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RIVER BASIN MANAGEMENT PLAN FOR AKHURYAN WATER BASIN MANAGEMENT AREA (AKHURYAN AND METSAMOR (SEVJUR) RIVER BASINS)

DRAFT INCEPTION REPORT



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LIST OF ACRONYMS

AWB	Artificial Water Body
BMA	Basin Management Area
CIS	Common Implementation Strategy
EEC	European Economic Community
EPIRB	Environmental Protection of International River Basins
EU	European Union
GWB	Groundwater Body
HMWB	Heavily Modified Water Body
JV	Joint Venture
LLC	Limited Liability Company
MNP	Ministry of Nature Protection
NGO	Non-Governmental Organization
POM	Program of Measures
RBMP	River Basin Management Plan
SWB	Surface Water Body
TOR	Terms of Reference
WBMA	Water Basin Management Authority
WBR	Water Body at Risk
WFD	Water Framework Directive
WRMA	Water Resources Management Agency

INTRODUCTION

This Inception Report is prepared within the Contract for Development of Draft River Basin Management Plan for the Akhuryan Basin Management Area (Akhuryan and Metsamor (Sevjur) sub-basins) in Armenia (Contract) made on February 14, 2014 between Hulla & Co. Human Dynamics and Resource Management Limited Liability Company (LLC) – a leading partner of the Joint Venture (JV) of Resource Management LLC and Environmental Policy Analysis Non-Governmental Organization (NGO) (Consultant).

This Inception Report provides the Implementation Strategy for development of the Draft River Basin Management Plan for the Akhuryan Basin Management Area in Armenia for the needs of the European Union Project “Environmental Protection of the International River Basins”. The Implementation Strategy details the approaches and methodology proposed for implementation of the Terms of Reference (ToR) of the Contract and Technical Proposal of the Resource management LLC as presented in Annex 2 and Annex 3 of the Contract, as well as major inputs and outputs. The Inception Report also proposes the implementation timeline and staffing plan for implementation of the requirements of the Contract.

1. IMPLEMENTATION STRATEGY

1.1. General approach

Despite many similarities in the approaches and principles of developing a river basin management plan (RBMP) as described in the Water Code of Armenia, the National Water Policy of Armenia, the National Water Program of Armenia and the European Union Water Framework Directive (EU WFD), certain differences are observed with the “Outline of the Model River Basin Management Plan” as presented in the Appendix to Decision of the Protocol Session No 4 of the Government of the Republic of Armenia of February 3, 2011.

Given that the specific objective of the EU “Environmental Protection of International River Basins” (EPIRB) project includes development of a RBMP for selected river basin according to the requirements of the EU WFD, our approach will be to take the EU WFD planning cycle as the basis, at the same time trying to incorporate the steps of the outline of the model RBMP to the extent possible and to the extent it does not contradict to the logic of the EU WFD planning cycle.

Thus, the following six main phases will be implemented while preparing the RBMP for Akhuryan Basin Management Area (BMA), including Akhuryan and Metsamor (Sevjur) sub-basins:

Phase 1: Analysis of the natural and anthropogenic pressures and their impacts on the surface and ground water resources of the basin (hereafter: pressure-impact analysis);

Phase 2: Identification of water bodies at risk and delineation of surface and groundwater bodies in the Akhuryan and Metsamor (Sevjur) sub-basins;

Phase 3: Definition of environmental objectives for the delineated surface and groundwater bodies;

Phase 4: Development of the program of measures (PoM) to achieve the defined environmental objectives;

Phase 5: Economic analysis and prioritization of the proposed measures;

Phase 6: Compilation of the Draft River Basin Management Plan.

The sub-sections below provide approaches and methodology proposed by the Consultant for implementation of each of the six phases of the planning cycle for preparation of the Draft RBMP for Akhuryan BMA in Armenia.

1.1.1 Pressure-impact analysis

While conducting the pressure-impact analysis, the Consultant we will use the approach outlined in the EU WFD CIS Guidance Document No 3 “Analysis of Pressures and Impacts”. This document aims at guiding experts and stakeholders in the implementation of EU WFD. It focuses on the analysis of pressures and impacts within the characterization of water bodies according to Article 5 of the EU WFD in the broader context of development of integrated river basin management plans as required by the Directive.

Most of this work has already been completed and the results are presented in the report on “River Basin Analysis of Akhuryan Water Basin Management Area”, produced under the EPIRB project. However, based on our review, there is a need to detail the analysis, and particularly the pressure-impact analysis part of the report.

Particularly, information on non-point pollution sources in the basin is not well enough presented, and some datasets lack level of detail. The Consultant, together with the representatives of Akhuryan Basin Management Authority, intends working on filling in these data gaps, and all of the above-mentioned datasets and information will serve as main input for the analysis conducted in the planning process.

One important development that occurred since preparation of River Basin Analysis for Akhhurian Basin Management Area relates to Kaps reservoir in the basin. The Government of Armenia and the Government of Germany finance construction of Kaps Reservoir and Kaps Gravity Irrigation System in the Akhuryan River basin. The project envisages completion of the Kaps dam and reservoir and the respective irrigation system at the Akhuryan River near Gyumri city. Construction of the infrastructure mentioned started in 1980s, but not completed due to worsening economic situation and devastating Spitak earthquake in 1988, and the collapse of the Soviet Union in 1991. The Consultant will include updated information on Kaps reservoir and the related irrigation and hydropower infrastructure in the updated pressure-impact analysis.

In addition, the Consultant will incorporate in the pressure-impact analysis the relevant data and information from the ongoing project on improvement of communal (drinking water supply and sewerage) infrastructure for Shirak Marz, which is currently implemented by the Government of Armenia, with a financial support of the Government of Germany.

Impact of climate change on water resources of the basin is another aspect, which needs to be included in the pressure-impact analysis. The thematic reports prepared within the UNDP/GEF "Enabling Activities for the Preparation of Armenia's Second National Communication to the UNFCCC" Project in 2010 show that by 2030 the expected decrease of the river flow (compared to 1961-1990 baseline scenario) is expected to be over 12% in the Akhuryan sub-basin and over 7% in the Metsamor (Sevjur) sub-basin. While analyzing the climate change impact on water resources of the basin, the Consultant will use the approach outlined in the EU WFD Common Implementation Strategy (CIS) Guidance Document No 24 "River Basin Planning in a Changing Climate".

Finally, based on the analysis of pressures and impacts, significant water management issues will be identified, which will serve a basis for identification of water bodies at risk and development of corresponding Program of Measure (PoM) at later stages of the planning process.

1.1.2 Delineation of surface water bodies and ground water bodies

The first step of the process of delineation of surface water bodies at risk is identification of the significant pressures in the basin. The EU WFD CIS IMPRESS guidance defines *significant pressure* as "any pressure that on its own, or in combination with other pressures, may lead to a failure to achieve the specified objective" for one or more water bodies. The Consultant will select the significant pressures based on the results of the revised pressure-impact analysis in the Akhuryan BMA, which relies on two sources of information: (a) existing information about the rivers, lakes and aquifers gathered from monitoring data, maps, aerial photos, knowledge about the geology etc.; and (b) existing information on pressures, and assessment of their impact.

For each significant pressure the Consultant will identify one or more water bodies at risk (WBR) of failure to achieve the specified objective. This requires an understanding of the nature of the impact that may result from a pressure, and appropriate methods to monitor or assess the relationship between the impact and pressure. Data on both anthropogenic and natural impacts on water bodies in Akhuryan BMA will be analyzed, including data on municipal and domestic wastewater discharge, industrial and mining wastewater discharge, unregulated water abstraction from surface and groundwater sources, industrial food processing, solid waste disposal, crop production agriculture, livestock breeding, fish farming as well as climate change impacts and trends.

The outcomes of the preliminary delineation of surface water bodies were presented in the reports "Surface water bodies identification and typology in the Akhuryan Basin Management Area" and "Identification, characterization and delineation of groundwater bodies in the Caucasus countries" prepared under the EPIRB project. Thus, at previous stages of the analysis, total 70 water bodies have been delineated in the Akhuryan BMA out of which:

- 50 are the water bodies in natural conditions including 6 WBRs;
- 13 are artificial water bodies, including 12 canals and one group of ponds; and
- 7 are heavily modified water bodies (main canals).

The Consultant will review the mentioned delineation of surface water bodies after identification of water bodies at risk.

The technical implementation of the above-described activities will be based on practical application of elements of the EU WFD and CIS documents, particularly the CIS Guidance Document No 2 "Identification of Water Bodies" and CIS Guidance Document No 4 "Identification and Designation of Heavily Modified and Artificial Water Bodies". After the overall delineation of surface water bodies, the typology of the newly delineated water bodies will be determined. In addition, the classification of the water bodies will be implemented based on the results of water quality monitoring conducted in the last 2 years.

Delineation of groundwater bodies (GWB) in Akhuryan BMA will be based on the conceptual presentation of groundwater system and analysis of human impacts conducted during the previous stages of the EPIRB project. As a result of that analysis, 14 GWBs were delineated in the Akhuryan BMA. All GWB are assigned a good quantitative and chemical status. During the GWB delineation, three GWBs have been assigned the category "at risk" of not achieving objectives of the EU WFD Article 4. No monitoring data is available to prove this assignment, therefore after the classification exercise all GWB were assigned good status. According to the WFD, where there is insufficient data to prove that GWB is of poor status, it should be assigned good status, but with low confidence of assessment.

The activity will be completed by a comprehensive GIS mapping of delineated surface and groundwater bodies for Akhuryan BMA. The generated GIS layers will identify the locations of the surface water bodies at risk and groundwater bodies at risk in the Akhuryan BMA, which will be used for further identification of measures to achieve the environmental objectives for the identified water bodies, and particularly the WBRs.

1.1.3 Setting Environmental Objectives

Setting environmental objectives for identified water bodies in Akhuryan BMA is the next step of the planning process, and an important output of the RBMP. While setting environmental objectives for surface and groundwater resources, as well as the protected areas in the Akhuryan BMA, the Contractor will be guided by approaches outlined in Article 4 of the EU WFD, as well as the CIS Guidance Document No. 20 "Exemptions to the Environmental Objectives".

In the process of determining the environmental objectives for achieving and maintaining good status of water bodies in the Akhuryan BMA, the Contractor will use data and information contained in the report on "River Basin Analysis of Akhuryan and Metsamor (Sevjur) rivers", and other deliverables prepared within the EPIRB project, some of which will be revised and further detailed under this contract.

The Contractor intends working with the Water Resources Management Agency (WRMA) and Akhuryan Basin Management Authority (WBMA) of the Ministry of Nature Protection (MNP) of the Republic of Armenia while specifying the good ecological or chemical status of surface water bodies and good chemical and quantitative status of groundwater bodies delineated in Akhuryan the BMA. At the same time the technical feasibility and methods of achieving the

environmental objectives, as well as exemptions to the environmental objectives defined will be specified for this first planning cycle in consultation with the beneficiaries.

The environmental objectives set for preventing deterioration of water body status in Akhuryan BMA, as well as achieving good status for all surface and groundwater bodies with exemptions, will be finalized in the deliverable, which will be used in the next phase of developing the PoM.

1.1.4 Preparation of the program of measures

Development of the PoM will commence after identification of water bodies at risk and setting the environmental objectives. It will include measures for achieving at least good status in all water bodies and preventing deterioration of the status of surface and groundwater resources. The Contractor will use approaches provided in Article 11 of the EU WFD as the main guiding principle. The PoM will be developed in consultation with the WRMA, Akhuryan Basin Management Authority and other beneficiaries as appropriate.

The PoM will establish basic and supplementary measures to be implemented at the basin and national levels for achieving the environmental objectives defined for surface and groundwater bodies, as well as protected areas in the Akhuryan BMA. The PoM will provide measures which can be implemented in the short to medium term (5-10 years), based on the knowledge of the pressures and kind of the impact causing the water body to be at risk. It will also be based on the findings of the economic analysis and prioritization of measures to be undertaken in accordance with Article 5 of the EU WFD and its Annex III.

The basic measures will cover the minimum technical interventions required for achieving the good status in water bodies at risk. Since untreated urban wastewater is one of the significant pressures in Akhuryan BMA, the Consultant will use agglomeration approach in accordance with the definitions provided in the Urban Waste-Water Directive (91/271/EEC).

In addition to the basic measures, the Consultant will propose supplementary measures to be implemented basin and nation-wide for achieving environmental objectives defined for the Akhuryan BMA. These measures will include, but not be limited to legislative and administrative instruments (i.e. enforcement of legislation), economic and fiscal instruments, point source and non-point source discharge controls, abstraction controls and demand management measures, efficiency and reuse measures, educational, research and development and demonstration projects, etc.

Along with the PoM, including basic and supplementary measures for achieving the environmental objectives set for the Akhuryan BMA, the Consultant, working together with EPIRB project key experts, will propose an EU WFD compliant monitoring program. It will be based on findings made in the report on “River Basin Analysis of Akhuryan Water Basin Management Area” prepared within the EPIRB project, as well as analysis conducted within this Contract. The EU WFD CIS Guidance Document No 7 “Monitoring under the Water Framework Directive” will be used at this stage.

1.1.5 Economic analysis and prioritization of measures

While the PoM is considered the key step in development of river basin management plans, the Consultant finds the economic analysis and prioritization of the measures is equally important, particularly taking into consideration the Armenian context. During the recent 5-6 years several draft river basin management plans have been developed in Armenia with the assistance of bi-lateral and multi-later donor organizations and with active participation of corresponding stakeholder agencies and other stakeholders in Armenia. Such draft plans have been developed for the Debed, Aghstev, Meghriget, Arpa, Vorotan and Marmarik River Basins of Armenia. However, as of today none of the PoMs, included in these draft RBMPs has been officially adopted and implemented due to insufficient financial resources. One of the key reasons for that is the fact that for the PoM only costing has been performed, and many decision makers view those RBMPs as significant cost and burden for the country, without seeing clear economic benefits of their implementation. Thus, economic analysis of the PoM, and particularly conducting cost-benefit analysis will make it possible to clearly show the benefits of implementing the plan. Hence, cost-benefit analysis of the PoM, and subsequent prioritization of the measures will greatly increase the chance of adoption and implementation of the plan.

The economic analysis, described in Annex III of the EU WFD is essential for prioritization of measures. Thus, according to EU WFD the economic analysis will help to make judgements about the most cost-effective combination of measures in respect of water uses to be included in the PoM, based on estimated potential costs of such measures.

Apart from Annex III, the Consultant will also use the approach indicated in the EU WFD CIS Guidance Document No 1 “Economics and the Environment – The Implementation Challenge of the Water Framework Directive” in this process. This guidance document aims at guiding experts and stakeholders in the implementation of the EU WFD and focuses on the implementation of its economic elements in the broader context of the development of RBMPs as required by the Directive. The guidance document also explains the role of economics the EU WFD, describes the methods of planning the economic analysis and provides methodologies for undertaking the economic analysis.

1.1.6 Compilation of the Draft River Basin Management Plan for Akhuryan BMA

The Consultant, by using the outputs of the previous phases of the planning cycle, will compile a Draft RBMP for Akhuryan BMA, including Akhuryan and Metsamor (Sevjur) sub-basins. The Draft RBMP will be prepared in accordance with the template Table of Contents proposed in Appendix 3 of the Contract, with application of approaches of Article 13 and Annex VII of the EU WFD and requirements of the Armenian legislation.

At this final phase, the Consultant, in addition to stakeholder consultations held in the previous phases of the planning process, intends conducting the stakeholder consultation in the Akhuryan BMA, with involvement of a wide range of national and basin stakeholders. The initial Draft of the RBMP for Akhuryan River Basin will be presented for stakeholders’ consideration, seeking their input before its finalization.

The Consultant, will finalize the Draft RBMP for Akhuryan BMA based on the comments and recommendations received from the stakeholders.

1.2 Main input and output components of the RBMP preparation process

As it can be seen from the reports “River Basin Analysis of Akhuryan Water Basin Management Area”, “Surface water bodies identification and typology in the Akhuryan Water Basin Management Area” and “Identification, characterization and delineation of groundwater bodies in the Caucasus countries” prepared under the EPIRB project, significant data and information has been collected on anthropogenic impacts on water bodies in Akhuryan BMA during the last 18 months. This include data on municipal and domestic wastewater discharge, industrial and mining wastewater discharge, unregulated water abstraction from surface and groundwater sources, industrial food processing, solid waste disposal, crop production agriculture, livestock breeding and fish farming. Also, surface and groundwater quantity and quality monitoring data, together with water user permit data has been collected. In addition, data obtained from the surface and groundwater joint field survey within the EPIRB project in 2013 provides a quite sophisticated database. However, data and information on non-point pollution sources is still missing, and some datasets lack level of detail. The Consultant, together with the representatives of Akhuryan Basin Management Authority will work on filling in these data gaps, and all of the above-mentioned datasets and information will serve as main input for the work.

In addition to above-described data and information, in the course of development of different components of the RBMP for the Akhuryan BMA, the Consultant will apply approaches and methodology proposed in different articles of the EU WFD and Guidance Documents of the CIS. Particularly:

- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community actions in the field of water policy – EU WFD,
- No 1 “Economics and the Environment – The Implementation Challenge of the Water Framework Directive”,
- No 2 “Identification of Water Bodies” (available also in Armenian),
- No 3 “Analysis of Pressures and Impacts” (available also in Armenian),
- No 4 “Identification and Designation of Heavily Modified and Artificial Water Bodies”,
- No 7 – “Monitoring under the Water Framework Directive”,
- No 8 “Public Participation in Relation to the Water Framework Directive” (summary available also in Armenian),
- No 11 “Planning Processes”,
- EU Urban Waste-Water Directive (91/271/EEC), etc.

Pursuant to the terms of the contract the Consultant will participate in regional and sub-regional river basin management planning workshops to be organized by EPIRB project. In addition to that, a sub-regional workshop will be organized in Gyumri, Armenia to present the first draft of the plan to the stakeholders of the basin pursuant to the requirement of the Article 14 of EU WFD, which requires that the Member States “encourage the active involvement of all interested parties, in particular in the production, review and updating of the

river basin management plans”. The sub-basin workshop will allow local stakeholders review particularly the significant water management issues and the proposed program of measures.

Parallel to that, the Consultant intends involving the representatives of the Akhuryan BMA and WRMA in the works to be implemented under this Contract, which will provide their involvement in the process of preparation of the RBMP for Akhuryan BMA of Armenia since the initial stages, thus enhancing their sense of ownership and responsibility for adoption and implementation of the RBMP.

The Consultant will coordinate the assignment with the EPRIB project, particularly the Country Water Management Expert, as well as the key experts on river basin planning, biology, hydromorphology, hydrogeology and non-key experts.

2. IMPLEMENTATION TIMELINE

Activities	2014												2015	
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
<u>Pressure-impact analysis</u>														
Updating the analysis of natural conditions														
Updating the analysis of human activities														
Analysis of climate change														
Analysis of pressures and impacts														
Identification of significant water management issues														
Preparation of the Draft Deliverable 2: Pressures and impacts report														
Finalization of the report														
<u>Delineation of water bodies</u>														
Identification of the surface water bodies at risk														
Revision of the delineation of HMWBs, AWBs and natural water bodies														
Determination of typology and classification based on water quality														
Final overall delineation of surface water bodies														
Revision of the delineation of groundwater bodies														
GIS mapping of delineated surface and groundwater bodies														
Draft Deliverable 3: Water bodies at risk report														
Finalization of the report														
<u>Determination of environmental objectives</u>														
Specification of good ecological status or chemical status of SWBs														
Specification of good chemical and quantitative status of GWBs														
Setting environmental objectives for protected areas														
Specification of exemptions to the environmental objectives														
Draft Deliverable 4: Environmental objectives report														
Finalization of the report														
<u>Program of measures</u>														
Development of basic measures to meet the environmental objectives														
Development of supplementary measures to meet the env. objectives														
Development of a proposal for the new monitoring program														
Draft Deliv. 5: POM report, including proposal for new monitoring program														

Activities	2014												2015	
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Finalization of the report														
<u><i>Economic analysis and prioritization of measures</i></u>														
Cost-benefit analysis of the program of measures														
Prioritization of measures														
Draft Deliverable 6: Economic analysis and prioritized measures report														
Finalization of the report														
<u><i>Development of a draft river basin management plan</i></u>														
Regional and sub-regional river basin management planning workshops														
Finalization of the river basin management plan														
Final river basin management plan in Armenian and English languages														

3. STAFFING

The Consultant - JV of Resource Management Limited Liability Company (LLC) and Environmental Policy Analysis Non-Governmental Organization (NGO), with the Resource Management LLC as a leading partner, provides a team of international and national experts on water resource management and protection. It is combined with extensive experience in project development, implementation and management.

The team of experts brings experience in preparation of water sector master plans and integrated river basin management plans overseas and in Armenia compliant with the EU's Water Framework Directive and National legislations.

The core team of **key-experts** that will be leading the preparation of the deliverables under this Contract is comprised of:

- **Mr. Danny Haezebrouck**, Msc Irrigation Engineer Msc Agricultural Engineer,
- **Mr. Aram Gevorgyan**, Ph.D. in Biology, Msc in Environmental Sciences and Policy, Msc in Applied Mathematics, and
- **Ms. Lilith Harutyunyan**, MSs in Environmental Science BSc in Economics.

The below listed pool of **non-key experts** will be involved in the respective stages of preparation of the Contract deliverables in their respective domains of expertise:

- **Dr. Karlen Grigoryan**, Professor of Yerevan State University, Faculty of Ecology, Expert in Ecology
- **Dr. Aida Iskoyan**, Professor of Yerevan State University, Faculty of Law, Legal and Institutional Expert,
- **Mr. Oganés Nikoghosyan**, Corresponding member of the International Academy of Ecology and Life Protection Science (St. Petersburg), Impact Assessment Expert,
- **Mr. Gevorg Afyan**, Agricultural Water Use Expert,
- **Ms. Liana Margaryan**, Water Quality Monitoring and Assessment Expert.