponent.

Table 8-51 Pre and Post Mitigation: Impacts on Road Function, Condition and Safety

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Road Safety	Construction	Moderate	Minor
Road Function	Construction	Moderate	Minor
Community Severance	Construction	Moderate	Minor
Road Condition	Construction	Major	Minor
Road Safety	Operations	Minor	Negligible
Road Function	Operations	Minor	Negligible
Community Severance	Operations	Minor	Negligible
Road Condition	Operations	Minor	Negligible
Road Safety	Decommissioning	Moderate	Minor
Road Function	Decommissioning	Moderate	Minor
Community Severance	Decommissioning	Moderate	Minor
Road Condition	Decommissioning	Moderate	Minor

8.12 Ecosystem Services

8.12.1 Introduction

8.12.1.1 Area of Influence (Aol)

The Project Area of Influence (Aol) in terms of ecosystem services, was defined as the Wider Regional Area, represented by the Direct Social Area of Influence (Aol) for any potential impacts due to the construction and operation of the Dama PV plant. This comprises all settlements impacted by land take for the Project components (that belong to the administrative territorial units of Grăniceri and Pilu Communes), together with the settlements that could be affected by potential temporary impacts during the construction phase and long-term during operations (such as glint and glare effect) located in a 2 km buffer from the PV area.

Additionally, a 'Study Area' for the Critical Habitat Assessment (CHA), was carried out in the Biodiversity Baseline Study for the Project, to determine the presence of each species or ecosystem that regularly occurs in the Project's Aol.

8.12.1.2 Summary of Baseline

The Project area is currently mainly covered by modified (artificial) agricultural lands under active cultivation for crops. The land use in the Social Aol is characterized by the following:

- all the settlements have a marked rural character.
- across the Direct Aol, arable land represents the major land use, followed by pastures in similar ratios (over 20% and more than the county ratio) and with very limited forested areas (less than 1% compared to approximately 30% at County level).

Food provisioning services and pollination maintenance services from agricultural lands, and socio-cultural services linked to the protected areas present in the area are the most important ecosystem services provided by the Project Aol.

8.12.2 Potential Impacts

The main factors affecting ecosystem services in the Project area, before the construction and operation of the Dama PV plant are summarized into three types: natural factors, land use factors, and socio-economic factors, as detailed below:

- Natural factors – including biological factors, soil factors, topographic factors and climate factors – are the natural foundations of ecosystem services.
- Changes in land-use type – including overall pattern, intensity, etc. – all further directly affect the level of ecosystem services.
- Socio-economic factors – including the economic level and economic development, population density, cultural, tourism and recreational factors, all influence ecosystem services by affecting the intensity use of ecological materials and environmental pollution (Millennium Ecosystem Assessment, 2005¹⁰⁶).

Project activities causing potential impacts to ecosystem services in the Project area are mainly represented by land taking and clearing of vegetation on the Project sites for the construction of the Dama PV Plant. These are likely to result in a disruption or reduction of ecosystem services that occur in the Project area, predominantly through the loss of available arable land and protected areas.

8.12.3 Assessment of Impacts

Assessment of impacts on ecosystem services was based on:

- Stakeholders' perception on impacts on ecosystem services;

¹⁰⁶ <https://www.millenniumassessment.org/en/index.html>

- Expert assessment of impacts on ecosystem services;
- Data available for the Wider Regional Area;
- The Project's layout and immediately adjacent areas (for direct impacts) and the Ecosystem Services Aol (for indirect impacts), taking into account the Project development phases: construction, operation, and decommissioning; and
- Selected indicators (such as ecosystem condition and extent) for key ecosystem services impacted in the Ecosystem Services Aol (indirect Social Aol).

8.12.3.1 Construction, Operation and Decommissioning Phase

The table below provides an assessment of impacts related to restrictions access to ecosystem services, considered as food and pollination services from arable land and socio-cultural services given by the protected areas, during Project's construction, operation and decommissioning phases.

Table 8-52 Impact assessment: Disruption of Ecosystem Services – during Construction, Operation and Decommissioning

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of ecosystem services is largely limited to the Direct Social Area of Influence and Biodiversity Study area.
Duration	Long term	The impacts are long-term and ongoing during the Construction (up to 24 months) and Operation phase (up to 25 years) and decommissioning phases.
Scale	Medium	Given the size of the project, the scale of the impact on the local communities is considered medium.
Frequency	Continuous	The frequency is continuous during all project phases, as there will be ongoing risk of disruption of the ecosystem services.
Magnitude		
Medium		
Given the extension of the PV plant, the impact magnitude is assessed as Medium.		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium		
Given the existing relationship of local communities with the services provided by the current agricultural activities, and the reduction of services related to protected areas, the sensitivity of the receptors is considered medium.		
Significance Rating Before Mitigation		
Moderate Negative Impact		
Considering the impact magnitude of change is medium and the sensitivity is high, the overall significance is considered to be of Major significance.		

8.12.4 Mitigation Measures

The recommended mitigation measures below, that address ecosystem services, are to be implemented by the EPC Contractor:

- Rehabilitation of all viable disturbed areas (e.g., temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way so as to facilitate natural regeneration of vegetation.
- Maintain ongoing engagement between the Project and local communities, with communities informed in advance of any additional land use change.
- Mitigation measures for loss of livelihoods as a result of land acquisition for the Project are also applicable to this impact as assessed in the Livelihood chapter. Main mitigation measure will include preparation of the Livelihood Restoration Plan (LRP), to provide the foundation for adequate compensation process. The LRP will include an entitlement matrix applicable to all Project Affected People (PAPs).
- Mitigations measures for impacts on biodiversity, defined in the biodiversity chapter, are also applicable to preserve natural protected ecosystems.
- Consult with protected areas management authority to ensure activities within designated protected areas (Natura 2000 sites) are permitted by the relevant protected areas management authority.
- Ensure that the project is aligned with the conservation and management objectives of the Natura 2000 protected areas and does not seek to undermine these.

8.12.5 Residual Impact Significance

After the application of mitigation measures, the impact significance of the Project on ecosystem services can be reduced to a minor significance.

Table 8-53: Pre- and Post-mitigation: Ecosystem services

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Disruption of Ecosystem Services	Construction, Operation and Decommissioning	Moderate	Minor

8.13 Cultural Heritage

8.13.1 Baseline Summary

As identified in the baseline, each of the 62 Cultural Heritage resources is presented with a sensitivity in line with the ERM Impact Assessment and Mitigation Methodology (Section 4.2). In the absence of more detailed information on these Cultural Heritage resources, the impact assessment takes a conservative, precautionary approach to the assessment of sensitivity and impact, in line with Good Industry International Practice.

Table 8-54 presents the ‘types’ and quantities of identified Cultural Heritage resources in relation to their sensitivity of receptor. The distinction of high, medium and low sensitivity is utilised in each impact assessment table. (Please refer to Appendix G for impact assessment details on each cultural heritage resource).

Table 8-54: Quantities of high, medium and low sensitivity of receptor for Cultural Heritage ‘types’ identified in the baseline

'Type' of Cultural Heritage resource	High Sensitivity	Medium Sensitivity	Low Sensitivity
Barrow/Mounds (also known as tumuli)	Grăniceri 30	0	0
	Pilu 17		
Open Settlements/multi-layered tell/settlement	Grăniceri 9	0	0
	Pilu 5		
Mound/open settlement	Grăniceri 1	0	0
	Pilu 0		
Total	Grăniceri 40	0	0
	Pilu 22		

8.13.2 Identification of potential impacts

The predicted impacts to the Cultural Heritage resources as a result of the Project are described in this section.

The impact assessment considers both tangible and intangible Cultural Heritage resources as described below:

- Tangible Cultural Heritage – such as (but not limited to) archaeological sites, built heritage (historic or culturally significant buildings or structures), places of worship, historic enclosures and potential settlements; and
- Intangible Cultural Heritage – such as (but not limited to) places that hold cultural, artistic, or religious values, knowledge, innovations, and practices of communities embodying traditional lifestyles, and living heritage resources (shrines, cemeteries, religious/ritual sites) etc. However, none were identified during fieldwork or desk-based assessments.

Project considerations

The Project Aol of Influence (Aol) and construction corridor for Cultural Heritage are outlined in **Table 8-55**. For the impact assessment it is assumed¹⁰⁷ that any identified Cultural Heritage Resources located within the construction corridor (defined as the footprint of the Proposed Development and associated infrastructure) will be wholly removed¹⁰⁸ during the construction phase.

Table 8-55 Scope of the Impact Assessment and Area of Influence

Project Phase	Construction corridor	Area of Influence
Construction	The footprint of the Proposed Development and associated infrastructure.	2000 metres from the proposed development and associated infrastructure;

¹⁰⁷ At the time of writing, no construction limits for the project had been defined, as such assumptions needed to be applied to the study.

¹⁰⁸ "Removed" here means the resource will need to be physically removed in its totality for construction of the Project, and no trace will survive in-situ beyond the construction phase

Operation	n/a – it is assumed any cultural heritage resources located within the construction corridor will have been wholly removed at construction stage	2000 metres from the proposed development and associated infrastructure;
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Direct, indirect, and cumulative impacts

Three types of impacts to Cultural Heritage resources are considered in this assessment resulting from construction and operation phases of the Project:

- Direct: ground disturbance due to earthworks are the most likely source of direct, physical impacts to known and unknown Cultural Heritage resources, with the potential to partially or wholly remove these resources. Direct impacts have the potential to be once off, non-reversible and permanent.



Unless the principle of avoidance is adopted in the first instance, mitigation measures will not significantly reduce the predicted residual effect of this impact on the Cultural Heritage.

- Indirect: Cultural Heritage resources are susceptible to indirect impacts through the introduction of intrusive visual, auditory or dust elements to their physical environment or 'setting'. Indirect impacts also include restricted access to existing Cultural Heritage resources as a result of construction or operation phases; and
- Cumulative: impacts to Cultural Heritage resulting from incremental change caused by surrounding projects in the past, present or reasonably foreseeable future, combined with this Project.

Impact Magnitude

Standard terminology and designations as per **Table 8-56** is provided to ensure consistency when characteristics are described in an impact assessment report. An assessment of the overall magnitude of an impact is provided by considering all the dimensions of the impact described in order to determine whether an impact is of negligible, small, medium or large magnitude¹⁰⁹.

A 2km zone of theoretical visibility (ZTV) was generated for the Project, using the height of the panels given a value of 4m above the ground. This ZTV was utilised to understand indirect impacts and the visibility of the introduction of new features to the landscape before mitigation measures were implemented.

Table 8-56 Impact Magnitude definitions for Cultural Heritage

Magnitude	Cultural Heritage resources
Negligible	No discernible change in the physical condition, setting or accessibility of the site.
Small	Small part of the site is lost or damaged, resulting in a loss of scientific or cultural value; Setting undergoes temporary or permanent change that has limited effect on the site's perceived value to stakeholders; Stakeholder/public or scientific access to site is temporarily impeded; and/or Historic building suffers minor, repairable, structural damage.

¹⁰⁹ Source: ERM Impact Assessment Methodology 2021

Medium	A significant portion of the site is lost or damaged, resulting in a loss of scientific or cultural value; Setting undergoes permanent change that permanently diminishes the site's perceived value to stakeholders; Site becomes inaccessible for the life of the Project to stakeholders including traditional users or researchers; and/or Historic building suffers major structural damage that is not repairable.
Large	The entire site is damaged or lost, resulting in a nearly complete or complete loss of scientific or cultural value; Setting is sufficiently impacted to cause site to lose nearly all or all cultural value or functionality; Site becomes permanently inaccessible to stakeholders including traditional users or researchers; and/or Historic building suffers major structural failure.

8.13.2.2 Construction Phase Impacts

Five Potential Impacts (PI) are considered during the construction phase:

- **PI1 Physical ground disturbance through earthworks:** a direct impact, ground disturbance and earthworks associated with the construction phase have the potential to partially or wholly remove Cultural Heritage resources, such as:
 - Buried archaeology, including undiscovered archaeological sites and pyramids;
 - Built heritage including historic buildings, places of worship, shrines or tombs;
 - Historic agricultural, irrigation, settlements or enclosures; and
 - Industrial heritage including historic railways, rail and road bridges.
- **PI2 Restriction of access:** restriction zones associated with the construction phase have the potential to temporarily or permanently restrict the access for traditional users or researchers to existing Cultural Heritage resources;
- **PI3 Visual:** The construction of temporary or permanent structures (towers, arrays, embankments etc.) has the potential indirectly impact built and living Cultural Heritage through the introduction of intrusive visual elements to the physical environment or 'setting' where the resource draws value from its surroundings.
- **PI4 Auditory:** The construction phase has the potential to introduce intrusive auditorial (noise) elements through associated construction works to the physical environment or 'setting' of Cultural Heritage resources; and
- **PI5 Dust:** The construction phase has the potential to introduce intrusive dust elements through associated works to the physical environment or 'setting' of Cultural Heritage resources.

Pre-mitigation Direct Impacts

Construction phase direct impacts are presented in the tables below. For clarity, each table is presented by the Cultural Heritage sensitivity of receptor (high, medium, and low) and by the types of potential impacts (PI1 through to PI5).

Direct Impacts on High Sensitivity resources

The magnitude of impact through physical ground disturbance activities (earth works) on **high** sensitivity Cultural Heritage resources during the construction phase is assessed as **large** when the majority or the entirety of the site is lost or damaged, resulting in a complete loss of scientific or cultural value (Table 8-57). The resulting significance of impact for all is (based on the sensitivity of the resources and the magnitude of impact) is **permanent major adverse**. A total of nine sites in the Granceri commune and three in Pilu were assessed to have high sensitivity and large magnitudes of impact.

Table 8-57: Direct impacts on PI1 Physical ground disturbance activities (earthworks) on High sensitivity Cultural Heritage Resources

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the construction corridor
Duration	Permanent	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology.
Frequency	Once-off	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology permanently, once.
Magnitude		
Large		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
Grăniceri: AR_CH_019, AR_CH_020, AR_CH_021, AR_CH_022, AR_CH_025, AR_CH_026, AR_CH_028, AR_CH_035, and AR_CH_036 Pilu: AR_CH_041, AR_CH_042, and AR_CH_043 which are barrow/mounds and open settlement sites.		
Significant Rating Before Mitigation		
Major Negative Impact		
The impact is considered to be of Major significance.		

The magnitude of impact through physical ground disturbance activities (earth works) on **high** sensitivity Cultural Heritage resources during the construction phase is assessed as **small**, when a small part of the site is lost or damaged, resulting in a loss of scientific or cultural value. The resulting significance of impact for all is (based on the sensitivity of the resources and the magnitude of impact) is **permanent moderate adverse** (Table 8-58). Two sites were identified as such within the Grăniceri commune and none in Pîlu.

Table 8-58: Direct impacts P11 Physical ground disturbance activities (earthworks) on High sensitivity Cultural Heritage Resources

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the construction corridor
Duration	Permanent	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology.
Frequency	Once-off	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology permanently, once.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
Grăniceri: AR_CH_031 and AR_CH_037 which are both barrow/mounds.		
Significant Rating Before Mitigation		
Moderate		
The impact is considered to be of moderate significance.		

Pre-mitigation Indirect Impacts

Construction phase indirect impacts are presented below in Table 8-59 to Table 8-60. For clarity, each table is presented by the Cultural Heritage sensitivity of receptor (high, medium, and low).

Indirect Impacts on High Sensitivity resources

The magnitude of impact through visual (PI3) and auditory (PI4) impacts on the following **high** sensitivity Cultural Heritage resources during the construction phase is assessed as **medium**, as the setting undergoes temporary and permanent changes that have moderate effect on the site's perceived value to stakeholders. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **permanent major adverse** (Table 8-59). Seven of these sites were in Grăniceri and four in Pîlu.

Table 8-59 Indirect visual (PI3) and auditory (PI4) impacts on High sensitivity Cultural Heritage Resources (Pre-Mitigation) with a medium magnitude.

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the Project site and surrounding environs
Duration	Permanent	The construction phase has the potential to introduce intrusive visual and auditory elements through associated works to the physical environment or 'setting' of Cultural Heritage resource
Frequency	Frequentf	Construction related activities will frequently introduce intrusive visual and auditory elements through associated works to the physical environment or 'setting' of Cultural Heritage resource
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
Grāniceri: AR_CH_003, AR_CH_009, AR_CH_010, AR_CH_018, AR_CH_024, AR_CH_034, AR_CH_038 which consist of barrow/mounds and open settlements.		
Pilu: AR_CH_045, AR_CH_046, AR_CH_049, AR_CH_051 which are all barrow/mounds.		
Significant Rating Before Mitigation		
Major Negative Impact		
The impact is considered to be of major significance.		

The magnitude of impact through visual (PI3) and auditory (PI4) impacts on the following **high** sensitivity Cultural Heritage resources during the construction phase is assessed as **small**, as the setting undergoes temporary or permanent change that has limited effect on the site's perceived value to stakeholders. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **permanent moderate adverse** (Table 8-60). Eighteen such sites were found in Grāniceri and twelve were in Pilu.

Table 8-60 Indirect visual (PI3) and auditory (PI4) impacts on High sensitivity Cultural Heritage Resources (Pre-Mitigation) with a small magnitude

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the Project site and surrounding environs
Duration	Permanent	The construction phase has the potential to introduce intrusive visual and auditory elements through associated works to the physical environment or 'setting' of Cultural Heritage resource
Frequency	Frequentf	Construction related activities will frequently introduce intrusive visual and auditory elements through associated works to the physical environment or 'setting' of Cultural Heritage resource
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		

Grăniceri: AR_CH_001, AR_CH_004, AR_CH_005, AR_CH_008, AR_CH_011, AR_CH_012, AR_CH_013, AR_CH_014, AR_CH_015, AR_CH_016, AR_CH_017, AR_CH_027, AR_CH_029, AR_CH_030, AR_CH_032, AR_CH_033, AR_CH_039, AR_CH_040.

Pilu: AR_CH_044, AR_CH_047, AR_CH_048, AR_CH_050, AR_CH_052, AR_CH_055, AR_CH_056, AR_CH_057, AR_CH_058, AR_CH_059, AR_CH_061, AR_CH_062

Significant Rating Before Mitigation

Moderate Negative Impact

The impact is considered to be of moderate significance.

8.13.2.3 Construction Phase Mitigation Measures

A comprehensive Cultural Heritage Management Plan (CHMP) will be developed for the Project to ensure all Cultural Heritage resources are addressed and managed adequately. The plan will be developed and agreed pre-construction, to allow appropriate mitigation measures to be applied before any impact occurs. Items to be covered in the CHMP include (but not limited to):

- Specific design measures, such as screening bunds or noise reduction measures, to address indirect impacts;
- Outlines for micro-siting to avoid cultural heritage or creating archaeological exclusion zones to protect sensitive resources.
- Regulator engagement with the Arad County Directorate of Culture and Ministry of Culture as needed to agree site-specific mitigation measures;
- Further field survey and assessment for potentially impacted resources. In the absence of more detailed information on Cultural Heritage resources identified in the baseline, additional field survey will be required under the CHMP to determine the full extents and significance of Project impacts to be undertaken by an appropriately qualified Cultural Heritage specialist. The CHMP will need to be updated to reflect the findings of this additional survey.
- Access management (Memorandum of Understanding with local communities regarding access and activities). Access arrangements will be made to the satisfaction of identified stakeholders through a Memorandum of Understanding agreed to by authorities and identified stakeholders, which will allow unrestricted access to Cultural Heritage resources. This memorandum should be in place before construction begins.
- Cultural Heritage input into the Community Grievance Mechanism;
- Grave Relocation Plan. This will be designed and implemented with the agreement of the local communities (for the cemetery identified in the AOI).
- Chance Finds Procedure. A Chance Finds Procedure will be designed and implemented to manage any unexpected discovery of archaeological material in-line with international requirements and guidelines IFC PS8.
- Detailed site-specific Archaeological mitigation, such as pre-construction investigations, setting assessments, archaeological excavations, etc.;
- Built heritage recording; and
- Monitoring of mitigation measures and Mitigation Control.

Post Mitigation Direct Impacts

The direct impacts presented in the tables below on **High** sensitivity Cultural Heritage resources will not be reduced unless avoidance is adopted in the first instance via micro-siting and the creation of archaeological exclusion zones.



The only mitigation measure that would be effective in reducing the significance of direct physical impact would be avoidance via micrositing or the creation of archaeological exclusion zones. If this were to be applied, the resulting Post-Mitigation significance would be negligible.

Post Mitigation Indirect Impacts

The magnitude of impact through visual (PI3) and auditory (PI4) impacts on the following **high** sensitivity Cultural Heritage resources during the construction phase after mitigations are conducted is assessed as **small**, as the setting undergoes temporary or permanent change that has limited effect on the site's perceived value to stakeholders. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **permanent moderate adverse (Table 8-61)**. Seven sites with such impacts were found in Grăniceri , and four in Pilu.

Table 8-61 Indirect visual (PI3) and auditory (PI4) impacts on High sensitivity Cultural Heritage Resources (Post-Mitigation) with a small magnitude.

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the Project site and surrounding environs
Duration	Permanent	The construction phase has the potential to introduce intrusive visual and auditory elements through associated works to the physical environment or 'setting' of Cultural Heritage resource
Frequency	Frequentf	Construction related activities will frequently introduce intrusive visual and auditory elements through associated works to the physical environment or 'setting' of Cultural Heritage resource
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
Grăniceri: AR_CH_003, AR_CH_009, AR_CH_010, AR_CH_018, AR_CH_024 AR_CH_034, AR_CH_038 which consist of barrow/mounds and open settlements.		
Pilu: AR_CH_045, AR_CH_046, AR_CH_049, and AR_CH_051 which consist of barrow/mounds and open settlements.		
Significant Rating Before Mitigation		
Moderate Negative Impact		
The impact is considered to be of moderate significance.		

The magnitude of impact through visual (PI3) and auditory (PI4) impacts on the following **high** sensitivity Cultural Heritage resources during the construction phase after mitigations are conducted is assessed as **Negligible**, as the setting undergoes temporary or permanent change that has negligible effect on the site's perceived value to stakeholders. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **permanent negligible adverse (Table 8-62)**. Eighteen thusly impacted sites were found in Grăniceri, and twelve in Pilu.

Table 8-62 Indirect visual (PI3) and auditory (PI4) impacts on High sensitivity Cultural Heritage Resources (Post-Mitigation) with a negligible magnitude.

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the Project site and surrounding environs
Duration	Permanent	The construction phase has the potential to introduce intrusive visual and auditory elements through associated works to the physical environment or 'setting' of Cultural Heritage resource
Frequency	Frequentf	Construction related activities will frequently introduce intrusive visual and auditory elements through associated works to the physical environment or 'setting' of Cultural Heritage resource
Magnitude		
Negligible		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
Grăniceri: AR_CH_001, AR_CH_004, AR_CH_005, AR_CH_008, AR_CH_011, AR_CH_012, AR_CH_013, AR_CH_014, AR_CH_015, AR_CH_016, AR_CH_017, AR_CH_027, AR_CH_029, AR_CH_030, AR_CH_032, AR_CH_033, AR_CH_039, and AR_CH_040 which consist of barrow/mounds and open settlements.		
Pilu: AR_CH_044, AR_CH_047, AR_CH_048, AR_CH_050, AR_CH_052 AR_CH_055, AR_CH_056, AR_CH_057, AR_CH_058, AR_CH_059, AR_CH_061, and AR_CH_062 which consist of barrow/mounds and open settlements.		
Significant Rating Before Mitigation		
Negligible Negative Impact		
The impact is considered to be of Negligible significance.		

8.13.2.4 Operation Phase Impacts

Three types of indirect impacts are considered during the operation phase:

- **PI6 Restriction of access:** the potential to permanently restrict access for traditional users or researchers to existing Cultural Heritage resources;
- **PI7 Visual:** the potential to introduce mobile intermittent intrusive visual elements to the physical environment or 'setting' of Cultural Heritage resources;
- **PI8 Auditorial:** the potential to introduce intermittent intrusive auditorial elements to the physical environment or 'setting' of Cultural Heritage resources;

Pre-mitigation direct Impacts

No direct impacts to Cultural Heritage resources have been identified at the Operation phase of the Project, as direct impacts to cultural heritage resources will happen at construction phase during earthwork activities, either partially or wholly removing the resource.

Pre-mitigation Indirect Impacts

Operation phase impacts are presented below. For clarity as with the construction phase, each table is presented by the Cultural Heritage sensitivity of receptor (high). No resources were identified with Medium or Low sensitivities.

Indirect impacts to High Sensitivity resources

The magnitude of impact through visual impact (PI7) and auditorial (PI8) impacts on setting on **high** sensitivity Cultural Heritage resources during the operation phase is assessed as **small**, as the impact will have a limited effect on the site's perceived value to stakeholders. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **permanent moderate adverse (Table 8-63)**. Eighteen thusly impacted sites were found in Grăniceri and sixteen in Pîlu.

Table 8-63 Indirect PI7 Visual and PI8 Auditorial impacts on High sensitivity Cultural Heritage Resources (Pre-Mitigation) with a small magnitude

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the Project site and surrounding environs
Duration	Permanent	The operation phase has the potential to introduce intrusive visual and auditorial elements to the physical environment or 'setting' of Cultural Heritage resource
Frequency	Frequentf	Operation will frequently introduce intrusive visual and auditorial elements to the physical environment or 'setting' of Cultural Heritage resource
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
Grăniceri: AR_CH_001, AR_CH_004, AR_CH_005, AR_CH_008, AR_CH_011, AR_CH_012, AR_CH_013, AR_CH_014, AR_CH_015, AR_CH_016, AR_CH_017, AR_CH_027, AR_CH_029, AR_CH_030, AR_CH_032, AR_CH_033, AR_CH_039, and AR_CH_040 which consist of barrow/mounds and open settlements.		
Pîlu: AR_CH_044, AR_CH_045, AR_CH_046, AR_CH_047, AR_CH_048, AR_CH_049, AR_CH_050, AR_CH_051, AR_CH_052, AR_CH_055, AR_CH_056, AR_CH_057, AR_CH_058, AR_CH_059, AR_CH_061, and AR_CH_062 which are all barrows/mounds or open settlements		
Significant Rating Before Mitigation		
Moderate Small Impact		
The impact is considered to be of moderate significance.		

8.13.2.5 Operation Phase Mitigation Measures & Residual Effect

The operation phase will make continued reference to the CHMP as discussed in the Construction Phase Mitigation Measures section with proposed monitoring, exclusion zones, and other measures implemented as needed.

Post Mitigation Direct Impacts

No direct impacts to Cultural Heritage resources have been identified at the Operation phase of the Project, as direct impacts to cultural heritage resources will happen at construction phase during earthwork activities, either partially or wholly removing the resource.

Post mitigation Indirect Impacts

Operation phase impacts are presented below. For clarity as with the construction phase, each table is presented by the Cultural Heritage sensitivity of receptor (high). No predicted impacts were assessed for Medium or Low sensitivity resources.

The magnitude of impact through visual impact (PI7) and auditorial (PI8) impacts on setting on **high** sensitivity Cultural Heritage resources during the operation phase post mitigation is assessed as **negligible**, as the impact will have a limited effect on the site's perceived value to stakeholders. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **negligible (Table 8-64)**. Twenty-five thusly impacted sites were found in Grăniceri and sixteen in Pilu.

Table 8-64 Indirect PI7 Visual and PI8 Auditorial impacts on High sensitivity Cultural Heritage Resources (Post-Mitigation) with negligible magnitude

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the Project site and surrounding environs
Duration	Permanent	The operation phase has the potential to introduce intrusive visual and auditorial elements to the physical environment or 'setting' of Cultural Heritage resource
Frequency	Frequentf	Operation will frequently introduce intrusive visual and auditorial elements to the physical environment or 'setting' of Cultural Heritage resource
Magnitude		
Negligible		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
Grăniceri: AR_CH_001, AR_CH_003, AR_CH_004, AR_CH_005, AR_CH_008 AR_CH_009, AR_CH_010, AR_CH_011, AR_CH_012, AR_CH_013, AR_CH_014, AR_CH_015, AR_CH_016, AR_CH_017, AR_CH_018, AR_CH_024, AR_CH_027, AR_CH_029, AR_CH_030, AR_CH_032, AR_CH_033, AR_CH_034, AR_CH_038, AR_CH_039 and AR_CH_040 which are all barrows/mounds or open settlements Pilu: AR_CH_044, AR_CH_045, AR_CH_046, AR_CH_047, AR_CH_048, AR_CH_049, AR_CH_050, AR_CH_051, AR_CH_052, AR_CH_055, AR_CH_056, AR_CH_057, AR_CH_058, AR_CH_059, AR_CH_061, and AR_CH_062 which are all barrows/mounds or open settlements		
Significant Rating Before Mitigation		
Negligible Small Impact		
The impact is considered to be of negligible significance.		

No impacts

A total of seven cultural heritage resources will experience no impact during the construction or operation phases. Four are within the Grăniceri Commune (AR_CH_002, AR_CH_006, AR_CH_007, AR_CH_023). Three are in the Pilu Commune (AR_CH_053, AR_CH_054, and AR_CH_060).

8.13.3 Summary of potential impacts to Cultural Heritage Resources

A summary of the potential direct and indirect impacts to Cultural Heritage at construction and operation phase is presented in **Table 8-65**.

Table 8-65 Summary of potential impacts to Cultural Heritage Resources

Construction Phase (quantity of Cultural Heritage resources impacted as shown)

Sensitivity	Direct Impacts	Indirect impacts	No Impact
High	Grăniceri: 11	Grăniceri: 25	Grăniceri: 4
	Pilu: 3	Pilu: 16	Pilu: 3
Medium	0	0	0
Low	0	0	0
Total	14	41	7

Operation Phase (quantity of Cultural Heritage resources impacted as shown)

Sensitivity	Direct Impacts	Indirect impacts	No Impact¹¹⁰
High	Grăniceri: 11	Grăniceri: 25	Grăniceri: 4
	Pilu: 3	Pilu:16	Pilu: 3
Medium	0	0	0
Low	0	0	0
Total	14	41	7

9. CUMULATIVE IMPACT ASSESSMENT

A Cumulative Impact Assessment (CIA) has been developed for the Project and is provided in Appendix K of this ESIA. The CIA evaluated the Project's relative contribution to cumulative impacts on five Valued Environmental and Social Components (VECs):

1. Birds
2. Climate
3. Traffic
4. Landscape & Visual
5. Employment

The assessment concluded that, in some cases, the Project may represent a major contributor to cumulative impacts on the identified VECs. However, the Project-level mitigation measures recommended within this ESIA are considered sufficient to reduce residual cumulative impacts to insignificant or minor levels.

¹¹⁰ If a Cultural Heritage resource falls wholly within the construction corridor, it has been assumed it will be fully removed at construction phase, and therefore no impact will occur at operation phase.

10. SUMMARY OF IMPACTS

The following table summarizes the impact assessment before and after mitigation expounded above in a tabular manner for an easier visualization.

Table 10-1 Summary of Environmental Impact Assessment

Topic	Potential Impact	Project Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Biodiversity	Physical destruction/ disturbance of vegetation and habitat	Construction	Minor	Minor to Negligible
	Reduced habitat connectivity	Construction/Operation/Decommissioning	Negligible	
	Vehicle collisions with Fauna	Construction/Operation/Decommissioning	Negligible	Negligible
	Hunting/ poaching	Construction/ decommissioning	Minor	Negligible
	Avifauna collisions with solar panels	Operation	Minor to Moderate	
	Barrier to species movement	Operation	Negligible	None
	Dust pollution	Construction/ decommissioning	Negligible	None
	Water and soil pollution	Construction	Minor	Negligible
	Disturbance caused by noise, light and vibrations	Construction	Minor	Negligible
	Introduction/ spread of invasive alien plants	Construction/Operation/Decommissioning	Negligible	Negligible
Climate Change	Exposure to climate events (Occurs once in 5 years to 10 years)	Operation/ decommissioning	Minor to Major	Negligible to Moderate
Groundwater and Surface water	Surface Water Contamination	Construction	Moderate	Negligible
		Operation	Moderate	Negligible
	Groundwater Contamination	Construction	Major	Negligible
		Operation	Moderate	Negligible
	Water use	Construction	Moderate	Negligible
		Operation	Negligible	Negligible
Hydrology and erosion changes	Operation	Moderate-Major	Minor	
Geology and Soil	Topsoil loss	Construction	Major-Moderate	Minor

	Topsoil loss	Operation	Major-Moderate	Minor
	Soil Contamination	Construction	Moderate	Negligible
	Soil Contamination	Operation	Minor	Negligible
	Soil Contamination	Decommissioning	Minor	Negligible
Noise and Vibration	Noise levels to the NSRs	Construction	Minor to Moderate	Negligible to Minor
Air Quality	Construction dust emissions	Construction	Minor to Moderate	Negligible
	Construction traffic emissions		Minor	Negligible
Waste Management	Inadequate Waste Management	Construction	Moderate	Minor
		Operation	Minor	Negligible
		Decommissioning	Minor	Negligible

Table 10-2 Summary of Social Impact Assessment

Topic	Potential Impact	Project Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Livelihood	Loss of jobs	Construction	Moderate	Minor
	Accidental damage to neighbouring plots	Construction	Moderate	Minor
	Access restrictions to agricultural plots	Construction	Moderate	Minor
	Dual use of Project site	Operation	Positive	Positive
Economy, employment and income	Increase in direct employment levels	Construction	Positive	Positive
	Economic benefits of indirect and induced employment and project procurement	Construction	Positive	Positive
	Increase in local council's revenue from Project authorisation taxes	Construction	Positive	Positive
	Increase in direct employment levels	Operation	Positive	Positive
	Increase in local council's revenue from Project authorisation taxes	Operations	Positive	Positive
Education training	Increased level of education and skills	Construction/ Operation and decommissioning	Positive	Positive
Infrastructure and public services	Increased demand on public services	Construction and decommissioning	Moderate	Minor
	Pressure on housing stock through the influx of non-local workers	Construction and decommissioning	Moderate	Minor
Community health and safety	Impact on air quality and noise	Construction and decommissioning	Major	Minor
	Workforce influx	Construction and decommissioning	Moderate	Minor
Labour and working conditions	Inadequate working and/or workforce accommodation conditions	Construction and decommissioning	Major	Minor
	Health and safety of supply chain workers	Construction and decommissioning	Major	Minor
	Workers' health and safety associated with incidents during construction	Construction	Major	Minor

	Workers' health and safety associated with incidents during operation	Operation	Moderate	Minor
Visual	Landscape value	Construction	Minor	Minor
	Landscape value	Decommissioning	Negligible	Negligible
	Visual	Construction	Minor	Minor
	Visual	Operational	Negligible to Minor	Negligible to Minor
	Visual	Decommissioning	Negligible	Negligible
Glare	Dwelling receptors	Operation	Minor to Moderate	Negligible to minor
	Road receptors	Operation	Moderate	Negligible to minor
Traffic	Road safety	Construction	Moderate	Minor
	Road function	Construction	Moderate	Minor
	Severance	Construction	Moderate	Minor
	Road condition	Construction	Major	Minor
	Road safety, road function, severance, road condition	Operation	Minor	Negligible
	Road safety	Decommissioning	Moderate	Minor
Human Rights	Child labour		Moderate	Minor
	Collective bargaining and freedom of association		Minor	Minor
	Modern slavery / forced labour		Moderate	Minor
	Grievance mechanism and remedy		Minor	Minor
	Job security / right to work		Moderate	Minor
	Non-discrimination		Major	Minor
	Occupational health and safety		Major	Minor
	Wages (pay equity standard of living)		Moderate	Minor
	Working hours		Moderate	Minor
	Freedom of expression		Moderate	Minor
	Right to life and security of person		Major	Minor
	Social insurance		Minor	Minor

	Right to land		Moderate	Minor
	Disability rights		Moderate	Minor
	Migrants rights		Major	Minor
	Women's rights gender equality		Moderate	Minor
	Human rights in the supply chain		Major	Moderate
	Right to clean environment and access to resources		Major	Minor
Ecosystem Services	Disruption of Ecosystem Services	Construction, operation and decommissioning	Moderate	Minor

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