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## **WATER RESERVOIRS PROJECT - ARMENIA**

### **Environmental and Social Impact Assessment for the Yelpin Reservoir Construction Project**

## **ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

Rev01

December 2025

**Prepared for:**

**European Bank for  
Reconstruction and  
Development**

*and*

**Water Committee under the  
Ministry of Territorial  
Administration and  
Infrastructure of the Republic of  
Armenia**



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## ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Rev01

Consultancy Services Contract № 2023.009567

### Prepared for:

- European Bank for Reconstruction and Development
- Water Committee under the Ministry of Territorial Administration and Infrastructure of the Republic of Armenia

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## Disclaimer

This Environmental and Social Management Plan (ESMP) has been developed as part of the Environmental and Social Impact Assessment (ESIA) for the Yelpin Reservoir Construction Project (hereinafter referred to as "the Project"). It is intended to guide the implementation of environmental and social management measures during the Project's design (pre-construction), construction, and operational phases, in alignment with applicable national regulations and international best practices.

The information presented in this ESMP is based on data available at the time of its preparation and may be subject to revision as project conditions evolve.

Although every effort has been made to ensure the accuracy and completeness of this document, the Consultant makes no warranties, express or implied, regarding the reliability or suitability of the information for any specific purpose. This ESMP does not constitute legal advice and should not be considered a substitute for compliance with statutory obligations.

Responsibility for implementing the mitigation measures, monitoring activities, and stakeholder engagement strategies outlined herein rests solely with the Project Client and its contractors. Any use of this document by third parties is at their own risk, and the Consultant shall not be held liable for any consequences arising from such use.

## List of Abbreviations

BAP	- Biodiversity Action Plan
BMP	- Biodiversity Management Plan
BSMP	- Blasting Safety Management Plan
CESMP	- Construction Environmental and Social Management Plan
CH	- Critical Habitat
CJSC	- Close Joint Stock Company
EBRD	- European Bank for Reconstruction and Development
EIA	- Environmental Impact Assessment
EPRP	- Emergency Preparedness and Response Plan
ESAP	- Environmental and Social Action Plan
ESIA	- Environmental and Social Impact Assessment
ESHS	- Environmental, Social, Health, and Safety
ESMP	- Environmental and Social Management Plan
ESMS	- Environmental and Social Management System
ESP	- Environmental and Social Policy
EU	- European Union
E&S	- Environmental and Social
GBVH	- Gender-Based Violence and Harassment
GHG	- Greenhouse Gas
GIP	- Good International Practice
HMMP	- Hazardous Materials Management Plan
ME	- Ministry of Environment
MSDS	- Material Safety Data Sheets
MTAI	- Ministry of Territorial Administration and Infrastructure
OHS	- Occupational Health and Safety
OHSMP	- Occupational Health and Safety Management Plan
GA	- Government of Armenia
PAP	- Project Affected Person
PBF	- Priority Biodiversity Features
PIU	- Project Implementation Unit
PPE	- Personal Protective Equipment
PR	- Performance Requirement
RA	- Republic of Armenia
SDA	- Spoil Disposal Area
SDMP	- Spoil Disposal Management Plan
SPA	- Spoil Disposal Area
SPMP	- Spill Prevention and Management Plan
SSESMP	- Site-Specific Environmental and Social Management and Monitoring Plan
TLV	- Threshold Limit Value
TsMP	- Topsoil Management Plan
ToR	- Terms of Reference
WCRA	- RA Water Committee
WMP	- Waste Management Plan



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## 1. Introduction

The Government of the Republic of Armenia ('RA') plans to construct 17 reservoirs within the EU support initiative 'Recovery, resilience and reform: post 2020 Eastern Partnership priorities' to the Government of Armenia ('GA') to enhance the water and food security level in the country. The European Bank for Reconstruction and Development ('EBRD' or the 'Bank') is considering provision of a loan to the GA to finance the construction of five water reservoirs in different regions (Marzes) of Armenia:

- Kassakh reservoir in Aragatsotn Marz<sup>1</sup>,
- Lichk reservoir in Syunik Marz,
- Yelpin reservoir in Vayots Dzor Marz,
- Artik reservoir in Shirak Marz,
- Astghadzor reservoir in Gegharkunik Marz.

The EBRD has categorized this greenfield project as 'A' in line with its Environmental and Social Policy ('ESP') (2019) because it may cause significant environmental and social impacts. This means that a comprehensive Environmental and Social Impact Assessment ('ESIA') report and associated documents must be elaborated, followed by their public disclosure for a minimum period of 120 days.

One of the five reservoirs listed above is planned for construction within the administrative boundaries of Yelpin village, part of the Areni community in the RA Vayots Dzor Marz. The Yelpin Reservoir is designed on the Yelpin River, a right-bank tributary of the Arpa River, to supply irrigation water to 300 hectares of agricultural land in the rural settlements of Yelpin and Chiva.

The Bank has engaged the Consultant<sup>2</sup> to update the national Environmental Impact Assessment ('EIA') report for the Yelpin Reservoir Construction Project in accordance with the EBRD ESP and to prepare the associated Environmental and Social (E&S) documentation, including this Environmental and Social Management Plan ('ESMP') proportionate to the Project's specific impacts, benefits, and opportunities.

## 2. Purpose and Scope

This ESMP is a standalone document associated with the Project's ESIA Report. It comprises a set of mitigation and management measures, criteria for their effective implementation, sources of financing, anticipated targets and institutional arrangements to be undertaken throughout the Project's life cycle to prevent, reduce and compensate adverse E&S impacts to acceptable levels. The ESMP has been prepared based on the findings of this E&S appraisal to ensure that the Project is implemented in compliance with applicable national E&S laws and regulations, the EBRD ESP (2019), relevant EU directives, and Good International Practices (GIP).

The ESMP is a key document that outlines the E&S requirements, including those related to cultural heritage (both tangible and intangible), land tenure, emergency situations, and community and occupational health and safety risks, and specifies the operational procedures necessary to manage significant issues that may arise during Project implementation.

This ESMP designated to:

- Legislative and regulatory framework applicable to the Project,

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<sup>1</sup>Marz - Region in Armenian

<sup>2</sup>A consortium consisting of ATMS Solutions Ltd. (Armenia) and Ecoline International Ltd. (Bulgaria)

- Ensure that the requirements of the EBRD are met,
- Outline the organisational structure, and key roles and responsibilities associated with E&S management,
- Document how the E&S risks and impacts identified through the ESIA studies will be managed. Management implies avoiding or limiting the adverse impacts as well as maximising the positive impacts (benefits) of the Project.

The scope of this ESMP encompasses the design (pre-construction), construction, and operation phases of the Project. Accordingly, it applies to the Construction contractor and its sub-contractors; specialized companies engaged to conduct specific studies required under the ESMP; the Supervising engineer; and the Client, represented by the RA Water Committee (WCRA) under the Ministry of Territorial Administration and Infrastructure (MTAI). It also covers the Project Implementation Unit (PIU), which is involved in the design and construction phases of the Project, as well as "Jrar" CJSC, responsible for the operation and maintenance of the completed reservoir.

### 3. Project Overview

The irrigation of agricultural land-plots in Yelpin and Chiva rural settlements of Vayots Dzor Marz is currently carried out intermittently by the Yelpin pump station<sup>3</sup>. During the peak-flow period, the agricultural land-plots in Yelpin are irrigated by gravity through water pipelines and ditches, which are in poor technical conditions and fed by the Yelpin River. In both Yelpin and Chiva, irrigation water is delivered to users through either gravity-fed or pumped systems managed by the Yeghegnadzor Water Users Association (WUA). During the low-flow vegetation period (July-September), water availability in rivers declines significantly, resulting in insufficient irrigation and reduced crop yields. As a result, farmers are mainly limited to cultivating grains (such as wheat and barley), which can typically be irrigated only once a year, usually in May.

The planned Yelpin Reservoir will be located within the administrative boundaries of Yelpin village. It is designed to be constructed on the Yelpin River, a right-bank tributary of the Arpa River, at an elevation of 1,650-1,700 meters above sea level (masl). The reservoir will provide irrigation for approximately 300 ha of agricultural land in the Yelpin and Chiva rural settlements. Yelpin village, along with 10 other rural settlements, is part of Areni multi-settlement community (**Figure 1**).

The reservoir hydraulic unit (**Figure 2**) consists of:

1. Dam,
2. Spillway,
3. Construction spillway,
4. Irrigation outlet and main pipeline.

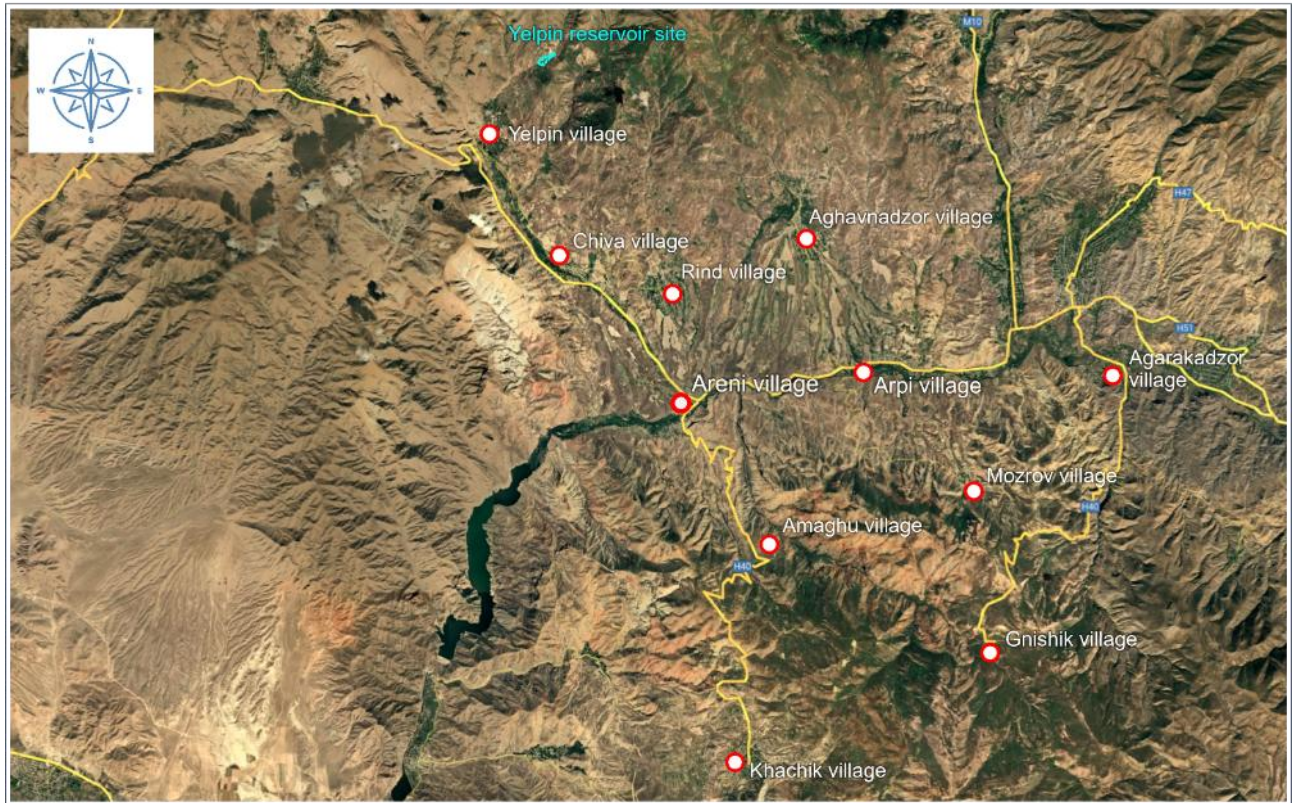
The Yelpin reservoir and its components will cover 14.7 ha, from which dam and its auxiliary structures will occupy 8.5 ha area. The storage capacity of the reservoir will be 0.93 mln. m<sup>3</sup>. It is planned to construct the reservoir in the midstream valley of the Yelpin River, where volcanic andesite-dacites from the secondary period are widespread. These are overlain by alluvial, eluvial, and deluvial formations of the modern age, with a thickness ranging from 5 to 14 m. The abrasive alluvial and terrace deposits are composed of pebble-gravel soils containing up to 30% sand, with a thickness of approximately 12 m. These soils are not suitable for agricultural crop production. The

<sup>3</sup>Preparation of design and cost estimation documents for construction of Yelpin reservoir in Vayots Dzor Marz of the Republic of Armenia, Explanatory Note, 2024

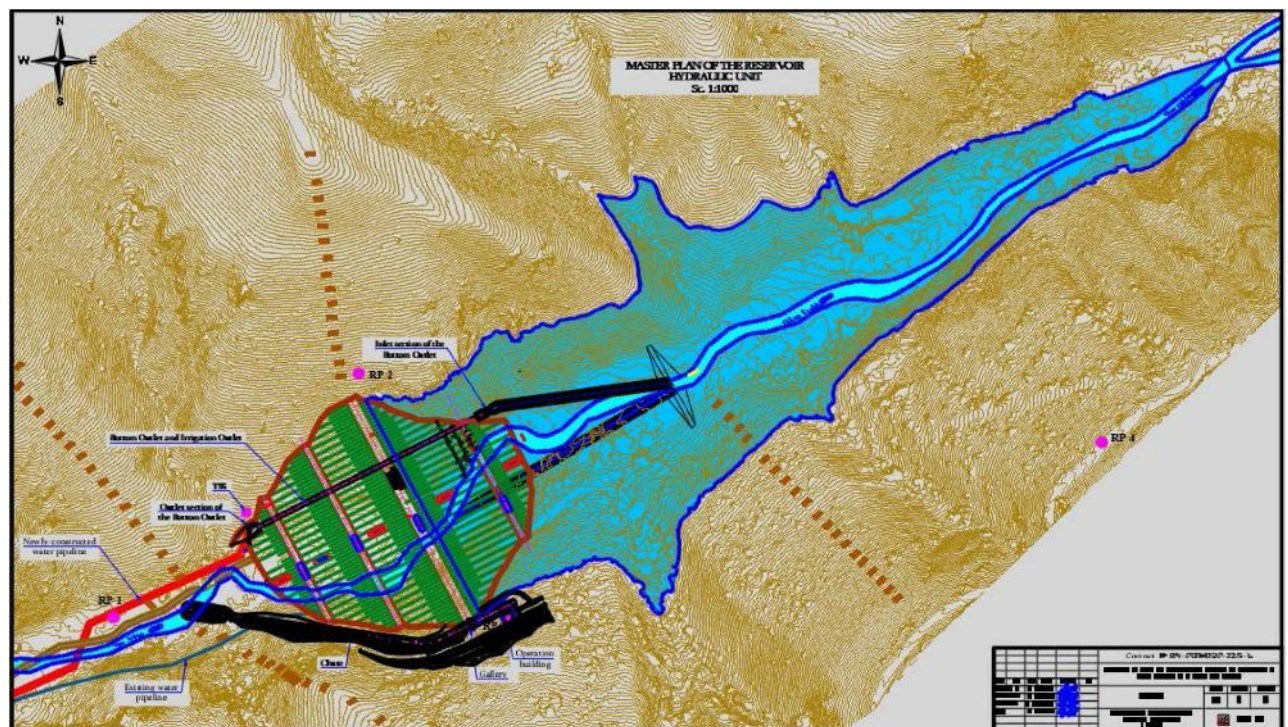


land proposed for the construction of the reservoir is communal and falls within the administrative boundaries of Yelpin rural settlement.

**Figure 1. Location of the Yelpin reservoir site and the rural settlements included in the Areni multi-settlement community**



**Figure 2. Hydraulic unit of the Yelpin reservoir**





The dam body is planned to be constructed using local materials, specifically pebble-gravel shells. Anti-seepage protection will be provided by a central loam core. The dam crest elevation has been determined for both the Full Supply Level (FSL) and the Maximum Water Level (MWL), with the MWL calculated at 1693 masl.

To deliver 188.6 l/s of irrigation water from the reservoir to the users, the installation of a steel pipeline with a diameter of 530 mm and wall thickness of 6 mm (Ø530×6 mm) and a length of 170.0 m is planned within the gallery. The main irrigation pipeline constructed from polyethylene pipes with Ø500 mm diameter and a total length of 1870 m will begin at the outlet section of the irrigation outlet.

According to the Project design study, around 1,500 m<sup>3</sup> of topsoil will be stripped and removed from the construction site. Based on preliminary estimates, approximately 400,000 m<sup>3</sup> of soil will be excavated. A portion of this material will be reused as backfill, while the remaining volume will be transported to Spoil Disposal Areas (SPA) designated and approved by the Areni municipality.

Construction materials (excluding the clay-pebble mixture), such as reinforced concrete, polyethylene and steel pipes, fittings, and others, will be delivered to the construction site from concrete and precast reinforced concrete producers, local suppliers, or, if not available locally, from Yerevan. Deliveries will be made via the M-2 highway and then along the earthen road from Yelpin village to the construction site.

The blasting method has been adopted in the design. Blasting operations will be carried out at a fixed time of day, preferably in the afternoon or at the end of the working day. People in the vicinity shall be informed in advance about the blasting schedule. All explosive charges will be prepared by a qualified specialist responsible for managing the process.

It is proposed to organize two construction camps with appropriate auxiliary structures. The facilities of each construction camp will be installed in their designated areas in parallel with the construction process and placed on unused land allocated for this purpose. The first camp will serve the dam and its structures, the reservoir basin, and the main pipeline. The second camp will serve the borrow-pits.

Two borrow-pits, covering a total area of approximately 2.3 ha, will be established in the vicinity of the Project site to supply clay-sand, pebble, and stone materials for the construction of the reservoir dam. The stone required for the dam's shell will be sourced from rock masses excavated during the construction of the dam foundation, associated structures, and access roads. The land to be allocated for the borrow-pits is not privatized and lies within the administrative boundaries of the settlement. Upon completion of the reservoir construction, remediation activities will be undertaken at the borrow-pit sites to restore the natural landscape and return the area to the settlement administration.

Duration of the construction works was determined based on the volume and labour intensity of the main earth/excavation and concrete works, the rational sequencing of tasks, and a consolidated assessment of operational constraints in line with CN&R №1.04.03-85 "Norms for the duration of construction of facilities, buildings, and structures". The construction period was determined according to the Project's implementation timeline and amounts to 34 months<sup>4</sup>. The maximum workforce will include 69 workers and technicians, 15 managers and engineers, and 20 officers. In total, 104 workers will be required for the construction stage.

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<sup>4</sup>Preparation of design and cost estimation documents for construction of Yelpin reservoir in Vayots Dzor Marz of the Republic of Armenia, Explanatory Note, 2024

## 4. Legal and Regulatory Framework

### 4.1 Applicable Legal and Regulatory Requirements

The following legal and regulatory requirements have been taken into account during the ESIA study and have accordingly served as criteria for the formulation of the management measures proposed in this ESMP:

- 1) Applicable national E&S laws and regulations,
- 2) Applicable international conventions ratified by Armenia,
- 3) Applicable EU legislation,
- 4) EBRD ESP and Performance Requirements (PRs).

The E&S legal and regulatory acts applicable for the Project are outlined in details in [Section 4](#) of the ESIA report and are listed below:

- The RA Law on Environmental Impact Assessment and Expert Examination (2014, revised in 2023),
  - The procedure for public notification and public discussions is outlined in the RA Government Decree №1325-N dated 19.11.2014,
  - The RA Government Decree №399-N dated 09.04.2015 "On approval of procedure for the environmental impact examination of concept documents and intended activities",
  - The Order №438-N of the RA Minister of environment dated 29.10.2024 "On approval of the guidelines for the strategic environmental assessment and environmental impact assessment",
- The RA Water Code (2002),
  - The quality of surface water in Armenia is monitored as per the principles of EU Water Framework Directive adopted by the RA Government Decree №75-N dated 27.01.2011,
  - The RA Government Decree №1332-N dated 03.08.2023 "On the procedures for issuing a water use permit, its extension, reformulation, review, suspension, revocation, termination, and the approval of the standard form of a water use permit, well passports, and well design geological and technical section forms",
- The Law on RA water national program (2006),
- The RA Law on the fundamentals of national water policy (2005),
- The RA Land Code (2001),
  - The procedure for topsoil use, approved by the RA Government Decree №1396-N dated 08.09.2011,
  - The requirements for determination of topsoil stripping norms and for stripped topsoil preservation and use, approved by the RA Government Decree №1404-N dated 02.11.2017,
  - The procedure for soil excavation, approved by the RA Government Decree №572-N dated 10.05.2019,
- The RA Law on surveillance over the land use and land conservation (2008),
- The RA Law on waste (2004),
- The RA Law on alienation of property for overriding interests of the public (2006),
- The RA Law on atmospheric air protection (1994, revised in 2022),

- The RA Government Decree №160-N dated 02.02.2006 approving the maximum permissible concentrations of ambient air pollution in residential areas,
- The RA Law on flora (1999),
- The RA Law on fauna (2000),
- The RA Government Decree №71-N on approval of the RA Red Book of animals,
- The RA Government Decree №72-N on approval of the RA Red Book of plants,
- The RA Law on special protected areas of nature (2006),
- The RA Law on protection and use of immovable cultural and historic monuments and historic environment (1998),
- The RA Law on intangible cultural heritage (2009),
  - RA Government Decree №310-A "On Defining the Criteria for Preparing the Lists of Intangible Cultural Values and Approving the List of Intangible Cultural Heritage Values"
  - RA Government Decree №36-N "On the Criteria for Preparing the Lists of Intangible Cultural Heritage in Need of Urgent Safeguarding, and the List of Intangible Cultural Heritage Values Based thereon",
  - RA Government Decree №241-N "On approving the criteria for defining cultural spaces and published the list of cultural spaces",
- The RA Code on subsoil resources (2011),
- The RA Forest Code (2005),
- The RA Law on environmental oversight (2005),
- The RA Law on public health (2024),
- The Labour Code (2004),
- The RA Law №HO-57-N (2013) On ensuring of equal rights and equal opportunities for men and women,
- The RA Law on fire safety (2001),
- The Fire Safety Rules approved by Order №595-N of the RA Minister of Territorial Administration and Emergency Situations (2015).

The International Conventions and Protocols ratified by RA and applicable to the Project are summarised in **Table 1**.

**Table 1. List of ratified by the RA international agreements applicable for the project**

International agreements (convention or protocol)	Description
Convention on Wetlands of International Importance - (Ramsar 1971)	The Convention entered into force in Armenia in 1993.
Paris Convention for the Protection of the World Cultural and Natural Heritage (1972)	Armenia became a State party in 1993.
The Convention on the Conservation of Migratory Species of Wild Animals (1979) (Bonn Convention)	Armenia is a State party since 2011
Convention on the Conservation of European Wildlife and Natural Habitats, Bern (1979)	Ratified by Armenia in 2008.
The Convention on Biological Diversity (1992)	Signed by Armenia in 1993.



International agreements (convention or protocol)	Description
European Landscape Convention, Florence (2000)	The European Landscape Convention of the Council of Europe promotes the protection, management and planning of the landscapes and organises international co-operation on landscape issues.
United Nation Framework Convention on Climate Change (UNFCCC) (1992)	Armenia became a state party in 2002.
Paris Agreement under the United Nations Framework Convention on Climate Change	Ratified by Armenia in 2017.
UN Convention to Combat Desertification, Paris (1994)	Ratified by Armenia in 1997.
UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003)	Ratified by Armenia in 2006.
Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, Aarhus Convention (1998)	Armenia became a State-party in 2001.
Convention on Environmental Impact Assessment in a Transboundary Context, Espoo Convention (1991)	Ratified by Armenia in 1997.
International Labour Organization (ILO) Conventions	Armenia has ratified 29 ILO conventions including the 8 fundamental ones.

The European Union (EU) legislation that is applicable to the Project includes the following Directives:

- 1) Directive 2011/92/EU, as amended by Directive 2014/52/EU, on assessment of the effects of certain public and private projects on the environment (the EIA Directive),
- 2) Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) (the Industrial Emissions Directive),
- 3) Directive 2009/147/EC on the conservation of wild birds (the Birds Directive),
- 4) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive),
- 5) Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the Water Framework Directive),
- 6) Directive 2008/98/EC on waste (Waste Framework Directive),
- 7) Directive 2003/10/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise),
- 8) Directive 2002/44/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration).

Specific E&S requirements applicable to the Project are set out in:

- The EBRD's Sub-sectoral Environmental and Social Guidelines: Building and Construction Activities (2010),
- The International Finance Corporation (IFC) General Environmental, Health and Safety Guidelines (2007),
- ICOLD Bulletin 173 (2021) - Integrated Operation of Hydropower Stations and Reservoirs,
- ICOLD Bulletin 96 (1994) - Dams and environment - Water quality and climate,

- ICOLD Bulletin 86 (1992) - Dams and Environment - Socio-economic impacts.

The EBRD outlines its key E&S requirements in the Environmental and Social Policy (ESP, 2019). The PRs applicable to this Project are listed below

- PR1: Assessment and Management of Environmental and Social Risks and Impacts,
- PR2: Labour and Working Conditions,
- PR3: Resource Efficiency and Pollution Prevention and Control,
- PR4: Health, Safety and Security,
- PR5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement,
- PR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources,
- PR8: Cultural Heritage,
- PR10: Information Disclosure and Stakeholder Engagement.

## 4.2 Environmental Criteria and Limits

The environmental criteria and limit values applied to determine baseline physical conditions within the Project area and its affected surroundings, and to guide environmental monitoring during the construction and operation phases, are summarized in **Tables 2-5**.

The criteria for assessing ambient air quality in the residential areas in Armenia is defined by the RA Government Decree №160-N and the World Health Organization (WHO) *Air Quality Guidelines - Global Update 2021*<sup>5</sup>, and are summarized in **Table 2**.

**Table 2. Air quality standards highlighting (in blue cells) the most stringent**

№	Pollutant	Averaging period	Maximal Permissible Concentrations (MPC), mg/m <sup>3</sup>		
			WHO		Armenian standards
			2005	2021	
1	PM2.5	24-hour	0.025	0.015	0.035
		Annual		0.01	
		Maximum			0.16
2	PM10	24-hour	0.05	0.045	0.06
		Annual	0.02	0.015	
		Maximum			0.3
3	Sulphur dioxide	1-hour			
		24-hour	0.02	0.04	0.05
		Maximum			0.5
4	Nitrogen dioxide	1-hour			
		24-hour		0.025	0.04
		Annual	0.04	0.01	
		Maximum			0.2
5	Carbon monoxide	Maximum daily 8hour			
		24-hour		4.0	3.0
		Maximum			5.0

<sup>5</sup><https://www.who.int/publications/i/item/9789240034228>

Threshold Limit Values (TLVs) for equivalent (average) and maximum noise/sound levels set by the RA Sanitary Norms №2-III-11.3 *Noise in the workplaces, in residential and public buildings and housing in construction areas*<sup>6</sup>, the IFC *Environmental, Health, and Safety General Guidelines (2007)*<sup>7</sup> and WHO *Guidelines for Community Noise (1999)*<sup>8</sup> are presented in **Table 3**.

**Table 3. Threshold limit values (TLV) for noise**

№	Premises and territories, receptors		TLV, dBA		
			National		IFC/WHO
			Equivalent to sound level	Maximum sound level	One hour equivalent sound level
1	Workplace		80		85
2	Shops, trading halls, airport and railway stations waiting rooms, drop-off points of public service providers		60	75	
	Industrial, commercial				70
3	Territories adjacent to residential buildings, clinics, ambulatories, rest houses, care homes, disabled persons homes, libraries, kinder gardens, schools and other educational facilities	day-time <sup>9</sup>	55	70	55
		night-time <sup>10</sup>	45	60	45

The TLVs set by the Hygienic Norms №2.2.4-009-06 *Vibration in the workplaces, in residential and public buildings*<sup>11</sup> and summarised in **Table 4**.

**Table 4. Threshold limit values (TLV) for vibration acceleration**

№	Whole-body vibration	TLV for corrected and equivalent corrected values	
		m/sec <sup>2</sup>	dB
1	Transport-technological (2nd category)	0.28	109
2	Technological (3rd category a)	0.1	100
3	Technological (3rd category b)	0.04	92
4	Technological (3rd category g)	0.014	83
5	Residential buildings, clinics	0.004	72

Admissible Concentration Limits (ACL) for chemical elements in soil set out in the Sanitary Rules and Norms №2.1.7.003-10 "Hygienic requirements for soil quality"<sup>12</sup> are given in **Table 5**.

**Table 5. Admissible Concentration Limits (ACL) for chemical elements in soil**

№	Chemical elements	Unit	ACL of chemicals in soil
1	Vanadium	mg/kg	150
2	Chrome	mg/kg	6
3	Manganese	mg/kg	1500
4	Cobalt	mg/kg	5

<sup>6</sup><https://www.arlis.am/hy/acts/163246>

<sup>7</sup><https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-en.pdf>

<sup>8</sup><https://www.who.int/publications/i/item/a68672>

<sup>9</sup>between 07:00 and 23:00

<sup>10</sup>between 23:00 and 07:00

<sup>11</sup><https://www.arlis.am/hy/acts/163276>

<sup>12</sup><https://www.arlis.am/DocumentView.aspx?docid=146741>



No	Chemical elements	Unit	ACL of chemicals in soil
5	Nickel	mg/kg	4
6	Copper	mg/kg	3
7	Zinc	mg/kg	23
8	Arsenic	mg/kg	2
9	Antimony	mg/kg	4.5
10	Lead	mg/kg	32

The quality of surface water in Armenia is monitored in accordance with the principles of the EU Water Framework Directive, as adopted by RA Government Decree №75-N dated 27.01.2011<sup>13</sup>. The environmental water quality standards for watercourses within the Arpa River Basin are defined in Annex 19 of the same decree.

## 5. Roles and Responsibilities

### 5.1 RA Water Committee (WCRA)

The WCRA (PIU) is the executing agency with overall responsibility for the Project and for implementing this Environmental and Social Management Plan (ESMP). It is also responsible for ensuring compliance with all Armenian environmental and social (E&S) legal requirements and for meeting the commitments set out in the Environmental and Social Impact Assessment (ESIA) Report.

While many of the ESMP requirements will be implemented by the Construction contractor and its sub-contractors, the WCRA will retain overall accountability for the Project's E&S performance. In addition, the WCRA (PIU) is responsible for the implementation of the Stakeholder Engagement Plan (SEP) and Biodiversity Action Plan (BAP)<sup>14</sup>, Cultural Heritage Management Plan (CHMP) and Resettlement Action Plan (RAP).

The WCRA employs environmental and social specialists who oversee and supervise the implementation of all Project obligations related to Environmental, Social, Health, and Safety (ESHS) matters. For specific E&S studies, the WCRA may engage specialised or licensed companies and consultants, as required.

### 5.2 Supervising Engineer

The Supervising Engineer will be contracted by the WCRA to oversee Project implementation during the construction phase and to ensure compliance with the requirements of the Environmental and Social Management Plan (ESMP) and other Project construction-related E&S management plans and procedures.

Responsibilities include developing and implementing a monitoring program, maintaining records, and reporting to the WCRA and the EBRD on the Construction Contractor's E&S performance. This will cover observed non-compliances, the corresponding corrective actions and defined timelines, roles and responsibilities.

<sup>13</sup><https://www.arlis.am/hy/acts/200962>

<sup>14</sup>The SEP and BAP were developed by the ESIA consultant on behalf of the WCRA and form part of the ESIA disclosure package

The Supervising Engineer will also provide capacity-building support and training to the Contractor's E&S team as needed and will be responsible for the approval of the management and monitoring plans outlined in **Section 6.2** of this ESMP.

The Supervising Engineer will be required to appoint suitably qualified and experienced ESHS individuals into the following specific roles:

- 1) International and local environmental specialists,
- 2) International and local Occupational Health and Safety (OHS) specialists,
- 3) Local social (including Gender) and resettlement specialist/s,
- 4) Local archaeologist,
- 5) Biodiversity (flora and fauna) specialists with international experience / experience with lender requirements.

### 5.3 Construction Contractor

The Construction contractor, selected through the WCRA tendering process, holds overall responsibility for the construction of the Project. The Contractor must fully comply with the requirements of this ESMP and all relevant WCRA management plans.

This includes developing the construction-phase E&S management plans outlined in **Section 6.2** of this ESMP and ensuring that all environmental and social management and mitigation measures specified in these plans are effectively implemented throughout construction activities.

The Contractor is also responsible for ensuring that all sub-contractors adhere to the requirements of all Project E&S management plans and procedures.

The Construction contractor will be required to appoint suitably qualified and experienced personnel to the following specific ESHS roles:

- 6) Project Manager,
- 7) Environmental specialist,
- 8) Occupational and community health and Safety specialist(s),
- 9) Social and resettlement specialist,
- 10) Cultural heritage expert,
- 11) Community liaison officers responsible for the implementation of the relevant tasks from the SEP at the community level (at least one such officer being a female),
- 12) Biodiversity (flora and fauna) specialist with international experience / experience with lender requirements.

### 5.4 EBRD

The Project Lender - EBRD will monitor the E&S performance of the Project to ensure compliance with the requirements of their respective E&S policies in relation to the water section which they will finance.

### 5.5 Project Implementation Unit (PIU)

The Project Implementation Unit (PMU) will, inter alia, assist the WCRA in implementing measures required in the ESMP and ESAP, provide training, as appropriate, to increase E&S management capacity of the WCRA and its contractors engaged in the Project implementation, review of the site-specific ESMPs, assist the WCRA in developing and integrating the policies, plans, procedures,

actions and mitigation measures required under the ESAP, Resettlement Plan (RP), SEP, BAP, CHMP and other management plans into the Project overall management system and budget approval procedures, as appropriate.

The PMU assist the WCRA in implementing the measures required under the ESMP, the Environmental and Social Action Plan (ESAP) and related management plans. The PMU will also provide training, as appropriate, to strengthen the E&S management capacity of the WCRA and its contractors involved in Project implementation. Training for the JRAR staff on proper reservoir operation will also be arranged by the PIU.

In addition, the PMU will review site-specific E&S management plans and support the WCRA in developing and integrating the policies, plans, procedures, actions and mitigation measures required under the ESAP, SEP, BAP, CHMP and other management plans into the Project's overall management system and budget approval processes, as appropriate.

## 5.6 "Jrar" CJSC - Reservoirs Operator

"Jrar" is a Close Joint-Stock Company (CJSC) under the MTAI, responsible for the operation and maintenance of 1st and 2nd category water reservoirs in Armenia.

"Jrar" CJSC will develop and implement the management and monitoring plans and measures proposed in the ESMP for the operation and maintenance phase of the Yelpin Reservoir.

## 5.7 Governmental Authorities and Local Self-governmental Bodies

The Ministry of Environment (ME) will issue air emission permits, approve hazardous waste passports and limits for waste generation and disposal. The ME will also provide guidance and support to the Project within the scope of its statutory responsibilities.

The Ministry of Education, Science, Culture and Sport (MESCS) will support the Project in conducting archaeological studies and addressing issues related to tangible and intangible cultural heritage. The MESCS will also assist the Project in accordance with its statutory mandate.

The Areni Municipality and administrative head of Yelpin rural settlement will identify suitable locations for Spoil Disposal Areas (SDA) and topsoil storage sites, facilitate communication between the Construction Contractor and the populations of affected settlements, and assist the Contractor in cases of temporary land acquisition or use, as needed.

# 6. Environmental and Social Management across the Project Life Cycle

## 6.1 Project Life Cycles

### Pre-construction Phase

Any requirement arising from the process of obtaining specific Project-related decisions (such as approvals, permits, or consents) from national and/or local self-governmental bodies (e.g., ministries, communities, inspection bodies, agencies) and/or the Client and EBRD during the pre-construction stage will be incorporated into the final construction documentation.

### Construction Phase

In principle, the implementation of the key E&S mitigation measures related to the construction phase will be delegated to the Construction contractor(s). This delegation will be governed by the ESMP,



which will form part of the tender documents, procurement process, and the Construction contractor's contract.

The Construction contractor(s) will develop their own Construction Environmental and Social Management Plans (CESMP), which must be aligned with this ESIA Report and this ESMP. The CESMP will include Site-Specific Environmental and Social Management and Monitoring Plans (SSESMPs) or procedures to address E&S issues during the construction period. The Supervising engineer, appointed by the Client, shall review and approve these documents.

It will be the responsibility of the Construction contractor(s) to further elaborate on the issues addressed in the ESMP as the Project planning progresses, both prior to and during construction. This includes, but is not limited to, the establishment of construction zones, temporary facilities for the workforce, details for storing construction and other materials, traffic and transport management, environmental protection and waste management, labour management, occupational and community health and safety, emergency preparedness, and other relevant matters.

### Operational Phase

The operation phase will commence following the full commissioning of the reservoir and supporting infrastructure. At that stage, all works will have been handed over by the Construction contractor to the reservoir operator ("Jrar" CJSC), who will be responsible for implementing the majority of E&S management measures to ensure continued compliance with the Project's mitigation strategy. These measures will be managed through "Jrar" CJSC's Environmental and Social Management System (ESMS), in alignment with applicable regulations and guidelines.

In addition, the implementation of key E&S mitigation measures related to maintenance activities may be delegated to a designated contractor (i.e. the reservoir maintenance contractor). Such delegation will be governed by specific contractual arrangements.

## **6.2 Environmental and Social Management Plans**

A set of specific operational, management and monitoring plans should be prepared by the Construction contractor in line with the Project's ESMP and implemented during the pre-construction and construction phases to effectively manage E&S impacts. At a minimum, the proposed SSESMPs shall include:

- Traffic Management Plan,
- Topsoil Management Plan,
- Borrow Pit Management Plan,
- Spoil Disposal Management Plan,
- Hazardous Materials Management Plan,
- Spill Prevention and Management Plan,
- Waste Management Plan,
- Occupational Health and Safety Management Plan,
- Construction Camp Management Plan, including sub-plans for Camp Code of Conduct and Camp Management,
- Local Employment and Procurement Plan,
- Cultural Heritage Management Plan,
- Chance Find Procedure,
- Riverine Habitat Construction Plan,

- Air, Water, and Soil Quality Monitoring Plan,
- Noise and Vibration Monitoring Plan,
- Resettlement Plan,
- Stakeholder Management Plan (that shall be updated at least once a year).

During the operation phase of the Yelpin Reservoir, a series of E&S management plans will be developed and implemented by the Client (WCRA and PIU) in cooperation with "Jrar" CJSC, taking into account the recommendations and mitigation measures outlined in the Operation Phase section of this ESMP (see table below), including:

- Irrigation Water and Environmental Flow Releases Management Plan,
- Reservoir Operation and Maintenance Plan,
- Traffic Management Plan,
- Emergency Response Plan,
- OHS procedures (Plan),
- Waste Management Plan,
- Stakeholder Engagement Plan,
- Biodiversity Action Plan.

## 7. Environmental and Social Management Measures

The proposed mitigation measures for the Project's pre-construction (design) phase (Section A), construction phase (Section B) and operation phase (Section C) are summarised in **Table 6** below. This table outlines the activities and associated impacts that require mitigation, defines the targets and indicators needed to assess the effectiveness of the implemented measures and identifies the sources of financing and responsible entities.

**Table 6. Environmental and social management measures**

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities <sup>15</sup>
<b>Section A - PRE-CONSTRUCTION (DESIGN) PHASE</b>					
Vegetation clearance	Impact on Landscape and Visual Amenity (8.2.5)	Develop Tree Management Plan (TrMP) and obtain approval from the Supervision engineer.	Within the Project's Construction contract.	TrMP is developed and approved.	D - Construction contractor A - Supervising engineer M - Client (WCRA/ PIU).
Topsoil removal and storage, loading and unloading operations, transportation of spoil and materials, storage of construction materials and oil products, etc.	Impact on Soil (8.2.8)	<ol style="list-style-type: none"> <li>1) Develop Topsoil Management Plan (TsMP) and obtain approval from the Supervising engineer and the Client,</li> <li>2) Obtain required permit for topsoil transportation and storage operations,</li> <li>3) Develop Hazardous Materials Management Plan (HMMP) and obtain approval from the Supervising engineer and the Client,</li> <li>4) Develop Blasting Safety Management Plan (BSMP) and obtain approval from the Supervising engineer and the Client,</li> <li>5) Develop Spill Prevention and Management Plan (SPMP) and obtain approval from the Supervising engineer and the Client.</li> </ol>	Within the Project's Construction contract.	TsMP, HMMP, BSMP and SPMP are developed and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.

<sup>15</sup>D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-Operation



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Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities <sup>15</sup>
All waste generation processes and activities during the construction phase	Waste Generation and Management (8.2.9)	<ol style="list-style-type: none"> <li>1) Obtain all required permits and regulatory documents governing waste management in Armenia, as a minimum including: <ul style="list-style-type: none"> <li>- hazardous waste passports,</li> <li>- waste generation norms, and their disposal limits,</li> <li>- waste generation register, etc.,</li> <li>- waste primary registration log-books.</li> </ul> </li> <li>2) Prepare and put into effect the Waste Management Plan (WMP) for the Project,</li> <li>3) Obtain agreement from Areni Municipality for the use of the selected Spoil Disposal Area (SDA), or propose an alternative SDA,</li> <li>4) Develop Spoil Disposal Management Plan (SDMP) for the selected SDA and obtain approval from the Supervision engineer and the Client.</li> </ol>	Within the Project's Construction contract	All permits required by the RA waste sector legislation are obtained. WMP and SDMP are prepared and approved. SDAs are identified and agreed.	D - Construction contractor A - Supervising engineer and Head of Areni community (for SDA locations) S&M - Client (WCRA/ PIU) and EBRD.
Transportation of construction materials, oil products, workers	Traffic Impacts (8.2.11)	<ol style="list-style-type: none"> <li>1) Develop a Traffic Management Plan (TMP), that will be approved by the Supervising engineer as well as relevant regional authorities and road police.</li> <li>2) Prior to the commencement of construction works, the condition of community roads to be used for project purposes shall be inspected and documented by the construction contractors and representatives from the affected settlements. In the event that significant damage is caused by the Project, the Construction Contractor shall restore the roads to at least their pre-construction condition.</li> </ol>	Within the Project's Construction contract.	TMP is prepared and approved.	D - Construction contractor A - Supervising engineer, Head of Areni community, Road Police S&M - Client (WCRA/ PIU) and EBRD.

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Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	<p><b>Habitats</b></p> <p>1) Study the priority habitats (five PBFs and one CH) within the Project area, including their plant composition and ecological structure, map their extent,</p> <p>2) Develop a Riverine Habitats Construction Plan to plan support, construction and maintenance of the following two habitats (PBFs) along the reservoir's banks:</p> <p><i>F9.12 Lowland and collinar riverine willow scrub (3280 Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of Salix and Populus alba, G1.11 Riverine willow woodland (92A0 Salix alba and Populus alba galleries),</i></p> <p>3) Study the reservoir protection/buffer area and areas along the river, upstream and downstream (including Gndasar KBA/IBA) to define existing habitats similar to the following:</p> <p><i>E1.2 Perennial food grasslands and main steppes (6190 Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis), 61A0 Eastern sub-Mediterranean dry grasslands (Scorzoneratalia villosae), F7.35-AM Armenian phryganoids (5410 West Mediterranean clifftop phrygas (Astregaloplaginetum subulatae), H3.1 Basic and ultra-basic inland cliffs (8210 Calcareous rocky slopes with chasmophytic vegetation), F3.1. Temperate thickets and scrub (40A0* Subcontinental peri-Pannonic scrub).</i></p>	35,000 EUR or can be included into the Project's Construction contract.	Project impacts on habitats are avoided, reduced, mitigated, or compensated.	D - Specialised company hired by the Construction contractor A - Supervising engineer S&M - Client (WCRA/PIU) and EBRD.

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		<p>4) Develop an offset project to provide conservation of the habitats in the most suitable for conservation areas.</p> <p><u>Preliminary quantitative assessment</u></p> <p>Total lost area of the two riverine habitats (F9.12 and G1.11) is 1.75 ha. The reservoir perimeter potentially suitable for the riverine habitats, according our estimation, is about 1.5 km. To achieve «no Net Loss» (multiplier = 1) a width of the shoreline strip for the riverine habitats construction should be about 12 m. Additionally 0.37 ha of the natural riverine habitats located upstream the reservoir in the protection/buffer zone, that will not be flooded, can be conserved thereby rising the multiplier up to 1.24.</p> <p>Lost area of the PBF habitats (E1.2, F7.35-AM, H3.1) is 1.26 ha. Lost area of the CH habitat (F3.1) is 2.14 ha. At the same time, area of the reservoir protection/buffer zone that can be used for conservation of these four habitats is about 21.8 ha. Accordingly, there are enough area in the protection/buffer zone to apply «Net Gain» approach for conservation of these habitats.</p> <p>Proposals for the construction and conservation of the habitats, including multipliers, should be developed in BAP.</p>			
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	<p><b>Flora</b></p> <ol style="list-style-type: none"> <li>1) Study plant composition and structure of the priority riverine habitats,</li> <li>2) Develop a Riverine Habitats Construction Plan based on indigenous plant species,</li> <li>3) Develop a Tree Management Plan (TrMP).</li> </ol>	Within the Project's Construction contract.	Riverine Habitats Construction Plan and TMP are developed.	<p>D - Construction contractor</p> <p>A - Supervising engineer</p> <p>S&amp;M - Client (WCRA/PIU) and EBRD.</p>



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		<i>See also mitigation measures proposed in Section 8.2.5.</i>			
Behaviour of workers of the Construction contractor.	Impact on Biodiversity (8.2.12)	<b>Fauna</b> Develop the Worker Code of Conduct for employees of the Construction contractor to prevent poaching.	Within the Project's Construction contract.	Worker Code of Conduct is developed and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	<b>Sedentary animals</b> 1) Identify existing forest and rocky habitats which are potential habitats for relocation of Forest dormouse, snakes, and lizards in the vicinities of the flooded area 2) Plant some indigenous tree species (for example, wild plum and pear) to address the loss of habitats of Forest dormouse, 3) Provide additional rocky outcrops in the vicinities of the flooded area to increase the number of native bush species (snakes, lizards), 4) Survey the area to map inhabited burrows of badger and other burrowing animals.	Within the Project's Construction contract.	Project impacts on sedentary animals are avoided, reduced, mitigated, or compensated.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU) and EBRD.
Conservation of bird species	Impact on Biodiversity (8.2.12)	<b>Birds</b> 1) Plant additional indigenous species of Poplar, Willow, and Walnut trees for Syrian Woodpecker in the vicinities of the Project area, 2) Plant additional thorny bush species in the vicinities of the Project area as breeding spots for White-throated Robin, Red-backed Shrike,	Within the Project's Construction contract.	Project impact on birds is avoided, reduced, mitigated, or compensated.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

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		<p>and Lesser Grey Shrike, helping them to discover new breeding sites,</p> <p><i>See also mitigation measures proposed in <b>B - Construction Phase, Sections 8.2.5, 8.2.12 - Flora and 8.2.12 - Large mammals.</b></i></p> <p><i>These spots should include trees, shrubs and rocky plots at the top of the valleys' slopes. The spots have to be included into the constructed habitats under the Riverine Habitats Construction Plan and conserved habitats with thickets/scrub and cliffs (see this <a href="#">Table, Habitats section</a>).</i></p> <p><u>Preliminary quantitative assessment</u></p> <p><i>The total area of the protection/buffer zone that is suitable for the constructed habitats under the Riverine Habitats Construction Plan and conserved habitats with thickets/scrub, cliffs, grasslands, Armenian phryganoids is about 24 ha.</i></p> <p><i>The minimum area (multiplier 1 - of the "no Net Loss" approach) for compensation of the lost habitats of the priority bird species is 26 ha (see above the sub-section Loss of breeding and foraging habitats for birds). To secure this area or larger one (if the "Net Gain" approach applied), additional area is required.</i></p> <p><i>The Gndasar KBA/IBA located 320 m from the Project site, upstream the river, can be used for conservation of the additional areas necessary for the birds (most of the IBA area is not protected).</i></p> <p><i>Proposals for the use of constructed and conserved habitats in the protection/buffer zone, as well as conservation of additional habitats, including multipliers and calculation, should be made in the BAP.</i></p>			

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Conservation of invertebrates	Impact on Biodiversity (8.2.12)	<b>Invertebrates</b> 1) Study the habitat requirements of the 22 priority species and estimate areas of the habitats, lost by these species, 2) Develop similar habitats in unflooded areas and in close vicinity of the existing populations, securing habitat connectivity (primarily requires planting forage plants, including herbaceous plants, for the species and in some cases improving soil conditions), <i>These habitats have to be included to the constructed habitats under the Riverine Habitats Construction Plan and conserved habitats with thickets/scrub, cliffs, grasslands, Armenian phryganoids (see this Table, Habitats section).</i>	Within the Project's Construction contract.	Project impacts on invertebrates are avoided, reduced, mitigated, or compensated.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU) and EBRD.
Land acquisition and compensation. Receiving and registering grievances and concerns from project stakeholders, investigating issues, providing solutions and maintaining communication and records throughout the resolution process.	Land Tenure Impacts (8.3.3)	1) Ensure that all users (if any) of the pasture land to be withdrawn for the Project needs will be provided with alternative land of the same or better characteristics for the cattle grazing, 2) Develop and implement the Resettlement Plan in line with the provisions of the RF to ensure that the compensation for community land is fully provided prior to any construction works on site, 3) Ensure that public consultations with affected people and communities are conducted in all affected settlements as per the RP to present the Project's aims, stages of land acquisition and compensation process, timelines. 4) Establish a Grievance Mechanism to deal with the Project-related concerns.	Separate budget for the RP consultant	RF with the Grievance Mechanism and RP are developed and implemented.	D&I - RP consultant A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.

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Emergency situations such as landslides, earthquakes, incidents, spills, and leakages.	Impact on Community Health and Safety (8.3.5)	Develop Emergency Preparedness and Response Plan (EPRP) for the whole Project lifecycle. <i>See also mitigation measures proposed in Section 8.4.</i>	Within the Project's Construction contract.	EPRP is prepared and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.
All processes and operations during the construction activities	Health and Safety Impact (8.3.6)	<ol style="list-style-type: none"> <li>1) Develop an Occupational Health and Safety Management Plan (OHSMP), covering key elements of the OHS performance management during the construction stage, including: <ul style="list-style-type: none"> <li>- Allocation of OHS roles and responsibilities</li> <li>- Identification of OHS risks and hazards,</li> <li>- Briefing, training and knowledge check,</li> <li>- OHS procedures and regulations,</li> <li>- Medical examination,</li> <li>- Emergency response,</li> <li>- Management of hazardous materials, chemicals and oil / fuel,</li> <li>- Fire safety and emergency response,</li> <li>- Performance of high hazard tasks</li> <li>- Use of PPE,</li> <li>- Supervision of sub-contractors,</li> <li>- Investigation of safety accidents,</li> <li>- Responsibilities for non-compliance, etc.</li> </ul> </li> <li>2) Develop a Blasting Safety Management Plan (BSMP) and obtain the necessary approvals from the Supervision Engineer, the Client, and the relevant regional authorities</li> </ol>	Within the Project's Construction contract.	OHSMP and BSMP are developed and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.
Operations and activities related to labour and working conditions,	Workers' Rights and Working	<ol style="list-style-type: none"> <li>1) Include requirements related to the compliance with the national labour regulations and EBRD</li> </ol>	Within the Project's Construction contract.	Relevant requirements of the EBRD PR2 are	D - Client (WCRA/ PIU) (for item 1) and Construction



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including the management of the construction camp and accommodation facilities.	Conditions Related Impacts (8.3.7)	PR2 in the contractual clauses with the Construction contractor, 2) Develop a Labour and Working Conditions Management Plan inclusive of measures to manage local employment and procurement (at least a month before the construction) and implement it, 3) Develop and implement a Construction Camp Management Plan, including Sub-plans for Camp Code of Conduct and Camp Management, with requirements for worker accommodation in compliance with the Armenian labour, sanitary and health standards, EBRD PR 2 requirements, Workers' accommodation: processes and standards - a guidance note by IFC and the EBRD, ILO Workers' Housing Recommendation 1961 (No. 115), and gender-specific provisions, 4) Set up and maintain grievance mechanism available to all project workforce, including the opportunity for anonymous complaints.		included in the Construction contract. Labour and Working Conditions Management Plan and Construction Camp Management Plan are developed.	contractor (for items 2 and 3) A - Supervising engineer (for items 2 and 3) S&M - Client (WCRA/ PIU) and EBRD.
Interactions between workers and residents of affected settlements.	Gender-Based Violence and Harassment (8.3.8)	Develop GBVH Policy and assign focal points responsible for handling GBVH incidents within the workforce and beyond including GBVH sensitive grievance management mechanism.	Within the Project's Construction contract.	Management of GBVH risks related to interactions between workers and residents of affected settlements.	D - WCRA/PIU I - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.
Earthworks, excavation, borrow pit operations, construction of electricity transmission lines, and	Impact on Tangible Cultural Heritage (8.5.1)	1) Develop a Chance Finds Procedure (CFP) for the Project prior to the commencement of construction works,	Within the Project's Construction contract.	The CFP are prepared and approved; detailed field archaeological	D - Construction contractor

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other related construction activities that have the potential to impact cultural heritage sites situated beyond the Project's direct impact area, yet within its designated buffer zone.		2) Hire a qualified cultural heritage expert to be present during the construction works and implement archaeological surveillance for all construction sites and help implement all heritage focused mitigations, if required, 3) Conduct additional field investigations focused on the identified artificial stone structures to verify their age and function. If necessary, protective (safeguard) excavations shall be carried out by the construction contractor under the supervision of qualified specialists, 4) Carry out cultural heritage field surveys both within and around the areas designated for construction camps and borrow pits, as well as along the main irrigation pipeline running to Yelpin.		investigations are completed prior to the start of construction; and a qualified cultural heritage expert is engaged within the construction contractor's team.	A - Supervising engineer and MESCS (for CHMP) S&M - Client (WCRA/ PIU) and EBRD.

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities <sup>16</sup>
<b>Section B - CONSTRUCTION PHASE</b>					
Site clearance, earth and excavation works, operation of construction machinery and heavy trucks, operation of borrow-pits, loading-unloading operations, etc.	Impact on air quality (8.2.4)	1) Use modern construction machinery equipped with engines compliant with at least Euro IV standards, with emission control and minimal noise characteristics, 2) Perform regular technical maintenance of used construction machinery and heavy vehicles, 3) Cover friable materials during the transportation by tarpauline,	Within the Project's Construction contract	Air, water, and soil quality monitoring plan is developed, approved prior to the start of construction and implemented	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD

<sup>16</sup>D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-operation

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		4) Minimise dust from open area sources, including storage piles and top-soil storage areas, by using control measures such as installing enclosures and covers, and increasing the moisture content, 5) Restrict excavation and earthworks during the periods of strong winds, 6) Select the location of construction yards and construction machinery taking into account prevailing wind directions, 7) Apply regular watering to on-site and off-site dirt roads, especially during the excavation and other earthworks, 8) Minimise the period between excavation and backfilling works, 9) Prohibit construction materials and waste burning.		during the construction. All specified mitigation measures are implemented effectively throughout construction.	
Planting of trees in accordance with the Tree Management Plan	Impact on Landscape and Visual Amenity (8.2.5)	1) Plant 1300 trees in areas agreed upon with the head of Areni Municipality and the administrative head of Yelpin rural settlement, and ensure their aftercare for a period of two years ( <i>aftercare may be carried out during the reservoir operation phase</i> ), 2) The proposed types of trees to be planted are: <ul style="list-style-type: none"> <li>- <i>Acer campestre</i> L.</li> <li>- <i>Amygdalus fenzliana</i> (Fritsch) Lipsky</li> <li>- <i>Salix excelsa</i> S.G. Gmel.</li> <li>- <i>Salix triandra</i> L.</li> <li>- <i>Populus nigra</i> var. <i>italica</i> Duroi</li> <li>- <i>Elaeagnus angustifolia</i> L. var. <i>culta</i> Sosn.</li> </ul>	Within the Project's Construction contract	Project's impact on landscape is minimised through the implementation of the proposed measures.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.

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		<i>See also mitigation measures proposed in Sections 8.2.12 - Flora, 8.2.12 - Large mammals and 8.2.12 - Birds.</i>			
Site clearance, earth and excavation works, operation of construction machinery and heavy trucks, operation of borrow-pits, loading-unloading operations, storage of construction materials and spoil, etc.	Impact on Geology (8.2.6)	<ol style="list-style-type: none"> <li>1) Provide diversion ditches or berms: redirect surface runoff away from disturbed areas,</li> <li>2) Implement proper grading: ensures slopes are stable and directs water flow in controlled paths,</li> <li>3) Install slope breakers: break long slopes into smaller segments to reduce erosion potential,</li> <li>4) Phase the construction: limits the area of exposed soil at any one time,</li> <li>5) Avoid earthworks during rainy seasons, where feasible, to reduce erosion risk.</li> </ol>	Within the Project's Construction contract	Site inspections of construction material and spoil storage areas are regularly conducted, and sediment control measures are effectively maintained to ensure the stability of geological conditions within the Project area.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD
Site clearance, earth and excavation works, operation of construction machinery and heavy trucks, operation of borrow-pits, loading-unloading operations, storage of construction materials and spoil, etc.	Impact on Water Resources (8.2.7)	<ol style="list-style-type: none"> <li>1) Construct intermediate collection pools between runoff-generating surfaces and downstream watercourses to regulate flow to water bodies. These pools will allow soil particles to settle at the bottom, thereby reducing the turbidity of the runoff,</li> <li>2) Limit excavation and other earthworks near the Yelpin River during the rainy season,</li> <li>3) Prohibit the discharge of any untreated wastewater effluent into surface water bodies,</li> <li>4) Where practical, construct local perimeter drains around working areas (e.g., storage and parking areas) to collect suspended runoff and prevent its discharge into surface water resources.</li> </ol>	Within the Project's Construction contract	Surface water quality is protected, and adverse impacts from construction activities are minimized through implementation of mitigation measures.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD



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<p>Topsoil removal, storage, transportation, reuse, loading and unloading operations.</p> <p>Transportation, storage and use of spoil, construction (friable) and hazardous materials, including oil products, refueling of construction equipment and trucks.</p> <p>Accidental spills of friable materials, leakages of oil, fuel, and other liquid chemicals during the field works within the construction site.</p>	Impact on Soil (8.2.8)	<p><b>Topsoil management</b></p> <ol style="list-style-type: none"> <li>1) Carry out the removal, transportation, storage, and use of topsoil in accordance with RA Government Decrees №1396-N and №1404-N,</li> <li>2) Store topsoil separately to prevent mixing with subsoil, maintaining it in a condition that preserves the natural seed bank, until construction works are completed,</li> <li>3) Locate topsoil stockpiles at least 50 m away from watercourses to prevent water siltation,</li> <li>4) Avoid placing topsoil stockpiles near planned excavation areas,</li> <li>5) Limit the height of stockpiles to a maximum of 3 m, and ensure the slope gradient does not exceed 25°,</li> <li>6) Clearly label all topsoil stockpiles to ensure easy identification,</li> <li>7) Cover topsoil stockpiles to prevent soil erosion, where natural revegetation has not occurred,</li> <li>8) Fence off topsoil stockpiles to prevent unauthorized access and compaction by Project vehicles,</li> <li>9) Reuse the stored topsoil for landscaping the disturbed areas and/or tree planting within the Project area after the completion of reservoir and dam construction.</li> </ol> <p><b>Hazardous materials</b></p> <ol style="list-style-type: none"> <li>1) Store all hazardous materials in clearly labeled, secure, and ventilated areas,</li> <li>2) Hazardous materials containers to be clearly labelled according to contents and hazards,</li> </ol>	Within the Project's Construction contract	The provisions of the Topsoil Management Plan are implemented and controlled.	<p>I - Construction contractor</p> <p>S - Supervising engineer</p> <p>M - Client (WCRA/PIU), EBRD</p>

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		3) Equip sites with spill response kits and train workers on emergency response, 4) Maintain Material Safety Data Sheets (MSDS) in accessible language for all hazardous materials on-site, 5) Segregate incompatible hazardous materials to ensure they are not stored together, 6) Equip hazardous materials storage areas with eye wash kits and fire extinguishers, 7) Use appropriate PPE. <b>Soil contamination</b> 1) Transport friable materials using trucks equipped with waterproof canvas covers, 2) Store construction and other friable materials in separately designated areas that are fenced and covered with waterproof tents, 3) Store oil products and chemicals separately, in special drums or tanks placed on secondary containment systems or trays (secondary containment should withhold 110% of the volume of the container), 4) Carry out refueling of oil, fuel, and other chemicals only in dedicated areas eqiped with impervious surface and protective berms, 5) Equip storage facilities for oil and chemicals, as well as heavy trucks transporting these materials, with appropriate spill kits, 6) Immediately stop work in the event of uncontrolled spillage of fuel, engine oil, or chemicals. Contain the spill. Remediate contaminated soil by removing the affected			

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		<p>layer (to be treated as hazardous waste) and replacing it with clean soil,</p> <p>7) Train all staff on the safe execution of construction works and on response procedures for environmental incidents such as spills and leaks,</p> <p>8) Ensure spoil piles do not exceed 3 m in height, and maintain slope gradients not exceeding 25°. Manage spoil piles to prevent erosion and runoff.</p>			
All waste generation processes and activities during the construction phase	Waste Generation and Management (8.2.9)	<p><b>General</b></p> <p>1) Train the workers engaged in waste management on provisions of the WMP,</p> <p>2) Apply waste hierarchy approach (prevention, minimization, reuse, recycling, energy recovery, disposal) while implementing the construction activities,</p> <p>3) Elaborate and implement waste handling procedures for the construction operations,</p> <p>4) Equip the construction site and construction camps with the waste separate collection area/ clearly labelled storage containers and locations,</p> <p>5) Fence the waste storage / collection facilities and provide fire extinguishers, secondary containment trays, oil and chemicals spill clean-up kits, etc.,</p> <p>6) Store liquid waste in leak-proof, sealed containers.</p> <p>7) Sign contracts with the licensed waste handling (recycling, treatment, disposal) companies to hand them over the generated wastes.</p>	Within the Project's Construction contract	Waste management during the reservoir construction phase shall be implemented in accordance with applicable national legislation, the waste hierarchy principles and GIP.	<p>I - Construction contractor</p> <p>S - Supervising engineer</p> <p>M - Client (WCRA/ PIU), EBRD</p>

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		<b>Waste transportation</b> 1) Transport all types of wastes using adequate, sealed and covered trucks to avoid the leakage or dispersal of the waste on roads and surroundings, 2) Ban waste fly tipping and/or their disposal in unauthorized locations, 3) Select less risky routes for the transportation of waste from the area of its generation to its storage and recycling / disposal area, 4) Instruct the waste truck drivers on waste transportation safety rules. <b>Household waste management</b> 1) Equip the construction site with household collection containers / bins, 2) Sign a contract with the communal company for the regular removal of household waste from the construction site and construction camps. <i>In addition to the measures listed above: enforce the use of PPE and in particular, the protective clothes, shoes, gloves, respirator / masks for the workers dealing with the waste.</i>			
Site clearance, earth and excavation works, operation of construction machinery and heavy trucks, operation of borrow-pits, loading-unloading operations, etc.	Noise and Vibration Impact (8.2.10)	1) Keep all diesel-powered vehicles and equipment (such as generators and air compressors) at a high level of maintenance. This will particularly include the regular inspection and, if necessary, replacement of intake and exhaust silencers, 2) Shut down or throttle back the machinery/vehicles that are used intermittently when not in use,	Within the Project's Construction contract.	Noise and vibration impacts arising from construction activities are effectively controlled to prevent exceedance of acceptable levels and to minimize	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD

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		3) Whenever possible: enclose noisy equipment, restrict non-stop operation of noisy equipment, avoid simultaneous operation of noise generating equipment, 4) Avoid unnecessary idling times, 5) Minimise the need for the machinery to reverse. This will reduce the frequency at which disturbing but necessary reverse warnings will occur, 6) Avoid unnecessary horn hooting from the used construction machinery, 7) Limit truck speeds - not to exceed 40 km/h, when driving through local community roads, 8) Inform Yelpin rural settlements of the schedule and duration of construction activities, particularly where these are likely to generate high noise levels and before the blasting works, 9) Prohibit movement of heavy trucks along the communal roads between 10 PM and 6 AM near residential areas. <i>In addition to the measures listed above:</i> 1) Enforce the use of PPE and in particular, the protective devices capable to reduce the sound level at the ear to acceptable levels, 2) Provide employees engaged in 'noisy' operations with additional 15 minutes break per 2 hours.		disturbance to nearby receptors. Noise and vibration monitoring plan is implemented.	
Transportation of construction materials, oil products, workers	Traffic Impacts (8.2.11)	1) Build the access roads as envisioned in the Project design document, 2) Implement the Traffic Management Plan (TMP), 3) Train drivers of heavy vehicles on the key requirements of the Traffic Management Plan,	Within the Project's Construction contract.	Traffic risks are minimized through effective implementation of the TMP, driver	I - Construction contractor S - Supervising engineer



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		4) Inform local residents of anticipated construction traffic impacts at least two weeks prior to the start of construction, 5) Equip roads used by Project vehicles with appropriate road safety signs and posters, 6) Provide additional crossings for cattle where necessary.  <i>See also mitigation measures proposed in <b>Section 8.3.5 and 8.5.2.</b></i>		training programs, installation of clear safety signs and awareness posters along project roads, etc.	M - Client (WCRA/ PIU), EBRD
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Implement Biodiversity Action Plan (BAP) to ensure proper mitigation of impacts during the pre-construction, construction, and operation phases. BAP will outline and provide guidance for such components as the of the Biodiversity Management Plan, Riverine Habitats Construction Plan, Offset Program. All mitigation and management measures outlined in this ESMP that relate to biodiversity impacts are incorporated into the BAP.	Within the Project's Construction contract.	BAP is effectively implemented. Other plans related to the biodiversity are developed and implemented during the construction phase.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	<b>Flora</b> Plant 1300 <sup>17</sup> trees and ensure their aftercare for a period of two years (aftercare may be carried out during the reservoir operation phase), The proposed types of trees to be planted are: - <i>Acer campestre</i> L. - <i>Amygdalus fenzliana</i> (Fritsch) Lipsky - <i>Salix excelsa</i> S.G. Gmel. - <i>Salix triandra</i> L. - <i>Populus nigra</i> var. <i>italica</i> Duroi - <i>Elaeagnus angustifolia</i> L. var. <i>culta</i> Sosn.	Within the Project's Construction contract.	1300 trees are planted and maintained.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

<sup>17</sup>According to calculations conducted in the frames of the national EIA study, these trees shall be planted as a compensatory measure; there were used 1:1 ratio when cut tree trunk diameter (D) <10 cm and 1:6 ratio when D>10cm. Total multiplier is 3.42 (1300/380). Meanwhile, as the species to which the 380 losing trees belong are not priority species, "no Net Loss" and "Net Gain" approaches are not mandatory to be applied.

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		<i>See also mitigation measures proposed in Sections 8.2.5, 8.2.12 - Large mammals and 8.2.12 - Birds.</i>			
Site clearance and removal of vegetation. Earth and excavation works. Behaviour of workers of the Construction contractor.	Impact on Biodiversity (8.2.12)	<b>Fauna</b> <ol style="list-style-type: none"> <li>1) Plan and begin construction works from one edge of the Project (dam) area (namely, from the western edge) moving up to the valley; this approach will allow animals to leave,</li> <li>2) Begin the construction works before or after the breeding season - prior to April or after August; this will prevent mortality of animals including offspring,</li> <li>3) Limit charges for explosion by the minimum demands of the building works; implement all required safety measures during blasting to minimize the impacted area,</li> <li>4) Monitor compliance with the Worker Code of Conduct of employee of the building company to prevent poaching,</li> <li>5) Develop the Worker Code of Conduct for the operator of the reservoir to prevent poaching..</li> </ol>	Within the Project's Construction contract.	Worker Code of Conduct for the Operator is developed. The project impact on the fauna species is reduced and/or mitigated.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Site clearance and removal of vegetation. Earth and excavation works. Behaviour of workers of the Construction contractor.	Impact on Biodiversity (8.2.12)	<b>Sedentary animals</b> <ol style="list-style-type: none"> <li>1) Before tree cutting in the reservoir area, examine each tree to check whether Forest dormouse inhabits it; if so, capture individuals and relocate them to safe habitats identified during the pre-construction phase,</li> <li>2) Before filling the reservoir, survey the reservoir site and capture as many individuals as possible including such species as Forest dormouse (if remained), snakes, lizards, and to move them to the safe habitats identified</li> </ol>	Within the Project's Construction contract.	Project impact on sedentary animals is avoided, reduced, mitigated, or compensated.	D&I - Specialised company and/or Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

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		and/or arranged during the pre-construction phase, 3) Before filling the reservoir, check the mapped residential burrows of badger and other animals; if they remain, to capture them and relocate to the safe habitats.			
Site clearance and removal of vegetation. Earth and excavation works. Behaviour of workers of the Construction contractor.	Impact on Biodiversity (8.2.12)	<b>Large mammals</b> Plant some indigenous species of wild fruit trees in the vicinities of the Project area to address the loss of habitat of Brown bear. <i>See also mitigation measures proposed in Sections 8.2.5, 8.2.12 - Flora and 8.2.12 - Birds.</i>	Within the Project's Construction contract.	Indigenous species of wild fruit trees are planted and maintained.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.
Conservation of bird species	Impact on Biodiversity (8.2.12)	<b>Birds</b> Maintain the planted trees and bush species.	Within the Project's Construction contract.	Project impact on birds is avoided, reduced, mitigated, or compensated.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.
Conservation of invertebrates	Impact on Biodiversity (8.2.12)	<b>Invertebrates</b> Maintain created habitats, primarily the species forage plants.	Within the Project's Construction contract.	Project impact on invertebrates is avoided, reduced, mitigated, or compensated.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.
Accidents and incidents during the construction works	Impacts on Public Facilities and Infrastructure (8.3.2)	1) Oblige the construction contractor to set up a medical post at least at one of the labour accommodation camps. 2) Consider the need for a constant presence of the ambulance at the construction site or sign an agreement with the Yeghegnadzor Medical Centre to ensure emergency response when	Within the Project's Construction contract.	A medical post is established in accommodation camp.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.

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		medical services are required for the contractor's workers.			
Stakeholder engagement process, recruitment and remuneration of employees during the construction works.	Impact on Vulnerable Groups (8.3.4)	Implement the SEP to ensure that information about the Project and its opportunities is widely available and communicated to the female-headed and elderly households engaged in agricultural activities.	Within the Project's Construction contract.	The Project's SEP is effectively implemented. Inclusive stakeholder engagement with vulnerable groups; equitable recruitment and fair remuneration during construction.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Transportation of construction materials, oil products, workers.  Operation of the construction machinery and trucks.  Operation of construction and accommodation camps.	Impact on Community Health and Safety (8.3.5)	<ol style="list-style-type: none"> <li>1) Implement the Emergency Preparedness and Response Plan,</li> <li>2) Screen worker influx for communicable disease and provide treatment, as appropriate, to reduce exposure to local population,</li> <li>3) Conduct information campaigns on STDs among the workers and local community,</li> <li>4) Implement controlled access measures, including the installation of appropriate fencing and warning signage, and conduct ongoing community awareness activities to inform residents of potential hazards and safety requirements during the construction phase,</li> <li>5) Supplement the Traffic Management Plan with the following topics related to community health and safety: <ul style="list-style-type: none"> <li>- Optimised routes and times of the day for transporting materials to site, especially bulky equipment parts (e.g., pipes) agreed</li> </ul> </li> </ol>	Within the Project's Construction contract.	Traffic management Plan and EPRP are effectively implemented. All engaged workers are vaccinated and have passed the required medical examinations prior to commencing construction works and regularly during the construction.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

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		<p>with the traffic police and local administrations.</p> <ul style="list-style-type: none"> <li>- Identification of the sensitive receptors (schools, hospitals, residential areas, other social infrastructure) along the transportation routes and development of the mitigation measures where necessary.</li> </ul> <p>6) Implement and communicate the grievance mechanism for communities and external stakeholders in line with EBRD's requirements, to include, inter alia, anonymous and confidential grievance channels and redress.</p> <p><i>The enhanced GM shall be communicated to workers and communities and become fully operational prior to commencement of construction.</i></p> <p><i>See also mitigation measures proposed in Sections 8.2.11 and 8.4.</i></p>			
All processes and operations during the construction activities.	Health and Safety Impact (8.3.6)	<ol style="list-style-type: none"> <li>1) Implement the provisions of the Occupational Health and Safety Management Plan,</li> <li>2) Implement the provisions of the Blasting Safety Management Plan,</li> <li>3) Conduct regular audits of the construction site to monitor the OHS performance of the contractors.</li> </ol>	Within the Project's Construction contract.	Compliance with applicable national legislation and GIP concerning OHS requirements.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.
Operations and activities related to labour and working conditions, including the management of the construction camp and accommodation facilities.	Workers' Rights and Working Conditions Related Impacts (8.3.7)	<ol style="list-style-type: none"> <li>1) Implement Labour and Working Conditions Management Plan,</li> <li>2) Implement Construction Camp Management Plan, including sub-plans for Camp Code of Conduct and Camp Management,</li> </ol>	Within the Project's Construction contract.	Compliance with applicable national legislation, EBRD PR2 and GIP concerning labour and working conditions.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.



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		3) Set up and maintain grievance mechanisms available to all project workforce, including the opportunity for anonymous complaints.			
Interactions between workers and residents of affected settlements.	Gender-Based Violence and Harassment (8.3.8)	1) Implement GBVH policy, 2) Conduct mandatory and regular training for workers on required lawful conduct in local community, the Code of Conduct and GBVH Policy and consequences for failure to comply with the above, 3) Maintain a grievance mechanism, which includes a specific mandate on GBVH, 4) Organize information and awareness raising campaigns for community members, specifically women and girls, 5) Provide information to communities on how to use the grievance mechanism to report GBVH issues.	Within the Project's Construction contract.	All workers receive mandatory induction and regular refresher training on the Code of Conduct, GBVH Policy and expected behaviour in the local community.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Emergency situations such as landslides, earthquakes, incidents, spills, and leakages.	Emergency Situations and Response (8.4)	Install and maintain in working condition the firefighting equipment and first aid kits at all construction sites and project-related delivery vehicles. Train selected workers in their usage. <i>See also mitigation measures proposed in Section 8.3.5.</i>	Within the Project's Construction contract.	All construction sites are equipped with appropriate firefighting kits. Warning systems and equipment are properly installed, maintained and operational (if required).	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Earthworks, excavation, borrow pit operations, construction of electricity transmission lines, etc.	Impact on Tangible Cultural Heritage (8.5.1)	Train relevant personnel in the implementation of the CFP to ensure that workers are able to identify potential chance finds, suspend work in the affected area, and notify site management promptly. Maintain an up-to-date training log and	Within the Project's Construction contract.	Relevant staff are properly trained and aware of the provisions and	I - Construction contractor S - Supervising engineer

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		include relevant information in regular monitoring reports.		requirements of the CFP.	M - Client (WCRA/ PIU), EBRD.
Rituals, ceremonies and celebrations representing the traditional and cultural identity of the affected settlements.	Impact on Intangible Cultural Heritage (8.5.2)	Communicate the provisions of the Traffic Management Plan to the population of Yelpin settlement to help them plan Christmas, New Year, Easter, Trndez, weddings, and other celebrations and to avoid additional nuisance. <i>See also mitigation measures proposed in Sections 8.2.11 and 8.3.5.</i>	Within the Project's Construction contract.	Residents of the Project-affected settlements are informed and aware of the provisions of the Traffic Management Plan and the measures proposed to reduce potential nuisance.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

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<b>Section C - OPERATION (MAINTENANCE) PHASE</b>					
Regular maintenance of the reservoir body, dam and supporting infrastructure	Impact on air quality (8.2.4)	<ol style="list-style-type: none"> <li>1) Use modern construction machinery equipped with engines that comply with at least Euro IV standards, featuring emission control systems and low-noise characteristics,</li> <li>2) Perform regular technical maintenance of all construction machinery,</li> <li>3) If maintenance services are outsourced, contractors will be required to use modern, well-maintained equipment that complies with all applicable technical requirements.</li> </ol>	Within the Project's Construction contract.	Only modern and maintained construction machinery are operated	I - Operator ("Jrar" CJSC) or engaged contractor S - WCRA M - State Inspection Body

<sup>18</sup>D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-operation

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<i>Technical and maintenance measures that could potentially be included in the Project design documents</i>	Impact on air quality (8.2.4)	<p><b>The following cost-efficient technical measures should be included in the Project design documentation, maintenance and operational plans for the reservoirs:</b></p> <ol style="list-style-type: none"> <li>1) Consider aeration systems to oxygenate water and suppress anaerobic methane production,</li> <li>2) Install surface aerators or diffused air systems to increase dissolved oxygen,</li> <li>3) Remove decaying vegetation, crop residues, or debris from the reservoir and inflows,</li> <li>4) Keep banks and inflow channels clear to reduce organic loading,</li> <li>5) Establish buffer zones with vegetation to absorb nutrients before they reach the reservoir</li> </ol>	Can be included in the loan agreement, if deemed appropriate for the project.	Proposed equipment is installed and operated; clearance and cultivation measures is implemented	I - Specialised contractor O - Operator S - WCRA
Tree planting according to the Tree Management Plan	Impact on Landscape and Visual Amenity (8.2.5)	<p>Ensure maintenance and aftercare of the planted trees for two years.</p> <p><i>Over time, natural regeneration and vegetation growth along the reservoir's perimeter may reduce visual contrasts and facilitate the integration of the area into the surrounding landscape.</i></p> <p><i>If well integrated with the natural landscape, the reservoir may contribute positively to the area's overall visual character.</i></p>	Within the Project's Construction contract.	The area allocated for the tree planting is covered by tree species	I - Specialised company hired by the Construction contractor S&M - Client (WCRA/PIU) and affected municipality
Planning, design and cultivation of agricultural land within the command area of the Yelpin Reservoir		<p>Consult with the heads of affected settlements and landowners who will gain access to irrigation water as a result of Project implementation, to discuss and agree on design solutions for establishing potato and vegetable cultivation based on modern agricultural and irrigation technologies.</p> <p><i>This may transform the organically evolved cultural landscape into a designed cultural landscape.</i></p>	-	Landowners and cultivators within the Yelpin and Chiva villages plan and cultivate their agricultural plots using modern, water-efficient and sustainable	I - Areni municipality with support of the WCRA/PIU S&M - Client (WCRA/PIU)

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				agricultural and irrigation practices.	
Coastal erosion around the entire perimeter of the reservoir due to water encroachment during the initial years of operation	Impact on Geology (8.2.6)	<p><i>If technically and economically feasible, implement all or some of the following activities:</i></p> <ol style="list-style-type: none"> <li>1) Bioengineering / Vegetative Measures <ul style="list-style-type: none"> <li>- Plant native grasses, shrubs, and trees to stabilize soil through root systems and reduce erosion,</li> <li>- Install biodegradable or synthetic mats that support vegetation growth while preventing initial soil loss.</li> </ul> </li> <li>2) Embankment Stabilization Measures <ul style="list-style-type: none"> <li>- Place layers of large, durable stones along vulnerable embankments to dissipate wave energy and prevent erosion,</li> <li>- Place sloped structures on banks to absorb and deflect the energy of incoming water.</li> </ul> </li> <li>3) Reservoir Operation Management <ul style="list-style-type: none"> <li>- Gradually fill the reservoir to allow embankment soils to stabilize and minimize sudden saturation that can lead to collapse,</li> <li>- Avoid large, rapid fluctuations in water level during early years to reduce destabilization of new embankments.</li> </ul> </li> <li>4) Erosion Monitoring and Adaptive Management <ul style="list-style-type: none"> <li>- Regular monitoring: Using drones, surveys, or satellite imagery to detect early signs of erosion and assess the effectiveness of mitigation measures,</li> <li>- Adaptive management plans: Revising and enhancing embankment protection</li> </ul> </li> </ol>	Can be included in the loan agreement, if deemed appropriate for the project.	Recommended mitigation measures for controlling coastal erosion are implemented effectively.	I - Specialised contractor S&M - Client (WCRA/PIU)

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		measures based on ongoing monitoring results, - Erosion-sensitive zoning: Identifying high-risk areas and applying stricter protection or engineering controls there.			
Water contamination	Impacts on Water Resources (8.2.7)	1) Minimize potential stormwater and agricultural runoff release to the Yelpin River, 2) Eliminate manmade inflows from domestic or industrial activities into the reservoir.	-	The inflow of wastewater to the reservoir is minimised/ eliminated.	I&O - Operator together with WUA and affected municipality S&M - Client (WCRA/ PIU)
Delivery of irrigation water to end users		<b>Hydrological Regime</b> 1) Develop and implement Irrigation Water and Environmental Flow Releases Management Plan to: - Ensure reliable and efficient delivery of irrigation water to agricultural areas, - Maintain minimum environmental flows to support the health of downstream aquatic and riparian ecosystems, - Prevent over-extraction and degradation of water resources, - Comply with national water use regulations and environmental protection standards. 2) Review the irrigation water and environmental flow releases management plan annually, or after major hydrological events, to incorporate new data, regulatory changes, and operational experience, 3) In the event of low reservoir levels or critical drought conditions, implement a prioritization protocol that protects environmental flows up to	-	Irrigation water is supplied to users in a manner that ensures the maintenance of the minimum environmental flow. Reservoir Operation and Maintenance Plan for the operation phase is developed and implemented.	I&O - Operator S&M - Client (WCRA/ PIU)



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		<p>a predefined minimum threshold before allocating water for irrigation.</p> <p><b>Water losses</b></p> <p>4) Develop Reservoir Operation and Maintenance Plan,</p> <p>5) Carry out technical maintenance of the reservoir's supporting infrastructure to eliminate incidents and breakdown in accordance with the Reservoir Operation and Maintenance Plan.</p>			
Regular maintenance of the reservoir body, dam and supporting infrastructure	Impact on Soil (8.2.8)	Outsource the maintenance of the operated reservoirs to the contractors equipped with modern and technically serviced equipment.	Within the Operator's budget.	Only modern and maintained construction machinery are operated.	I&O - Operator or engaged contractor S - WCRA M - State Inspection Body
All waste generation processes and activities during the operation and maintenance works	Waste Generation and Management (8.2.9)	<p>1) Obtain all required permits and regulatory documents relevant to the operation of reservoirs in Armenia, as required by local waste-related legislation (can be done at the corporate level),</p> <p>2) Develop and implement WMP for the operation and maintenance of the reservoir (can be done at the corporate level),</p> <p>3) Apply waste hierarchy approach (prevention, minimization, reuse, recycling, energy recovery, disposal) for the generated waste,</p> <p>4) Equip the site with waste collection and storage containers and areas,</p> <p>5) Sign contracts with the licensed waste handling (recycling, treatment, disposal) companies to hand them over the generated wastes,</p>	Within the Operator's budget.	Waste management during the reservoir operation phase shall be implemented in accordance with applicable national legislation, the waste hierarchy principles and GIP.	D,I&O - Operator S - WCRA M - State Inspection Body

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		6) Sign a contract with the communal company for the regular removal of household waste from the reservoir site.			
Conservation of flora species and habitats.	Impact on Biodiversity (8.2.12)	<b>Habitats</b> 1) Implement the Riverine Habitats Construction Plan: construct and maintain the following two habitats (PBFs) along the reservoir's banks: <i>F9.12 Lowland and collinar riverine willow scrub (3280 Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of Salix and Populus alba), G1.11. Riverine willow woodland (92A0 Salix alba and Populus alba galleries).</i> 2) Implement the offset project to conserve the following four priority habitats: <i>E1.2 Perennial food grasslands and main steppes (6190 Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis), 61A0 Eastern sub-Mediterranean dry grasslands (Scorzoneratalia villosae), F7.35-AM Armenian phryganoids (5410 West Mediterranean clifftop phrygas (Astregaloplaginetum subulatae), H3.1 Basic and ultra-basic inland cliffs (8210 Calcareous rocky slopes with chasmophytic vegetation), F3.1. Temperate thickets and scrub (40A0* Subcontinental peri-Pannonic scrub).</i>	Within the biodiversity conservation budget.	All proposed mitigation measures are effectively implemented.	D&I - Specialised company via WCRA/PIU S&M - Client (WCRA/PIU) and EBRD
Conservation of flora species and habitats.	Impact on Biodiversity (8.2.12)	<b>Flora</b> Construct and maintain two riverine habitats along the reservoir's banks based on indigenous plant species (see this <a href="#">Table</a> , previous row, <a href="#">Habitats</a> ).	Within the biodiversity conservation budget.	Two riverine habitats are constructed and maintained.	D&I - Specialised company S&M - Client (WCRA/PIU) and EBRD

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Behaviour of the Operator's workers	Impact on Biodiversity (8.2.12)	<b>Fauna</b> Monitor compliance of the reservoir's operator with the Worker the Code of Conduct to prevent poaching during operations.	-	Operator's staff regularly participate in emergency response training and practical drills, consistently use appropriate PPE, and affected settlements are equipped with the required safety signage and devices.	S&M - Client (WCRA/ PIU)
Conservation of flora, fauna and habitats.	Impact on Biodiversity (8.2.12)	<b>Sedentary animals</b> 1) Introduce/support a sustainable grazing practice in the areas that surround the planned reservoir, as the improved quality of the habitats can provide higher and diverse food supply for reptilians, thus supporting in the increase of the density of the protected snake and lizard species, 2) Maintain forest and rocky habitats which are habitats for relocation of Forest dormouse, snakes and lizards in the vicinities of the flooded area. <i>These habitats have to be included into the conserved priority habitats with trees, thickets and scrub (see above - this <a href="#">Table</a>, <a href="#">Habitats section</a>).</i>	Within the biodiversity conservation budget.	Project impact on sedentary animals is avoided, reduced, mitigated, or compensated.	D&I - Specialised company S&M - Leadership of affected community with training support from Client (WCRA/ PIU)
Conservation of large mammals	Impact on Biodiversity (8.2.12)	<b>Large mammals</b> Maintain planted indigenous wild fruit trees in the vicinities of the Project area to address the loss of	Within the Project's Construction contract.	Indigenous species of wild fruit trees	D&I - Specialised company

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		habitat of Brown bear for at least two first years of operations (during the first two years).		are planted and maintained.	S&M - Client (WCRA/PIU) and EBRD
Conservation of bird species	Impact on Biodiversity (8.2.12)	<b>Birds</b> 1) Introduce/support sustainable grazing practices in Yelpin community, which can improve the quality of grassland habitat, increase the number and diversity of invertebrates, and support the necessary food supply for European Roller, Tawny Pipit, Wood Lark, White-throated Robin, Red-backed Shrike, Lesser Grey Shrike, and Red-billed Chough, which may support in some increase of their density, 2) Maintain the planted trees and bush species for at least two first years of operations.	Within the biodiversity conservation budget.	Project impact on birds is avoided, reduced, mitigated, or compensated.	D&I - Specialised company S&M - Leadership of affected community with training support from Client (WCRA/PIU)
Conservation of invertebrates	Impact on Biodiversity (8.2.12)	<b>Invertebrates</b> 1) Introduce/support sustainable grazing practices in communities around the reservoir, which can improve quality of grassland habitat, increase the number and diversity of invertebrates, 2) Maintain developed habitats with the priority species forage plants.	Within the biodiversity conservation budget.	Project impact on invertebrates is avoided, reduced, mitigated or compensated.	D&I - Specialised company S&M - Leadership of affected community with training support from Client (WCRA/PIU)
Stakeholder engagement process, recruitment and remuneration of employees during the construction works.	Impact on Vulnerable Groups (8.3.4)	Continue the SEP implementation during the reservoir operation phase to ensure that information about the additional irrigible water and access to the water is widely available and communicated to the vulnerable groups engaged in agricultural activities.	Within the Operator's budget.	Participation of vulnerable groups in water user associations or community decision-making on irrigation is prioritised.	D&I - Client (WCRA/PIU) and Operator S&M - Client (WCRA/PIU)

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Transportation of materials, oil products and workers.  Operation and maintenance of the Yelpin Reservoir.	Impact on Community Health and Safety (8.3.5)	<ol style="list-style-type: none"> <li>1) Monitor the technical conditions of the reservoir, provide timely maintenance,</li> <li>2) In case if heavy machinery or large number of vehicles is needed for the performance of the maintenance works, a Traffic Management Plan should be developed, accounting for the recommendation outlined above,</li> <li>3) Develop an Emergency Preparedness and Response Plan (EPRP) covering the Project operation stage.</li> </ol> <p><i>See also mitigation measures proposed in <b>Section 8.4.</b></i></p>	Within the Operator's budget.	Traffic Management Plan and EPRP for the operation phase are implemented.	D&I - Operator S&M - Client (WCRA/ PIU)
Operation and maintenance of the Yelpin Reservoir.	Health and Safety Impact (8.3.6)	<ol style="list-style-type: none"> <li>1) Develop an OHS procedure/instruction for the maintenance and repair works,</li> <li>2) Comply with the requirements of the relevant national OHS legislation.</li> </ol>	Within the Operator's budget.	OHS procedures are prepared and implemented.  The activities of the Operator are in line with the national OHS requirements.	D&I - Operator S - Client (WCRA/ PIU) M - Health and Labor Inspection body
Labour and working condition-related operations, including management of reservoir operations staff.	Workers' Rights and Working Conditions Related Impacts (8.3.7)	If a large-scale maintenance is planned, oblige the Maintenance contractor to develop and implement a Labour and Working Conditions Management Plan and Worker Code of Conduct (if needed) in line with Armenian labour laws and EBRD PR2 at least a month before any maintenance works, and implement it.	Within the Operator's budget.	Compliance with applicable national legislation, EBRD PR2 and GIP concerning labour and working conditions.	D&I - Operator or Maintenance contractor S - Client (WCRA/ PIU) M - Health and Labor Inspection body
Interactions between workers and residents of affected settlements.	Gender-Based Violence and Harassment (8.3.8)	<ol style="list-style-type: none"> <li>1) Monitor access to the irrigation infrastructure following the Project completion,</li> <li>2) Maintain the grievance mechanism during the Project operation, including the GBVH cases.</li> </ol>	Within the Operator's budget.	Effective grievance mechanism, including provisions for addressing GBVH-	D&I - Operator S&M - Client (WCRA/ PIU)

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				related cases is implemented.	
Operation of the Yelpin Reservoir.	Emergency Situations and Response (8.4)	1) Conduct Dam Integrity Risk Assessment, 2) After completion of the dam integrity risk assessment and flood safety check, consider the need of an early-warning system and provision of the life-saving equipment in the local communities, with the requirement of regular maintenance and emergency evacuation drills.	Within the Operator's budget.	Dam Integrity Risk Assessment is carried out. All required warning systems and equipment are installed and maintained.	I&O - Operator S&M - Client (WCRA/PIU)
Promotion of rituals, ceremonies, celebrations, and cultural heritage values that represent the traditional and cultural identity of the affected settlements, socio-economic development of Areni community.	Impact on Intangible Cultural Heritage (8.5.2)	Discuss with local cultural NGOs, tourism organizations, the heads of Areni community, affected settlements and other relevant stakeholders the possibility of including the Yelpin reservoir in the potential list of sightseeing sites along the "Areni Wine Route".	5,000 EUR	Events promoting the intangible cultural heritage values of Areni community are organized and implemented.	D&I - Specialised company (for example cultural NGO) S&M - Client (WCRA/PIU) and EBRD