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WATER RESERVOIRS PROJECT - ARMENIA

Environmental and Social Impact Assessment for the Kasakh Reservoir Construction Project

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Rev02

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**



ATMS Solutions Ltd.
www.atms.am

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Consultancy Services Contract № 2023.009567

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Prepared by:



ATMS Solutions Ltd. (Armenia)

Director: Dr. Artak Ter-Torosyan

1, 11 Griboedov str.,

0051, Yerevan, Armenia

Tel.: +37499 109495

E-mail: artak.ter-torosyan@atms.am

www.atms.am

and



Ecoline International Ltd. (Bulgaria)

Director: Dr. Maia Gachechiladze-Bozhesku

Tel.: +380 951 100 727

+ 359 876 63 0522

E-mail: mgachechiladze@ecoline-int.org

www.ecoline-int.org

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This Environmental and Social Management Plan (ESMP) has been developed as part of the Environmental and Social Impact Assessment (ESIA) for the Kasakh 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.

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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
STD	- Sexually Transmitted Disease
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 Marz¹,
- 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 Voskehat, Voskevaz, and Oshakan rural settlements in Ashtarak community (Aragatsotn Marz, RA), as well as Amberd and Aygeshat settlements in Khoy community (Armavir Marz, RA). The Kasakh Reservoir is designed with a capacity of 10 mln. m³ and will be fed by the Kasakh and Amberd Rivers. It is intended to provide irrigation water to 21 settlements in Armavir Marz.

The Bank has engaged the Consultant² to update the national Environmental Impact Assessment ('EIA') report for the Kasakh 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:

¹Marz - Region in Armenian

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

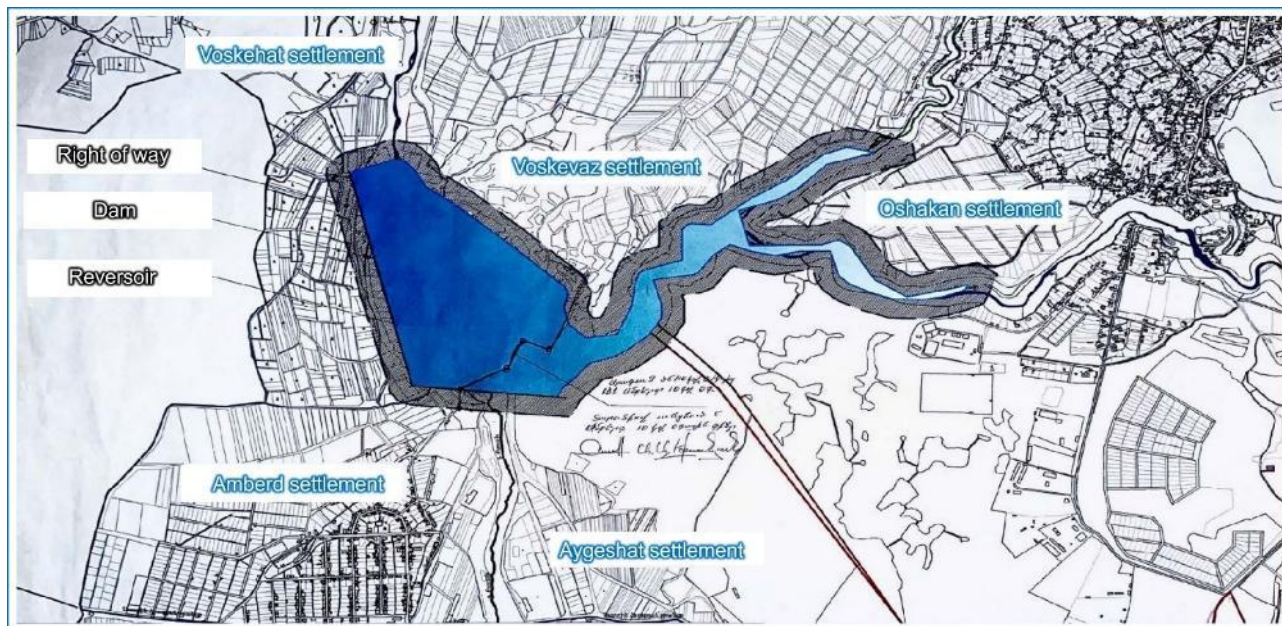
- Legislative and regulatory framework applicable to the Project,
- Ensure that the requirements of the EBRD are met,
- Outline the organisational structure, and key roles and responsibilities associated with E&S management,
- Document how the E&S risks and impacts identified through the ESIA studies 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

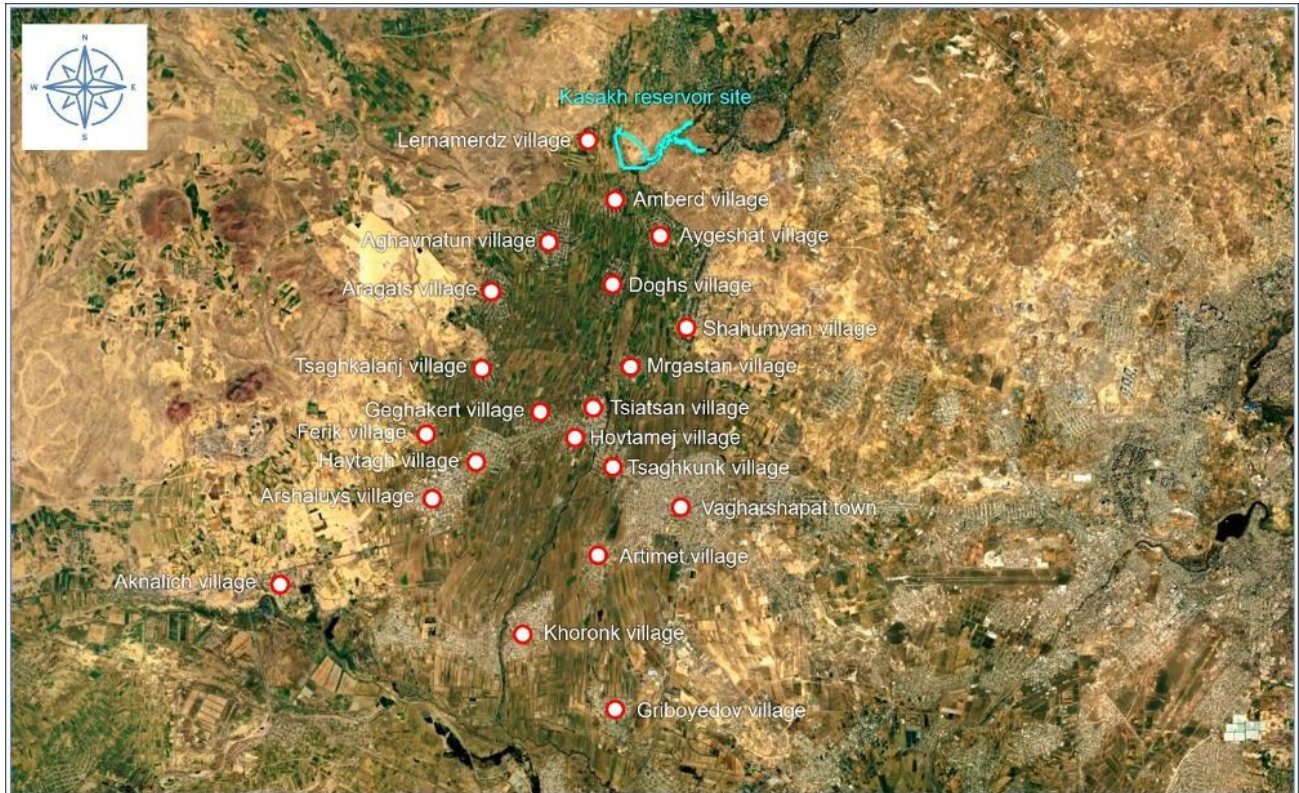
Kasakh Reservoir is planned for construction within the administrative boundaries of Voskehat, Voskevaz and Oshakan villages of Ashtarak community (RA Aragatsotn Marz) and Amberd and Aygeshat villages of Khoy community (RA Armavir Marz) (**Figure 1**) at the confluence of the Kasakh and Amberd rivers, at an elevation of 950-980 masl. The area proposed for the reservoir is mainly covered by community and private lands of agricultural significance, including pastures and arable land.

Figure 1. Location of the reservoir within administrative boundaries of 5 settlements



The reservoir is designed to be fed by the Kasakh and Amberd rivers and will supply water to the Stage 2 Hrazdan Down Channel, through which 503 ha of agricultural land in 21 settlements of Armavir Marz will be irrigated (see **Figure 2**). The reservoir will have a total capacity of 10 mln. m³, including 1.12 mln. m³ of dead storage and 8.9 mln. m³ of useful (active) storage.

Figure 2. Map of Project command area



The Kasakh Reservoir will occupy an area of 89.7 ha; however, a total of 145.26 ha of land will be permanently allocated for the project's needs, including the protection zone around the reservoir, the dam, and supporting infrastructure.

The reservoir hydraulic unit consists of:

1. Dam,
2. Construction (diversion) outlets 1 and 2,
3. Irrigation outlet (offtake),
4. Bottom outlet,
5. Emergency spillway.

The dam body will be constructed using locally available materials: a loam core with upstream and downstream filters around the core and a "gravel pebble" shell. There is upstream rock armour wave protection. The geological survey shows predominantly sands and gravels overlying highly fractured porous basalt and Tuffs. The loam is noted to be mined, potentially from 35 km away from site and then transported, but with more research said to be ongoing. Anti-seepage protection will be provided by a central loam core.

The irrigation outlet consists of an intake well with a metal flume, from which a steel pipe with a diameter of 1,420 mm and a wall thickness of 12 mm extends for 170.0 meters within a reinforced concrete tunnel. Three-disc valves with a diameter of 1,400 mm are planned at the pipeline outlet.

To manage emergency discharge, an open-bank ditch spillway has been designed. It consists of the following components: (1) lateral spillway, (2) ditch, (3) transition section, (4) gallery beneath the dam crest, (5) high-velocity removal section, and (6) surge end section.

Construction (diversion) outlet 1 is a temporary working structure designed to convey river flows downstream during reservoir construction and to keep the construction site dry. For the purposes of the Project, the construction discharge is directed through a rectangular floor gallery (b = 4.0 m,

L = 161.0 m). Calculations were based on a discharge with a 10% exceedance probability ($Q_{10\%} = 128.9 \text{ m}^3/\text{s}$), from which the gallery's cross-sectional dimensions and floor slope were determined. Construction (diversion) outlet 2 is an open channel with a length of 810.0 m and a cross-section of $4.0 \times 2.0 \text{ m}$.

In total, 280 land plots covering a surface area of $1,452,605.40 \text{ m}^2$ are affected across 2 communities (Ashtarak and Khoy), including 5 settlements (Voskehat, Voskevaz, Oshakan, Amberd and Aygeshat), of which 172 private, 106 community-owned and 2 state-owned land plots.

All facilities required for the reservoir construction, except of the loam (clay) borrow pit, are situated within the Construction site (145.26 ha area permanently allocated for the Project needs). These facilities include a construction camp, a stone quarry, two pebble-gravel and loam borrow pits, three stone storage areas, three pebble-gravel storage areas and two topsoil temporary storage areas.

The loam (clay) required for dam construction will be sourced from a borrow pit located in the Gay community of the Etchmiadzin region, approximately 35 km from the Project site. Upon completion of the reservoir construction, the loam borrow pit will be recultivated and returned to Gay community.

A construction camp will be established to the south of the reservoir dam. It will include a batching plant, storage areas for construction and other materials, administrative offices, and accommodation facilities. A stone quarry, covering an area of 10.7 ha, is located on the northern side of the reservoir area. Two borrow pits for pebble-gravel and loam, occupying 8.4 ha and 12.5 ha respectively, will supply approximately $1,145,000 \text{ m}^3$ of pebble-gravel material for dam construction. One loam (clay) storage area, three stone storage areas, and three pebble-gravel storage areas are planned within the construction site. All generated spoil will be reused as backfill material; therefore, no Spoil Disposal Areas (SDAs) will be required.

During the earthworks and excavation activities, the topsoil from the site will be removed and stored in accordance with existing regulations. According to the Project design study, $106,774 \text{ m}^3$ of topsoil will be stripped and stored in temporary topsoil storage areas located outside the reservoir area but within the designated protection zone. The topsoil will later be used for landscaping activities.

The Project design document also envisions the construction of power supply lines and a substation. There is lack of information related to this power supply infrastructure, its technical parameters and required land-plots in the design document. The land use impacts regarding the power supply lines will be managed within the RAP study to be developed as required in the RF.

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 Construction Norms and Rules - 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 construction work schedule and amounts to 39 months³.

³Preparation of design and cost estimation documents for construction of Kasakh reservoir in Armavir 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*⁴, 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 ³		
			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

⁴<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*⁵, the IFC *Environmental, Health, and Safety General Guidelines (2007)*⁶ and WHO *Guidelines for Community Noise (1999)*⁷ 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 ⁸	55	70	55
		night-time ⁹	45	60	45

The TLVs set by the Hygienic Norms №2.2.4-009-06 *Vibration in the workplaces, in residential and public buildings*¹⁰ 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 ²	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"¹¹ 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

⁵<https://www.arlis.am/hy/acts/163246>

⁶<https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-en.pdf>

⁷<https://www.who.int/publications/i/item/a68672>

⁸between 07:00 and 23:00

⁹between 23:00 and 07:00

¹⁰<https://www.arlis.am/hy/acts/163276>

¹¹<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 27.01.2011¹². The environmental water quality standards for watercourses within the Kasakh River Basin are defined in Annex 8 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)¹³, 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.

¹²<https://www.arlis.am/hy/acts/200962>

¹³The 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:

- 1) Project Manager,
- 2) Environmental specialist,
- 3) Occupational and community health and Safety specialist(s),
- 4) Social and resettlement specialist,
- 5) Cultural heritage expert,
- 6) 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),
- 7) 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 Kasakh 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 Khoy and Ashtarak Municipalities and administrative heads of Amberd, Aygeshat, Oshakan, Voskehat and Voskevaz rural settlements will identify suitable locations for 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 Kasakh 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,
- Operation and Maintenance 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 ¹⁴
Section A - PRE-CONSTRUCTION (DESIGN) PHASE					
Vegetation clearance, tree cutting	Impact on Landscape and Visual Amenity (8.2.5)	Develop Tree Management (TrMP) and obtain approval from the Supervising engineer and agreement from the affected community. <i>See also mitigation measures proposed in Section 8.2.12 - Flora.</i>	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)	1) Develop Topsoil Management Plan (TsMP) and obtain approval from the Supervising engineer, 2) Obtain required permit for topsoil transportation and storage operations, 3) Develop Hazardous Materials Management Plan (HMMP) and obtain approval from the Supervising engineer, 4) Develop Spill Prevention and Management Plan (SPMP) and obtain approval from the Supervising engineer.	Within the Project's Construction contract.	TsMP, HMMP and SPMP are developed and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.
All waste generation processes and activities	Waste Generation and Management (8.2.9)	1) Obtain all required permits and normative documents regulating waste management in Armenia, as a minimum including:	Within the Project's Construction contract.	All permits required by the RA waste	D - Construction contractor

¹⁴D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-Operation

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during the construction phase		<ul style="list-style-type: none"> - hazardous waste passports, - waste generation norms, and their disposal limits, - waste generation register, etc., - waste primary registration log-books. 2) Prepare and put into effect the Waste Management Plan (WMP) for the Project.		sector legislation are obtained. WMP is prepared and approved. SDAs are identified and agreed (if required).	A - Supervising engineer and Heads of Khoy and Ashtarak communities (for SDA locations) S&M - Client (WCRA/PIU) and EBRD.
Transportation of construction materials, oil products, workers	Traffic Impacts (8.2.11)	1) Develop a Traffic Management Plan inclusive of identification of sensitive receptors and management of impacts to them, which will be approved by the Supervising engineer, as well as relevant regional authorities and road police, 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 representatives of 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. <i>The TMP shall also cover measures outlined in Section 8.3.5.</i>	Within the Project's Construction contract.	TMP is prepared and approved.	D - Construction contractor A - Supervising engineer, Heads of Khoy and Ashtarak communities, Road Police S&M - Client (WCRA/PIU) and EBRD.
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Habitats 1) Study the priority habitats (three PBFs, one CH) in the Project area, their plant composition and ecological structure, specify areas and develop detailed habitat maps. 2) Develop a Riverine Habitats Construction Plan to plan construction and maintenance of the following two habitats (PBFs) along the reservoir's banks:	30,000 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>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),</p> <p>G1.11 - Riverine willow woodland (92A0 Salix alba and Populus alba galleries).</p> <p>3) Study the reservoir protection/buffer area as well as the upper parts of the Kasakh, Amberd and Shahvard river valleys and downriver from the reservoir, to define existing habitats similar to the following habitats:</p> <p>F3.1 - Temperate thickets and scrub (40A0* Subcontinental peri-Pannonic scrub),</p> <p>H3.2 - Basic and ultra-basic inland cliffs (8210 Calcareous rocky slopes with chasmophytic vegetation).</p> <p>4) Develop an offset project to provide conservation of the both habitats (40A0 and 8210) in the most suitable for the conservation.</p> <p><u>Preliminary quantative assessment</u></p> <p>Total lost area of the two riverine habitats (3280 and 92A0) is 5.91 ha. The reservoir perimeter potentially suitable for the riverine habitats, according our estimation, is about 7.5 km. If the minimum width of the habitats strip is estimated at 10 m, then a min 7.5 ha of the riverine habitats can be constructed along the reservoir shoreline (the minimal multiplier will be 1.23).</p> <p>Lost area of the habitat «8210 Calcareous rocky slopes with chasmophytic vegetation» is 3.07 ha. Taking into account that the reservoir buffer zone is 23.41 ha, there is possibility to conserve the habitat</p>			

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		<p><i>in the buffer zone boundaries (if this habitat is found there and of such or more area).</i></p> <p><i>Lost area of the habitat «40A0* Subcontinental peri-Pannonic scrub» is 11.36 ha. By excluding the riverine habitats minimum area (7.5 ha) and 8210 habitat area (3.07 ha, multiplier 1), from the buffer zone area the remaining area (12.84 ha) should be sufficient for achieving No Net Loss and the conservation of the 40A0* habitat (with multiplier 1). However, should the "net gain" approach for this Critical Habitat be applied, it will necessitate the use of other areas (located up and down the rivers) to achieve the Net Gain.</i></p> <p><i>The protection /buffer zone and areas located up and down the rivers can be used as compensation/offset areas. The buffer zone is more suitable for the long-term offset implementation to be incorporated in the reservoir management plan. Proposals for the restoration and conservation of the habitats, including multipliers, should be developed in BAP.</i></p>			
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	<p>Flora</p> <ol style="list-style-type: none"> 1) Study plant composition and structure of the priority riverine habitats, 2) Develop a Riverine Habitats Construction Plan based on indigenous plant species, 3) Develop a Tree Management Plan (TMP). <p><i>See also mitigation measures proposed in Section 8.2.5.</i></p>	Within the Project's Construction contract.	Riverine Habitats Construction Plan and TMP are developed.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/PIU) and EBRD.
Behaviour of workers of the Construction contractor.	Impact on Biodiversity (8.2.12)	4) Fauna	Within the Project's Construction contract.	Worker Code of Conduct is	D - Construction contractor

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		1) Develop the Worker Code of Conduct for employees of the Construction contractor to prevent poaching, 2) Survey the Project area to identify species of bats and, if so, possible bat roosts (can be found on trees, in hollows, crevices, foliage, caves) and estimate their number. If the bat roosts presence is confirmed, identify existing forest and rocky habitats which are potentially suitable for bat roosting in the vicinities of the flooded area (first of all, in the reservoir buffer/protection zone), built the bat boxes and hang them on trees to increase the habitat capacities for bats.		developed and approved.	A - Supervising engineer S&M - Client (WCRA/PIU) and EBRD.
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Sedentary animals 1) Survey the dam and reservoir footprint areas to identify the priority reptile species at the beginning (April) or end (September) of the species' activities season. 2) Identify existing bush and rocky habitats which are potential habitats for relocation of snakes and lizards in the vicinities of the reservoir area, 3) Provide additional rocky outcrops, plant some indigenous tree and bush species in the vicinities of the areas to be flooded to increase the habitats capacity for snakes and lizards, 4) Survey the area to map inhabited burrows of badger and other burrowing animals as well as possible dens of the Gray wolf and Wild cat, <i>The results of this survey will be used at the end of the construction phase, prior to reservoir filling, to inspect the mapped burrows and dens.</i>	Within the Project's Construction contract.	Project impacts on sedentary animals are avoided, reduced, mitigated, or compensated.	I - Construction contractor with the assistance of qualified herpetologists S - Supervising engineer M - Client (WCRA/PIU) and EBRD.

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		<i>See also measures proposed in Section B, Sedentary animals.</i>			
Conservation of bird species	Impact on Biodiversity (8.2.12)	Birds 1) Plant additional indigenous species of Poplar, Willow, and Walnut trees for Syrian Woodpecker in the vicinity of the Project area, 2) Plant additional thorny bush species in the vicinity of the Project area as breeding spots for White-throated Robin, Red-backed Shrike, and Lesser Grey Shrike, helping them to discover new breeding sites, <i>Theses 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, 8210 and 42A0 (see above Section - Habitats).</i>	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)	Invertebrates 1) Study the habitat requirements of the ten priority species and estimate areas of the habitats, lost by these species, 2) Develop similar habitats in not flooded 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</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.

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		<i>thickets/scrub and cliffs, 8210 and 42A0 (see above Section - Habitats).</i>			
Conservation of aquatic species.	Impact on Biodiversity (8.2.12)	Aquatic species 1) Survey the rivers to be impounded to confirm presence of the Transcaucasian water shrew and Eurasian otter along the Kasakh and Amberd riverbanks in the dam construction area. If the species presence is confirmed - capture the water shrew and relocate upriver to similar habitats; implement measures to scare away the otter and stimulate animals to relocate, 2) Construct the fishway to provide fish species with safe migration along the rivers during the construction phase. 3) Maintain the fish passage during the operation of the reservoir	Within the Project's Construction contract.	Project impacts on aquatic species are avoided, reduced, mitigated, or compensated.	I - Construction contractor with assistance of qualified ichthyologist 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 public consultations with AHs are conducted in all affected communities during the Project development to present the Project's aims, stages of land acquisition and compensation process, a concept of "cut-off date", basic eligibility and entitlements, survey timelines, resettlement timelines, 2) Establish a Grievance Mechanism to deal with the Project-related concerns, 3) Develop a Resettlement Plan for the Project in line with the approved Resettlement Framework, ensure necessary mitigation measures for all the affected communities, including vulnerable households are included and implemented,	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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		4) Develop and implement the Resettlement Plan to ensure that the compensation for community land is fully provided prior to any construction works on site.			
Construction activities, excavation and blasting works, movement of trucks along the communal roads, etc.	Impact on Community Health and Safety (8.3.5)	1) Supplement the TMP (<i>in addition to the measures proposed in Section 8.2.11</i>) with the following: <ul style="list-style-type: none"> - Avoid community access roads if possible and document quality of roads prior to their use, - Optimise routes and times of the day for transporting materials to site, especially bulky equipment parts (e.g., pipes) agreed with the traffic police and local administrations to avoid deterioration of roads and landscapes prone to landslides, - Enhance the access roads and construction sites and reservoir basins with technical measures (e.g. installing gabions, rip-rap, adequate bedding materials, etc.) to minimise the risk of displacement, collapse or damage in case of seismic events or landslides - Should any blasting be required, use minimal charge to prevent potential impacts on geological stability of the area - Ban any refuelling or storage of hazardous materials or waste in the water buffer zones to prevent potential spills and contamination, - Identify sensitive receptors (schools, hospitals, residential areas, other social infrastructure) along the transportation routes and implement traffic diversion and speed restriction measures, install warning signage, use traffic marshals, etc., 	Within the Project's Construction contract.	TMP and EPRP are prepared and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/PIU) and EBRD.

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		2) Screen worker influx for communicable disease and provide treatment, as appropriate, to reduce exposure to local population, 3) Conduct information campaigns on STDs among the workers and local community, Inform local residents about construction schedules, risks, and safety precautions.			
All processes and operations during the construction activities.	Health and Safety Impact (8.3.6)	Develop an Occupational Health and Safety Management Plan (OHSMP), covering the key elements of the OHS performance management during the construction stage, including: <ul style="list-style-type: none"> - Allocation of OHS roles and responsibilities - Identification of OHS risks and hazards, - Induction, briefing, training and knowledge check, - OHS procedures and regulations, including the Permit to Work procedure - Medical examination, - Emergency response, - Management of hazardous materials, chemicals and oil / fuel, - Fire safety and emergency response, - Performance of high hazard tasks - Use of PPE, - Supervision of sub-contractors, - Investigation of safety accidents, - Responsibilities for non-compliance, etc. 	Within the Project's Construction contract.	OHSMP is 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, including the management of the	Workers' Rights and Working Conditions Related Impacts (8.3.7)	1) Include requirements related to the compliance with the national labour regulations and EBRD PR2, and EBRD/IFC joint guideline of worker accommodation in the contractual clauses with the Construction contractor, including provisions	Within the Project's Construction contract.	Relevant requirements of the EBRD PR2 are included in the	D - Client (WCRA/ PIU) (for item 1) and Construction contractor (for items 2 and 3)

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construction camp and accommodation facilities.		<p>related to GBVH and audit and monitoring regime,</p> <ol style="list-style-type: none"> 1) Develop a Labour and Working Conditions Management Plan well in advance of construction commencement to allow sufficient time for review and implementation, inclusive of measures to manage local employment and procurement, 2) Develop Local Employment and Procurement Plan, 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, EBRD/IFC guidance on worker accommodation (2009), 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. 		Construction contract. Labour and Working Conditions Management Plan, Construction Camp Management Plan and Local Employment and Procurement Plan are developed.	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)	<ol style="list-style-type: none"> 1) Develop GBVH Policy and assign focal points responsible for handling GBVH incidents within the workforce and for external communities including GBVH sensitive grievance management mechanism, 2) Implement and communicate the grievance mechanism for communities and external stakeholders in line with EBRD's requirements, to include, inter alia, anonymous and 	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.

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		<p>confidential grievance channels and redress. It shall also include:</p> <ul style="list-style-type: none"> - Confidential reporting pathways for GBVH grievances, - Designated staff experienced in GBVH response, - Protection of complainants and witnesses from retaliation or adverse consequences, etc. <p><i>The enhanced GM shall be communicated to workers and communities and become fully operational prior to commencement of construction.</i></p>			
Emergency situations such as landslides, earthquakes, incidents, spills and leakages.	Emergency Situations and Response (8.4)	<p>1) Develop and implement Emergency Preparedness and Response Plan (EPRP) for the whole project lifecycle.</p> <p>2) Prepare site-specific emergency response procedures for incidents such as landslides, machinery accidents, or hazardous material spills.</p> <p><i>See also measures proposed in Section 8.3.5.</i></p>	Within the Project's Construction contract.	Emergency response procedures are developed and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.
Earthworks, excavation, borrow pit operations, construction of electricity transmission lines, and 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.	Impact on Tangible Cultural Heritage (8.5.1)	<p>3) Carry out a detailed archaeological survey before the start of construction works, including:</p> <ul style="list-style-type: none"> - Conduct test excavations (trial trenching), - Delineate the impacted areas, identify the surface area and volume requiring safeguard excavations, and carry out such excavations to preserve the affected units, if relevant, - Assess the possibility of relocating monuments to areas outside the reservoir impoundment but within the protection zone, 	Within the Project's Construction contract.	The CHMP and CFP are prepared and approved; detailed field archaeological investigations are completed prior to the start of construction; and a qualified cultural heritage expert is engaged within the	D - Construction contractor A - Supervising engineer and MESCS (for CHMP) S&M - Client (WCRA/ PIU) and EBRD.

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		<ul style="list-style-type: none"> - Propose specific protection measures to prevent damage during construction activities, - Recommend appropriate preservation measures for each of the identified cultural heritage sites. <p>4) Develop a Cultural Heritage Management Plan (CHMP) for the Project, to be agreed upon by the supervision engineer, the Client, the Bank and the authorized state body (the CHMP may include the measures proposed in item 1 above),</p> <p>5) Hire a qualified cultural heritage expert from an authorized institution to be present during the construction works and implement archaeological surveillance for all construction sites, as well as to help implement all heritage focused mitigations and reporting to Client/Bank,</p> <p>6) Prior to construction works, develop a Chance Finds Procedure (CFP)¹⁵ for the Project and train the relevant workers in applying it (so that they can identify the chance finds, stop the works and notify the management); keep the training log up to date and include reporting on it in monitoring reports.</p>		construction contractor's team.	

¹⁵A template of this procedure can be found in the 2023 EBRD's guidance note for PR8 at <https://www.ebrd.com/documents/environment/guidance-note-performance-requirements-8-cultural-heritage.pdf>. In addition, the regulations with regards to 'chance finds' are defined by the RA Law №HO-261 (1998) "On the protection and use of immovable historical and cultural monuments and historical environment". Particularly, according to Article 11 of the Law, if during the construction, agricultural and other works, the unknown historical and cultural monument/heritage is discovered, the above-mentioned works must be stopped and the authorized state body must be immediately informed by the local self-government bodies.

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Section B - CONSTRUCTION PHASE					
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)	<ol style="list-style-type: none"> 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) While transporting friable materials keep the body of heavy vehicles covered, 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 facilities 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. 	Within the Project's Construction contract.	Air, water, and soil quality monitoring plan is developed, approved prior to the start of construction and implemented during the construction. All specified mitigation measures are implemented effectively throughout construction.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.

¹⁶D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-operation

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Planting of trees in accordance with the Tree Management Plan.	Impact on Landscape and Visual Amenity (8.2.5)	Implement TrMP. Conduct the planting of 1,840 trees in areas agreed upon with the heads of Ashtarak and Khoy municipalities and ensure their aftercare for a period of two years (<i>aftercare may be carried out during the reservoir operation phase</i>). The proposed types of trees to be planted are: <ul style="list-style-type: none"> - <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. <i>See also mitigation measures proposed in Section 8.2.12 - Flora.</i>	Within the Project's Construction contract.	Proposed types of trees are planted.	D&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 Geology (8.2.6)	<ol style="list-style-type: none"> 1) Intsal diversion ditches or berms: redirect surface runoff away from disturbed areas, 2) Ensure proper grading to stabilise the slopes direct water flow in controlled paths, 3) Install slope breakers: break long slopes into smaller segments to reduce erosion potential, 4) Implement phased construction by limiting the area of exposed soil at any one time, 5) Avoid earthworks during rainy seasons, where feasible, to reduce erosion risk. 	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	Impact on Water Resources (8.2.7)	Water Contamination <ol style="list-style-type: none"> 1) Construct intermediate collection pools between runoff-generating surfaces and downstream watercourses to regulate flow to water bodies. 	Within the Project's Construction contract.	Surface water quality is protected, and adverse impacts from	I - Construction contractor

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trucks, operation of borrow-pits, loading-unloading operations, storage of construction materials and spoil, etc.		<p>These pools will allow soil particles to settle at the bottom, thereby reducing the turbidity of the runoff,</p> <p>2) Limit excavation and other earthworks near the Amberd and Kasakh Rivers during the rainy season,</p> <p>3) Prohibit the discharge of any untreated wastewater effluent into surface water bodies,</p> <p>4) Where practical, construct local perimeter drains and install oil and sand traps around working areas (e.g., storage and parking areas) to collect suspended runoff and prevent its discharge into surface water resources.</p>		construction activities are minimized through implementation of mitigation measures.	S - Supervising engineer M - Client (WCRA/PIU), EBRD.
Topsoil removal, storage, transportation, reuse, loading and unloading operations.	Impact on Soil (8.2.8)	<p>Topsoil management</p> <p>1) Carry out the removal, transportation, storage, and use of topsoil in accordance with RA Government Decrees №1396-N and №1404-N,</p> <p>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,</p> <p>3) Locate topsoil stockpiles at least 50 m away from watercourses to prevent water siltation,</p> <p>4) Avoid placing topsoil stockpiles near planned excavation areas,</p> <p>5) Limit the height of stockpiles to a maximum of 3 m, and ensure the slope gradient does not exceed 25°,</p> <p>6) Clearly label all topsoil stockpiles to ensure easy identification,</p> <p>7) Cover topsoil stockpiles to prevent soil erosion, where natural revegetation has not occurred,</p>	Within the Project's Construction contract.	The provisions of the Topsoil Management Plan are implemented and controlled.	I - Construction contractor with the assistance of qualified agronomist S - Supervising engineer M - Client (WCRA/PIU), EBRD.

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		8) Fence off topsoil stockpiles to prevent unauthorized access and compaction by Project vehicles, 9) Reuse the stored topsoil for landscaping the disturbed areas and/or tree planting within the Project area and vicinities near the end of the construction phase.			
Transportation, storage and use of spoil, construction (friable) and hazardous materials, including oil products, refueling of construction equipment and trucks. Accidental spills of friable materials, leakages of oil, fuel, and other liquid chemicals during the field works within the construction site.		Hazardous materials 1) Store all hazardous materials in dedicated warehouses in clearly signposted, secure, and ventilated areas, 2) Ensure hazardous materials containers are clearly labelled according to contents and hazards, 3) Equip sites with spill response kits and train workers on emergency response, 4) Maintain Material Safety Data Sheets (MSDS) in accessible language(s) for all hazardous materials on-site, 5) Ensure incompatible hazardous materials are not stored together, 6) Equip the hazardous materials storage areas with eye wash kits and fire extinguishers, 7) Use appropriate PPE. Soil contamination 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,	Within the Project's Construction contract.	Provisions of the HMMP and SPMP are implemented and controlled.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.

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		3) Store oil products and chemicals separately, in special drums or tanks placed on secondary containment systems or trays having 110% of the volume of the container, 4) Carry out refuelling of oil, fuel, and other chemicals only in dedicated areas equipped 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 and remediate contaminated soil by removing the affected layer (to be treated as hazardous waste) and replacing it with clean soil, 7) Train all staff on the safe execution of construction works and on response procedures for environmental incidents such as spills and leaks, 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.			
All waste generation processes and activities during the construction phase.	Waste Generation and Management (8.2.9)	General 1) Implement WMP, 2) Train the workers engaged in waste management on provisions of the WMP, 3) Apply waste hierarchy approach (prevention, minimisation, reuse, recycling, energy recovery, disposal) while implementing the construction activities,	Within the Project's Construction contract.	Waste management during the reservoir construction phase shall be implemented in accordance with applicable national legislation, the	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.

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		<p>4) Elaborate and implement waste handling procedures for the construction operations,</p> <p>5) Equip the construction site and construction camps with the te dedicate waste collection and storage araes and segregated waste collection / storage containers,</p> <p>6) Furnish the waste storage / collection facilities with fences, fire extinguishers, secondary containment trays, oil and chemicals spill clean-up kits, etc.,</p> <p>7) Store liquid waste in leak-proof, sealed containers.</p> <p>8) Sign contracts with the licensed waste handling (recycling, treatment, disposal) companies to hand them over the generated wastes.</p> <p>Waste transportation</p> <p>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,</p> <p>2) Ban abandoning the wastes on the route and/or fly tipping wasre in unauthorized locations,</p> <p>3) Select the routes involving the least risk for the transportation from the area of its generation to its storage and recycling / disposal area,</p> <p>4) Instruct the waste truck drivers on waste transportation on safety rules.</p> <p>Household waste management</p> <p>1) Equip the construction site with clearly-labelled household collection containers / bins,</p>		waste hierarchy principles and GIP.	

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		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, 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) Implement reverse parking policy to minimise the need for equipment 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 residents of Amberd, Aygeshat and Voskehat settlements of the schedule and duration of construction activities, particularly	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 disturbance to nearby receptors. Noise and vibration monitoring plan is implemented.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.

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		<p>where these are likely to generate high noise levels,</p> <p>9) Movement of heavy trucks along the communal roads will be strictly prohibited between 10 PM and 6 AM near residential areas.</p> <p><i>In addition to the measures listed above:</i></p> <p>1) Enforce the use of PPE and in particular, the protective devices capable to reduce the sound level at the ear to acceptable levels,</p> <p>2) Ensure that all workers exposed to local vibration are provided with and use appropriate PPE,</p> <p>3) Provide employees engaged in 'noisy' operations with additional 15 minutes break per 2 hours.</p>			
Transportation of construction materials, oil products, workers	Traffic Impacts (8.2.11)	<p>1) Construct the access roads as envisioned in the Project design document,</p> <p>2) Implement the Traffic Management Plan (TMP),</p> <p>3) Train drivers of heavy vehicles on the key requirements of the Traffic Management Plan,</p> <p>4) Inform local residents of anticipated construction traffic impacts at least two weeks prior to the start of construction,</p> <p>5) Equip roads used by Project vehicles with appropriate road safety signs and posters,</p> <p>6) Provide additional crossings for cattle where necessary.</p> <p><i>See also mitigation measures proposed in Sections 8.3.2 and 8.5.2.</i></p>	Within the Project's Construction contract.	Traffic risks are minimized through effective implementation of the TMP, driver training programs, installation of clear safety signs and awareness posters along project roads, etc.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Implement Biodiversity Action Plan (BAP) during the pre-construction phase to cover mitigation activities of the pre-construction, construction, and	Within the Project's Construction contract.	BAP is effectively implemented.	D&I - Construction contractor with the

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		operation phases. The BAP will outline and provide guidance for components such as the Biodiversity Management Plan (including monitoring) and the Riverine Habitats Construction Plan. The mitigation and/or management measures listed below shall be incorporated into the BAP.		Other plans related to the biodiversity are developed and implemented during the construction phase.	assistance of the biodiversity expert S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Flora Plant 1840 ¹⁷ trees and ensure their aftercare for a period of two years (aftercare may be carried out during the reservoir operation phase), The proposed species of trees to be planted are: <ul style="list-style-type: none"> - <i>Salix excelsa</i> S.G. Gmel., - <i>Populus nigra</i> L., - <i>Ulmus minor</i> Mill., - <i>Tamarix ramosissima</i>. <i>See also mitigation measures proposed in Section 8.2.5.</i>	Within the Project's Construction contract.	1840 trees are planted and maintained.	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)	Fauna 1) Plan and begin construction works from one edge of the Project (dam) area (namely, from the south and western edges of the dam footprint area) moving to the north-east and up to the river valleys; this approach will provide time for animals to leave, 2) Begin the construction works before or after the breeding season - before May or after August; this will save lives of animals including offspring,	Within the Project's Construction contract.	Required measures for the preservation of fauna species are implemented.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

¹⁷According to calculations conducted as part of the national Environmental Impact Assessment (EIA) study, these trees are to be planted as a compensatory measure. A 1:1 replacement ratio was applied for trees with a trunk diameter (D) of less than 10 cm, and a 1:6 ratio for trees with D greater than 10 cm. The overall compensation multiplier is 3.54 (1840/520). Since the 520 trees being removed do not belong to priority species, the "no net loss" and "net gain" principles are not required to be applied.

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		3) Monitor compliance with the Worker Code of Conduct of employee of the building company to prevent poaching, 4) Develop the Worker Code of Conduct for the operator of the reservoir to prevent poaching.			
Site clearance and removal of vegetation. Earth and excavation works.	Impact on Biodiversity (8.2.12)	Sedentary animals 1) Before tree cutting and top-soil removal in the dam footprint area and in the "triangle" - western part of the reservoir footprint area, survey the areas and capture as many individuals as possible including snakes and lizards, and move them to the safe habitats identified and/or arranged during the pre-construction phase, 2) Before filling the reservoir, survey the reservoir site and capture as many individuals as possible including snakes and lizards, and move them to the safe habitats identified and/or arranged during the pre-construction phase, 3) Before filling the reservoir, check the mapped residential burrows of badger and other animals; if the animals stayed, capture and relocate them to the safe habitats. If Gray wolf or/and Wild cat discovered, take measures to scare away animals.	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 with the assistance of qualified herpetologist S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Conservation of bird species.	Impact on Biodiversity (8.2.12)	Birds Maintain 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.

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Conservation of invertebrates.	Impact on Biodiversity (8.2.12)	Invertebrates 1) Maintain created habitats, primarily the species forage plants, 2) Explore the potential of creation of mosaic habitats between the arable fields and orchards, support farmers/local communities in creation of such habitats.	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.
Conservation of aquatic species.	Impact on Biodiversity (8.2.12)	Aquatic species 1) Monitor presence of the Transcaucasian water shrew and Eurasian otter along the river banks, <i>Capture and relocate them to the upper reaches of the river, if identified.</i> 2) Maintain the fishway in working conditions.	Within the Project's Construction contract.	Project impacts on aquatic species are avoided, reduced, mitigated, or compensated.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU) and EBRD.
Accidents and incidents during the construction works	Impacts on Public Facilities and Infrastructure (8.3.2)	1) Develop a Traffic Management Plan aiming to minimise pressure on the regional and local road infrastructure and avoiding as much as possible sensitive receptors, <i>See also measures proposed in Sections 8.2.11 and 8.5.2.</i> 2) Oblige the construction contractor to set up a medical post at the labour accommodation camp, 3) Consider the need for a constant presence of the ambulance at the construction site or sign an agreement with the Ashtarak Medical Centre to ensure emergency response when medical services are required for the contractor's workers. This should take into account the 10-12 minutes ambulance response time.	Within the Project's Construction contract.	TMP is effectively implemented. A medical post is established in accommodation camp. An agreement between the Construction contractor and Ashtarak Medical Centre is signed.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

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Stakeholder engagement process, recruitment and remuneration of employees during the construction works.	Impact on Vulnerable Groups (8.3.4)	1) Implement the SEP to ensure that information about the Project and its opportunities is widely available and communicated to vulnerable households, including the female-headed and elderly households engaged in agricultural activities, households below the poverty line, 2) Equal employment opportunities and payment for men and women should also be ensured during the Project construction stage through local employment and procurement plans.	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.
All processes and operations during the construction activities.	Health and Safety Impact (8.3.6)	1) Implement the provisions of the Occupational Health and Safety Management Plan, 2) Conduct regular audits of the construction site to monitor the OHS performance of the contractors.	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)	Set up and maintain grievance mechanisms available to all project workforce, including the opportunity for anonymous complaints.	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.
Interactions between workers and residents of affected settlements.	Gender-Based Violence and Harassment (8.3.8)	1) 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,	Within the Project's Construction contract.	All workers receive mandatory induction and regular refresher training on the Code of Conduct, GBVH Policy and expected	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

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		2) Implement and maintain a grievance mechanism, which includes a specific mandate on GBVH, 3) Organize information and awareness raising campaigns for community members, specifically women and girls, 4) Provide information to communities on how to use the grievance mechanism to report GBVH issues.		behaviour in the local community.	
Emergency situations such as landslides, earthquakes, incidents, spills and leakages.	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, 3) Provide and maintain firefighting equipment and first aid kits at all construction sites and project-related delivery vehicles. Train selected workers on their usage,	Within the Project's Construction contract.	A Dam Integrity Risk Assessment is conducted, dam integrity risks are assessed, and warning systems and equipment are planned and in place.	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)	1) Implement the CHMP, 2) Implement CHP, 3) Deliver regular briefing to all workers involved in implementing heritage focused mitigations.	Within the Project's Construction contract.	Relevant staff are properly trained and aware of the provisions and requirements of the CFP.	I - Construction contractor S - Supervising engineer 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 and construction schedule to the population of Amberd, Aygeshat and Voskehat rural settlements to help them plan Christmas, New	Within the Project's Construction contract.	Residents of the Project-affected settlements are informed and aware of the	I - Construction contractor S - Supervising engineer

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		Year, Easter, Trndez, weddings, and other celebrations and to avoid additional nuisance. <i>See also mitigation measures proposed in Section 8.2.11 and 8.3.2.</i>		provisions of the TMP and the measures proposed to reduce potential nuisance.	M - Client (WCRA/PIU), EBRD.

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁸
Section C - OPERATION (MAINTENANCE) PHASE					
Regular maintenance of the reservoir body, dam and supporting infrastructure.	Impact on air quality (8.2.4)	1) Use modern construction machinery equipped with engines that comply with at least Euro IV standards, featuring emission control systems and low-noise characteristics, 2) Perform regular technical maintenance of all construction machinery, 3) If maintenance services are outsourced, contractors will be required to use modern, well-maintained equipment that complies with all applicable technical requirements.	Within the Project's Construction contract.	Only modern and maintained construction machinery are operated.	I - Operator ("Jrar" CJSC) or engaged contractor S - WCRA/PIU M - State Inspection Body.
Technical and maintenance measures that could potentially be included in the Project design documents	Impact on air quality (8.2.4)	<i>Incorporate cost-effective technical measures in the Project design documentation and reservoir operation and maintenance plans:</i> 1) Installing aeration systems to oxygenate water and suppress anaerobic methane production, 2) Installing surface aerators or diffused air systems to increase dissolved oxygen,	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/PIU.

¹⁸D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-operation

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		3) Removing decaying vegetation, crop residues, or debris from the reservoir and inflows, 4) Keeping banks and inflow channels clear to reduce organic loading, 5) Establishing buffer zones with vegetation to absorb nutrients before they reach the reservoir.			
Tree planting according to the Tree Management Plan	Impact on Landscape and Visual Amenity (8.2.5)	Ensure maintenance and aftercare of the planted trees for two years. <i>Over time, natural regeneration and vegetation growth may reduce visual contrasts and facilitate the integration of the area into the surrounding landscape.</i> <i>If well integrated with the natural landscape, the reservoir may contribute positively to the area's overall visual character.</i>	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 municipalities.
Planning, design and cultivation of agricultural land within the command area of the Kasakh Reservoir		Consult the heads of affected settlements and landowners who will gain access to irrigation water as a result of the project implementation, regarding the design solutions for establishing orchards and vineyards based on modern cultivation and irrigation technologies. <i>This may transform the organically evolved cultural landscape, characterized by traditional vineyards and orchards, into a designed cultural landscape.</i>	-	Landowners and cultivators of 21 villages within the Project command area plan and cultivate their agricultural plots using modern, water-efficient and sustainable agricultural and irrigation practices.	I - Khoy and Ashtarak municipalities with support of the WCRA/PIU S&M - Client (WCRA/PIU).
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)	<i>If technically and economically feasible, implement all or some of the following activities:</i> 1) Bioengineering / Vegetative Measures	Can be included in the loan agreement, if deemed appropriate for the project.	Recommended mitigation measures for controlling coastal erosion are	I - Specialised contractor S&M - Client (WCRA/PIU).

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		<ul style="list-style-type: none"> - Planting native grasses, shrubs, and trees to stabilize soil through root systems and reduce erosion, - Installing biodegradable or synthetic mats that support vegetation growth while preventing initial soil loss. <p>2) Embankment Stabilization Measures</p> <ul style="list-style-type: none"> - Placing layers of large, durable stones along vulnerable shorelines to dissipate wave energy and prevent erosion, - Placing sloped structures on reservoir banks/walls to absorb and deflect the energy of incoming water. <p>3) Reservoir Operation Management</p> <ul style="list-style-type: none"> - Gradually filling the reservoir to allow the slope soils to stabilize and minimize sudden saturation that can lead to collapse, - Avoiding large, rapid fluctuations in water level during early years to reduce destabilization of new shorelines. <p>4) Erosion Monitoring and Adaptive Management</p> <ul style="list-style-type: none"> - Regular monitoring: Using drones, surveys, or satellite imagery to detect early signs of erosion and assess the effectiveness of mitigation measures, - Adaptive management plans: Revising and enhancing embankment protection measures based on ongoing monitoring results, - Erosion-sensitive zoning: Identifying high-risk areas and applying stricter protection or engineering controls there. 		implemented effectively.	

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Water contamination	Impacts on Water Resources (8.2.7)	1) Minimise potential stormwater and agricultural runoff release to the Amberd and Kasakh Rivers, 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 municipalities S&M - Client (WCRA/PIU).
Delivery of irrigation water to end users		Pre-operation phase - Hydrological Regime Develop Irrigation Water and Environmental Flow Releases Management Plan to: <ul style="list-style-type: none"> - 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. Operation phase - Hydrological Regime <ol style="list-style-type: none"> 1) 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, 2) In the event of low reservoir levels or critical drought conditions, implement a prioritisation protocol that protects environmental flows up to a predefined minimum threshold before allocating water for irrigation. 	Within the Operator's budget.	Irrigation water is supplied to users in a manner that ensures the maintenance of the minimum environmental flow.	I&O - Operator S&M - Client (WCRA/PIU).
		Pre-operation phase - Water losses	Within the Operator's budget.	Reservoir Operation and Maintenance Plan	I&O - Operator

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		1) Develop Reservoir Operation and Maintenance Plan, 2) Conduct technical audit of the Stage-2 Hrazdan Down Channel and, if necessary, implement required rehabilitation measures to minimise irrigation water losses, preferably before the commissioning of the reservoir. Operation phase - Water losses Carry out technical maintenance of the reservoir's supporting infrastructure to eliminate incidents and breakdown in accordance with the Reservoir Maintenance Plan.	Budget for the technical audit shall be requested from the Government.	for the operation phase is developed and implemented. Technical audit is conducted.	S&M - Client (WCRA/ PIU).
Regular maintenance of the reservoir body, dam and supporting infrastructure	Impact on Soil (8.2.8)	Outsource the maintenance of operational reservoirs to contractors who are equipped with modern, well-maintained equipment and have relevant experience and qualified personnel.	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)	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), 2) Develop and implement WMP for the operation and maintenance of the reservoir (can be done at the corporate level), 3) Apply waste hierarchy approach (prevention, minimisation, reuse, recycling, energy recovery, disposal) for the generated waste, 4) Equip the site with waste collection and storage containers and areas,	Within the Operator's budget.	Waste management during the reservoir operation phase shall be carried out 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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		5) Sign contracts with the licensed waste handling (recycling, treatment, disposal) companies to hand them over the generated wastes, 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)	Habitats 1) Implement the Riverine Habitats Construction Plan: construct and maintain the following two habitats (PBFs) along the reservoir's banks: 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). 2) Implement the offset project to conserve the following two priority habitats: F3.1 - Temperate thickets and scrub (40A0* Subcontinental peri-Pannonic scrub), H3.2 - Basic and ultra-basic inland cliffs (8210 Calcareous rocky slopes with chasmophytic vegetation).	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)	Flora Construct and maintain two riverine habitats along the reservoir's banks based on indigenous plant species (see above - the Section 1. Habitats).	Within the biodiversity conservation budget.	Riverine habitats are constructed and maintained.	D&I - Specialised company S&M - Client (WCRA/PIU) and EBRD.
Behaviour of the Operator's workers.	Impact on Biodiversity (8.2.12)	Fauna	-	Worker Code of Conduct for the	D&I - Specialised company

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		Monitor compliance of the reservoir's operator with the Worker Code of Conduct to prevent poaching during operations.		Operator is developed. The project impact on the fauna species is reduced and/or mitigated.	S&M - Client (WCRA/ PIU).
Conservation of flora, fauna and habitats.	Impact on Biodiversity (8.2.12)	Sedentary animals 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 the population increase of the protected snake and lizard species, 2) Maintain bush and rocky habitats in the vicinities of the flooded area to where snakes and lizards were relocated. <i>These habitats have to be included into the conserved priority habitats with scrub and cliffs, 8210 and 42A0 (see above the Table Section 1. Habitats).</i>	Within the biodiversity conservation budget.	Project impact on sedentary animals is avoided, reduced, mitigated, or compensated.	I - Specialised company S&M - Leadership of affected community with training support from Client (WCRA/ PIU).
Conservation of bird species.	Impact on Biodiversity (8.2.12)	Birds 1) Introduce/support sustainable grazing practices in communities around the reservoir, 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, Red-billed Chough and Long-legged Buzzard, which may support in some increase of their density,	Within the biodiversity conservation budget.	Project impact on birds is avoided, reduced, mitigated, or compensated.	I - Specialised company S&M - Leadership of affected communities with training support from Client (WCRA/ PIU).

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		2) Maintain planted trees and bush species for at least two first years of operations.			
Conservation of invertebrates.	Impact on Biodiversity (8.2.12)	Invertebrates 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.	I - Specialised company S&M - Leadership of affected communities with training support from Client (WCRA/ PIU).
Conservation of aquatic species.	Impact on Biodiversity (8.2.12)	Aquatic species Maintain the fishway in working conditions to provide fish species with safe migration along the rivers during the reservoir operation.	Within the biodiversity conservation budget.	Project impact on aquatic species is avoided, reduced, mitigated or compensated.	I - Specialised company S&M - Client (WCRA/ PIU).
Transportation of materials, oil products and workers. Operation and maintenance of the Kasakh Reservoir.	Impact on Community Health and Safety (8.3.5)	1) Monitor the technical conditions of the reservoir, provide timely maintenance, 2) In case if heavy machinery or large number of vehicles is needed for the performance of the maintenance works, develop and implement a Traffic Management Plan e, accounting for the recommendation outlined above, 3) Update and implement the Emergency Preparedness and Response Plan (EPRP) for the Project operation stage (see also Section 8.4). 4) Continue to operate the grievance mechanism.	Within the Operator's budget.	TMP and EPRP for the operation phase are implemented.	D&I - Operator S&M - Client (WCRA/ PIU).
Operation and maintenance of the Kasakh Reservoir.	Health and Safety Impact (8.3.6)	1) Develop an OHS procedure/instruction for the maintenance and repair works, 2) Comply with the requirements of the relevant national OHS legislation.	Within the Operator's budget.	OHS procedures are prepared and implemented. The activities of the Operator are in line	D&I - Operator S - Client (WCRA/ PIU) M - Health and Labor Inspection body.

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				with the national OHS requirements.	
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 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)	1) Monitor access to the irrigation infrastructure following the Project completion, 2) Maintain the grievance mechanism during the Project operation, including the GBVH cases.	Within the Operator's budget.	Effective grievance mechanism, including provisions for addressing GBVH-related cases is implemented.	D&I - Operator and WUA 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 Khoy and Ashtarak community.	Impact on Intangible Cultural Heritage (8.5.2)	Conduct consultations with the relevant staff of the Ashtarak community, the administrative heads of the Oshakan, Voskehat, and Voskevaz villages, as well as with local cultural NGOs, tourism organizations, winery owners, and other relevant stakeholders. These consultations should focus on developing tourist routes that include visits to cultural heritage sites and wine tasting tours, particularly at Voskevaz Winery.	7,000 EUR	Events promoting the intangible cultural heritage values of Khoy and Ashtarak community are organized and implemented.	D&I - Specialised company (for example cultural NGO) S&M - Client (WCRA/ PIU) and EBRD.