

TERMS OF REFERENCE

for

**Consulting Services for the Update of the Feasibility Study and
Preparation of Final Detailed Designs and Bidding Documentation for
Phase 2 Irrigation and Phase 3 Hydropower of the Zletovica Hydro-
System**

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1. Brief Description of the Services

The Government of North Macedonia, in coordination with support from the World Bank Group, is seeking to prepare an integrated Project comprising Phase 2 irrigation and Phase 3 hydropower of the Zletovica Hydro-System using the available feasibility studies, designs, surveys, investigations, and other existing reports. The Consultant's role shall be to critically validate and operationalize that proposal: confirm or refine the technical basis through targeted updates and additional analysis; close the identified climate-resilience, hydrological, socio-economic, economic, financial, environmental and social interface, dam-safety, procurement, and implementation-readiness gaps; advise the Client on any material changes needed; and convert the agreed proposal into complete implementation-ready outputs. The services shall be completed within ten (10) months through coordinated and overlapping workstreams. Phase 2 irrigation and Phase 3 hydropower shall be prepared as two components of a single Project through concurrent, coordinated, and equally prioritized workstreams. Both components shall follow review and decision milestones and shall be developed to the required levels of feasibility, detailed-design, procurement, and construction readiness within the assignment period. Neither component shall be treated as subordinate to. The Phase 2 Irrigation and Phase 3 hydropower packages shall include preparation of all applicable statutory and permit-support documentation, submission of the relevant applications to the competent authorities, and follow-up through to issuance of the required construction permits,

The Consultant shall review and update the available feasibility studies, designs, surveys, investigations, calculations, environmental and social information, cost estimates, permits, and procurement documents. Existing information may be reused only after its adequacy, accuracy, current validity, and compatibility with the accepted design have been demonstrated. The Consultant shall undertake all supplementary surveys, investigations, modelling, analyses, consultations, and design work necessary to eliminate material uncertainties and complete the final design. The Consultant shall provide technical support to stakeholder consultations organized by the Client and the environmental and social consultant but shall not be responsible for stakeholder engagement planning, consultation logistics, disclosure activities, or preparation of environmental and social instruments.

At a minimum, the assignment shall deliver: (i) a validation and targeted update of the technical and analytical basis underpinning the Project proposal, explicitly addressing known limitations in the existing studies, particularly climate resilience, hydrological uncertainty, socio-economic conditions, farmer demand and uptake, distributional impacts, and economic and financial viability; (ii) documented advice on any refinement of component scope, configuration, sequencing, operating assumptions, implementation arrangements, or technical documentation of procurement packaging required before the proposal is confirmed; (iii) economic and financial assessments suitable for World Bank appraisal, presented by component and for the integrated Project; (iv) the technical analysis and documentation required to support compliance with World Bank Operational Policy OP 7.50 on Projects on International Waterways; (v) a jobs contribution assessment and results-measurement framework; (vi) complete construction-ready final detailed designs and the technical specifications, drawings, bills of quantities, price schedules, technical schedules, and related technical annexes for the agreed Phase 3 hydropower and Phase 2 irrigation civil works bidding packages; and (vii) all technical studies, applications, drawings, calculations, certificates, and supporting documentation required to obtain the construction permits and other applicable permits, approvals, authorizations, consents, licenses, connection agreements, and rights for both Phase 2 irrigation and Phase 3 hydropower investments required under the laws of North Macedonia. The PIU's independent procurement expert will prepare the procurement strategy and the non-technical procurement documentation.

The Consultant shall provide the technical, economic, financial, climate-resilience, socio-economic, environmental and social interface, dam-safety, OP 7.50, costing, scheduling, permitting, and implementation inputs needed to test, refine, substantiate, and operationalize the Project; promptly identify any assumption or proposed scope that is not supported by evidence; recommend practical adjustments; and prepare the agreed investments for implementation. Throughout the ten-month program, Phase 2 irrigation and Phase 3 hydropower final designs and technical components of the civil works bidding packages shall proceed concurrently and with equal priority. Component-specific permitting activities may follow different statutory pathways, but this shall not affect the equal priority,

resourcing, or completion schedule of the two design and technical bidding-package workstreams. The Consultant shall coordinate with the PIU's separately engaged independent procurement expert, who will be responsible for the procurement strategy and non-technical procurement documentation. Any decision regarding the sequencing of subsequent implementation shall be made by the Client and the World Bank based on the updated feasibility studies, technical readiness, economic and financial viability, environmental and social considerations, transboundary-water requirements, permitting status, and available financing. References in this TOR to "Phase 2" and "Phase 3" describe the technical development phases of the Zletovica Hydro-System and do not denote separate projects or financing phases.

The Consultant shall prepare the complete technical assessment and supporting materials required for the Client and the World Bank to determine and implement the applicable transboundary-waterways process, including preparation of the technical basis for communication or notification to riparian states under OP 7.50. The assessment shall cover the single integrated Project and shall distinguish the incremental effects of the Phase 3 hydropower component, the incremental effects of the Phase 2 irrigation component, and their cumulative effects together with the existing Phase 1 assets. The assessment shall expressly examine the expectation that the hydropower component has less significant transboundary implications because it primarily affects the timing and pattern of non-consumptive releases, whereas the irrigation component may involve more significant consumptive use and return-flow effects. The consultant will not be responsible for issuing any formal communication or notification to riparians.

The final detailed designs shall provide all information needed for a qualified contractor to price, plan, construct, test, commission, and complete the works without requiring further substantive design by the contractor, except for clearly identified temporary works, fabrication and shop drawings, construction methods, and other contractor design elements expressly permitted in the bidding documents. The use of the national term "Basic Design" shall not reduce this requirement. Where national legislation requires Basic Design or another statutory design category, the Consultant shall prepare that documentation together with all additional details necessary to achieve a construction-ready final design equivalent to detailed design in international practice.

The Consultant shall assess the Phase 1 facilities—including Knezhevo Dam, the existing water-supply system, Hydropower Plant B, and the existing control and SCADA systems—to the extent necessary to verify their as-built condition, operational capacity, safety, environmental-flow arrangements, remaining service life, and physical, hydraulic, electrical, control, and operational interfaces with the proposed Phase 2 and Phase 3 works. Any remedial, interface, safety, or compliance investments found necessary shall be clearly justified and, if accepted by the Client, included in the final designs and bidding documents.

The assignment shall be undertaken through defined review and decision gates within a ten-month program. The Consultant shall review the Project proposal against the updated evidence, identify material gaps or risks, and advise whether adjustments are needed before each component advances. This validation shall not be limited to confirming the existing design and shall explicitly address the documented gaps in climate resilience and socio-economic evaluation. Hydropower and irrigation shall be prepared as components of one integrated Project and shall share an integrated hydrology, water balance, climate-risk assessment, socio-economic baseline, economic and financial framework, and implementation strategy.

The Consultant shall prepare construction-ready final designs and technical components of the bidding packages for both components in parallel and within the same overall completion period. For both phases, the Consultant shall prepare all documentation required for issuance of the construction permit and support the Client throughout the permitting process until the permit is obtained.

Client or World Bank review shall not relieve the Consultant of professional responsibility for the accuracy, completeness, coordination, constructability, and fitness for purpose of the outputs it prepares.

A separate consultant will update the environmental and social assessment and prepare the required instruments. The Consultant under this assignment shall coordinate closely with that consultant and

incorporate the accepted environmental and social requirements into the feasibility study, designs, implementation arrangements, cost estimates, permit documentation, and bidding documents.

2. Project Background

The Zletovica Hydro-System is an existing multipurpose water-resources scheme in northeastern North Macedonia, centered on Knezhevo Reservoir and the associated Phase 1 water-supply assets. The system is intended to operate according to an integrated priority sequence: drinking-water supply first, followed by the approved ecological-flow regime and irrigation, with hydropower generation using the residual water available after these requirements have been met. The present assignment concerns the reassessment and development of the proposed Phase 2 irrigation and Phase 3 hydropower investments. The Consultant shall develop both components concurrently within the same overall assignment period and bring both to financing-, procurement-, and construction-ready design status. For each phase, the Consultant shall prepare the complete statutory design and supporting documentation required for issuance of the construction permits, submit the relevant applications to the competent authorities on behalf of the Client, and support and follow up on the permitting procedures through to issuance of the required construction permits, including addressing comments and providing any necessary revisions or supplementary documentation.

Detailed historical descriptions, legacy scheme parameters, costs, performance figures, and summaries of prior studies are provided in Annex A.

2.1 Existing Phase 1 System

Phase 1 established the core multipurpose infrastructure on which the further development of the Zletovica Hydro-System depends. Phase 1 was completed in 2011 and includes Knezhevo Dam and Reservoir, the dam appurtenant structures and outlets, the principal raw-water conveyance and water-supply facilities serving Kratovo, Probishtip, Zletovo, Štip, Karbinci, Sveti Nikole and Lozovo, and the associated control and SCADA systems. Hydropower Plant B, located near the Knezhevo Dam outlet, has also been constructed and is operational; it uses releases conveyed for the ecological minimum flow, with the historical design indicating a discharge range of approximately 0.090–0.155 m³/s and an output range of approximately 44–100 kW. These figures are historical reference values and shall be confirmed against as-built drawings, commissioning records and current operational data. The Consultant shall verify the as-built configuration, ownership and operating responsibilities, condition, capacity, safety, remaining service life, current water-allocation and reservoir-operating rules, environmental-flow release arrangements, and the hydraulic, structural, electrical, control and operational interfaces between Phase 1 and the proposed Phase 2 and Phase 3 investments.

Documented characteristics and dam-safety arrangements for Knezhevo Dam. The as-built and dam-safety documents describe Knezhevo as a high rockfill dam with a central asphalt-concrete diaphragm. The dam is approximately 75 m high above ground level (approximately 83 m construction height), with a crest elevation of 1,065.50 m a.s.l., crest width of 10 m, crest length reported as approximately 280–290 m, and upstream and downstream slopes of 1.8H:1V. The dam body comprises approximately 1.322 million m³ of rockfill and approximately 8,454 m³ of asphalt core. The reservoir has a reported maximum storage of 23.5 million m³, comprising approximately 22.5 million m³ of useful storage and 1.0 million m³ of dead storage; the maximum, normal and minimum operating levels are approximately 1,063.50, 1,061.50 and 1,009.00 m a.s.l., respectively. At normal level, the reservoir is approximately 2.75–2.80 km long, covers about 77 ha and has a maximum depth of approximately 71 m. The principal appurtenant works include a shaft spillway with a 17.2 m crest diameter and an effective crest length reported as approximately 51–54 m, designed to pass approximately 293 m³/s; a spillway tunnel, chute and ski-jump energy dissipator; and a diversion tunnel adapted as the bottom outlet and intake. The bottom outlet is reported to have a maximum capacity of approximately 16.7–18 m³/s and to permit drawdown of the reservoir in approximately 17–25 days, depending on inflow and operating assumptions. The reservoir also receives water transferred from the Kucheška River through an intake and conveyance system with an installed flow of approximately 0.37 m³/s. The dam-safety documentation establishes continuous surveillance covering visual inspections; reservoir levels; surface and internal deformation; pore pressures; seepage and drainage flows; seismic response; hydrometeorological conditions; water quality; and sedimentation. The installed monitoring system

includes geodetic control points, DSM settlement cells, two inclinometer installations, foundation and open piezometers, three seepage-measuring weirs, approximately 1,020 m of fibre-optic cable for leakage detection, reservoir-level instrumentation, a meteorological station and four accelerographs, connected to data loggers, the central monitoring station, SCADA and the warning system. The 2025 geodetic-surveillance report records 18 measurement campaigns since the 2010 baseline and concludes that the monitoring points on the dam, spillway and outlet structures remained within the applicable criteria; it nevertheless records continuing annual upstream horizontal movements of approximately 2–10 mm and settlements of approximately 1–5 mm, with the largest cumulative settlement of approximately 171 mm at the centre of the crest, which shall be reviewed as a trend rather than treated as a stand-alone safety conclusion. The 2026 operational plan confirms 24-hour surveillance, an updated flood and dam-break response framework, downstream warning arrangements, and defined alert levels linked to reservoir level, deformation, seepage, seismic events and visible instability. The Consultant shall review the complete monitoring record, instrument functionality and calibration, thresholds, inspection and maintenance records, reservoir sediment surveys, emergency preparedness and warning arrangements, and the consistency of reported dimensions and capacities; reconcile the differences among the as-built documents, monitoring program and operational plan; and identify any remedial, modernization or compliance measures required for continued safe operation and for the interfaces with Phases 2 and 3.

2.2 Proposed Phase 2 Irrigation Investments

Phase 2 concerns the development of pressurized, predominantly gravity-fed irrigation systems in the municipalities of Probishtip, Kratovo and Kumanovo, supplied from the existing Zletovica Hydro-System after meeting drinking-water and ecological-flow requirements. The historical feasibility study identified two principal service areas. The Probishtip system was divided into upper and lower pressure zones and was developed around a gross command area of approximately 3,522 ha. The upper zone was to be supplied from an intake at approximately elevation 622 m a.s.l., while the lower zone was to be connected to Intake No. 3, which also serves the Štip/Sveti Nikole water-supply system. The Kratovo subsystem covered approximately 987 ha, bringing the indicative total Phase 2 command area to approximately 4,509 ha. These figures represent historically delineated command areas and shall not be interpreted as confirmed net irrigable, economically viable, or realistically serviceable areas.

The preliminary investment concept comprised: (i) intake works and connections to the Phase 1 conveyance facilities; (ii) main transmission pipelines and buried pressurized distribution networks serving delineated irrigation units; (iii) filtration and sediment-control facilities; (iv) pressure-reducing and network-protection equipment; (v) valve chambers, outlets and hydrants for connection to tertiary and on-farm systems; (vi) flow measurement, automation, remote control and integration with the existing SCADA system; and (vii) associated drainage, ravine crossings, access roads and ancillary works. The historical drawings show separate upper- and lower-zone mains for Probishtip, together with filtration stations, pressure-control structures and plot-level distribution networks. For Kratovo, the concept included a dedicated intake and main conveyance, filtration and settling facilities, use of existing small reservoirs, and alternative arrangements for additional balancing storage and reservoir replenishment.

The 2013 feasibility drawings compared three preliminary configurations for the Kratovo-area subsystems. Alternative I included Markovci, Gorno Gradishte and Povishnica storage and irrigation areas of approximately 667 ha, 222 ha and 68 ha, respectively. Alternative II concentrated most development around Sakulica, with indicative areas of approximately 49 ha at Markovci, 818 ha at Sakulica, 22 ha at Gorno Gradishte and 68 ha at Povishnica. Alternative III comprised Markovci, Sakulica and Povishnica, with indicative areas of approximately 354 ha, 535 ha and 68 ha, respectively, and included a transfer pipeline from Gorno Gradishte to supplement Sakulica Reservoir. The drawings also indicate preliminary dam or storage configurations at Markovci, Gorno Gradishte, Sakulica and Povishnica, including associated spillways, diversion and outlet works, intakes and reservoir-supplementation pipelines. Alternative III would include two dams intended primarily for irrigation: Markovci Dam, approximately 30 m high with an indicative storage capacity of 1.1 million m³, and Sakulica Dam, approximately 27.5 m high with an indicative storage capacity of 1.4 million m³. All historical areas, elevations, flows, reservoir capacities, pipeline dimensions, pressure zones and storage requirements shall be treated as reference parameters only and shall be reconciled with the textual

report, hydraulic calculations, cost estimates, socio-economic analysis and any formal Government approval before the preferred investment scope is confirmed.

2.3 Proposed Phase 3 Hydropower Investments

Phase 3 concerns hydropower development within the multipurpose operating constraints of the Zletovica Hydro-System. The available historical design and bidding documents describe a cascade comprising HPP B, Zletovo 1, Zletovo 2 and Zletovo 3, together with small units on the Probishtip and Kratovo water-supply pipelines. HPP B is already operational and is therefore subject to an as-built, performance, safety, environmental-flow, operation-and-maintenance and interface audit rather than new development, except for any accepted remedial or compliance measures. The historical configuration indicates: Zletovo 1 with one approximately 2.85 MW Pelton unit using releases from Knezhevo Dam and one approximately 1.26 MW Pelton unit using tributary flows from the Emerichka and Venechka rivers; Zletovo 2 with three approximately 1.2 MW Francis units; Zletovo 3 with two approximately 1.025 MW Francis units; Probishtip HPP with one approximately 70 kW Pelton unit; and Kratovo HPP with one approximately 175 kW Pelton unit. The 2022 Employer's Requirements report an overall Phase 3 installed capacity of about 10 MW and annual generation of about 49.5 GWh, but these values and the apparent difference between stated plant configuration and aggregate capacity shall be reconciled. The proposed works may include river intakes and settling basins, open channels and tunnels, GRP and steel pressure pipelines, penstocks and manifolds, powerhouses and tailraces, hydromechanical and electromechanical equipment, transformers and switchgear, grid connections, control, protection, communications and SCADA integration, access and associated civil works. The Consultant shall reassess each plant and the cascade as a whole using updated hydrology and residual flows available after drinking-water, ecological-flow and irrigation requirements; as-built conditions and interfaces; hydraulic profiles and transient analysis; geotechnical and constructability constraints; turbine operating ranges; grid, licensing and off-take conditions; land and environmental and social constraints; CAPEX, OPEX and energy-price assumptions; and operation and maintenance requirements.

2.4 Historical Studies and Previously Selected Options

The project has been developed through several generations of studies and procurement documents, including 2009 irrigation and hydropower documentation and an integrated feasibility assessment prepared principally in 2013–2014. The attached historical Phase 3 bidding documents were subsequently prepared by SWECO Aqua Hydro and revised in 2022 on the basis of indicative Basic Designs, using an engineering, procurement and construction approach for plant design, supply and installation. Those documents contain useful technical descriptions, equipment requirements, contract provisions and functional guarantees, but they were prepared for a different procurement context and do not constitute construction-ready final detailed designs or current World Bank-compliant bidding documents for this assignment. The historical studies compared irrigation configurations, including alternative storage arrangements for the Kratovo subsystem, and hydropower cascade layouts and turbine alternatives; the TOR indicates that a Government-approved feasibility solution, referred to elsewhere as Alternative 3, and a configuration using Francis turbines were selected. These conclusions shall be treated as the starting baseline only. The Consultant shall establish a definitive chronology and document register; identify the formally approved option for each phase and the assumptions supporting it; reconcile inconsistencies in areas, flows, capacities, energy production, costs and layouts; determine which surveys, investigations, models, approvals and design outputs remain valid; and confirm, optimize, revise or replace the earlier options through the updated feasibility assessment.

2.5 Need for Updated Feasibility and Design Documentation

Although the existing documentation is extensive and supports the broad project concept, the principal studies date from 2013–2014 and rely partly on earlier investigations and design information. Material assumptions—including hydrology, climate risk, water demand, crop patterns, electricity prices and off-take conditions, regulatory requirements, construction costs, financing terms, environmental and social requirements, land constraints, and the condition and interfaces of existing assets—require current verification. Some historical documents also contain differences in reported configurations and

performance figures. The assignment shall therefore establish a current and internally consistent basis for investment decisions, World Bank appraisal, national permitting, final detailed design, procurement, and construction.

3. Available Information and Data Responsibilities

The Consultant shall review, validate, supplement, and manage all information required for the assignment. Annex B provides the initial inventory of historical studies, designs, datasets, approvals, and procurement documents. The Consultant shall verify and complete this inventory through the Master Document Register during inception.

The Consultant shall obtain and validate the additional data and investigations expressly included in its scope and financial proposal. Investigations whose extent cannot reasonably be defined before the diagnostic review shall be treated as provisional services with stated quantities, unit rates, approval triggers, program implications, and a written Client instruction before commencement. Material additional requirements outside the agreed scope shall be managed through the Contract's change-control procedures.

The Consultant shall comply with the Client's reasonable requirements concerning the quality, accuracy, scope, source and validation of project data and additional investigations.

Within its authority, the Client shall assist the Consultant in obtaining necessary information by facilitating communication with the competent institutions.

4. Applicable Requirements

The Consultant shall comply with the current laws and technical regulations of North Macedonia and shall verify, at inception and before each relevant submission, the title, amendment status, and applicability of all requirements affecting the assignment.

The technical documentation prepared under this assignment shall comply with the applicable World Bank Procurement Regulations for IPF Borrowers and the technical requirements of the Standard Procurement Documents identified by the Client. The PIU will separately engage an independent procurement expert to prepare the procurement strategy, determine the procurement approach and contract packaging, confirm the applicable Standard Procurement Documents, and prepare or coordinate the non-technical procurement sections.

The assignment shall also comply with the World Bank Environmental and Social Framework and the relevant Environmental and Social Standards, including requirements relating to biodiversity, stakeholder engagement, labor, community health and safety, land, dam safety, and emergency preparedness, as applicable.

Before design begins, the Consultant shall submit a project-specific register of codes and standards showing the edition/year, hierarchy and justification for any proposed departure.

The Consultant shall prepare all technical documentation in accordance with these Terms of Reference; current legislation and technical regulations of North Macedonia; the applicable World Bank requirements; and a project-specific hierarchy of standards based primarily on current MKS/EN standards, supplemented by other internationally recognized standards only where necessary and technically justified. Where requirements conflict, the Consultant shall identify the conflict and obtain the Client's written direction before proceeding.

Before commencing the services, the Consultant shall identify and obtain the current laws, technical regulations and standards applicable in North Macedonia. The Consultant shall comply with all amendments and new legislation entering into force during performance of the services.

Annex C provides an indicative legal, regulatory, standards, World Bank, and permit framework. The Consultant shall verify and update this framework at inception and before each relevant submission. Inclusion of a reference in Annex C does not relieve the Consultant of responsibility for identifying and applying all current requirements.

5. Scope of the Consulting Services

5.1 Definition, Scope and Limits of the Services

Overall approach. The Consultant shall deliver the assignment through eight interrelated activity groups set out below. These activity groups define the complete scope and the logical development of the services, but they are not intended to be performed as a strictly sequential series. The Consultant shall organize them as coordinated and partially overlapping streams of work, taking account of technical dependencies, decision requirements, review periods, and the mandatory hold points defined in this Section.

Phase 2 Irrigation and Phase 3 Hydropower shall be prepared in within the same ten (10)-month assignment period. For both phases, the Consultant's responsibilities shall include preparation of construction-ready final designs and technical bidding packages, preparation and submission of complete construction permit applications, and follow-up through issuance of the required construction permits and prerequisite approvals within the assignment period.

1. **Inception, data and document review, and gap analysis.** Establish the Master Document Register and a project data-management system; inventory, obtain, collect, digitize, catalogue, georeference where applicable, and systematize all available studies, designs, records, datasets, approvals, and procurement documents; assess their source, completeness, accuracy, resolution, consistency, currency, and suitability for use; confirm applicable legal, regulatory, technical, environmental and social, and World Bank requirements; identify material data and information gaps; and prepare the detailed methodology, work program, data-collection and processing plan, investigation plan, decision schedule, and review arrangements.
2. **Data collection, investigations, design bases, and verification of the existing system.** The Consultant shall be responsible for obtaining and collecting all primary and secondary data reasonably required to perform the assignment, including data held by the Client, public authorities, operators, utilities, municipalities, and other relevant entities, as well as field data generated through surveys, inspections, measurements, monitoring, testing, and investigations within the agreed scope. The Consultant shall validate, clean, digitize, georeference, harmonize, reconcile, interpolate or otherwise process the data as technically appropriate; document all sources, assumptions, transformations, limitations, and quality-control checks; and develop complete, traceable, and fit-for-purpose design datasets and models. On that basis, the Consultant shall complete and validate the surveys, hydrology, climate analysis, water balance, geotechnical and other investigations needed to verify existing designs, reassess assumptions, determine applicable adjustments, evaluate alternatives where required, and complete the final designs. The Consultant shall also verify the condition, capacity, performance, safety, remaining life, operating constraints, and interfaces of relevant Phase 1 assets, including Knezhevo Dam, HPP B, water-supply facilities, environmental-flow arrangements, and SCADA systems.
3. **Validation of the selected proposal and targeted options advice.** Review the Project proposal from the existing studies and test its technical, hydrological, climate, economic, financial, environmental and social, institutional, legal, operational, land, constructability, and implementation assumptions. The Consultant shall close the identified climate-resilience and socio-economic evidence gaps and shall develop comparative technical options only where the validation identifies a material deficiency, risk, or opportunity requiring a decision. It shall provide clear, documented advice on whether the proposed component scope, configuration, phasing, or operating assumptions should be retained, optimized, or revised. Procurement strategy and procurement-method advice are outside the Consultant's scope and will be provided by the PIU's independent procurement expert.
4. **Recommendation and confirmation of final Project scope.** Present the validation findings and any recommended adjustments using transparent technical, multicriteria, economic and financial, environmental and social, climate-resilience, constructability, operability, implementation, and risk analysis. The Client with advice from the World Bank will decide the final Project scope and financing proposal to be advanced. The Consultant shall proceed to

final detailed design and bidding documents only for the final Project scope confirmed through that review.

5. **Financing and implementation support.** Provide, from inception and in parallel with the technical work, the analyses and implementation inputs requested by the Client and the World Bank to prepare and substantiate the financing proposal, including the economic and financial analysis, environmental and social technical inputs, OP 7.50 technical package, jobs contribution and results framework, institutional and operating arrangements, permit and land roadmaps, technical inputs to contract packaging, project cost tables, implementation and disbursement schedules, risk register, and related implementation-readiness materials. The Consultant shall maintain consistency between these inputs and the agreed technical scope as it is refined. Procurement strategy, procurement method, contract packaging decisions, and preparation of non-technical procurement sections will be undertaken by an independent procurement expert engaged separately by the PIU.
6. **Construction-ready final detailed design.** Prepare complete, coordinated, construction-ready final detailed designs for the confirmed Phase 2 Irrigation and Phase 3 Hydropower investments. Each package shall include drawings, technical schedules, technical specifications, bills of quantities, and cost estimates suitable for competitive bidding and subsequent construction. Both packages shall be prepared in parallel within the same overall completion period.

For both phases, the Consultant shall prepare the complete statutory design and supporting documentation required for issuance of the construction permits. Submission of the applications, follow-up with the competent authorities, and obtaining the permits shall be undertaken in accordance with Activity Group 7 below.

Where an existing Basic Design covers all or part of the confirmed investment scope, the Consultant shall comprehensively review and validate it and, where necessary, update and improve it to meet the requirements of this assignment. The review shall assess the original design assumptions, current site conditions, applicable technical and regulatory requirements, and consistency with the confirmed investment scope.

The Consultant shall cooperate with the firm that originally prepared and signed the design to clarify assumptions, obtain supporting information, and coordinate necessary revisions. Such cooperation shall not relieve the Consultant of responsibility for the completeness, technical quality, and consistency of the updated design or its coordination with the other assignment outputs.

7. **Permitting and approval support.** The Consultant shall identify all applicable permitting and approval requirements for the accepted Phase 2 Irrigation and Phase 3 Hydropower investments and prepare the complete set of technical and supporting documentation required for their respective construction permit applications. This shall include documentation required for urban planning approvals, authorizations, licenses, consents, technical conditions, utility clearances, grid connection approvals, water-management approvals, environmental approvals, and other prerequisite regulatory instruments, as applicable to each phase.

For each phase, the Consultant shall submit complete construction permit applications on behalf of the Client, coordinate with the competent authorities, and follow the procedures through to issuance of the required construction permits and prerequisite approvals. This shall include responding to comments, providing clarifications, revising documentation, and submitting supplementary information as required. Obtaining the required construction permits and prerequisite approvals for both phases shall form part of the Consultant's obligations and shall be completed within the ten (10)-month assignment period.

The Consultant shall initiate permitting activities as early as practicable and maintain a coordinated permitting schedule showing prerequisites, responsible parties, submission dates, review periods, and required decisions for each phase. It shall promptly identify any action or documentation required from the Client or other parties and any risk to timely permit issuance. Responsibilities for environmental and social instruments shall remain as specified under the environmental and social interface provisions below.

Note: If approval of the Infrastructure Project remains outstanding when the Request for Proposals (RFP) is prepared, the TOR may be revised following shortlisting to include additional services required to complete or update the urban-planning documentation and obtain such approval. The scope and requirements of these additional services will be specified in the RFP, allowing shortlisted Consultants to address them in their technical proposals and include the corresponding costs in their financial proposals.

8. **Technical parts of the bidding packages.** Prepare the complete technical specifications, drawings, bills of quantities, price schedules, technical schedules, performance and testing requirements, and other technical inputs required for the accepted civil works bidding packages, and provide technical inputs reasonably required by the PIU's independent procurement expert for the development of technically appropriate qualification and evaluation criteria. The Consultant shall coordinate these outputs with the independent procurement expert engaged by the PIU, who will develop the procurement strategy, determine the procurement method and contract packaging, select and complete the applicable World Bank Standard Procurement Documents, and prepare or coordinate the non-technical bidding-document sections.

Data management and processing. Raw and processed data shall be maintained in a structured project database with a data dictionary, units, coordinate reference systems, source and collection dates, responsible entity, revision status, processing history, quality status, limitations, and links to the calculations, models, drawings, and decisions that use the data. The Consultant shall resolve material inconsistencies among documentary, field, operational, spatial, cadastral, hydrological, geological, environmental, agricultural, energy, financial, and other datasets and shall not rely on unverified values where they could materially affect option selection, design verification, adjustment, safety, cost, permits, or constructability. Where direct measurement is not reasonably possible, the Consultant may use justified estimation or interpolation methods, supported by sensitivity analysis and clearly identified uncertainty. All source data, processed datasets, spatial layers, scripts or calculation procedures where used, and editable models shall be submitted in open or commonly used editable formats as part of the relevant deliverables.

Coordination and overlap. The Consultant shall organize the services as concurrent, resource-loaded workstreams capable of completion within ten (10) months. The Inception Report, diagnostic review, and gap analysis shall be completed by Month 1. Investigations, water-balance modelling, climate-risk and resilience assessment, verification of existing assets, socio-economic and agricultural analysis, environmental and social coordination, OP 7.50 analysis, economic and financial analysis, jobs assessment, institutional and implementation planning, technical inputs to contract packaging, costing, and preparation of technical bidding-package components shall commence as early as practicable and be updated continuously. The integrated feasibility study and preferred-option package shall be completed by Month 3. Draft detailed designs for hydropower and irrigation shall be completed by Month 5 before stakeholder consultation. The Consultant shall support stakeholder consultation activities organized by the Client by preparing consultation materials, technical summaries, drawings, maps, visualizations, and responses to technical questions. The Consultant shall participate in consultation meetings when requested by the Client and shall incorporate accepted consultation outcomes into subsequent design stages.

The final hydropower and irrigation design packages, including the technical components of their respective bidding packages, shall both be completed by Month 9. A coordinated interim design and readiness for permitting review for both components shall be completed by Month 7. Month 10 shall be used for final consolidation, resolution of comments, obtaining construction permits, coordination with the PIU's procurement expert, and assignment completion. The Consultant shall coordinate with the PIU's independent procurement expert so that each technical package is consistent with the procurement strategy and selected Standard Procurement Documents. The Inception Report and each updated work program shall show interfaces, dependencies, critical path, concurrent activities, review periods, decision dates, and the measures required to achieve the completion date.

Transboundary-waterways technical assessment and component sequencing. The Consultant

shall commence the OP 7.50 technical assessment at inception and maintain it as a live workstream aligned with the hydrology, water balance, feasibility, environmental and social, dam-safety, economic, design, and implementation analyses. The assessment shall describe the international waterway context and relevant basin connections; establish the without-project baseline; define the existing Zletovica system and the proposed works; quantify, for relevant hydrological conditions and climate scenarios, water abstractions, storage, diversions, return flows, consumptive use, environmental-flow releases, reservoir operations, hydropower releases, water quality implications, construction effects, and other potentially relevant changes in flow regime; assess potential adverse effects on riparian states and potential effects from other riparians' water use on the Project; and document the underlying data, models, assumptions, uncertainties, mitigation measures, monitoring arrangements, maps, diagrams, and calculations. The analysis shall distinguish: (i) the Phase 3 hydropower component; (ii) the Phase 2 irrigation component; and (iii) the cumulative effects of the integrated Project together with the existing Phase 1 assets and reasonably foreseeable related investments. The package shall clearly explain whether and how hydropower changes the timing or pattern of releases without materially increasing consumptive use and shall separately quantify the incremental and cumulative consumptive and return-flow implications of irrigation. It shall test and substantiate the expectation that hydropower has less significant transboundary implications than irrigation. The Consultant shall prepare concise, technically accurate, non-confidential summaries, maps, data tables, and annexes in a form suitable for attachment to a riparian communication or notification, respond promptly to technical questions arising during the process, and update the assessment following material design or operating changes. Formal communications with riparians shall be issued only by the Client, the Government, or the World Bank, as applicable.

Environmental and social interface. A separate environmental and social consultant shall prepare the applicable environmental and social instruments. The Consultant under this assignment shall provide timely and complete technical inputs, coordinate assumptions and schedules, assess design implications, and incorporate accepted environmental and social requirements into the feasibility study, designs, quantities, costs, implementation arrangements, permit documentation, and bidding documents.

Mandatory hold points. Overlap between activities does not remove the need for formal authorization at key decision points. The Consultant shall obtain the Client's written instruction, following the agreed World Bank review where applicable, before: (i) commencing material additional investigations not already authorized; (ii) confirming the principal design bases, including hydrology, climate scenarios, water balance, service criteria, and key interfaces; (iii) adopting the preferred Phase 3 hydropower solution for final detailed design; (iv) adopting the preferred Phase 2 irrigation solution for final detailed design; (v) finalizing the technical specifications, drawings, bills of quantities, price schedules, and other technical components for each bidding package based on the procurement strategy and contract packaging confirmed by the PIU; (vi) issuing the statutory designs and supporting documentation for either phase for statutory review and submitting the complete construction permit applications on behalf of the Client; and (vii) issuing the final technical parts of the bidding packages to the PIU's independent procurement expert for incorporation into the procurement documents. The Client's authorization under item (vi) shall confirm its approval of the documentation for submission and shall be obtained sufficiently early to meet the permitting program. Issuance of the required construction permits and prerequisite approvals for both phases shall be an acceptance of condition for D6 and G6, rather than a separate hold point requiring prior authorization to obtain the permits. The draft technical assessment supporting the transboundary communication or notification shall be submitted early enough to inform the feasibility and preferred-option decision and avoid delaying the parallel preparation of either component. Subsequent material changes, including those arising from detailed design and stakeholder consultation, shall be reflected in the updated assessment of the integrated Project. The detailed submission and decision schedule shall be confirmed in the Inception Report and shall preserve concurrent completion of all contracted outputs within ten (10) months. Review, acceptance, or authorization shall not relieve the Consultant of professional responsibility.

General obligations. Throughout the assignment, the Consultant shall maintain quality assurance and quality control; coordinate all disciplines, the Client, approved subcontractors, the separate environmental and social consultant, competent authorities, infrastructure operators; maintain the work

program, financing-readiness matrix, risk register, permit register, decision log, and document-control system; submit the required progress and special reports; and ensure timely participation of authorized key experts in coordination and review meetings.

Scope limits and responsibility. Existing information may be reused only after validation. The Consultant shall make reasonable and documented efforts to obtain required data from the Client and relevant third parties and shall remain responsible for collecting and generating the data included in its agreed scope. If essential third-party data are unavailable, inaccessible, unreliable, or insufficient, the Consultant shall promptly notify the Client, identify the implications for verification or design, propose technically justified measures to close or manage the gap, and distinguish between work included in the agreed scope and any material additional services requiring change control. Lack of readily available data shall not, by itself, relieve the Consultant of the obligation to process, reconcile, supplement, or verify the information needed to complete the assignment. The Consultant remains responsible for quality, accuracy, completeness, coordination, constructability, fitness for purpose, and timely delivery of all outputs.

Communications. Formal correspondence shall be in English, issued by authorized representatives, and maintained through the agreed document-control system.

5.2 General Requirements for Technical Documentation

5.2.1 Required Level of Detail

The technical documentation shall comprise: (i) a fully reassessed and updated integrated Feasibility Study, including robust climate-resilience, hydrological, socio-economic, agricultural, economic and financial analysis and comparative selection of the preferred Phase 2 and Phase 3 solutions; (ii) complete construction-ready final detailed design documentation for the accepted Phase 2 and Phase 3 investments; (iii) statutory design and permit-support documentation required for Phase 2 and Phase 3 investments under the laws of North Macedonia; and (iv) complete technical components for the accepted Phase 3 hydropower and Phase 2 irrigation civil works bidding packages, including technical specifications, drawings, bills of quantities, price schedules, technical schedules, performance and testing requirements, and related technical annexes. The PIU's independent procurement expert will develop the procurement strategy, determine the procurement method and packaging, select and complete the applicable World Bank Standard Procurement Documents, and prepare or coordinate the non-technical procurement sections. The design documentation shall allow a qualified contractor to price, plan, construct, test, commission, and complete the permanent works without further substantive design, except for clearly identified shop drawings, temporary works, construction methods, fabrication details, and other limited contractor-design elements expressly defined in the bidding documents.

The content and level of detail of each submission shall comply with this TOR, the applicable laws of North Macedonia, internal and World Bank quality standards, and the requirements of the agreed World Bank procurement approach.

5.2.2 Detailed Work Plans

In addition to the overall work plan included in the Inception Report, the Consultant shall prepare detailed work plans for each principal output and submit them to the Client for review and approval.

Before commencing each principal output, the Consultant shall submit a concise work plan identifying:

- A description of the output, its agreed contents and level of detail, the preparation methodology, and the applicable review and acceptance requirements.
- The responsible key experts and supporting team members.
- The preparation schedule, dependencies, interfaces, and review periods.
- The data, standards, assumptions, models, and design bases to be used.
- The proposed intermediate reviews, hold points, and decisions required from the Client.
- Any risks or assumptions that could affect quality, scope, or timely completion.

5.2.3 Submission and Format Requirements

The Consultant shall prepare the complete technical documentation in English and Macedonian. The contractual record shall comprise searchable signed PDF files and complete editable native files, including Word, Excel, CAD, GIS, schedules, calculations, models, quantities, cost estimates, and source data. At inception, the Client shall confirm the language requirements and the limited number of legally required signed hard copies. Electronic review copies for the World Bank shall be transmitted through the Client/PIU's agreed document-control arrangements.

The Consultant shall establish and maintain a project GIS database throughout the assignment. The final submission shall include all geospatial information developed or used during the assignment, including topographic surveys, cadastral information, infrastructure alignments, hydrological features, environmental constraints, land requirements, utility crossings, project footprints, and permit-related spatial data. Deliverables shall include editable GIS databases, shapefiles or equivalent formats, metadata, coordinate-system definitions, and data dictionaries. All spatial information shall be submitted in open or commonly used editable formats compatible with standard GIS software.

Where necessary to maintain the program, the Client may authorize interim working submissions in English. The number and format of such submissions shall be agreed in writing.

All working and final submissions shall be signed and certified by the Consultant and by the responsible licensed professionals, as required by the applicable laws of North Macedonia.

Each formal submission shall be accompanied by a transmittal letter signed by the Consultant's authorized representative and identifying the document title, number and type of copies, submission status, revision, and relationship to previous correspondence.

The documentation shall be delivered to the offices of the Client.

For the format of the printed copies, the Consultant shall use standard formats of paper (A4 – A0), with recommendation for maximal use of the A4 and A3 formats i.e. to use larger formats only if the distinctness cannot be achieved with the smaller formats.

The Consultant shall use SI system of measurement units and their marks in the technical documentation.

6. Tasks and Technical Requirements

6.1 Review and Gap-Analysis Report

The diagnostic review shall test and operationalize the project proposal from the existing reports; it shall not duplicate project-concept preparation or assume that the historical designs can be adopted without scrutiny. The Consultant shall review the latest Feasibility Study, Alternative 3, the historical hydropower options, the previously selected irrigation configurations, and the assumptions against current technical, hydrological, climate, economic, financial, environmental, social, institutional, legal, operational, implementation, and financing-readiness requirements. Particular attention shall be given to correcting the limitations of the existing studies on climate resilience, hydrological uncertainty, socio-economic conditions, farmer demand and uptake, affordability, distributional impacts, agricultural transformation, and component-level and program-level economic and financial viability. The Consultant shall identify which assumptions and elements can be retained, which require targeted verification or updating, and which present a material risk or deficiency. Where a material issue is identified, the Consultant shall develop proportionate alternatives or refinements and provide a clear recommendation to the Client and the World Bank. Following their decision on the final Project scope to be advanced, the Consultant shall prepare the implementation-ready designs, required statutory and permit documentation, and technical components of the bidding documents.

The Consultant shall review the latest Feasibility Study, the 2014 irrigation and hydropower documentation, the available urban infrastructure project for Phase 2 and Phase 3, the available historical Basic Designs and other technical documentation, the as-built and operating records for the existing and operational Hydropower Plant B (HPP B), environmental and social documentation, previous economic and financial analyses, permits, and historical procurement documents. Each source

shall be classified as suitable for retention, requiring verification, requiring update or supplementation, requiring replacement, or unsuitable for decision-making.

The gap-analysis report shall identify the decisions that can be supported by existing information and all additional data, surveys, investigations, models, and approvals required to complete the assignment.

For each identified gap, the report shall state its purpose, method, responsible party, timing, dependencies, and acceptance criteria. The findings shall be reflected in the detailed work plan and Master Document Register.

6.2 Key Input Data and Investigations

6.2.1 Hydrological Data

Historical hydrological data and the 2009 design series shall be treated as reference inputs only. The Consultant shall prepare a new quality-controlled hydrological database using all reliable observations available after the historical design period; verify stations, rating curves, gaps and consistency; and develop updated inflow series, flow-duration curves, flood and low-flow statistics, drought and climate-sensitivity scenarios, sediment considerations and reservoir-operation simulations. Editable datasets and models shall be submitted.

- Zletovica river – profile of Zletovo water measurement station
- Zletovica river – Knezhevo profile (990 m.a.s.l.)
- Zletovica river – intake profile for Kratovo (1.090 m.a.s.l.)
- Kuchevishka river – intake profile (1.075 m.a.s.l.)
- Zletovica river – profile before the mouth of Emirichka river
- Zletovica river – profile after the mouth of Emirichka river
- Emirichka river - profile before the mouth of Zletovica river
- Venechka river – intake profile (1.074 m.a.s.l.)
- Emirichka river – intake profile (1.076 m.a.s.l.)
- Zletovica river – profile for HPP Zletovo 2 (640 m.a.s.l.)
- Zelengradska river – profile before the mouth of Zletovica river
- Eshterec river – profile before the mouth of Zletovica river

6.2.1.1 Water supply needs

The water-supply demand values adopted in the 2009 Preliminary Design are historical references and shall be updated using current abstraction records, population and development projections, losses, seasonal demand, service-reliability criteria and actual infrastructure constraints. The Consultant shall reconcile all updated values with competent-authority plans and operating data.

Table 3.1. Average annual needs of water supply			
No.	Settlement	l/s	m ³ /year
1	Kratovo	110	3.468.960
2	Probishtip with Zletovo	128	4.036.608
3	Shtip	409	12.898.224
4	Karbinci	25	788.400
5	SV. Nikole	125	3.942.000
6	Lozovo	17	536.112
	Total:	814	25.670.304

6.2.1.2 Irrigation needs

Month	1	2	3	4	5	6	7	8	9	10	11	12
CMN	0,80	0,90	1,00	1,10	1,10	1,12	1,18	1,15	1,05	0,95	0,85	0,80

The historical 2009 irrigation demand and command-area assumptions shall be reassessed. The Consultant shall distinguish technically irrigable, economically viable and realistically serviceable areas and shall update soils, land use, crop patterns, irrigation methods, efficiency, peak and seasonal demand, farmer participation, tariffs, affordability, operation and maintenance and implementation phasing. Climate resilience will be a critical factor for the design and alternative selection.

The Feasibility Study shall update the crop-water requirements for each irrigation zone. Requirements shall be expressed as average decade secondary flows (l/s/ha) and shall be derived from current crop patterns, soils, climate data and on-farm application efficiencies rather than from the historical design values. The feasibility study also shall consider institutional context in the irrigation sector in the study area, learning from country's and international good practices on management, operation and maintenance of irrigation schemes and tertiary systems.

6.2.1.3 Needs of environmentally guaranteed flow (E-flow)

Month	1	2	3	4	5	6	7	8	9	10	11	12
CMN	0,80	0,90	1,00	1,10	1,10	1,12	1,18	1,15	1,05	0,95	0,85	0,80

The environmental/ecological flow regime shall be newly determined and justified from updated hydrology, seasonal ecological requirements, existing permits, biodiversity and fish studies, cumulative impacts, current national legislation and applicable World Bank requirements. Any previous fixed percentage or flow value, including the referenced 10% concept, shall be tested and shall not be treated as automatically sufficient.

- Knezhevo profile - the applicable seasonal ecological-flow release shall be determined by the updated hydrological and ecological assessment and verified against the as-built release arrangement.
- Zletovo gauging-station profile - the applicable seasonal ecological-flow requirement shall be determined by the updated hydrological and ecological assessment.

6.2.2 Criteria for quality satisfaction of the priority water users

The Consultant shall develop an integrated operating policy for the Zletovica Hydro-System that reflects the agreed priority of uses and avoids excessive reservoir drawdown during critical dry periods. Historical reliability criteria and reduction coefficients shall be treated as reference values only. The Consultant shall validate or revise them using updated hydrology, demand projections, ecological-flow requirements, operating records, and climate scenarios. The recommended policy shall define normal, drought, and emergency operating rules; service-reliability targets; allocation and curtailment rules; monitoring indicators; and decision triggers.

The Consultant shall define the optimal operating regime of the multipurpose system. The regime shall respect the following priority order of water uses:

1. drinking-water supply,
2. scientifically and legally justified ecological/environmental flow,
3. irrigation demand,
4. hydropower generation from residual water only.

The regime shall avoid excessive draw-down of the reservoir during critical dry periods. Service reliability criteria (to be confirmed with the Client) shall include, as a minimum:

- Drinking-water demand met at full supply level in at least 95 % of years (or equivalent reliability criterion

agreed with the Client);

- Ecological flow released according to the updated seasonal regime;
- Irrigation demand met according to the reliability targets agreed for each irrigation zone.

6.2.3 Other required data and investigations

The Consultant shall obtain/generate all topographic, cadastral, sediment, erosion, flood-risk, utility, and grid data required to complete the feasibility assessment and designs. Survey standards, coordinate systems, accuracy, coverage, and deliverable formats shall be defined in the Inception Report.

6.3 Additional Geotechnical Investigations

Based on the diagnostic review of the existing investigation records and the requirements of the shortlisted solutions, the Consultant shall prepare and implement a program of additional geotechnical investigations sufficient for the feasibility assessment, option selection, construction-ready final designs, reliable cost estimates, bidding documents, and applicable permit applications for both components. The program shall define the location, purpose, method, quantity, depth, laboratory testing, reporting requirements, health and safety measures, environmental and social controls, schedule, and acceptance criteria for each investigation.

The Consultant shall develop and implement a geotechnical investigation program sufficient to support feasibility assessment, alternative selection, construction-ready final designs, reliable cost estimates, and preparation of bidding documents for both components. The program shall also support the applicable permit submissions for both phases. It shall include, as applicable, boreholes, test pits, geophysical surveys, laboratory testing, permeability testing, groundwater investigations, slope-stability assessments, seismic characterization, foundation investigations, borrow-area investigations, material-source investigations, and construction-material suitability assessments. The extent of investigations shall be justified based on project risks, geological conditions, and the confidence level required for final design and procurement.

The payment arrangements for provisional geotechnical investigations are defined in the Request for Proposals. No provisional investigation shall commence without the Client's written authorization.

Any provisional investigation shall have a clear trigger, scope, method, price basis and decision date. Critical missing investigations shall be completed before the related design steps.

6.4 Feasibility Study for the Irrigation Component - Phase 2

The irrigation work shall validate and refine Phase 2 irrigation proposal from the existing studies. The Consultant shall update the evidence required to confirm realistic service areas, network concepts, technologies, phasing, and institutional and O&M arrangements under the updated water-allocation constraints and shall recommend changes only where the analysis demonstrates that the proposed approach is not technically, economically, financially, socially, or operationally sound.

The analysis shall include farm and market conditions, crop budgets, water productivity, farmer uptake, tariffs, affordability, land/access constraints, environmental and social impacts and financial and economic viability with and without the project. Climate projections and climate change conditions will be integrated into the analysis as well.

After the Client with support from the World Bank confirms the final irrigation Project scope to be implemented, the Consultant shall prepare all surveys, investigations, calculations, drawings, specifications, quantities, cost estimates, land and interface information, and other details necessary to constitute a complete construction-ready design and support the corresponding bidding documents. Formal statutory design submissions undertaken solely for irrigation permitting, irrigation permit applications, and authority review or approval support are included in this assignment.

6.4.1 Introduction

After meeting drinking-water demand and the approved seasonal ecological-flow regime, water available from Knezhevo Reservoir may be allocated to irrigation in the municipalities of Probishtip and Kratovo. Hydropower generation shall use only the residual flows remaining after these priority

requirements have been satisfied. The indicative irrigation service area of approximately 4,500–5,000 ha shall be verified and optimized through the updated feasibility assessment.

The irrigation component is expected to increase agricultural productivity and support rural economic development in the region.

Upper irrigation zone. The historical concept supplied the upper command area from an intake at approximately 622 m above sea level. The Consultant shall verify the intake location and elevation, available head, service area, pressure zones, network configuration, on-farm requirements, and monitoring and control arrangements. The final command area shall be based on updated water availability, topography, land use, farmer demand, economic viability, and environmental and social constraints.

Lower irrigation zone. The historical concept supplied the lower command area from Intake No. 3, which also serves the Štip/Sveti Nikole water-supply system. The Consultant shall verify the available capacity, operational interface, service area, ground elevations, pressure management, and network layout, and shall revise the concept as necessary.

Kratovo subsystem. The historical studies considered an intake, conveyance and filtration facilities, existing small reservoirs, and several possible new storage structures. The Consultant shall reassess whether a Kratovo subsystem and any additional storage are technically required and economically justified under the updated hydrology, allocation priorities, land constraints, environmental and social requirements, and implementation conditions.

Within the Phase 2 (Irrigation) Feasibility Study the Consultant shall update irrigation water requirements on the basis of current crop patterns, soils, climate data and realistic command areas. These updated demands shall form a key input to the system water-balance and reservoir-operation simulations.

The residual flows available at the potential hydropower sites (after satisfaction of drinking-water, ecological-flow and irrigation priorities) shall be transferred as input data to the Phase 3 (Hydropower) Feasibility Study for the determination of optimal installed capacities and energy production.

6.4.2 Scope of the Phase 2 Irrigation Feasibility Study

1. Desk review: Provided summary report on the available studies
2. Physical data for the irrigable area
 - General description
 - Topography, geology

For the irrigation Feasibility Study the Consultant shall collect and analyse at least the following data (updating or replacing the historical information as necessary):

Soils – soil types, available water-holding capacity, infiltration rates, drainage characteristics and any salinity or structural constraints;

Climate – temperature (mean, min, max), rainfall, reference evapotranspiration, solar radiation, relative humidity, wind speed and frost-free period;

Land tenure and farm structure – number of farms, size distribution, average farm size, number of plots per farm, and the practicality of plot consolidation;

Crop water requirements – present and potential future cropping patterns, including any higher-value crops that become viable with reliable irrigation;

Institutional and financial context – existing or planned support programmes for agriculture and rural development, farmer willingness and ability to pay, and possible tariff structures.

3. Agriculture structure

- Ownership structure: number of farms, surface distribution, farm's average surface, number

of plots per farm, plot concentration requirements

- Current crops and animal husbandry, production and yields
- Availability of labour
- Mechanisation
- Current agriculture revenues and probable evolution without the project area, yields
- Livestock quantity and livestock breeding
- Budget for agricultural crops (costs for production and revenues, estimating the current entry data and prices)
- Current revenues from agriculture and possible development outside the frames of the project
- Available mechanisation (agricultural mechanisation)
- Planned agricultural crops (with irrigation), area, yields, turnover of agricultural crops, etc.
- Needs of water from the aspect of agricultural crops, from the aspect of new crops (introduced as a result of the increased water availability)
- Definition of irrigation water needs in accordance with the agricultural crops and types of soil
- Quantity of livestock and livestock breeding – envisaged with irrigation of the increased production of feeding stuff
- Budget for agricultural crops (costs for production and revenues, estimating the current entry data and prices)
- Optimisation of the planned types of agricultural crops (maximisation of the profit with minimum water consumption)
- Water supply in accordance with the planned types of agricultural crops
- Necessary mechanisation (agricultural mechanization)

4. Agricultural policy

- Administration in the agriculture
- Services in the agriculture (expanded services...)
- Industrialisation of agricultural crops
- Availability of funds for agriculture and rural development (referring to the funds which can be made available by the country for development of the agriculture and rural development)

5. Market study

- Development of main products in the past
- Production
- Demand
- Import
- Export

- Prices and prices policy, Grants
- Marketing structure

6. Farm profitability

- Types of farms
- Possible development as a result of the irrigation
- Business plans for farms (turnover of agricultural crops, livestock breeding and production costs)
- Differences in the profitability (with or without the Project)

7. The project

Proposed techniques and equipment for irrigation:

- Definition of the best irrigation method in accordance with the agricultural crops, soil, and field
- Definition of the irrigation equipment which is needed on the farms
- Energy consumption for the irrigation, energy balance and energy optimization
- Irrigation parameters
- On farm works
- Diversion Main works
- Irrigation network design (scale 1:2.500) and optimization
- Filtration stations, pumping stations if required
- Main distribution works (hydrants, valve chambers and network protection devices)
- Network control and irrigation automatization
- Drainage requirement. Drainage network design
- Roads network
- Plots concentration
- Others investments
- Water measurement and tariffs
- Organisation and operation

8. Project profitability

- Differences in the financial profitability (with or without the Project)
- Differences in the economic profitability (with or without the Project)
- Conclusions

9. Definition of the additional necessary studies and preparation of those studies

6.4.3 Design Definition Associated with the Feasibility Study

The preferred feasibility option shall be developed to a sufficient level to support transparent comparison, reliable cost estimation, environmental and social assessment, land requirements, implementation planning and the subsequent preparation of the required design documentation.

Key outputs:

- Preliminary layout of irrigation infrastructure
- Hydraulic concepts and design criteria
- Preliminary cost estimates
- Initial identification of land to be acquired
- The Consultant shall support stakeholder consultation activities organized by the Client by preparing consultation materials, technical summaries, drawings, maps, visualizations, and responses to technical questions. The Consultant shall participate in consultation meetings when requested by the Client and shall incorporate accepted consultation outcomes into subsequent design stages.

6.5 Feasibility Study for the Hydropower Component - Phase 3

The hydropower work shall validate and refine the Phase 3 hydropower proposal from the existing reports. The Consultant shall test the proposed configuration against current hydrology and priority water uses, actual as-built conditions, technology, grid conditions, costs, energy prices, environmental and social constraints, land, constructability, and implementation risks. Where the validation identifies a material deficiency, risk, or opportunity, the Consultant shall develop proportionate modifications or alternatives and advise the Client and the World Bank on the preferred adjustment. Following confirmation of the final Project scope to be implemented, the Consultant shall prepare the required construction-ready final design, permit documentation, and bidding documents.

HPP B: as-built, performance, environmental-flow, safety, O&M and interface audit only, plus justified remedial or compliance design where required.

Zletovo 1, Zletovo 2 and Zletovo 3: reassess layout, hydraulic profile, turbine flow/head, pipelines or waterways, transients, bypass continuity, civil/geotechnical risks, grid/SCADA, land, access, costs and constructability.

Kratovo and Probishtip plants: reassess pressure management, drinking-water priority, bypass/needle-valve operation, turbine economics, grid connection and O&M practicality.

The preferred option shall be robust under hydrology, ecological flow, CAPEX, OPEX, schedule, energy price, irrigation uptake, grid and environmental/social sensitivity tests.

6.5.1 Introduction

The Consultant shall prepare the Phase 3 Feasibility Study for electricity generation by small hydropower plants.

The Phase 3 Feasibility Study shall determine the optimal configuration, location and technical characteristics of the small hydropower plants within the multipurpose system, applying the criteria and methodology set out in Section 6.5.3.

In the Phase 3 Feasibility Study the Consultant shall carry out a complete technical, energy and economic analysis of all hydropower layouts that remain feasible under the updated hydrology, water-allocation priorities and as-built constraints.

The analysis shall include, as a minimum, the layouts previously examined in the historical documentation. The Consultant shall compare energy production, investment and operating costs, economic and financial indicators, environmental and social impacts, and implementation risks, and shall recommend the preferred layout.

The Consultant may also propose one or more additional layouts if these can be shown, with clear justification, to offer superior technical or economic performance. Any new layout that receives Client (and, where required, World Bank) acceptance shall be developed to the same level of detail as the historical variants.

The Consultant shall remain fully responsible for the quality and completeness of the services and for

developing the accepted concept to the required level of detail, notwithstanding any review undertaken by the Client.

6.5.2 Historical Hydropower Concepts

The historical studies assessed a cascade of small hydropower plants using reservoir releases, tributary inflows, and water conveyed for priority uses, together with small units on the Probishtip and Kratovo water-supply mains. These concepts are reference inputs only and shall not constrain the Consultant's reassessment.

For each retained or newly proposed plant, the Consultant shall verify the source and reliability of available flow, gross and net head, hydraulic losses, transient behavior, turbine type and operating range, civil and geotechnical conditions, grid connection, SCADA and control interfaces, access, land requirements, environmental and social constraints, constructability, operation and maintenance requirements, capital and operating costs, energy production, and financial and economic viability. HPP B shall be addressed through an as-built, performance, safety, environmental-flow, operation and maintenance, and interface audit, together with any justified remedial or compliance measures.

6.5.3 Objectives, Tasks and Methodology for the Hydropower Feasibility Study

The hydropower feasibility assessment shall determine the technically, economically, financially, environmentally, and operationally preferred level of hydropower development within the multipurpose Zletovica system. It shall optimize energy generation without compromising drinking-water supply, the approved ecological-flow regime, irrigation reliability, dam safety, or other binding operational requirements.

Using the updated hydrological database, water-demand projections, operating rules, as-built information, grid conditions, energy-market assumptions, environmental and social constraints, and current costs, the Consultant shall: (i) define feasible hydropower configurations; (ii) optimize installed flows, capacities, turbine arrangements, and operating regimes; (iii) estimate firm and average energy production; (iv) assess hydraulic, civil, geotechnical, electromechanical, control, grid, land, and implementation requirements; (v) compare alternatives using transparent technical, economic, financial, environmental and social, climate-resilience, constructability, operability, and risk criteria; and (vi) recommend the preferred configuration for the Client's acceptance following the agreed World Bank review.

- Updated hydropower market, tariff, off-take, grid-access, licensing, and regulatory analysis.
- Daily or finer system simulation consistent with the integrated water-allocation and reservoir-operating model.
- Feasibility-level layouts, profiles, hydraulic calculations, energy estimates, equipment selection, geotechnical assessment, access and construction concepts, grid and SCADA interfaces, quantities, costs, implementation schedules, and risk assessments for each shortlisted configuration.
- Economic and financial comparison of the shortlisted configurations, including sensitivity and switching-value analysis.
- Clear documentation of input data, calculation methods, efficiency assumptions, hydraulic losses, equipment performance, cost basis, model outputs, and reasons for the recommended option.

6.6 Integral Economic and Financial Analysis of Phases 2 and 3

The Consultant shall validate and update the supporting economic and financial evidence, including redevelopment of the 2014 Integral Economic and Financial Analysis as a current decision model, and shall provide the editable calculations, assumptions, sensitivities, and advice needed for the World Bank and the Client to confirm or refine the proposed component scope and sequencing.

The model shall use current quantities, CAPEX, OPEX, replacement costs, contingencies, land, supervision, environmental/social mitigation, escalation, financing and implementation schedule.

Electricity production, availability, grid/curtailment risk, energy price or off-take assumptions, irrigation benefits, affordability and O&M sustainability shall be updated and supported by sources.

Editable economic and financial models with visible formulas shall include sensitivity, scenario and switching-value analysis and shall identify any non-viable component or package.

The Consultant shall first assess the economic and financial viability of each component, or of technically interdependent groups of components, within Phases 2 and 3. The analysis shall account for the relevant interfaces with Phase 1 assets, including any incremental costs, benefits, constraints, sunk costs, and residual values.

The Consultant shall then prepare an integrated economic and financial analysis of Phases 2 and 3 as components of one interdependent multipurpose Project. The analysis shall identify component-level and Project-level viability, distribution of costs and benefits, affordability, operating sustainability, and any cross-subsidies or institutional arrangements needed to maintain the system.

The integrated economic analysis for the hydropower and the irrigation components will include the following parts:

- Implementation planning: assessment of alternative sequencing options for investments for both Phases II and III, including simultaneous, phased, and component-based implementation scenarios. The Consultant shall assess the technical, economic, financial, environmental and social, transboundary-water, land, regulatory, permitting, institutional, and scheduling implications of each scenario and provide an evidence-based recommendation. No implementation sequence shall be assumed in advance.
- Project management for all components
- Organisation of operations
- Project funding options
- Simulation of operational use of water from Hydro-system "Zletovica" for water supply, irrigation, ecologically guaranteed flow and power (in accordance with the anticipated operating rules for water management in the hydro-system)

The model shall present the base case, downside and upside scenarios, sensitivity and switching values, and the principal conditions required for the recommended investment to remain economically and financially viable. All assumptions shall be sourced, documented, and reconciled with the technical designs, implementation schedule, procurement packaging, and operating arrangements.

The Consultant shall prepare an integral economic and financial analysis covering Phase 2 (irrigation) and Phase 3 (hydropower), combined and disaggregated, taking into account the sunk costs and residual value of the already constructed Phase 1 assets where relevant.

The analysis shall produce, as a minimum:

- cash-flow statements for the economic and financial analyses;
- Economic Internal Rate of Return (EIRR) and Net Present Value (ENPV);
- Financial Internal Rate of Return (FIRR) and Net Present Value (FNPV);
- switching values and sensitivity tests.
- Sensitivity and risk analysis shall examine the impact of plausible variations in the key drivers, including:
 - capital investment costs;
 - energy production / water availability;
 - electricity tariff and irrigation water charges;
 - financing conditions;
 - implementation delays and cost overruns.

All models shall be delivered in editable form with transparent assumptions, formulas and sources.

6.7 Dam-Safety Instruments

Several project components depend on water stored behind Knezhevo Dam and therefore rely on its safe operation. Knezhevo Dam is a relatively recent dam, reportedly designed by Tractebel and commissioned in 2013. The available 2024 inspection and dam-safety reports do not identify deficiencies affecting safe operation under normal loading conditions; however, this preliminary conclusion shall not limit the Consultant's independent review or the scope of measures required to achieve and sustain an acceptable level of safety under all applicable loading, operational, climate, and emergency conditions.

The starting point for the dam-safety work shall be a critical review of, and documented comments on, the findings, conclusions, assumptions, recommendations, and unresolved issues in the available dam-safety assessment, inspection reports, monitoring records, operational documents, and the 2026 Operational Plan for Protection and Defense against Floods for the Zletovica Hydrosystem. The Consultant shall verify the adequacy of the underlying data and analyses against the applicable provisions of ESS4, the World Bank Good Practice Note on Dam Safety, current good international industry practice, and relevant national requirements.

On the basis of that review, the Consultant shall identify all hard and soft remedial measures required to ensure and sustain an acceptable level of dam safety in accordance with World Bank requirements. The Consultant shall develop the measures to the level necessary for decision-making and implementation, including technical basis and prioritization; final design and specifications where physical works or equipment are required; institutional, staffing, procedural, training, and financing actions; implementation responsibilities and dependencies; procurement and permit implications; risk-based sequencing; implementation schedule; and itemized capital and recurrent cost estimates. Accepted measures shall be incorporated into the relevant final designs, cost estimates, implementation plan, financing-readiness assessment, permit documentation, and bidding documents. The Consultant shall cooperate fully with any Independent Dam Safety Expert, Dam Safety Panel, Independent Technical Reviewer, or other specialist appointed by the Client or the World Bank, respond to their comments, and incorporate accepted recommendations without relieving the Consultant of professional responsibility.

At a minimum, the review and remedial-measures program shall address: (i) completion, modernization, calibration, reliability, data management, alarm thresholds, maintenance, and operational use of the dam-monitoring and instrumentation system; (ii) the operator's organizational capacity, staffing, competencies, training, decision authority, equipment, recordkeeping, and ability to evaluate dam performance and safety, together with a sustainable mechanism and budget for routine and long-term maintenance; (iii) preparation and operationalization of a complete O&M Plan where no adequate current plan exists; (iv) dam-safety implications of the morning-glory spillway located close to the abutment, including structural, hydraulic, geotechnical, blockage, access, inspection, maintenance, and operational risks, and verification of spillway adequacy under updated flood hydrology, climate-change scenarios, hydrological uncertainty, reservoir routing, freeboard, and relevant loading combinations; and (v) strengthening of emergency preparedness as specified below.

Using the available documentation as a starting point, and building on the accepted dam-safety review and remedial-measures program, the Consultant shall assess, update, complete, and prepare the following dam-safety instruments in accordance with ESS4 and the applicable World Bank guidance:

- Construction Supervision and Quality Assurance Plan (CSQAP);
- Instrumentation Plan (IP);
- Operation and Maintenance Plan (O&MP);
- Emergency Preparedness Plan (EPP).

These plans are based on the ESF Good Practice Note on Dam Safety, with Appendices 1–4 providing the reference framework for the preparation of each document. Their objectives and preparation schedule are summarized below. The draft and final submission stages for all four plans, together with their links to D1–D6, shall follow the supplementary deliverable schedule in Section 8

Construction Supervision and Quality Assurance Plan (CSQAP)

The Construction Supervision and Quality Assurance Plan shall define the organization, staffing, responsibilities, procedures, equipment, qualifications, records, testing, inspection, hold points, and reporting required to supervise any works that could affect the existing dam or its appurtenant structures. The Contractor's quality-control arrangements shall be coordinated with the Engineer's independent quality-assurance procedures.

Instrumentation Plan (IP)

The updated Instrumentation Plan shall assess the completeness, condition, functionality, calibration, redundancy, reliability, and adequacy of the existing monitoring system and identify required rehabilitation, replacement, modernization, or additional instruments. It shall define monitoring locations and parameters; baseline values and trends; reading, inspection, calibration, and maintenance frequencies; data validation, storage, analysis, visualization, and reporting arrangements; alert and action thresholds; escalation and response protocols; responsible personnel and competency requirements; interfaces with SCADA and warning systems; equipment and software requirements; implementation schedule; and capital and recurrent costs. The system shall enable the operator to evaluate dam behavior and initiate timely action throughout the dam's operational life.

Operation and Maintenance Plan (O&MP)

The Operation and Maintenance Plan shall be a complete, controlled, and operator-ready document covering the dam, reservoir, spillway, outlet works, monitoring and warning systems, access, and other appurtenant structures. It shall define the organizational structure, decision authority, staffing, qualifications, training, equipment and facilities; normal, unusual, flood, drought, seismic, and emergency operating procedures; surveillance, inspection, testing, preventive and corrective maintenance; reservoir and outlet operating rules; documentation and reporting; management of defects and recommendations; periodic safety review arrangements; interfaces with the EPP; and annual and long-term budgets. The Consultant shall assess current operator capacity and resources, prepare a capacity-building and implementation plan, and recommend a sustainable maintenance-funding mechanism with responsibilities, funding sources, forecast recurrent costs, and monitoring arrangements.

Emergency Preparedness Plan (EPP)

The Consultant shall review the 2026 Operational Plan for Protection and Defense against Floods and use its monitoring arrangements, alarm thresholds, dam-break flood-wave analysis, warning procedures, and institutional coordination provisions as inputs. The Consultant shall identify and close the gaps between that flood-protection and warning plan and a comprehensive Emergency Preparedness Plan consistent with Appendix 4 of the World Bank Good Practice Note on Dam Safety. The EPP shall be proportionate to the assessed downstream risk and shall establish clear, actionable, operator-ready procedures for identifying, verifying, classifying, escalating, responding to, communicating, managing, and closing out all credible dam-safety emergencies that could endanger life, property, infrastructure, essential services, or the environment.

The EPP shall include, as applicable: emergency detection indicators and decision thresholds; emergency classification levels and notification flowcharts; 24-hour contact and communication protocols; role-specific action sheets and checklists; decision authority and command arrangements; inundation maps and identification of populations, assets, routes, and facilities at risk; warning and public-notification arrangements; coordination with protection and rescue institutions, municipalities, emergency services, water users, and other responsible entities; access, equipment, backup power, communications, and logistical requirements; arrangements for controlled releases and reservoir drawdown; security and continuity of operations; termination and recovery procedures; event documentation and post-event review; training, drills, exercises, periodic testing, updating, and document control. The Consultant shall verify the dam-break analysis and downstream consequences at a level commensurate with risk, consult the responsible institutions, validate roles and contact arrangements, conduct at least one tabletop exercise before finalization, and provide a time-bound implementation plan and estimate of the capital and recurrent financial resources required to operationalize and maintain the EPP.

6.8 Coordination with the ESIA Consultant

The Client intends to engage a separate consultant to update the environmental and social (E&S) assessment of the Project in accordance with applicable Republic of North Macedonia requirements and the World Bank Environmental and Social Framework. The Consultant shall cooperate closely with the ESIA Consultant throughout the Assignment and shall coordinate the timing, assumptions, and exchange of information between the technical and E&S workstreams.

The Consultant shall provide the ESIA Consultant, in a timely manner, with the project's technical information, including design options, drawings, construction methods, land and material requirements, workforce assumptions, construction schedules, reservoir operating parameters, and disposal requirements.

The Consultant shall incorporate relevant E&S findings, constraints and mitigation requirements into the comparison of alternatives to be explored in the Feasibility Study.

The Consultant shall participate in joint coordination meetings convened by the Client and shall identify promptly any information gap, inconsistency or design change that may affect the E&S assessment or associated instruments.

6.9 Detailed Design for the Irrigation System

Following acceptance of the preferred irrigation option, the Consultant shall prepare complete, coordinated, construction-ready final detailed designs for the accepted irrigation investments and the technical specifications, drawings, bills of quantities, price schedules, technical schedules, and related technical annexes required for the civil works bidding packages within the ten-month assignment. A draft detailed design suitable for stakeholder consultation shall be submitted by Month 5, and the final irrigation detailed design with all associated assessments and studies shall be submitted by Month 9. Suitable existing design documentation may be retained only after validation and shall be updated, supplemented, or replaced as necessary. The final designs shall reflect the accepted hydrology, climate scenarios, water allocation, command areas, agricultural and socio-economic analysis, environmental and social requirements, costs, implementation sequencing, the procurement strategy and packaging confirmed by the PIU, and interfaces with existing assets and Phase 3 hydropower. Irrigation permit applications, formal statutory submissions, support during authority processing and obtaining all necessary permits and approvals, including the construction permit for Phase 2 Irrigation are included.

- 1) General part
- 2) Review of previous documentation, input data and design basis
- 3) Calculations determining the basic hydraulic, energy, dimensional and other operating characteristics of the equipment and facilities, necessary for defining their function, the preparation of technical conditions for their implementation, as well as a Bill of Quantities.
- 4) Design report
- 5) Other studies and technical elaborates required under applicable legislation.
- 6) Bill of Quantities
- 7) Drawings
 - Overview map in scale 1:25.000
 - Layout of irrigation pipelines in scale 1:2.500
 - Longitudinal sections of pipelines in scale 1:100/1.000
 - Base and sections of typical and other structures in scale 1:50

Before commencing final design, the Consultant shall submit a detailed design work plan and discipline-by-discipline document schedule for the Client's acceptance. This submission shall define the proposed design basis, contents, calculations, drawings, models, specifications, quantities, interfaces, review

stages, statutory verification, permit dependencies, and acceptance criteria. Acceptance of the work plan shall not relieve the Consultant of responsibility for delivering complete construction-ready designs.

6.10 Detailed Designs for the Hydropower Plants

Following acceptance of the preferred hydropower configuration and contract packaging, the Consultant shall prepare complete, coordinated, construction-ready final detailed design documentation for each retained hydropower plant, turbine installation, and associated package. A draft detailed design suitable for stakeholder consultation shall be submitted by Month 5. The final hydropower detailed design, together with all associated assessments, studies, statutory and permit-support documentation, cost estimates, and technical bidding-package components addressing all consultation comments, shall be submitted by Month 9, in parallel with the final irrigation package. Existing approved design outputs may be retained only after validation and shall be updated, supplemented, or replaced where they are incomplete, inconsistent, outdated, or incompatible with the accepted solution. HPP B is excluded from new development except for accepted remedial, interface, safety, or compliance measures identified through the audit.

The Consultant shall support stakeholder consultation activities related to the hydropower component by preparing consultation materials, visualizations, drawings, and technical summaries and by participating in consultation meetings when requested by the Client. The Consultant shall review consultation outcomes and incorporate accepted comments into the final hydropower design package.

- 1) General part
- 2) Review of previous documentation, input data and design basis
- 3) Hydro-construction part
- 4) Hydro-mechanical equipment
- 5) Electro-technical part
- 6) Construction part
- 7) Access roads
- 8) Automatic control and administration of the work of the system, coordinated with already constructed SCADA system
- 9) Other studies and technical elaborates required under applicable legislation.

Each of the specified parts should include the following elements:

- 1) Technical description
- 2) Calculations determining the basic hydraulic, energy, dimensional and other operating characteristics of the equipment and facilities, necessary for defining their function, the preparation of technical conditions for their implementation, as well as Bill of quantity.
- 3) Technical condition
- 4) Bill of Quantities
- 5) Drawings
 - Overview map in scale 1:25.000
 - Layout of pipelines and open channels in scale 1:2.500
 - Longitudinal sections of pipelines and open channels in scale 1:100/1.000
 - Base and sections of machine building in scale 1:100

- Base and sections of other structures in scale 1:50

Before commencing final design, the Consultant shall submit a detailed design work plan and document schedule for the Client's acceptance. The submission shall identify the discipline packages, design bases, calculations, drawings, specifications, equipment schedules, quantities, interfaces, review stages, statutory verification, grid and permit dependencies, and acceptance criteria. Acceptance of the work plan shall not relieve the Consultant of responsibility for delivering complete construction-ready designs.

6.11 Design Documentation and National Legislation

Under the applicable national construction framework, the statutory Basic Design is the design documentation required for construction permitting. For both Phase 2 irrigation and Phase 3 hydropower, the Consultant shall prepare the statutory Basic Design and all supplementary documentation necessary to form a complete construction-ready final detailed design and permit package consistent with international practice.

The same level of design completeness, statutory documentation, and permitting obligations shall apply to both phases. For both phases, the Consultant shall prepare the statutory Basic Design and all associated discipline designs, studies, calculations, drawings, verifications, applications, and supporting documents required for the construction permits and related approvals. The Consultant shall submit the required applications on behalf of the Client and undertake all necessary follow-up with the competent authorities, including addressing comments and providing revisions or supplementary documentation. Obtaining all necessary permits and related approvals, including the construction permits for both phases, shall form part of the Consultant's obligations and shall be completed within the assignment period.

Where the statutory design does not contain sufficient information for competitive bidding and construction without further substantive design by the Contractor, the Consultant shall provide the additional details, specifications, schedules, quantities, interface requirements, and construction information necessary to satisfy the construction-ready standard defined in this TOR.

6.12 Technical Components of the Accepted Hydropower Bidding Package(s)

The existing hydropower bidding and prequalification documents are historical reference and technical-gap sources only. The Consultant shall use them only after verifying their consistency with the accepted final design, current technical requirements, and the procurement approach confirmed by the PIU.

After accepting the preferred hydropower option and completion of the required final designs, environmental and social inputs, and integral economic and financial analysis, the Consultant shall prepare the complete technical components required for each accepted hydropower civil works bidding package. These components shall be structured for incorporation by the PIU's independent procurement expert into the applicable World Bank Standard Procurement Document.

For each accepted hydropower contract package, the Consultant shall prepare coordinated technical specifications, drawings, bills of quantities or price schedules, equipment and performance schedules, testing and commissioning requirements, training requirements, technical interface provisions, completion requirements, and relevant environmental, social, health and safety technical clauses. The technical package shall clearly identify any permitted contractor-design elements and the associated performance and review requirements.

The PIU will engage an independent procurement expert to develop the procurement strategy, assess delivery and packaging alternatives, determine the procurement method and contract model, and advise on risk allocation and market approach. The Consultant shall provide all technical inputs reasonably requested for that assessment, including design interfaces, construction sequencing, quantities, cost estimates, technical risks, implementation constraints, performance requirements, and technical implications of alternative packaging options.

The PIU's independent procurement expert will prepare or coordinate the instructions to bidders, bid data, qualification and evaluation criteria, bidding forms, contract conditions and data, and other non-technical procurement sections. The Consultant shall review the assembled package solely to confirm that the technical specifications, drawings, bills of quantities, schedules, performance requirements, and interfaces have been incorporated accurately and remain consistent with the final design.

6.13 Technical Components of the Accepted Irrigation Bidding Package(s)

The existing irrigation bidding and prequalification documents are historical reference and technical-gap sources only. For each accepted irrigation works package, the Consultant shall prepare complete and coordinated technical specifications, drawings, bills of quantities or price schedules, technical schedules, performance and testing requirements, and relevant environmental, social, health and safety technical clauses, all fully consistent with the accepted final design.

The PIU will engage an independent procurement expert to develop the procurement strategy, determine the procurement method, contract model and packaging, assess the market and procurement risks, select the applicable World Bank Standard Procurement Documents, and prepare or coordinate the non-technical procurement sections. The Consultant shall provide the technical information needed for these decisions and shall organize its technical outputs in accordance with the packaging confirmed by the PIU.

The Consultant shall submit the draft technical package to the Client and the PIU's independent procurement expert for review, revise it in response to consolidated comments, and deliver a final coordinated package suitable for direct incorporation into the procurement documents. The Consultant's scope does not include preparation of the procurement strategy, choice of procurement method or contract model, qualification and evaluation criteria, instructions to bidders, bid data, contract conditions, or other non-technical bidding-document sections.

At a minimum, each irrigation technical package shall include: general and particular technical requirements; specifications for materials, equipment and workmanship; drawings and schedules; bills of quantities or price schedules with measurement and payment provisions; testing, commissioning and acceptance requirements; technical interface and completion requirements; and applicable technical codes and standards.

7. Consultant Qualifications and Expertise Requirements

The Consultant shall be selected using Quality and Cost-Based Selection (QCBS), in accordance with the applicable Procurement Regulations.

Consultants may associate with other firms through a joint venture or sub-consultancy arrangement to complement their expertise, strengthen their technical capacity, and provide the multidisciplinary resources required for the assignment. The proposal shall clearly describe the proposed association, the responsibilities of each participating firm, and the arrangements for coordination, quality assurance, and delivery of the services.

7.1 Firm Qualifications

The Consultant shall be a consulting firm or an association of firms demonstrating the following qualifications and experience:

- At least ten (10) years of relevant technical, operational, and managerial experience in the planning and design of complex hydropower and irrigation infrastructure.
- The Consultant shall have an average annual turnover of at least USD 1,000,000, or its equivalent, over the last three (3) completed financial years preceding the deadline for submission of expressions of interest. As proof of compliance, the Consultant shall provide audited financial statements or verified financial statements showing its annual turnover for each of those years. For a joint venture, this requirement shall be met by the members collectively, by adding their average annual turnovers for the relevant three-year period; each member shall provide its corresponding financial statements.
- Successful completion of at least five (5) comparable contracts during the last ten (10) years. These contracts shall collectively demonstrate experience in feasibility studies, final detailed design, and preparation of bidding documentation for multipurpose water resources systems, irrigation infrastructure, hydropower facilities, dams, and associated works.
- Experience in Europe, the Western Balkans, Central Asia, or countries with comparable legal, regulatory, institutional, hydrological, and permitting conditions. Experience in North Macedonia or neighboring countries shall be considered an advantage.

- Demonstrated capacity to address North Macedonian design, licensing, permitting, and regulatory requirements, through appropriately qualified personnel, association with suitably national experienced firms, or other clearly defined arrangements.
- Experience in assignments financed by international financial institutions, such as the World Bank, EBRD, EIB, ADB, or comparable institutions. Experience with World Bank-financed operations, including procurement, appraisal, dam safety, and preparation of investments for financing, shall be considered an advantage.
- A valid license for preparing design documentation for Category I structures (License A), or the relevant recognition of foreign qualifications and licenses, as required under the applicable legislation of North Macedonia. The Consultant shall describe how the applicable licensing requirements will be met before undertaking activities requiring such authorization. More information about license confirmation can be get on the following link: <http://mtc.gov.mk/>;
- For any urban planning activities included in the assignment, the Consultant shall demonstrate compliance with the applicable national licensing requirements. A foreign legal entity shall undertake such activities under a technical cooperation agreement with a domestic legal entity holding a valid license to perform urban planning activities in the Republic of North Macedonia. The domestic legal entity shall act as the lead entity for those activities and shall be responsible for ensuring that the urban plans and other urban planning outputs prepared through this cooperation comply with the applicable law and implementing regulations. As evidence of compliance, the Consultant shall submit a copy of the domestic legal entity's valid urban planning license and, where the Consultant is a foreign legal entity, the technical cooperation agreement specifying the parties' respective roles and responsibilities.

The Consultant and its associated firms shall disclose any actual or potential conflicts of interest relating to the assignment or the proposed Zletovica investments, in accordance with the applicable Procurement Regulations.

Evidence of experience

The Consultant shall provide a list of relevant assignments demonstrating compliance with the above requirements. Each reference shall include:

- Assignment title, location, and country;
- Client or contracting entity;
- Description of the infrastructure and services provided;
- Contract value and implementation period;
- Status and date of completion;
- The Consultant's role and scope of services; and
- For assignments undertaken through an association or sub-consultancy, the Consultant's share of the services and the activities it directly performed.

References shall be supported by client-issued completion certificates or other client confirmations of satisfactory performance.

7.2 Key Experts: Qualifications and Responsibilities

The Consultant shall provide a multidisciplinary team capable of reviewing and validating existing studies and designs, updating feasibility assessments, and preparing ready for implementation detailed designs, permitting documentation, and bidding documentation for both Phase 2 Irrigation and Phase 3 Hydropower.

The team shall demonstrate the capacity to translate existing project documentation into technically sound and implementable investment proposals, integrating technical, economic, financial, climate-resilience, agricultural, institutional, regulatory, and implementation considerations.

The team's collective expertise shall cover:

- Multipurpose water resources systems;
- Irrigation infrastructure;

- Hydropower infrastructure;
- Dams and associated facilities;
- Hydrological analysis and water resources modelling;
- Economic and financial analysis of infrastructure investments;
- Dam safety assessment and planning;
- Final detailed design;
- Technical specifications, drawings, bills of quantities, price schedules, and other technical components of bidding documentation; and
- Permitting and regulatory compliance.

The Consultant shall organize its team to support parallel preparation of both phases, with coordinated investigations, consistent design assumptions, and effective management of interfaces between the irrigation, hydropower, and existing water supply systems.

The core team shall comprise the following ten (10) Key Experts.

7.2.1 Project Manager / Team Leader

Minimum Qualifications

- University degree in civil engineering, water resources engineering, hydropower engineering, irrigation engineering, or a related discipline. A master's degree in a relevant field will be considered an advantage.
- At least fifteen (15) years of professional experience in planning, feasibility assessment, design, or implementation of major water infrastructure projects.
- Demonstrated experience as Team Leader, Project Manager, or equivalent lead management role on at least three (3) assignments involving multipurpose water resources project, dam project, irrigation scheme, hydropower development, or comparable infrastructure of similar complexity.
- Demonstrated experience managing multidisciplinary consulting teams and coordinating technical, economic, institutional, permitting, procurement, and implementation workstreams.
- Experience in assignments financed by international financial institutions and in Europe, the Western Balkans or countries with comparable institutional and regulatory environments shall be considered an advantage.

Principal responsibilities

The team leader shall be responsible for overall assignment management, including:

- Coordinating all disciplines and the parallel preparation of both phases;
- Managing the work program, staffing inputs, deliverables, and review milestones;
- Overseeing quality assurance and quality control;
- Coordinating investigations, feasibility assessments, and design activities;
- Managing interfaces among technical, economic, permitting, procurement, and implementation activities; and
- Coordinating submissions to the Client and responses to comments from the Client and the World Bank.

7.2.2 Lead Irrigation Engineer

Minimum Qualifications

- University degree in irrigation engineering, agricultural engineering, civil engineering, water resources engineering, or a related discipline.
- At least fifteen (15) years of relevant professional experience.

- Served as Lead Irrigation Engineer, Irrigation Design Engineer, Irrigation Specialist, or in an equivalent senior technical role on at least three (3) assignments involving irrigation feasibility studies and/or irrigation design, each relating to an irrigation project forming part of a multipurpose water resources system or a project of comparable complexity.
- Demonstrated experience in pressurized irrigation systems, irrigation networks, hydraulic design, water-demand assessment, irrigation optimization, and irrigation infrastructure costing.
- Experience in irrigation modernization or large-scale irrigation development projects shall be considered an advantage.

Principal responsibilities

The Lead Irrigation Engineer shall lead the irrigation feasibility assessment, alternatives analysis, water-demand assessment, system optimization, and final detailed design. The expert shall prepare or oversee the irrigation drawings, technical specifications, bills of quantities, cost estimates, and technical inputs to permitting and bidding documentation, in coordination with the other specialists.

7.2.3 Lead Hydropower Civil Engineer

Minimum Qualifications

- University degree in civil engineering, hydropower engineering, hydraulic engineering, or related discipline.
- At least fifteen (15) years of relevant professional experience.
- Experience as Lead Hydropower Engineer, Hydropower Civil Engineer, Hydraulic Engineer, or in an equivalent senior technical role on at least three (3) hydropower feasibility studies, detailed designs, or implementation assignments involved a hydropower project forming part of a multipurpose water resources system or a project of comparable complexity.
- Demonstrated experience in hydraulic structures, pressure conveyance systems, intake structures, tunnels, surge facilities, penstocks, and powerhouses.

Principal responsibilities

The Lead Hydropower Civil Engineer shall lead the hydropower feasibility assessment, alternatives analysis, and civil and hydraulic design of the hydropower facilities. The expert shall coordinate interfaces with the mechanical, electrical, geotechnical, water resources, and dam safety specialists and prepare or oversee the corresponding drawings, specifications, quantities, cost estimates, and technical inputs to permitting and bidding documentation.

7.2.4 Lead Mechanical Engineer

Minimum Qualifications

- University degree in mechanical engineering.
- At least fifteen (15) years of relevant professional experience.
- Experience as Lead Mechanical Engineer, Hydromechanical Engineer, Electromechanical Engineer, or equivalent senior technical role on at least three (3) hydropower, dam, or water infrastructure projects involving major mechanical equipment.
- Demonstrated experience in turbines, valves, gates, pressure systems, hydromechanical equipment, testing, commissioning, and operation and maintenance requirements.
- Experience preparing procurement specifications for electromechanical equipment shall be considered an advantage.

Principal responsibilities

The Lead Mechanical Engineer shall be responsible for turbine selection and optimization; design and specification of mechanical and hydromechanical equipment; coordination of equipment interfaces with civil and electrical works; and preparation of technical specifications, quantities, cost estimates, testing and commissioning requirements, and operation and maintenance requirements.

7.2.5 Lead Electrical Engineer

Minimum Qualifications

- University degree in electrical engineering.
- At least fifteen (15) years of relevant professional experience.
- Experience as Lead Electrical Engineer, Power Systems Engineer, Electrical Design Engineer, or equivalent senior technical role on at least three (3) hydropower, energy, or water infrastructure projects involving electrical systems.
- Demonstrated experience in power systems, grid connection, protection systems, instrumentation, automation, SCADA integration, and testing and commissioning.
- Experience with utility interconnection requirements and power evacuation systems shall be considered an advantage.

Principal responsibilities

The Lead Electrical Engineer shall be responsible for electrical systems design; grid connection and power evacuation requirements; protection, control, instrumentation, and SCADA integration; and preparation of electrical drawings, specifications, quantities, cost estimates, and testing and commissioning requirements. The expert shall coordinate the relevant technical requirements with the utility and the other design disciplines.

7.2.6 Senior Water Resources Modelling Specialist

Minimum Qualifications

- University degree in hydrology, water resources engineering, civil engineering, environmental engineering, or related discipline.
- At least ten (10) years of relevant professional experience.
- Experience as Water Resources Modelling Specialist, Hydrologist, Reservoir Operations Specialist, or equivalent senior technical expert on at least three (3) assignments involving reservoir simulation, water allocation modelling, or integrated water resources planning.
- Demonstrated experience in hydrological analysis, reservoir operations, drought analysis, climate-risk assessment, and water-balance modelling.
- At least one (1) referenced assignment shall have involved a multipurpose reservoir system, transboundary basin, or competing water-use demands.
- Demonstrated experience preparing or supporting at least one international-waterways, transboundary-water, or riparian-notification technical assessment for an infrastructure or water-resources investment shall be considered an advantage.

Principal responsibilities

The specialist shall be responsible for: hydrological assessment, climate and drought analysis, and water-balance modelling; reservoir simulation, water allocation modelling, and development of operating rules; assessment of environmental flow requirements in coordination with the environmental and social consultant; evaluation of interactions among irrigation, hydropower, existing water supply, and other water uses; and preparation and updating of the transboundary-waterways technical assessment and supporting quantitative analyses, maps, tables, and annexes required to support communication or notification under World Bank Operational Policy OP 7.50. The transboundary assessment shall address the irrigation and hydropower components separately and their cumulative effects as an integrated project.

7.2.7 Geotechnical Engineer

Minimum Qualifications

- University degree in geotechnical engineering, geological engineering, geology, or civil engineering.

- At least ten (10) years of relevant professional experience.
- Experience as Geotechnical Engineer, Engineering Geologist, or equivalent senior technical role on at least three (3) infrastructure projects involving geotechnical investigations and design.
- Demonstrated experience in foundation assessment, slope stability analysis, seismic characterization, and construction-material evaluation.
- At least one (1) referenced assignment shall have involved dams, hydropower facilities, tunnels, reservoirs, or other major water infrastructure.

Principal responsibilities

The Geotechnical Engineer shall plan and interpret geotechnical investigations; assess geological and geotechnical conditions affecting project alternatives; evaluate foundations, slopes, and construction materials; and develop geotechnical design parameters and recommendations for incorporation into the final detailed designs and bidding documentation.

7.2.8 Irrigation and Agricultural Economist

Minimum Qualifications

- University degree in agricultural economics, agricultural engineering, economics, agronomy, or related discipline.
- At least ten (10) years of relevant professional experience.
- Experience as Agricultural Economist, Irrigation Economist, Agribusiness Specialist, or equivalent senior role on at least three (3) irrigation feasibility studies or agricultural water-management projects.
- Demonstrated experience in crop-water demand assessment, crop budgets, agricultural production analysis, irrigation benefits analysis, and agricultural market assessments.
- Experience evaluating farmer adoption, irrigation service demand, and agricultural value chains shall be considered an advantage.

Principal responsibilities

The expert shall assess agricultural production, cropping patterns, crop budgets, productivity, market opportunities, farmer adoption, and demand for irrigation services. The expert shall assess crop-water requirements jointly with the Lead Irrigation Engineer and quantify agricultural benefits and assumptions for incorporation into the project's economic and financial analysis.

7.2.9 Economic and Financial Analyst

Minimum Qualifications

- University degree in economics, finance, business administration, public policy, or related discipline.
- At least ten (10) years of relevant professional experience.
- Experience as Economic Analyst, Financial Analyst, Infrastructure Economist, or equivalent senior role on at least three (3) infrastructure feasibility studies involving economic and financial analysis.
- Demonstrated experience preparing EIRR, ENPV, FIRR, FNPV, affordability analyses, sensitivity analyses, and financial models.
- At least one (1) referenced assignment shall have involved water infrastructure, hydropower, irrigation, dams, or comparable infrastructure investments.
- Experience with World Bank or other international financial institution appraisal requirements shall be considered an advantage.

Principal responsibilities

The analyst shall prepare and update the economic and financial analyses for both phases and the integrated project, as required by the assignment. Responsibilities shall include affordability assessments; sensitivity, scenario, and switching-value analyses; assessment of financial sustainability; and assessment of the project's contribution to employment and preparation of the associated jobs reporting framework. The analyst shall ensure consistency between the models and the technical designs, cost estimates, implementation schedule, and operating assumptions.

7.2.10 Dam Safety Specialist

Minimum Qualifications

- University degree in civil engineering, dam engineering, hydraulic engineering, hydropower engineering, or related discipline.
- At least ten (10) years of relevant professional experience.
- Experience as Dam Safety Specialist, Dam Engineer, Dam Safety Reviewer, or equivalent senior expert on at least three (3) assignments involving dam safety assessments, dam rehabilitation, dam safety planning, or preparation of dam safety instruments.
- Demonstrated experience in dam safety evaluation, instrumentation, surveillance systems, operation and maintenance planning, and emergency preparedness planning.
- At least one (1) referenced assignment shall have involved an existing dam relied upon by downstream infrastructure or water users.
- Familiarity with World Bank dam safety requirements applicable to existing dams shall be considered an advantage.

Principal responsibilities

The specialist shall undertake the dam safety review and gap assessment and prepare or update the dam safety instruments required under the assignment, including the Construction Supervision and Quality Assurance Plan (CSQAP), Instrumentation Plan (IP), Operation and Maintenance Plan (O&MP), and Emergency Preparedness Plan (EPP). The specialist shall coordinate dam safety inputs across the design disciplines and liaise with independent dam safety reviewers. The Consultant's internal dam safety work shall remain distinct from any independent review required for the project.

7.3 Non-key experts and Supporting Personnel

The Consultant shall provide all Non-Key Experts and supporting personnel necessary to complete the assignment. Their roles, responsibilities, timing, and estimated inputs shall be identified in the Technical Proposal and staffing schedule, with corresponding costs included in the Financial Proposal.

Depending on the proposed methodology, these personnel may include:

- Climate Adaptation and Resilience Specialist;
- SCADA and Automation Specialist;
- Grid Connection Specialist;
- Geologist;
- Survey Specialists;
- GIS Specialists;
- CAD Specialists;
- Cost Estimators;
- Construction Planning Specialists;
- Quantity Surveyors;
- Legal Advisors;
- Permitting and Regulatory Specialist;

- Translators and Document Control Specialists.

Permitting and regulatory support

The Consultant shall provide a suitably qualified Permitting and Regulatory Specialist with:

- A university degree in engineering, urban planning, law, public administration, or a related discipline;
- At least seven (7) years of relevant professional experience; and
- Demonstrated experience supporting permitting and approval processes for infrastructure projects category A.

Experience in North Macedonia, the Western Balkans, European Union member states, or comparable permitting systems shall be considered an advantage.

The specialist shall maintain the Permit Action Register and permitting roadmap for both phases; identify applicable approvals, responsible authorities, submission requirements, and dependencies; and coordinate preparation of permit documentation and responses to authority comments.

The specialist shall work closely with the design team, the Client, the environmental and social consultant, utilities, and competent authorities. Support shall cover the statutory and permit-support documentation required to bring both phases to permitting-ready status and to secure the construction permits for both Phase 2 Irrigation and Phase 3 hydropower infrastructures.

7.4 Indicative Staffing Schedule and Level of Effort

Tables 7.1 and 7.2 present the Client's estimated staffing inputs. The Consultant shall review these estimates and propose a staffing plan consistent with:

- The scope of services;
- The deliverables specified in Section 8;
- The review milestones specified in Section 9;
- The proposed methodology;
- The work program and implementation schedule; and
- Parallel preparation of Phase 2 Irrigation and Phase 3 Hydropower.

The Consultant shall remain fully responsible for providing all personnel and inputs necessary to complete the assignment and meet the required deliverables and milestones.

Table 7.1 Indicative Key Expert Inputs

Key Expert	Main Assignment Period	Indicative Input (person-months)
Project Manager / Team Leader	Entire assignment	10
Lead Irrigation Engineer	Feasibility through irrigation detailed design	10
Lead Hydropower Civil Engineer	Feasibility through hydropower detailed design	10
Lead Mechanical Engineer	Hydropower feasibility and detailed design	8
Lead Electrical Engineer	Hydropower feasibility and detailed design	8
Senior Water Resources Modelling Specialist	Inception through preferred option selection and design support	10
Geotechnical Engineer	Investigations, feasibility and design stages	6
Irrigation and Agricultural Economist	Feasibility and economic analysis	5

Economic and Financial Analyst	Feasibility, financing readiness and procurement stages	5
Dam Safety Specialist	Dam safety review and preparation of instruments	4

Total Indicative Key Expert Input: 76 person-months

The staffing plan shall demonstrate that Key Experts will be mobilized at the appropriate stages of the ten-month assignment and remain available for coordination, review, and resolution of comments when required. Continuous full-time deployment is not required for experts whose scheduled inputs are intermittent.

The cumulative Key Expert input shall be at least seventy-six (76) person-months, unless the Consultant substantiates an alternative staffing approach that the Client accepts as sufficient to deliver all required outputs and milestones. Any proposed reduction shall be explicitly identified and justified in the Technical Proposal.

Non-Key Expert inputs, including those required for permitting and bidding documentation, shall be separately identified and adequately resourced.

Table 7.2 Indicative Non-Key Expert Inputs

Non-Key Expert	Indicative Input (person-months)
Climate Adaptation and Resilience Specialist	3
SCADA and Automation Specialist	2
Grid Connection Specialist	2
Geologist	2
Survey Specialists	4
GIS Specialist	3
CAD Specialists	8
Cost Estimators / Quantity Surveyors	4
Construction Planning Specialist	3
Document Control Specialist	3
Permitting and Regulatory Specialist	5
Translators and Language Support	As required
Administrative Support Staff	As required

Total Indicative Non-Key Expert Input: approximately 39 person-months

The total of thirty-nine (39) person-months excludes translation, language support, administrative support, and any additional specialist inputs proposed by the Consultant.

7.5 Additional Experts, Assistant Engineers, and Home-Office Support

The Consultant may propose additional specialists and assistant engineers where necessary to support its methodology and complete the services. These personnel shall supplement the required Key Experts and Non-Key Experts, with clearly defined responsibilities and inputs.

Assistant engineers shall have at least five (5) years of relevant professional experience.

The Technical Proposal shall identify the qualifications, relevant experience, responsibilities, and estimated inputs of additional personnel.

The Consultant shall also provide adequate home-office technical and managerial support throughout the

assignment, including access to specialist expertise and internal technical review resources.

7.6 Conduct of the Work and Consultant's Resources

The Consultant shall:

- Provide overall technical, administrative, and contractual management of the services;
- Designate the Project Manager / Team Leader as the principal contact with the Client and nominate a suitably qualified deputy to act during the Team Leader's absence;
- Establish clear arrangements for coordination among all participating firms and experts;
- Implement and document quality assurance and quality control procedures, including internal technical checks by personnel other than the original preparers, as appropriate;
- Maintain a coordinated work programme, deliverables register, and record of review comments and responses;
- Provide the offices, equipment, computers, licensed software, vehicles, and other resources necessary to perform the services, except those expressly identified as Client-provided;
- Work closely with the Client's designated personnel and coordinate with other consultants engaged on related project activities; and
- Ensure consistency among the feasibility assessments, models, designs, cost estimates, permitting documentation, dam safety instruments, and bidding documentation for both phases.

7.7 Information and Support to Be Provided by the Client

The Client shall provide or facilitate the following:

- **Available project documentation:** Existing studies, designs, reports, and other relevant information in the Client's possession.
- **Access to additional information:** Assistance in obtaining relevant data from government agencies and other institutions, including numerical data, maps, plans, and policy documents.
- **Site access:** Facilitation of access to project sites and other areas required for the assignment, including coordination with relevant authorities, landholders, communities, and other rights holders to obtain necessary access permissions.
- **Stakeholder coordination:** Assistance in arranging meetings with government agencies, utilities, project stakeholders, and other relevant organizations.

The Consultant shall identify its information, access, and coordination needs sufficiently in advance and promptly notify the Client of any gaps or constraints affecting the work program.

8. Reports and Deliverables

8.1 General Requirements

The Consultant shall provide all reports, technical documentation, designs, analyses, models, drawings, specifications, schedules, and supporting materials necessary to achieve the objectives of these Terms of Reference and to support preparation of a World Bank-financed operation.

Each principal deliverable shall be submitted in draft and final form and shall include, as applicable:

- executive summary;
- quality assurance and quality control certificate;
- document register and revision history;
- assumptions register;

- risk register;
- interface register;
- comment-response matrix;
- editable source files;
- supporting calculations;
- models and databases;
- GIS data and metadata;
- drawings and specifications;
- evidence of internal interdisciplinary review; and
- any supporting documentation required under these Terms of Reference.

All technical conclusions shall be traceable to source data, investigations, calculations, analyses, assumptions, models, surveys, or field verification activities.

Draft and final submissions shall be provided in searchable PDF format together with complete editable native files, including Word, Excel, GIS, CAD, schedules, calculations, databases, models, and source data.

Acceptance shall be provided in writing by the Client. Acceptance shall not be inferred from the passage of time, partial use of a deliverable, interim payment, or commencement of downstream activities.

The Consultant shall ensure consistency among all deliverables and shall maintain alignment of assumptions, hydrological analyses, environmental and social requirements, economic and financial analyses, implementation schedules, procurement arrangements, quantities, costs, and design parameters throughout the assignment.

The table below shall not limit the Consultant's obligation to prepare any additional outputs reasonably required to support project preparation process within the scope of this assignment.

The Consultant shall prepare a Climate Risk and Resilience Assessment consistent with applicable World Bank climate-screening requirements. The assessment shall evaluate climate variability, drought risk, changing hydrological patterns, temperature impacts, irrigation water-demand changes, hydropower generation impacts, reservoir operating resilience, and infrastructure vulnerability. The assessment shall identify adaptation measures and demonstrate how climate resilience considerations are incorporated into alternative selection, final designs, implementation planning, and economic analysis. Supplementary deliverable schedule: the requirements for the following cross-cutting outputs apply to both components and are integral to D1–D6 and G1–G6. D1 (Month 1) shall confirm methodologies, responsibilities, data needs and the detailed submission and review program. D2 (Month 3) shall include the dam-safety review and gap assessment, initial remedial-measures program, initial Financing Readiness Report, and draft jobs contribution assessment and results-measurement framework. D3 (Month 5) shall include draft CSQAP, IP, O&MP and EPP. G4 (Month 7) shall review revised drafts of all four dam-safety plans, the consolidated draft Financing Readiness Report and updated draft jobs assessment and framework. Final versions of all these outputs shall accompany D4 and D5 (Month 9), with the EPP tabletop exercise completed and its findings incorporated before finalization, as required by Section 6.7. D6 (Month 10) shall contain the final controlled set and the financing-readiness completion update reflecting permits issued and any accepted subsequent changes. All drafts shall be submitted early enough for the review and acceptance process under Section 9.2; all dates are subject to the commencement-date provisions of Section 9.

The Consultant shall prepare a Financing Readiness Report demonstrating the readiness of the preferred investment package for World Bank appraisal and implementation. The report shall consolidate findings from updated feasibility study, environmental and social assessments, dam safety review, OP 7.50 technical package, economic and financial analysis, implementation arrangements, permitting status, land requirements, and institutional assessments. The report shall identify remaining actions, responsible parties, timelines, and risks requiring resolution prior to financing approval or commencement of procurement. An initial version shall form part of D2, a consolidated draft shall be reviewed at G4, the

final report shall accompany D4 and D5, and the completion-status update shall form part of D6, as detailed below.

Gate	Target	Decision
G1	Month 1	Acceptance of the Inception Report, diagnostic review, gap analysis, data basis, investigation program, and detailed ten-month work program.
G2	Month 3	Acceptance of the integrated feasibility study and recommendation of the preferred hydropower and irrigation options, supported by the hydrology, water balance and system operations report; climate risk and resilience assessment; and Existing Assets Verification and HPP B Audit Report.
G3	Month 5	Acceptance of the draft detailed designs for both hydropower and irrigation as the basis for stakeholder consultation and coordinated technical review.
G4	Month 7	Acceptance of the coordinated detailed designs and readiness review for both Phase 2 Irrigation and Phase 3 Hydropower, including advanced multidisciplinary designs, updated cost estimates and implementation schedules, resolution of key technical interfaces, progress on statutory and permitting documentation, and substantially developed technical components of the bidding packages. The review shall also cover the revised draft dam-safety instruments, a consolidated draft Financing Readiness Report, and the updated draft jobs contribution assessment and results-measurement framework.
G5	Month 9	Acceptance of the complete, coordinated final detailed designs, associated technical assessments and studies, and finalized technical components of the bidding packages for both Phase 2 irrigation and Phase 3 hydropower. Confirmation that complete construction permit applications and supporting documentation for both phases have been submitted no later than this milestone. Permitting shall have commenced earlier in accordance with the approved permitting program wherever required to secure the construction permits by G6.
G6	Month 10	Acceptance of the consolidated final assignment package for both phases, incorporating all resolved review comments, finalized and coordinated design documentation, editable files, technical models, databases, and completion records. Completion of the required permitting procedures, including issuance of the construction permits for Phase 3 Hydropower and Phase 2 Irrigation.

No.	Deliverable	Due date for final version	Minimum acceptance criteria
D1	Inception Report, Diagnostic Review and Gap Analysis Report	Month 1	Confirmed methodology; detailed ten-month work program; staffing and mobilization plan; Master Document Register; diagnostic review of existing studies, designs, permits, procurement documents, datasets, models, and operating records; classification of information suitable for retention, verification, update, replacement, or further investigation; gap analysis; data-collection and validation plan; investigation program; legal, permit, codes and standards registers; environmental and social coordination arrangements; quality-assurance procedures; review gates; decision schedule; risk register; and critical-path actions. The program shall include draft, review and final dates for the dam-safety instruments, Financing Readiness Report, and jobs contribution assessment and results-measurement framework, in accordance with the supplementary deliverable schedule below.

No.	Deliverable	Due date for final version	Minimum acceptance criteria
D2	Integrated Feasibility Study, Alternatives Assessment and Preferred Option Recommendation Package Including: Hydrology, Water Balance and System Operations Report; Climate Risk and Resilience Assessment; and Existing Assets Verification and HPP B Audit Report.	Month 3	Integrated and internally consistent feasibility assessment for hydropower and irrigation; updated hydrological database and models; water balance, reservoir-operation and water-allocation simulations; climate and drought analysis; ecological-flow assessment; verified demand projections; assessment of viable alternatives; multicriteria, technical, economic, financial, environmental and social, land, constructability, operational, and implementation comparisons; verification of Phase 1 assets and HPP B performance, condition, safety, environmental-flow and SCADA interfaces; updated costs and implementation schedule; OP 7.50 technical assessment at feasibility level; and clear recommendation of the preferred options and implementation sequencing.
D3	Draft Detailed Designs for Hydropower and Irrigation — Pre-Stakeholder Consultation	Month 5	Coordinated draft detailed designs for both components, including confirmed design bases; principal calculations; layouts, profiles and drawings; equipment and technical schedules; preliminary quantities and cost estimates; land and interface requirements; constructability and implementation considerations; environmental and social design inputs; identified mitigation measures; draft technical specifications; and a consultation-ready description of the proposed works and alternatives resolved since feasibility. The submission shall identify outstanding decisions and matters to be addressed through stakeholder consultation and technical review.
D4	Final Hydropower Detailed Design and Associated Technical Package	Month 9	Construction-ready final hydropower detailed design incorporating accepted review and consultation outcomes; final civil, hydromechanical, mechanical, electrical, control, SCADA, grid-connection, geotechnical, access, and interface documentation; final calculations, drawings, specifications, bills of quantities, price and technical schedules, performance and testing requirements, cost estimates, and implementation schedule; updated economic and financial analysis for hydropower; final relevant climate, OP 7.50, dam-safety, land, environmental and social technical inputs; HPP B remedial or compliance designs where accepted; statutory design and permit-support documentation; and complete technical components for the hydropower bidding package. D4 and D5 shall be developed concurrently, coordinated through common technical interfaces, and submitted as parallel final deliverables of equal priority.
D5	Final Irrigation Detailed Design and Associated	Month 9	Construction-ready final irrigation detailed design incorporating accepted review and consultation

No.	Deliverable	Due date for final version	Minimum acceptance criteria
	Technical Package		outcomes; final hydraulic, civil, geotechnical, control, SCADA, access, drainage, land, and interface documentation; final calculations, drawings, specifications, bills of quantities, price and technical schedules, performance and testing requirements, cost estimates, and implementation schedule; final agricultural, socio-economic, institutional, operation and maintenance, economic and financial, climate-resilience, water-demand, land, environmental and social, and OP 7.50 technical assessments relevant to irrigation; statutory design and permit-support documentation; and complete technical components for the irrigation bidding package. D4 and D5 shall be developed concurrently, coordinated through common technical interfaces, and submitted as parallel final deliverables of equal priority.
D6	Consolidated Final Assignment Package and Completion Report	Month 10	All accepted reports, designs, assessments, studies, technical bidding-package components, drawings, specifications, bills of quantities, calculations, models, databases, GIS and CAD files, cost estimates, schedules, registers, and source data in final signed PDF and editable formats; consolidated comment-response matrices; confirmation of interdisciplinary consistency; financing- and implementation-readiness summary; outstanding-action register identifying responsibilities and deadlines; and final handover of the complete controlled document set. D6 shall include the issued construction permits and prerequisite approvals for both phases, the Financing Readiness Report, the dam-safety instruments and jobs framework.

The Consultant will prepare and deliver the following reports to the Client and the Bank:

1. Inception Report

The Consultant shall submit the Inception Report within four weeks of the Commencement Date. It shall confirm the methodology, team, program, document register, data requests, investigations, decision gates, QA/QC system, risks, environmental/social pathway and applicable World Bank procurement framework.

The Inception Report shall detail the activity, draft-submission, review and decision dates within the approved program. Any proposed adjustment shall comply with Section 9 and shall not amend contractual milestones or the completion date merely by acceptance of the report.

2. Monthly Progress Reports

The Consultant shall submit Monthly Progress Reports within seven (7) calendar days after the end of each reporting month.

Each report shall include:

- progress against the approved work program;

- progress against review gates;
- progress against deliverables;
- investigations completed;
- staffing status;
- key findings;
- critical risks and mitigation measures;
- decisions required from the Client;
- matters requiring World Bank review or guidance;
- activities planned for the next reporting period.

3. Interim Technical Review Reports

The Consultant shall prepare Interim Technical Review Reports at key decision points during the assignment. The purpose of these reports is to present preliminary findings, identify critical decisions requiring Client guidance, support World Bank review processes, and obtain authorization to proceed through the formal review gates defined in Section 9.

Interim Technical Review Reports shall be submitted whenever:

- significant technical findings may affect the preferred solution, project scope, costs, schedule, procurement strategy, environmental and social requirements, financing readiness, or implementation arrangements;
- completion of a review gate requires Client and World Bank consideration before proceeding to the next stage;
- additional investigations, studies, analyses, or design modifications are proposed that may materially affect the Project;
- alternative solutions require comparison and selection;
- unforeseen technical, environmental, social, institutional, legal, hydrological, geotechnical, economic, financial, permitting, procurement, or implementation issues are identified; or
- the Client reasonably requests an interim review of a specific component of the services.

Each Interim Technical Review Report shall include, as applicable:

- summary of work completed since the previous submission;
- key findings and conclusions;
- status of investigations, surveys, modelling, analyses, and studies;
- identified risks, assumptions, constraints, and unresolved issues;
- implications for project scope, costs, implementation schedule, procurement strategy, permitting, environmental and social requirements, financing readiness, and operation of the system;
- alternative solutions considered and preliminary recommendations;
- decisions required from the Client and, where applicable, matters requiring World Bank review or guidance;

- proposed actions and work program for the next stage of the assignment.

Where requested by the Client, the Consultant shall present the findings of Interim Technical Review Reports at coordination meetings, technical workshops, or review sessions involving the Client, relevant stakeholders, and the World Bank.

Submission of an Interim Technical Review Report shall not constitute acceptance of the related work. Formal acceptance shall occur only through the review and authorization procedures defined in Sections 9 and 12.

8.2 Draft and Final Submission Requirements

All principal deliverables identified in Section 8 shall be submitted in draft and final form and shall be subject to the review and authorization process described in Section 9.

Submission of draft deliverables shall be sufficiently early to allow review by the PIU, PE HS Zletovica, the World Bank (where applicable), and other designated stakeholders.

The Consultant shall maintain a Comment Response Matrix throughout the assignment and shall submit an updated matrix with each revised deliverable.

9. Schedule and Submission Requirements

The assignment shall be completed within a period of ten (10) months from the Commencement Date, and no later than December 20, 2027, whichever occurs earlier, unless amended in accordance with the Contract. The Month 1 to Month 10 milestones in Sections 5, 6, 8 and 9 are measured from the Commencement Date and describe the baseline ten-month program. If commencement occurs after 20 February 2027, the Consultant shall submit a compressed, resource-loaded program with proposed calendar dates for all deliverables, review gates and permit submissions for the Client's written approval at inception. The program shall preserve parallel preparation of both phases, the full scope and acceptance requirements, and adequate time for technical, statutory and World Bank reviews. Any inability to achieve these requirements within the remaining period shall be promptly notified to the Client and addressed through the Contract's change-control provisions; neither the scope nor the final completion date shall change automatically.

The Consultant shall organize the services as overlapping and coordinated workstreams in accordance with the implementation approach described in Section 5 and the deliverables defined in Section 8. The program shall be managed through formal review gates linked to the principal deliverables and the coordinated interim design and readiness review for both components.

The Consultant shall maintain a detailed program identifying critical-path activities, investigations, stakeholder consultations, design reviews, permitting support activities, procurement support activities, World Bank review requirements, and delivery milestones.

Progression beyond a review gate shall require written authorization from the Client following completion of the applicable review process.

9.1 Deliverables and Review Gates

Gate	Deliverable	Target Submission
G1	D1 – Inception Report, Diagnostic Review and Gap Analysis Report	Month 1
G2	D2 – Integrated Feasibility Study, Alternatives Assessment and Preferred Option Recommendation Package	Month 3
G3	D3 – Draft Detailed Designs for Hydropower and Irrigation (Pre-Stakeholder Consultation)	Month 5

Gate	Deliverable	Target Submission
G4	Coordinated Interim Design and Readiness Review for Phase 2 and Phase 3	Month 7
G5	D4 and D5 – Final Detailed Designs and Associated Technical Packages for Phase 2 Irrigation and Phase 3 Hydropower.	Month 9
G6	D6 – Consolidated Final Assignment Package and Completion Report	Month 10

9.2 Review Process and Comment Resolution

The following periods shall be used for program planning, subject to confirmation of the applicable World Bank review arrangements. PIU and PE HS Zletovica reviews shall run concurrently from receipt of the same complete submission. PE HS Zletovica's 5-working-day review shall fall within the PIU's ten-working-day review and comment-consolidation window. Where World Bank review is required, it shall follow the concurrent PIU and PE HS Zletovica reviews. An indicative allowance of seven (7) working days shall be included for program planning, subject to confirmation with the World Bank. Where additional sequential or longer review is required, it shall be expressly identified and allowed for in the approved program:

Reviewing Party	Review Period
PIU review and consolidation of comments	10 working days
PE HS Zletovica review	5 working days
World Bank review (where applicable)	7 working days (indicative; following the concurrent PIU and PE HS Zletovica reviews)
Consultant response and resubmission	5 working days

The PIU shall consolidate comments from PE HS Zletovica, the Ministry, the World Bank, and other designated stakeholders into a single consolidated Comment Response Matrix. A Dam Safety Panel may be appointed to review all deliverables related to dam safety. The Consultant's five-working-day response and resubmission period shall start upon receipt of the consolidated comments. The review-and-response allowance shall therefore be 10 working days, comprising ten (10) working days for concurrent PIU and PE HS Zletovica review in parallel with World Bank and Panel of experts as appropriate, and five (5) working days for the Consultant's response and resubmission. These allowances exclude any additional verification or review cycles. The program shall also allow time for verification of revisions, written acceptance and further review cycles where necessary. Draft submissions shall be scheduled sufficiently before each final deliverable and gate deadline to accommodate the complete review process; the dates in Sections 8 and 9 are deadlines for accepted deliverables and gate decisions, not for first drafts, except D3, which is acceptance of the consultation-stage draft design. No acceptance shall be inferred from expiry of a review period.

However, during the inception phase, review process will be discussed and agreed upon with client, PIU and PEHS Zletovica.

The Consultant shall respond to all comments received and shall identify:

- comment number;
- source of comment;
- action taken;
- location of revision;
- justification where a comment is not incorporated.

Submission of revised deliverables shall include an updated Comment Response Matrix.

9.3 Gate Authorization Requirements

G1 – Inception Authorization (Month 1)

Acceptance Basis:

- D1 accepted;
- methodology approved;
- work program approved;
- investigation program approved;
- project registers established.

Authorization:

- proceed with investigations, modelling and feasibility analyses.

G2 – Feasibility Authorization (Month 3)

Acceptance Basis:

- D2 accepted;
- hydrological basis confirmed;
- climate-risk assessment completed;
- existing asset verification completed;
- preferred options recommended.

Authorization:

- proceed with detailed design development.

G3 – Stakeholder Consultation Authorization (Month 5)

Acceptance Basis:

- D3 accepted;
- draft detailed designs suitable for stakeholder consultation and technical review;
- principal design assumptions confirmed.

Authorization:

- proceed with final detailed design.

G4 – Coordinated Interim Design and Readiness Review (Month 7)

Acceptance Basis:

- advanced designs for Phase 2 irrigation and Phase 3 hydropower reviewed;
- principal technical and operational interfaces resolved;
- updated costs, implementation schedules, and progress on technical bidding-package components reviewed;
- outstanding decisions and permitting actions for both components identified and initiated.

Authorization:

- proceed concurrently with finalization of the detailed designs and technical bidding packages for both components.

G5 – Final Design Authorization for Phase 2 and Phase 3 (Month 9)

Acceptance Basis:

- D4 and D5 accepted;
- final detailed designs for both components completed;
- technical bidding-package components for both components completed;
- Complete construction permit applications and supporting documentation for both phases submitted no later than G5, with evidence of submission and an updated action register demonstrating progress towards permit issuance by G6; earlier submissions shall follow the approved permitting program.

Authorization:

- proceed with procurement and financing-readiness activities for both components, subject to the Client's and the World Bank's decision on implementation sequencing.

G6 – Assignment Completion Authorization (Month 10)**Acceptance Basis:**

- D6 accepted;
- all comments resolved;
- final models and databases delivered;
- editable documentation delivered;
- construction permits and prerequisite approvals issued for both Phase 2 Irrigation and Phase 3 Hydropower;
- Completion Report accepted.

Authorization:

- assignment completed.

The deliverable deadlines and review gates in Sections 8 and 9 are baseline contractual milestones, subject to the commencement-date adjustment expressly provided in Section 9. The Inception Report shall confirm their calendar dates and the supporting activity and draft-submission schedule after verification of data availability, seasonal investigations, site access and review periods. Supporting activity dates may be adjusted with the Client's written approval provided that the approved deliverable and gate dates, parallel preparation of both phases, full scope and acceptance requirements are maintained. Changes to contractual milestones or the final completion date require approval through the Contract's applicable change-control procedures and any required World Bank review. Acceptance of the Inception Report alone shall not extend the contractual completion date.

10. Document-Control and Coding System**10.1 Technical-Documentation Coding System**

The Consultant will deliver a documentation marking system which is prepared in accordance with the Contract on Consultant Services to the Client for his/her approval. The system must contain the following identification data:

1. Name of the Project
2. Name of the Client
3. Documentation phase
4. Document title
5. Place (number of Book, Volume, Part, etc.) of the document in the general contents of the documentation

6. Contract holder
7. Person preparing the documentation
8. Competent engineer
9. Elaboration date
10. Number of document audit

For the graphical documentation (drawings, maps, etc.), besides the given data, the following systems will be additionally applied:

- Drawing title,
- Numeric marking.

The planned manner should provide: uniformity, clarity, comprehensibility and chronology in the documentation marking. The markings must be analogous and easy to compare in English and Macedonian and in both alphabets (Latin and Cyrillic)

10.2 Correspondence Coding System

The Consultant will provide for and deliver special system for documentation marking to the Client for his/her approval with which written communication is performed with the Client.

- Letters
- Reports
- Minutes
- and other forms of correspondence

11. Consultant's Quality Assurance and Quality Control

Every technical conclusion shall be traceable to controlled data, assumptions, calculations, model outputs or drawings.

Hydrology and economic/financial models shall be delivered in editable form with visible formulas, sources and version control.

Independent interdisciplinary checks shall verify quantities, costs, hydraulic/electrical interfaces, environmental/social requirements and consistency between the Feasibility Study, Basic Designs and bidding documents.

The Consultant shall maintain assumption, risk, interface and comment-response registers throughout the assignment.

Prior to submission of any Draft Final Detailed Design, the Consultant shall undertake an independent interdisciplinary design review performed by qualified senior professionals who were not directly involved in preparation of the design under review. The review shall assess technical adequacy, consistency among disciplines, constructability, operability, maintainability, compliance with applicable laws and standards, environmental and social integration, safety, hydraulic performance, geotechnical assumptions, cost estimates, quantities, procurement implications, and implementation risks. The Consultant shall submit a Design Review Report summarizing findings, corrective actions, and confirmation that all identified issues have been addressed prior to submission.

11.1 Quality-Assurance System

The Consultant shall have an established quality management system. Certification to ISO 9001 or an equivalent standard shall be considered an advantage.

The Consultant should submit certification evidence according to the abovementioned standards, or, eventually standards equivalent to the abovementioned ones.

11.2 Consultant's Quality-Control System

The Consultant will provide his/her own system for control of the service which he/she is performing, designating members of his/her team which are competent for this function. The Consultant will deliver in written form the list of members of his/her expert team competent for quality control to the Client for his/her approval.

The purpose of the system for quality control by the Consultant is to confirm that the following requirements have been met:

- the services have been performed in accordance with these Terms of Reference and the Contract,
- technical and accounting control has been performed of the materials which are delivered for an inspection to the Client,
- harmonization has been performed of certain parts of the technical documentation,
- the documentation has been duly verified and signed,
- the agreed terms of delivery of certain parts of the technical documentation have been met,
- other obligations of the Consultant have been performed which are arising out of this Terms of Reference.

The purpose of the Consultant's quality-control system is to ensure the efficient, complete and timely delivery of the agreed services.

Each submission shall identify the competent expert who performed the internal quality-control review and shall include evidence that the review has been completed.

12. Client Review and Coordination

12.1 Client Review and Control System

The Client may review any deliverable, report, design, study, model, calculation, drawing, specification, schedule, or other output prepared under this assignment.

The Client may obtain support from the PIU, PE HS Zletovica, the World Bank, and independent technical specialists appointed by the Client.

The Consultant shall address comments received through the review process described in Section 9.

Review, comments, acceptance, or authorization by the Client shall not relieve the Consultant of responsibility for the quality, accuracy, completeness, coordination, constructability, fitness for purpose, or compliance of the services.

12.2 Access to Information

The Consultant shall provide the Client with reasonable access to information relating to the progress of the services, including supporting analyses, calculations, models, drawings, schedules, and other working materials relevant to the assignment.

12.3 Coordination Meetings

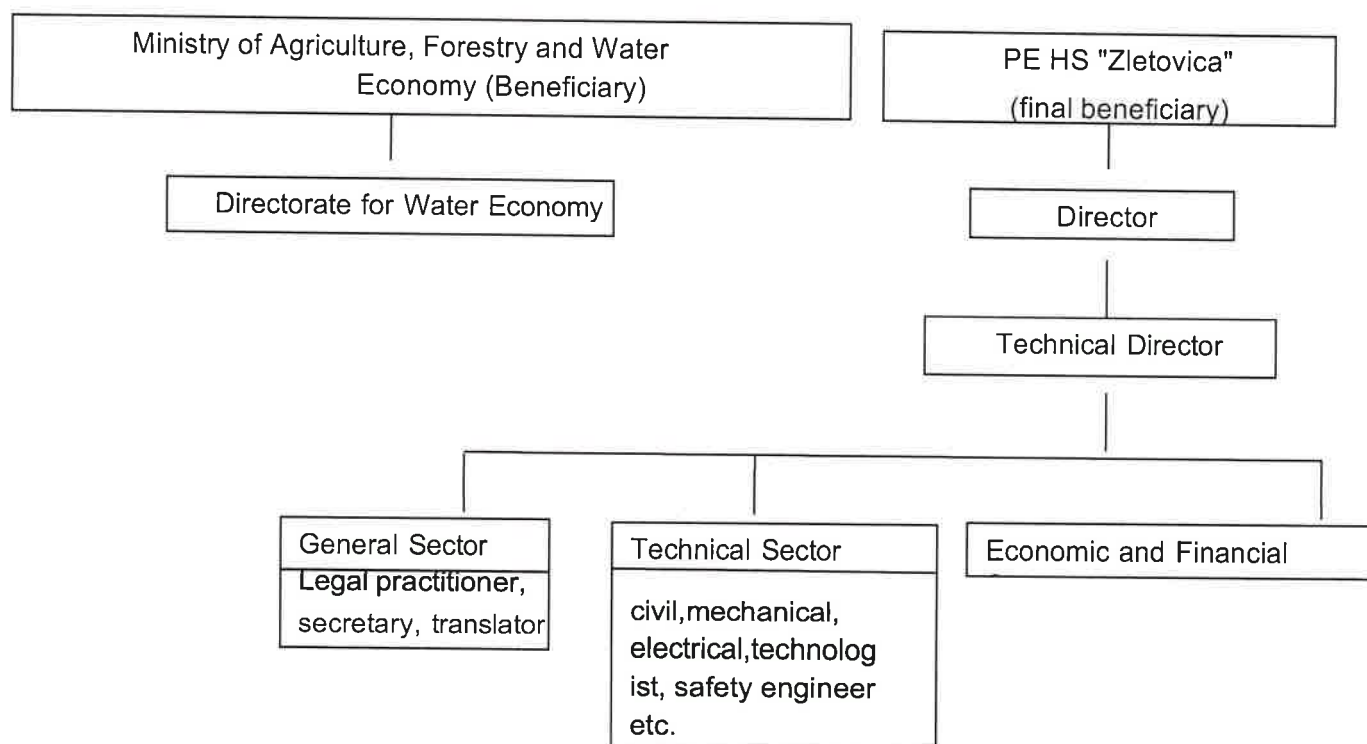
The Consultant shall participate in coordination meetings requested by the Client and shall provide appropriate technical representation.

Meeting discussions, comments, or recommendations shall not constitute formal acceptance of deliverables, which shall occur only through the procedures defined in Section 9.

13. Client Organization and Technical Arrangements

The Consultant shall organize the assignment as an integrated technical, economic/financial and procurement workflow using common controlled assumptions. Procurement-document preparation shall remain downstream of the accepted feasibility, preferred-option, environmental/social, economic-financial and Basic Design outputs.

Organizational structure for the realization of the project for selection of Consultancy Services for preparation of technical documentation for phase 2 and 3 of the project HS "Zletovica"



Technical setup:

- Ownership-terrain vehicles
- Possession of computer equipment

Final provision: The assignment shall be considered complete only when the accepted revised Feasibility Study, confirmed or newly selected preferred option, required design documentation, environmental and social instruments, integral economic and financial analysis and updated bidding documents form a coherent, auditable and internally consistent basis for an informed investment and procurement decision. Acceptance of the assignment shall not constitute an obligation to construct any component that has not been demonstrated to be feasible.

Annex A – Project Background, Existing Assets, and Historical Scheme Description

This annex consolidates the historical information needed to interpret the assignment. It is not a design basis and does not establish binding capacities, layouts, costs, operating rules, or investment decisions. The Consultant shall verify all information against the original source documents, as-built records, current surveys and investigations, operating data, updated hydrology and water demands, applicable permits, and current legal and World Bank requirements. Where historical sources conflict, the Consultant shall document the discrepancy in the Master Document Register and establish the value or arrangement to be used.

Annex A.1 Development of the Multipurpose Scheme

The Zletovica Hydro-System was conceived as an integrated, multipurpose scheme for water supply, ecological releases, irrigation, and hydropower generation in northeastern North Macedonia. Development was organized in three phases: Phase 1 for Knezhevo Dam and the principal water-supply system; Phase 2 for irrigation development in the Probishtip and Kratovo areas; and Phase 3 for hydropower generation using releases and conveyance flows remaining after priority water uses are met. The operating concept gives first priority to drinking-water supply, followed by the approved ecological-flow regime and irrigation, with hydropower generated from residual water only.

Historical planning and design work spans several decades. The principal sources include early system optimization and hydropower studies, irrigation designs for the upper and lower command areas, water-management and optimal-use studies, the 2009 irrigation and small-hydropower preliminary designs, and the integrated feasibility, environmental, economic, and procurement work prepared during 2013–2014. Annex B lists the available documentation. The historical studies provide a substantial feasibility-level baseline but require reconciliation and updating before they can support current investment, permitting, procurement, or construction decisions.

Annex A.2 Existing Phase 1 Assets

Phase 1 was completed in 2011 and established the core storage and water-supply infrastructure on which the proposed Phase 2 and Phase 3 investments depend. The principal assets include Knezhevo Dam and Reservoir; the spillway, outlets, appurtenant structures, and access facilities; the Kucheshka diversion or inlet works; the principal raw-water conveyance system; municipal water-supply intakes and pipelines; associated valve, control, measurement, and protection structures; and the central control and SCADA system. Hydropower Plant B, located at or near the dam outlet and using releases associated with the environmental-flow requirement, has also been constructed and is operational.

Table A.1. Historical summary of principal Phase 1 assets

Asset group	Historical function and description	Verification required under the assignment
Knezhevo Dam and Reservoir	Principal storage and regulation facility for the multipurpose system.	As-built condition, safety status, operating limits, storage-elevation relationship, outlet and spillway capacity, instrumentation, remaining service life, and interfaces with proposed works.
Water-supply conveyance facilities	Existing intakes, pipelines, control structures, and associated infrastructure serving municipal systems.	Condition, hydraulic capacity, actual demand and operating data, losses, pressure constraints, reliability, and compatibility with proposed irrigation and hydropower offtakes.
HPP B	Operational plant using releases at the dam outlet, historically associated with ecological-flow releases.	As-built configuration, performance, generation, turbine operating range, safety, ecological-flow arrangements, O&M, defects, remaining life, and hydraulic, electrical, grid, and SCADA interfaces.
SCADA and control systems	Monitoring and control infrastructure for the existing system.	Architecture, functionality, communications, cybersecurity, expandability, data availability, ownership, and interfaces with proposed Phase 2 and Phase 3 systems.

Annex A.3 Historical Phase 2 Irrigation Concept

The historical Phase 2 concept comprised pressurized, predominantly gravity-fed irrigation systems in the municipalities of Probishtip and Kratovo. The 2013 feasibility work reported an indicative total command area of approximately 4,509 ha, of which about 3,552 ha was associated with the Probishtip system and about 957 ha with the Kratovo subsystem. These areas are historical planning figures and shall be tested against updated water availability, irrigable and economically viable land, farmer demand, land tenure, environmental and social constraints, service standards, and implementation feasibility.

Table A.2. Historical Phase 2 irrigation configuration

Subsystem	Historical concept	Indicative historical parameter
Probishtip upper zone	Gravity-fed pressurized system supplied from an intake or water chamber associated with the upper system and the proposed Zletovo 3 arrangement.	Approximately 2,300 ha; historical intake elevation about 622 m above sea level.
Probishtip lower zone	Pressurized system supplied from the existing downstream intake, historically identified as Intake No. 3, with an interface to the Štip/Sveti Nikole water-supply system.	Approximately 1,252 ha.
Kratovo subsystem	Separate irrigation system involving an intake, conveyance and filtration facilities, distribution networks, use of existing small reservoirs, and possible new storage structures.	Approximately 957 ha; storage configuration varied among historical alternatives.
Distribution and control	Main conveyance pipelines, distribution networks, hydrants, filtration, pressure control, automation, measurement, access, drainage, and associated works.	Historical documentation referred to approximately 131 km of distribution network for the Probishtip system.

Annex A.3.1 Historical Kratovo Alternatives

The Probishtip concept remained broadly common across the historical alternatives. The main differences concerned the storage configuration serving Kratovo. The feasibility documentation compared combinations of the Markovci, Gorno Gradište, Sakulica, and Povichnica reservoirs or dams. The reported alternatives were: Alternative I—Markovci, Gorno Gradište, and Povichnica; Alternative II—Sakulica and Povichnica; and Alternative III—Markovci, Sakulica, and Povichnica. Alternative III was reported as the preferred option because it combined the lowest estimated capital cost among the compared alternatives, the highest reported financial indicators, and greater operating flexibility through multiple reservoirs.

Table A.3. Reported historical irrigation indicators

Indicator	Reported value for the selected historical concept	Status
Total command area	Approximately 4,509 ha	To be verified and optimized.
Estimated investment cost	Approximately EUR 35.1 million in 2013 prices	Historical only; requires complete current-cost redevelopment.
Reported financial internal rate of return	Approximately 6.01 percent	Historical only; methodology and assumptions require verification.
Reported net present value	Approximately EUR 2.18 million	Historical only; discount rate, price basis, benefits, and costs require updating.

Annex A.4 Historical Phase 3 Hydropower Concept

The historical Phase 3 concept comprised a cascade of small hydropower plants using releases from Knezhevo Reservoir, tributary inflows, and water conveyed for priority water users. The principal proposed plants were Zletovo 1, Zletovo 2, and Zletovo 3, supplemented by smaller installations on the Probishtip and Kratovo water-supply pipelines. HPP B was treated as an existing operational asset. The studies compared alternative cascade layouts and Francis and Pelton turbine arrangements. The preferred historical configuration was identified as Alternative 3 using Francis turbines.

Table A.4. Historical Phase 3 configuration and reported parameters

Plant or installation	Historical configuration	Reported reference parameter
HPP B	Existing plant at the dam outlet using releases associated with the ecological-flow requirement.	Operational asset; to be audited rather than redeveloped, except for accepted remedial or interface measures.
Zletovo 1 HPP	Supplied through pressure pipelines from Knezhevo Reservoir and the Emirichka and Venechka tributaries.	Historical selected design flow approximately 2.10 m ³ /s.
Zletovo 2 HPP	Historical concept included intake works, a free-flow conduit or pipeline and tunnel, forebay, steel penstock, and powerhouse.	Historical selected design flow approximately 2.40 m ³ /s.
Zletovo 3 HPP	Historical concept included a long pressure pipeline and an irrigation offtake serving the upper Probishtip zone.	Historical selected design flow approximately 1.80 m ³ /s.
Probishtip and Kratovo units	Small turbine installations considered on municipal water-supply pipelines, subject to priority water-supply and pressure-management requirements.	Configuration and economic viability to be reassessed.

Table A.5. Reported historical hydropower indicators

Indicator	Reported value for Alternative 3 with Francis turbines	Status
Total installed capacity	Approximately 9.8 MW	Historical only; plant-by-plant capacity shall be re-optimized.
Average annual generation	Approximately 49.5 GWh	Historical only; reported values differ among sources and require reconciliation.
Estimated investment cost	Approximately EUR 23.7 million in 2014 prices	Historical only; quantities, prices, contingencies, grid, land, environmental and social, and implementation costs require updating.
Reported internal rate of return	Approximately 14.48 percent	Historical only; tariff, generation, cost, financing, and tax assumptions require verification.
Reported payback period	Approximately eight years	Historical only.
Reported net present value	Approximately EUR 19.95 million	Historical only; methodology and price basis require verification.

Annex A.5 Historical Integrated Operating Concept

The historical studies modelled the system as an integrated reservoir and conveyance network. Drinking-water demand was assigned first priority, followed by an environmental or ecological release and irrigation demand. Hydropower production was calculated from the residual flows passing through the retained plant locations. The studies used historical hydrological series, daily simulation, historical municipal demand projections, command-area and crop-water assumptions, and fixed reliability criteria. All such inputs and criteria are reference information only.

Annex A.6 Basis of the Historical Alternatives Assessment

The historical feasibility work compared alternatives using technical feasibility, water availability, energy production, capital and operating cost, economic and financial indicators, environmental considerations, and implementation factors. It also optimized selected flows, pipeline diameters, hydraulic layouts, and turbine types. The level and consistency of analysis differed by component and alternative. The Consultant shall therefore reconstruct the comparison framework using current and consistently applied criteria and shall not rely solely on previously reported rankings or indicators.

Annex A.7 Known Limitations and Matters Requiring Reconciliation

- The principal feasibility and economic analyses date from 2013–2014 and use earlier hydrological, survey, design, agricultural, market, demographic, tariff, and cost information.
- Historical designs and technical descriptions may not consistently reflect the final as-built condition of Phase 1 assets, HPP B, water-supply pipelines, and SCADA systems.
- Different documents report different Kratovo storage configurations and may not use consistent names, capacities, or implementation assumptions.
- Reported hydropower production, installed capacity, costs, and financial indicators vary among documents and shall be reconciled at plant and system level.
- The historical environmental-flow assumptions, including any fixed percentage or flow, may not satisfy current ecological, permit, national, or World Bank requirements.
- The historical command areas and irrigation demands may exceed or differ from the currently irrigable, economically viable, and realistically serviceable areas.
- Historical price levels, contingencies, land costs, environmental and social mitigation costs, grid requirements, financing terms, taxes, tariffs, and implementation schedules are not suitable for current appraisal without updating.
- Prior documentation identified the need for additional geotechnical and other investigations at later design stages.
- The regulatory, permitting, procurement, environmental and social, dam-safety, climate-resilience, OP 7.50, and jobs-reporting requirements applicable to the present assignment were not all reflected in the historical studies.

Annex A.8 Use of Annex A During the Assignment

During inception, the Consultant shall link each historical value, layout, and conclusion in this annex to its source document in the Master Document Register. The Diagnostic Review and Gap-Analysis Report shall identify whether each item is retained, verified, updated, supplemented, or replaced. The accepted feasibility study shall provide the definitive current description of the system and preferred investments. If material discrepancies are identified between this annex and the source documentation, the source documentation and the Consultant's verified analysis shall prevail, subject to the Client's written acceptance.

Annex B – Available Documentation and Data

This annex provides the initial inventory of documentation and data expected to be available at commencement. It is not exhaustive and does not confirm that any item is complete, current, accurate, internally consistent, approved, or suitable for reuse. During inception, the Consultant shall obtain the available source files and record each item in the Master Document Register, including its title, date, revision, approval status, language, format, custodian, spatial and temporal coverage, and known limitations. The Consultant shall classify each item as suitable for retention, requiring verification, requiring update or supplementation, requiring replacement, or unsuitable for current decision-making.

Table B.1. Initial inventory and required treatment

Reference group	Available material	Required treatment in line with the TOR scope and objectives
B1	Feasibility studies, optimization studies, and alternatives assessments for the integrated scheme, irrigation, and hydropower components.	Reconstruct the historical decision basis and verify the source data, assumptions, methods, water-allocation priorities, layouts, capacities, costs, benefits, risks, and conclusions against current conditions. Reconcile inconsistencies and determine whether each previously selected option should be confirmed, optimized, revised, or replaced. Use the validated material to support the updated feasibility study, transparent alternatives assessment, preferred-solution recommendation, World Bank appraisal, and formal decision gates. Historical approval shall not be treated as confirmation of current feasibility or preference.
B2	Historical urban infrastructure projects, preliminary designs, Basic Designs, design reports, calculations, drawings, bills of quantities, specifications, schedules, and other technical documentation for Phase 2 and Phase 3.	Confirm statutory and approval status, revision history, design basis, surveys, investigations, calculations, models, drawings, quantities, specifications, interfaces, constructability, permit status, and consistency with the accepted option and verified as-built system. Retain only documentation demonstrated to be current, accurate, coordinated, and suitable for reuse. Update, supplement, or replace it as necessary to prepare complete statutory documentation and construction-ready final detailed designs that allow competitive pricing and construction without further substantive Contractor design.
B3	Phase 1 and HPP B as-built drawings, completion records, operating and maintenance records, dam-safety and instrumentation records, incident and defect records, performance data, manuals, and SCADA documentation.	Verify the records through site inspection, measurements, testing, operator consultation, and reconciliation with actual operating data. Establish the current configuration, condition, capacity, performance, safety, environmental-flow arrangements, defects, operating constraints, remaining service life, and hydraulic, structural, mechanical, electrical, control, grid, and SCADA interfaces. Identify any remedial, interface, safety, monitoring, or compliance measures and, if accepted by the Client, incorporate them into the feasibility assessment, final designs, permit documentation, cost estimates, and bidding documents.
B4	Historical economic and financial analyses, cost estimates, bills of quantities, price databases, tariffs, energy-production estimates, agricultural benefit assumptions, demand	Use the historical analyses only to understand the previous methodology and decision basis. Redevelop current, editable component-level and integrated economic and financial models using the verified technical solution, current quantities, capital and operating costs, replacement costs, contingencies, land and environmental and social costs, supervision, implementation schedule,

	projections, financing assumptions, and sensitivity analyses.	energy production and market assumptions, irrigation benefits, affordability, operation and maintenance, financing terms, taxes, and residual values. Provide scenario, sensitivity, risk, and switching-value analyses suitable for World Bank appraisal and identification of any non-viable component or package.
B5	Environmental, social, biodiversity, ecological-flow, land and cadastral, stakeholder, dam-safety, emergency, permit, license, approval, authorization, and consent documentation.	Coordinate the review with the separate environmental and social consultant and identify current national and World Bank gaps. Provide the technical data needed to update the environmental and social instruments, ecological-flow regime, dam-safety instruments, land requirements, stakeholder materials, and permit pathway. Incorporate the accepted avoidance, mitigation, monitoring, land, labor, community-safety, biodiversity, dam-safety, and emergency requirements into option selection, designs, quantities, costs, schedules, permit submissions, and bidding documents. Do not duplicate or replace instruments assigned to the separate consultant.
B6	Historical procurement plans, packaging analyses, prequalification documents, bidding documents, contract documents, evaluation records, and related procurement materials.	Use these documents only as technical, commercial, market, packaging, qualification, interface, and risk-allocation references. Assess lessons, omissions, outdated assumptions, quantities, specifications, and prior market responses, but do not redline historical documents into final tender text. Following acceptance of the preferred solution and procurement strategy, prepare new, internally consistent technical parts of the bidding documents for the agreed packages using the applicable World Bank Standard Procurement Documents, current qualification and evaluation criteria, technical requirements, environmental and social provisions, drawings, quantities or price schedules, contract data, testing, commissioning, and interface requirements.
B7	Hydrological, meteorological, climate, water-quality, sediment, geological, geotechnical, geophysical, survey, cadastral, GIS, agricultural, land-use, energy, grid, tariff, institutional, and financial datasets and models.	Establish a controlled inventory and verify the source, format, language, custodian, units, coordinate and vertical reference systems, collection dates, spatial and temporal coverage, completeness, quality, gaps, limitations, and permitted use of each dataset. Clean, digitize, georeference, harmonize, reconcile, and supplement the data as required; document all transformations and assumptions; and develop traceable datasets and editable models suitable for the updated hydrology and water balance, climate analysis, feasibility assessment, OP 7.50 technical analysis, economic and financial assessment, permit applications, construction-ready final designs, cost estimates, and bidding documents. Submit all raw and processed data, metadata, spatial layers, calculations, models, and source files in open or commonly used editable formats.

Historical document inventory. The available sources are expected to include, among other materials, the 1994 system-optimization and hydropower studies; the 2003 lower- and upper-zone irrigation designs; the 2006 water-management study; the 2008 optimal water-use study; the 2009 Phase 2 irrigation preliminary design; the 2009–2010 small-hydropower preliminary design; subsequent feasibility, economic, environmental, permit, design, as-built, procurement, and operating records; and all available electronic source files. The Consultant shall reproduce and complete the detailed inventory in the

Inception Report and shall link each material assumption, calculation, drawing, dataset, and conclusion used in the assignment to its source and validation status.

Data gaps and unavailable information. Where an essential item is unavailable, inaccessible, unreliable, incomplete, or inconsistent, the Consultant shall promptly identify the affected decision or design activity, assess the implications for scope, quality, safety, cost, programme, permits, and procurement, and propose a technically justified measure to close or manage the gap. The proposal shall distinguish work included in the agreed scope from material additional services subject to the Contract's change-control procedures. No critical design assumption shall remain unsupported at the stage when it is required for option selection, statutory submission, construction-ready final design, or bidding.

Annex C – Applicable Legal, Regulatory, Standards, World Bank, and Permit Framework

Annex C.1 Purpose and Application

This annex establishes the minimum framework to be verified and applied by the Consultant. It is indicative rather than exhaustive and does not constitute legal advice or relieve the Consultant of professional responsibility. At inception, and before each relevant feasibility, statutory-design, permit, final-design, or bidding submission, the Consultant shall verify the current title, official citation, amendment status, implementing rules, competent authority, applicability, approval pathway, and technical implications of each requirement. The Consultant shall promptly notify the Client of any conflict, ambiguity, new requirement, or change that could affect scope, solution selection, cost, schedule, land, environmental and social obligations, permits, procurement, or construction readiness.

Annex C.2 Compliance Hierarchy and General Rules

- The Consultant shall comply with mandatory laws, regulations, permits, approvals, and technical rules of North Macedonia.
- For World Bank financing and procurement, the Consultant shall also apply the requirements confirmed by the Client and the World Bank, including the Environmental and Social Framework, applicable Environmental and Social Standards, OP 7.50, Procurement Regulations for IPF Borrowers, and the applicable Standard Procurement Documents.
- Current MKS/EN standards shall be the primary technical basis. ISO, IEC, IEEE, ICOLD, Eurocodes and related EN documents, AWWA, ASTM, ASME, DIN, BSI, or other internationally recognized standards may supplement them where necessary and technically justified.
- Where two requirements address the same matter, the more stringent requirement shall be applied unless prohibited by mandatory law or otherwise directed in writing by the Client following consultation with the World Bank where applicable.
- No alternative standard, material, testing regime, or design criterion shall be adopted without a documented equivalence assessment and the Client's written acceptance.
- Compliance with this annex does not replace the Consultant's obligation to produce a safe, coordinated, durable, operable, maintainable, climate-resilient, permit-compliant, and construction-ready design.

Annex C.3 National Legal, Regulatory, and Approval Framework

Table C.1. Indicative National Framework and Required Consultant Action		
Requirement Area	Indicative Subject Matter	Required Application under the Assignment
Construction and statutory design	Construction law and implementing regulations; classification of structures; design stages; licensed designers; statutory review and revision; construction permits; commencement, supervision, technical inspection, commissioning, and use permits.	Confirm the legal classification and competent permit authority for each facility and package; define the statutory Basic Design and all associated studies and verifications; identify signatures, licenses, review bodies, languages, copies, and submission formats; and provide all supplementary design development needed to achieve the construction-ready standard required by the TOR.
Spatial and urban planning	Spatial plans, municipal plans, planning conditions, urban-project documentation, infrastructure corridors, location conditions, and compatibility with protected or restricted areas.	Confirm applicable planning requirements, planning constraints, corridor restrictions, and planning approvals affecting the accepted investments. Identify planning risks, dependencies, and actions required

Table C.1. Indicative National Framework and Required Consultant Action

Requirement Area	Indicative Subject Matter	Required Application under the Assignment
		to support design development, permitting, and implementation.
Water management and water rights	Water abstraction, storage, diversion, discharge, ecological flows, reservoir operation, river works, crossings, water-protection zones, flood risk, sediment management, monitoring, and water permits or consents.	Verify existing rights and permit conditions; quantify current and proposed abstractions and releases; prepare the technical water-balance, hydraulic, ecological-flow, flood, sediment, water-quality, and operating information required for decisions and applications; and incorporate permit conditions into designs, operating rules, costs, and bidding documents.
Environment, nature, forestry, and waste	Environmental impact assessment; screening and scoping; biodiversity and protected areas; fish and aquatic ecology; forestry; pollution prevention; spoil and waste management; quarry, borrow, and disposal areas; noise, air, water, and soil protection.	Coordinate with the separate environmental and social consultant and provide technical information required for environmental and social assessment, including alternatives, footprints, quantities, construction methods, schedules, water-regime changes, and design assumptions. Incorporate accepted environmental and social requirements into the feasibility studies, final designs, permit-support documentation, cost estimates, and technical bidding documentation.
Land, cadastre, and rights of way	Ownership, cadastral status, expropriation, easements, temporary occupation, access rights, public land, water land, and utility corridors.	Identify land requirements, access constraints, easements, rights-of-way, and significant cadastral issues affecting the accepted investments. Prepare the technical information required to support design development, implementation planning, and any land-related activities undertaken by others.
Energy facilities and electricity market	Energy law and implementing rules and regulations; annual planning of energy facilities; authorization of energy facilities; generation licenses; grid connection; network codes; metering, protection, dispatch, curtailment, testing, and market or off-take arrangements.	Identify applicable energy-sector requirements, authorizations, licenses, grid studies, connection agreements, and approval pathways affecting the accepted hydropower investments. Reflect these requirements in hydropower optimization, design, implementation planning, financial analysis, testing, commissioning, permit-support documentation, and technical bidding documentation.
Dam safety and emergency management	National dam-safety classification, inspections, surveillance, instrumentation, operating rules, emergency planning, civil protection, seismic and flood safety, and obligations applying to existing dams.	Compile and assess the applicable national requirements together with ESS4; verify the safety status and reliance on Knezhevo Dam; identify required inspections, analyses, instruments, plans, reviews, and remedial measures; and align the technical outputs with the accepted dam-safety pathway.
Roads, railways,	Crossing and protection approvals; relocation or protection of roads, bridges, railway assets, power lines,	Identify utility and infrastructure interfaces, applicable technical conditions, required approvals, and associated design

Table C.1. Indicative National Framework and Required Consultant Action

Requirement Area	Indicative Subject Matter	Required Application under the Assignment
rivers, and utilities	telecommunications, water and sewerage systems, and other public infrastructure.	requirements. Prepare any crossing, protection, relocation, reinstatement, and interface designs required for the accepted investments and incorporate the resulting requirements into the design documentation and bidding packages.
Occupational and community safety	Worker health and safety, fire protection, electrical safety, pressure systems, hazardous materials, traffic safety, public access, emergency preparedness, and construction-site security.	Incorporate applicable occupational health and safety, community safety, emergency preparedness, and operational safety requirements into the feasibility studies, final designs, technical specifications, and technical bidding documentation.

Annex C.4 Technical Codes and Standards Register

Within the Inception Report, the Consultant shall submit a project-specific Codes and Standards Register. The register shall identify, for each discipline and facility, the governing standard, exact edition and amendments, design situations and return periods, loading and material criteria, safety and serviceability factors, testing and acceptance provisions, interaction with national requirements, and any proposed supplemental standard. It shall cover, as applicable:

- Hydrology, flood estimation, drought, climate change, reservoir operation, sediment, water quality, ecological flows, hydraulic structures, conveyance systems, pressure pipelines, surge and transient analysis.
- Dams, spillways, outlets, foundations, slopes, tunnels, canals, reservoirs, geotechnical and geological investigations, seismicity, structural reliability, and instrumentation.
- Reinforced concrete, structural steel, masonry, earthworks, roads, drainage, buildings, access, fire safety, and temporary design assumptions affecting permanent works.
- Irrigation conveyance and distribution, filtration, pumping where required, hydrants, metering, pressure control, automation, drainage, on-farm interfaces, water efficiency, and service performance.
- Hydroturbines, generators, governors, valves, gates, cranes, pressure vessels, mechanical auxiliaries, electrical systems, grounding, protection, metering, communications, SCADA, control, cybersecurity, grid connection, testing, and commissioning.
- Materials, welding, coatings, corrosion protection, factory and site testing, inspection, quality assurance, tolerances, asset identification, spare parts, manuals, training, operation, and maintenance.

Annex C.5 World Bank Environmental and Social Framework

The Consultant shall provide and maintain the technical basis needed for application of the World Bank Environmental and Social Framework. The relevant requirements are expected to include ESS1, ESS2, ESS3, ESS4, ESS5, ESS6, ESS8, and ESS10, subject to confirmation by the Client and the World Bank. The Consultant shall not duplicate the environmental and social instruments assigned to the separate consultant, but shall:

- Provide complete, timely, and internally consistent descriptions of alternatives, footprints, land needs, construction methods, material sources, spoil and waste quantities, workforce, camps, traffic, schedules, water-regime changes, operating rules, and associated facilities.
- Assess design measures for resource efficiency, pollution prevention, occupational and

community safety, road safety, emergency preparedness, biodiversity and aquatic connectivity, land take, accessibility, cultural heritage, labor conditions, and climate and disaster resilience.

- Incorporate accepted environmental and social commitments, mitigation measures, monitoring requirements, method constraints, codes of conduct, reporting, incident-management, and Contractor management provisions into designs, quantities, cost estimates, implementation plans, and bidding documents.
- Maintain a technical environmental and social commitments matrix linking each accepted requirement to the relevant drawing, specification, bill item, schedule, responsible party, and verification method.

Annex C.6 Dam Safety under ESS4

Because the proposed Phase 2 and Phase 3 investments rely on water stored behind Knezhevo Dam, the Consultant shall assess the existing dam and appurtenant structures in accordance with ESS4 and the applicable World Bank dam-safety guidance. The Consultant shall verify the adequacy of existing safety information, surveillance, instrumentation, operation and maintenance, emergency preparedness, organizational capacity, and financing arrangements; identify required studies, reviews, investigations, and remedial measures; and prepare or update the dam-safety instruments specified in the TOR. The scope and review arrangements for any independent dam-safety expertise or panel shall be confirmed with the Client and the World Bank.

Annex C.7 OP 7.50 on Projects on International Waterways

The Consultant shall prepare the technical information required for the World Bank's assessment and processing under OP 7.50 and BP 7.50. The Consultant shall prepare all technical annexes, flow tables, hydrological analyses, water-balance calculations, storage analyses, abstraction calculations, operating-rule analyses, cumulative-use assessments, transboundary impact assessments, maps, figures, and supporting technical documentation required by the World Bank for processing under OP 7.50 and BP 7.50. The Consultant shall update these materials whenever modifications to the preferred option, water balance, operating regime, reservoir operation, abstractions, releases, or project configuration materially affect the technical basis of the assessment.

The World Bank and the Borrower retain responsibility for policy determinations, formal communications, notifications, and any decision on an exception. The Consultant's technical package shall be prepared early enough to avoid delaying appraisal and shall include, as applicable:

- A clear description of the international waterway and basin context, project location, tributaries, existing infrastructure, and relevant riparian states, supported by suitable maps.
- Existing and proposed abstractions, storage, diversions, consumptive use, return flows, releases, ecological flows, hydropower operation, water quality, and timing of flows by component and scenario.
- Updated hydrology, water balance, low-flow and drought analysis, flood analysis where relevant, climate scenarios, cumulative-use context, operating rules, and quantified before-and-after flow tables at relevant locations.
- An objective technical assessment of potential transboundary effects, including water deprivation, changes in timing, pollution or water-quality effects, dam or operational risk, and the measures incorporated to avoid, minimize, monitor, or manage such effects.
- Concise project specifications, implementation schedule, drawings, cost and operating information, and other technical details needed for notification or other World Bank processing.
- Rapid responses to Client and World Bank comments and updates whenever the preferred solution, water balance, operating regime, or design changes materially.

Annex C.8 World Bank Procurement and Bidding Requirements

The Consultant shall apply the edition of the World Bank Procurement Regulations for IPF Borrowers and the Standard Procurement Documents confirmed by the Client for the operation. The Consultant shall support value for money, economy, integrity, efficiency, transparency, fairness, fit-for-purpose procurement, sustainable procurement, and effective risk allocation. The Consultant shall:

- Provide technical inputs necessary to align the procurement strategy, packaging, market approach, qualification and evaluation criteria, contract form and risk allocation with the accepted technical solution.
- Prepare the complete technical components of the bidding documents around the accepted final design; historical bidding documents shall serve only as reference and gap-analysis sources.
- Use the current mandatory provisions of the selected Standard Procurement Document without unauthorized modification, while completing the project-specific sections, technical requirements, schedules, contract data, and environmental and social provisions.
- Ensure consistency among drawings, specifications, bills of quantities or price schedules, cost estimates, completion schedules, design responsibilities, testing, commissioning, performance guarantees, permits, land access, environmental and social requirements, and contract conditions.
- Include prequalification or initial selection only where required by the accepted procurement strategy and applicable Standard Procurement Document.
- Provide technical support for clarifications, amendments, evaluation, and contract finalization within the scope defined in the TOR.

Annex C.9 Financing Readiness, Economic and Financial Analysis, and Jobs Reporting

The Consultant shall align the technical work with World Bank appraisal and implementation-readiness requirements. This includes current project costs and financing tables, implementation and disbursement schedules, procurement packaging, institutional and operating arrangements, climate and disaster-risk inputs, economic and financial models, affordability and fiscal implications where relevant, results indicators, and risk analysis. The jobs assessment shall apply the methodology and definitions confirmed by the Client and World Bank; distinguish direct, indirect, induced, temporary, permanent, and improved jobs as applicable; avoid double counting; document assumptions and data sources; and establish practical indicators, responsibilities, baselines, targets, and reporting arrangements.

Annex C.10 Legal and Permit Register

The Consultant shall establish the Legal and Permit Register at inception and maintain it through final submission. The register shall be package-specific and shall, at a minimum, identify:

- The permit, approval, consent, license, authorization, connection agreement, statutory review, design verification, land right, or technical condition required.
- The governing legal basis and current official citation; competent authority or infrastructure operator; applicant; and responsible preparer.
- The facility, parcel, alignment, contract package, and project stage to which the requirement applies.
- Prerequisite decisions, studies, designs, environmental and social instruments, land documents, fees, guarantees, forms, signatures, licensed professionals, translations, and copies.
- Planned submission date, statutory review period, dependencies, critical path, current status, comments, resubmissions, approval date, validity, renewal requirements, and conditions.
- The drawing, specification, cost item, schedule activity, operating rule, or bidding provision through which each approval condition is incorporated.

Annex C.11 Stage-Specific Compliance Outputs

Table C.2. Minimum compliance outputs by stage	
Stage	Minimum output
Inception	Verified Applicable Requirements Register; Codes and Standards Register; initial Permit and Approval Register distinguishing the component-specific requirements for Phase 3 hydropower and the Phase 2 irrigation; confirmation of required licensed professionals and independent statutory reviewers; OP 7.50 technical-information plan; environmental and social coordination protocol; confirmation of interfaces with the PIU's independent procurement expert; and schedule of priority consultations with authorities, utilities, operators, and other relevant entities.
Feasibility and preferred-option confirmation	Regulatory, statutory, land, water, energy, grid, environmental and social, dam-safety, constructability, and implementation-readiness screening of the viable alternatives for both components; preliminary approval pathways, responsibilities, dependencies, and timelines; permit-support requirements and statutory design constraints for both Phase 2 Irrigation and Phase 3 Hydropower; OP 7.50 technical assessment; compliance-related costs and risks; and identification of any option that cannot reasonably achieve the required financing-, design-, procurement-, permitting-, or construction-readiness standard, as applicable.
Accepted solution and design basis	Updated requirements, standards, and permit registers; agreed statutory and approval pathways for both components within the scope of this assignment; documented authority, operator, utility, grid, and energy-authorization requirements; accepted environmental and social design inputs; applicable dam-safety requirements; confirmed land, access, confirmed statutory and permitting requirements, interfaces and submission pathways for both components; and a compliance-incorporation matrix linking each applicable requirement to the relevant calculation, drawing, specification, schedule, assessment, or other design output.
Draft detailed design	Coordinated draft detailed designs demonstrating incorporation of applicable technical, statutory, environmental and social, dam-safety, land, grid, utility, operational, and constructability requirements; draft Phase 2 and Phase 3 statutory and permit-support documentation; and an updated compliance-incorporation matrix for review before finalization.
Final detailed designs and component-specific permitting	Construction-ready final detailed designs for Phase 2 irrigation and Phase 3 hydropower, signed and licensed as required and completed in parallel; complete statutory designs, technical studies, calculations, drawings, applications, certificates, and supporting documentation required for permits, approvals, authorizations, licences, consents, utility clearances, and grid-connection arrangements; responses to statutory and authority comments received within the assignment period; and incorporation of applicable approval conditions into the designs.
Technical components of bidding packages	Package-specific technical compliance schedule; coordinated technical specifications, drawings, bills of quantities or price schedules, technical schedules, performance requirements, testing and commissioning requirements, applicable codes and standards, land and permit responsibilities, environmental and social technical obligations, dam-safety and emergency interfaces, required contractor licences and certifications, completion and handover requirements, and confirmation of consistency across the technical bidding-package components. Procurement strategy, procurement method, contract model and packaging decisions, qualification and evaluation criteria, bidding forms, contract conditions, and other non-technical procurement sections remain the responsibility of the PIU's independent procurement expert.
Final handover	Final Applicable Requirements, Codes and Standards, Permit and Approval, Compliance-Incorporation, and Outstanding-Actions registers; permit documentation and construction permits, approvals, conditions, and authority correspondence; signed and editable source files; consolidated comment-response matrices; identification of accountable parties and deadlines for outstanding actions; and a written statement of any unresolved compliance, approval, or implementation-readiness risks for either component.

Annex D – Minimum Contents of Final Detailed Designs and Bidding Packages

D.1 Purpose

This Annex summarizes the minimum content requirements for the principal design and procurement deliverables defined in Section 8.

The detailed scope, deliverable requirements, and acceptance criteria contained in Sections 6 and 8 shall prevail in the event of any inconsistency.

D.2 Final Detailed Design Packages (D4 and D5)

The Final Detailed Design Packages shall include, as applicable:

- approved design basis and design criteria;
- surveys, investigations, and supporting studies;
- discipline-specific calculations and models;
- design reports;
- drawings and schedules;
- technical specifications;
- bills of quantities;
- cost estimates;
- permit-support documentation;
- environmental and social requirements incorporated into the design;
- dam-safety requirements incorporated into the design, where applicable;
- GIS deliverables;
- interdisciplinary design-review documentation;
- complete editable source files.

The detailed requirements for D4 (Hydropower) and D5 (Irrigation) are specified in Sections 6 and 8.

D.3 Technical Bidding-Package Components Included in D4 and D5

The Bidding Document Packages shall include, as applicable:

- applicable World Bank Standard Procurement Documents;
- Instructions to Bidders;
- qualification criteria;
- evaluation criteria;
- bidding forms;
- contract conditions;
- technical specifications;
- drawings;
- bills of quantities or price schedules;
- environmental and social requirements;
- testing and commissioning requirements;
- implementation schedules;
- interface requirements;

- contract-specific technical schedules.

The technical bidding-package requirements are included within Deliverables D4 and D5 and are specified in Sections 6 and 8.

D.4 Deliverable Consistency

The Consultant shall ensure consistency among:

- designs;
- specifications;
- quantities;
- cost estimates;
- implementation schedules;
- environmental and social requirements;
- permit documentation;
- procurement documentation.

All final submissions shall comply with the acceptance requirements established in Section 8.

Annex E – Document Control, Coding, Submission, and File Requirements

E.1 Purpose

This Annex establishes the minimum requirements for document control, file management, submission formats, and project records.

The detailed submission requirements established in Sections 8, 10, 11, and 12 shall prevail in the event of any inconsistency.

E.2 Document Control

The Consultant shall establish and maintain a document-control system consistent with Section 10.

The system shall provide:

- unique document identification;
- revision control;
- submission tracking;
- comment tracking;
- response tracking;
- approval status tracking;
- maintenance of current and superseded versions.

E.3 Submission Requirements

All formal submissions shall:

- comply with the coding system approved under Section 10;
- be accompanied by a transmittal;
- clearly identify revision status;
- identify draft or final status;
- include all supporting documentation required by Section 8.

E.4 Electronic Deliverables

All deliverables shall be submitted in:

- searchable PDF format; and
- complete editable native format.

Editable formats shall include, as applicable:

- Word;
- Excel;
- CAD;
- GIS;
- schedules;
- databases;
- models;
- calculation files.

E.5 GIS and Model Deliverables

Where applicable, submissions shall include:

- GIS databases;
- metadata;

- coordinate-system information;
- data dictionaries;
- editable models;
- documented assumptions;
- visible formulas;
- source references.

E.6 Final Handover

The Consolidated Final Assignment Package and Completion Report (D6) shall include all documentation required under Section 8, including:

- final accepted deliverables;
- document registers;
- comment-response registers;
- GIS databases;
- models and calculations;
- source data inventories;
- final revision histories;
- archived electronic project records.