

Senior Hydraulic and Water Resources Engineer
(International Consultant)
Terms of Reference (TOR)

1. Background

The Zletovica Hydrosystem (HS Zletovica) is a multipurpose water infrastructure system located in the northeastern and eastern parts of North Macedonia, primarily within the municipalities of Probištip and Kratovo. The system was designed to harness the water and hydropower potential of the Zletovska River for the integrated benefit of Kratovo, Probištip, Zletovo, Štip, Karbinci, Sveti Nikole, and Lozovo, collectively serving a population of approximately 100,000 people.

The Zletovica Hydrosystem has been conceived as a phased development:

- Phase I (Completed): Construction of the Kneževo Dam and Reservoir, access roads, and regional transmission mains for drinking water supply. This phase is fully operational.
- Phase II (Planned): Modernization and expansion of irrigation services over approximately 4,500 hectares of agricultural land in the municipalities of Probištip (3,606 ha) and Kratovo (957 ha), including the construction and rehabilitation of primary and secondary irrigation infrastructure, conveyance pipelines, pumping stations, and distribution networks.
- Phase III (Planned): Development of hydropower generation capacity of approximately 9–9.5 MW (around 45.5–48 GWh per year) through the construction of small hydropower plants integrated into the existing water system.

The Government of North Macedonia (GNM) is preparing a World Bank–financed investment operation to support Phases II and III of the Zletovica Hydrosystem. To support project preparation, a Grant Facility for Project Preparation (GFPP) grant in the amount of US\$2.0 million, covering the period July 2026 to December 2027, has been secured. The GFPP will finance preparatory activities, including the updating of technical and hydraulic studies, dam safety documentation, transboundary water analyses, and preparation of environmental and social instruments in accordance with the World Bank’s Environmental and Social Framework (ESF).

The GNM has decided to implement the GFPP through the existing Project Implementation Unit (PIU) of the Agriculture Modernization Project (AMP) housed within the Ministry of Agriculture, Forestry and Water Economy (MAFWE), in close partnership with PS Zletovica. While the PIU will be responsible for fiduciary, procurement, and environmental and social coordination aspects of the grant, PS Zletovica will lead the technical preparation and prioritization of activities financed under the GFPP. Within this implementation arrangement, an international Senior Hydraulic and Water Resources Engineer will be engaged as Technical Team Leader to provide overall technical leadership, coordinate the multidisciplinary technical inputs, and oversee the review and updating of the technical documentation for Phases II and III. The Technical Team Leader will be supported by a local Senior Irrigation Engineer and other specialized experts mobilized under the GFPP.

2. Objective of the Assignment

The objective of the assignment is to provide overall technical leadership and independent engineering oversight to PS Zletovica, in coordination with the PIU, for the preparation of Phases II and III. The Consultant shall help ensure that the proposed irrigation and hydropower investments are technically sound, operationally viable, cost-effective, climate-resilient, safe, and compliant with applicable requirements. In particular, the Consultant shall coordinate and quality-assure the preparation of final, construction-ready detailed designs, cost estimates, technical specifications, and civil works bidding documents; support completion of the technical documentation required for World Bank appraisal and financing readiness; and facilitate the technical inputs needed for environmental and social instruments, dam safety requirements, OP 7.50 compliance, economic and financial assessment, jobs contribution reporting, and construction and other permits required under North Macedonian legislation.

3. Scope of Work and Responsibilities

The Senior Hydraulic and Water Resources Engineer will serve as Technical Team Leader and work as an integral part of the PS Zletovica technical team, in close coordination with the Director of PS Zletovica, the PIU, relevant authorities, specialized consultants engaged under the GFPP, and the World Bank team. The Consultant shall coordinate multidisciplinary inputs, maintain consistency across the Phase II and Phase III packages, identify and resolve technical interfaces and gaps, and advise PS Zletovica and the PIU on decisions needed to achieve appraisal, permitting, procurement, and construction readiness. Responsibilities include the following:

- **Technical leadership and coordination.** Prepare and maintain an inception work plan, deliverables schedule, responsibility matrix, , and consolidated review tracker; coordinate inputs from other specialists; and promptly escalate unresolved matters affecting scope, cost, schedule, safety, permits, procurement, or financing readiness.
- **Due diligence and investigations.** Review available studies, designs, surveys, hydrological and meteorological records, operating data, asset condition information, geotechnical investigations, water-demand projections, prior approvals, and as-built documentation. Identify data and investigation gaps and prepare prioritized terms of reference, specifications, and review criteria for any additional surveys, tests, modelling, or studies needed to support final design.
- **Water resources and hydraulic analyses.** Review and, where required, guide updates to the system water balance, yield and reliability analyses, irrigation-demand assessment, environmental-flow provisions, climate-change and drought scenarios, reservoir operating rules, conveyance capacities, surge and transient analyses, and hydraulic modelling. Confirm the compatibility of Phase II and Phase III abstractions and operating regimes with existing drinking-water supply and dam operations.
- **Investment options and prioritization.** Advise on the screening, sequencing, and prioritization of irrigation and hydropower investments using clearly documented technical, economic, environmental and social, operational, climate-resilience, safety, land, permitting, and implementation-readiness criteria. Confirm that the selected scope is coherent and can be packaged for efficient implementation.
- **Final detailed designs.** Lead the technical review and quality assurance of final construction-ready detailed designs for the selected Phase II and Phase III investments, including drawings, design calculations, design reports, technical specifications, bills of quantities, engineer's estimates, construction methods and sequencing, temporary works requirements, instrumentation and control systems, commissioning and performance-testing requirements, operation and maintenance provisions, and implementation schedules. Verify constructability, completeness, internal consistency, compliance with applicable standards, and resolution of all review comments.
- **Technical interfaces and dam safety.** Assess the hydrological, hydraulic, structural, electromechanical, geotechnical, seismic, operational, and safety implications of the proposed investments for Kneževu Dam, the reservoir, outlet works, transmission infrastructure, and existing operations. Coordinate with dam-safety specialists and ensure that relevant recommendations, monitoring requirements, emergency considerations, hold points, and risk-control measures are incorporated into designs, specifications, cost estimates, construction sequencing, and bidding documents.
- **Environmental and social design integration.** Provide engineering inputs to environmental and social instruments, including the ESIA, ESMP, stakeholder and labor-related requirements, land-acquisition considerations, occupational and community health and safety, biodiversity and cultural-heritage measures, and any other instruments required under the World Bank Environmental and Social Framework. Ensure that applicable mitigation, monitoring, design,

supervision, and contractor obligations are translated into drawings, specifications, bills of quantities, schedules, and bidding documents.

- **International waterways.** Support preparation and verification of the technical information needed for the World Bank's review under OP 7.50, including basin and tributary context, hydrology, current and proposed abstractions and releases, consumptive use, return flows, water quality, cumulative effects, and an evidence-based assessment of potential impacts on other riparians. Coordinate with the PIU and World Bank team on timely completion of any required technical package.
- **Economic, financial, and jobs analysis.** Provide and validate engineering inputs for economic and financial analyses, including capital and operation and maintenance costs, implementation schedules, energy generation, irrigated area and cropping assumptions, water and energy benefits, residual values, sensitivity and risk scenarios, and climate impacts. Support credible estimation and reporting of direct, indirect, and induced jobs associated with construction, operation, agricultural productivity, and related value chains, using clearly stated assumptions and avoiding double counting.
- **Permits and regulatory compliance.** Review applicable North Macedonian laws, technical regulations, design standards, approval procedures, and requirements for urban-planning, water, environmental, energy, construction, land, utility, and other permits. Prepare and maintain a permit and approval matrix identifying required submissions, responsible institutions, dependencies, status, and target dates; review the technical completeness of permit applications; and support responses to comments from competent authorities.
- **Procurement and bidding readiness.** Lead or support preparation, review, and finalization of the technical parts of civil works and related goods and consulting-services procurement packages. Ensure that designs, employer's requirements, technical specifications, drawings, bills of quantities, schedules, ESHS requirements, qualification and rated criteria where applicable, and contract-management provisions are mutually consistent and suitable for the selected procurement and contract strategy. Prepare consolidated comment-response matrices and written recommendations confirming whether each package is ready for bidding.
- **Procurement support.** At the PIU's request and subject to applicable conflict-of-interest and procurement requirements, provide technical support to clarifications, pre-bid meetings, evaluation of bids or proposals, and technical negotiations, without assuming the decision-making responsibilities of the evaluation committee or contracting authority.
- **Implementation and capacity support.** Advise on construction supervision arrangements, quality assurance and quality control, contract packaging, interfaces, testing and commissioning, asset management, staffing, operation and maintenance, water measurement, automation and SCADA, and institutional readiness. Prepare and deliver targeted capacity-building activities for PS Zletovica, PIU staff, operators, and other relevant stakeholders.
- **Reporting and missions.** Prepare concise technical progress reports and decision notes; contribute to project preparation and appraisal documents, implementation status reporting, mission briefings, and aide-memoires; participate in World Bank missions and technical meetings; and monitor completion of agreed actions within the Consultant's area of responsibility.

4. Deliverables

The Consultant shall submit the following deliverables in English, in editable and PDF formats, together with the underlying calculations, models, drawings, schedules, and comment-response matrices, as applicable. The Consultant shall revise each deliverable to address consolidated comments from PS Zletovica, the PIU, relevant authorities, and the World Bank team.

No.	Deliverable	Indicative timing
1	Inception Report and Readiness Work Plan. Review of available documentation; confirmed assignment methodology; deliverables schedule; responsibility and coordination matrix; initial data-gap and investigation plan;;	Within 15 calendar days of contract effectiveness
2	Design Basis and Appraisal Inputs Package. Reviewed design criteria and standards; system water balance and key hydraulic parameters; demand, energy, cost, schedule, climate and risk assumptions; technical inputs for economic and financial analysis and jobs contribution reporting; OP 7.50 technical information; updated permit matrix; and documented confirmation of issues requiring decision before final design.	As agreed in the inception work plan for the detail design update consultancy
3	Detailed Design Review Memoranda. Stage-based reviews (draft design and final design) of each Phase II and Phase III package, covering calculations, drawings, specifications, bills of quantities, cost estimates, constructability, dam-safety interfaces, ESHS integration, implementation sequencing, testing and commissioning, and operation and maintenance. Each memorandum shall include categorized comments, required actions, responsible parties, deadlines, and closure status.	At agreed design milestones contract and within 10 working days of receiving each complete submission
4	Permit and Regulatory Readiness Package. Maintain a permit and approval matrix as a working document supported by a checklist of technical documentation required by each competent authority; review notes on applications; and status report identifying outstanding actions, dependencies, and critical-path approvals needed before procurement and construction.	Updated throughout the assignment and finalized before bidding
5	Final Bidding Readiness Package. Technical review of the complete civil works bidding documents and related procurement packages; confirmation of consistency among drawings, specifications, bills of quantities, schedules, ESHS provisions, qualification requirements, and contract strategy; final resolved comment matrix; residual-risk list; and a signed recommendation identifying whether the package is ready for bidding and any conditions that remain to be satisfied.	Before issuance of each bidding document
6	Periodic Progress and Mission Outputs. Monthly concise progress notes, field-visit notes, decision memoranda, technical inputs to project and World Bank documentation, capacity-building materials, and a final completion report summarizing results, outstanding risks, lessons, and recommended next steps for procurement and implementation.	Monthly, after each mission or field visit, and at assignment completion

5. Qualification and Experience Requirements

- Master's degree in civil, hydraulic, water resources, irrigation, hydropower, or a closely related engineering field. A relevant professional engineering registration or equivalent certification is desirable.
- At least 15 years of relevant professional experience in hydraulic engineering, water-resources planning, irrigation infrastructure, hydropower, and multipurpose water systems.

- Demonstrated senior-level experience in at least three large or technically complex irrigation or multipurpose water-resources projects involving dams or reservoirs, water-conveyance systems, pressurized or gravity-fed irrigation networks, and/or hydropower facilities.
- Experience as Team Leader, Technical Team Leader, Lead Engineer, or Independent Technical Reviewer in at least two multidisciplinary assignments covering feasibility, detailed design, procurement documentation, and implementation readiness.
- Demonstrated experience reviewing final detailed designs, design calculations, drawings, technical specifications, bills of quantities, cost estimates, construction methods, and civil works bidding documents.
- Strong experience in hydrological and hydraulic analysis, water allocation and reservoir operation, climate-resilience assessment, irrigation demand, pumping and conveyance systems, and technical interfaces with dam safety and hydropower.
- Experience with flow measurement, automation, SCADA, commissioning, operation and maintenance, and asset-management arrangements is desirable.
- Experience providing engineering inputs to environmental and social assessments, economic and financial analysis, construction permitting, and international-waterways assessments is highly desirable.
- Familiarity with World Bank-financed investment projects, the Environmental and Social Framework, OP 7.50, Procurement Regulations for IPF Borrowers, and Standard Procurement Documents is a strong advantage.
- Experience in North Macedonia, the Western Balkans, or countries with comparable technical and regulatory conditions is desirable.
- Strong analytical, leadership, coordination, and technical writing skills, including the ability to communicate complex issues clearly and provide practical, decision-oriented recommendations.
- Excellent written and spoken English. Knowledge of Macedonian or another relevant regional language is an advantage.

6. Reporting and Duration

- The Consultant shall report contractually to the PIU Project Director/Coordinator and work in close technical coordination with the Director and designated technical representatives of PS Zletovica. In the capacity of Technical Team Leader, the Consultant shall coordinate and consolidate the inputs of the local Senior Irrigation Engineer and other technical specialists engaged under the GFPP. Technical advice shall be documented and provided through the PIU and PS Zletovica's agreed coordination arrangements.
- The assignment is expected to require up to 90 working days during the GFPP implementation period. The Consultant shall propose the allocation of inputs by task and deliverable in the inception work plan. The actual timing of services shall be coordinated with the availability of consultant submissions, project-preparation milestones, permit processes, procurement activities, and World Bank missions.
- The Consultant may work remotely and in North Macedonia, subject to the approved work plan. At least one-third of the total level of effort shall be delivered in North Macedonia through direct coordination with PS Zletovica, the PIU, competent authorities, consultants, and other stakeholders, including site inspections and technical meetings.
- PS Zletovica and the PIU will facilitate access to available studies, designs, records, sites, and relevant institutions. The Consultant remains responsible for identifying missing information,

verifying the adequacy and consistency of inputs used, and clearly stating assumptions, limitations, dependencies, and residual risks in all deliverables.

7. Duty Station

- When working in North Macedonia, the Consultant will be based primarily at PS Zletovica's offices and will travel to project sites and relevant institutions as required under the approved work plan. Monthly trips to North Macedonia will be required, as agreed with PS Zletovica and PIU.