



د افغانستان اسلامي امارت

د اوبو او انرژۍ وزارت

د اوبو معینیت

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ISLAMIC EMIRATE OF AFGHANISTAN

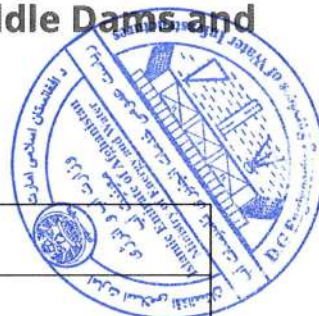
MINISTRY OF ENERGY AND WATER



TERMS OF REFERENCE (TOR)

Independent Third-Party Review, Verification and Technical Certification of the Detailed Design

Dahla Dam Raising, Two Spillway Packages, Six Saddle Dams and Associated Works



Document Particular	Approved Entry
Project	Upgrading of Dahla Multipurpose Dam
Location	Shah Wali Kot District, Kandahar Province, Afghanistan
Employer / Client	Ministry of Energy and Water (MEW)
Procurement	Consulting Firm Services - (QCBS-International)
Contract Form	Lump-sum, deliverable-based professional services
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Prepared by	
Reviewed by	
Approved by	



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Assignment boundary: The Consulting Firm shall independently review and verify the Ministry-prepared detailed design. It shall not take over the role of the original designer or silently redesign the project. Where a deficiency requires redesign, the Consultant shall define the required corrective action, review the revised design prepared by MEW, and verify closure before technical certification. The Consultant's certificate does not replace MEW's statutory or administrative approval.

Acronyms and Abbreviations



Term	Meaning
AEP	Annual Exceedance Probability
BoQ	Bill of Quantities
CAD	Computer-Aided Design
CFD	Computational Fluid Dynamics
DCF	Dam Crest Flood
DD	Detailed Design
EAP/EPP	Emergency Action / Emergency Preparedness Plan
FAT	Factory Acceptance Test
FEM	Finite Element Method
FSL	Full Supply Level
GIS	Geographic Information System
HMI	Human-Machine Interface
ICOLD	International Commission on Large Dams
IDF	Inflow Design Flood
IFC	Issued for Construction
MEW	Ministry of Energy and Water
MCE/MDE/OBE	Maximum Credible / Maximum Design / Operating Basis Earthquake
NCR	Non-Conformance Report
NDT	Non-Destructive Testing
NTP	Notice to Proceed
O&M	Operation and Maintenance
PFMA	Potential Failure Modes Analysis
PMF/PMP	Probable Maximum Flood / Precipitation
QA/QC	Quality Assurance / Quality Control
SAT	Site Acceptance Test
SDS	Seismic Design Spectrum
TOR	Terms of Reference

1. Background and Rationale

Dahla Dam is an existing multipurpose reservoir on the Arghandab River in Shah Wali Kot District, Kandahar Province. The original dam and related works were constructed in the early 1950s. The Ministry of Energy and Water has prepared or is completing the detailed design for upgrading the project, including raising the existing main embankment, raising and extending six saddle dams, spillway works, outlet and intake modifications, instrumentation, road realignment and associated facilities.

The proposed works materially change reservoir level, storage, flood routing, seepage conditions, embankment stresses, foundation loading, operating procedures and downstream consequences. They also create safety-critical interfaces between approximately seven decades of existing works and new construction. MEW therefore intends to engage an independent international or suitably qualified international consulting firm to conduct a traceable third-party review of the complete detailed design and to issue professional technical approval certificates only after all safety-significant findings have been resolved.

The review shall extend beyond a document-completeness check. It shall include site inspection, review of existing-dam behavior, verification of design data and criteria, selective independent calculations and model run, multidisciplinary interface checks, constructability and construction-stage safety review, comment classification and formal closure, and certification against a controlled final document register.

2. Project Description and Review Particulars

2.1 Feasibility-Level / Proposed Project Data

The following values are extracted from the Dahla Detailed Design TOR and are included to define the expected scale of review. They shall not be treated as approved final design values. The Consultant shall reconcile them with the latest MEW design baseline, identify discrepancies and certify only the controlled final values.

Item	Review Baseline / Required Confirmation
Dam type	Clay-core rockfill embankment / zoned earth fill
Catchment area	Approximately 12,925 km ²
Existing / proposed storage	Approximately 478 / 782 million m ³ as stated in the source TOR; verify against current survey and reservoir-elevation tables
Main dam height	Approximately 60 m existing / 73 m proposed above deepest foundation
Main dam crest elevation	Approximately El. 1,140.9 m existing / El. 1,154 m proposed (WGS 84)



Item	Review Baseline / Required Confirmation
Main dam crest length / width	Approximately 755 m proposed length / 8 m width
Proposed raising	Feasibility concept approximately 13.6 m; final raising value requires independent verification
Saddle Dams 1-5	Proposed heights approximately 18-29 m; combined proposed length approximately 1,995 m
Saddle Dam 6	Proposed height approximately 33 m; proposed length/extension approximately 510 m
Spillway 1	Proposed ogee spillway, approximately 220 m; feasibility discharge approximately 2,301 m ³ /s at PMF routing condition
Spillway 2	Proposed ogee and/or partly gated arrangement, approximately 120 m; feasibility discharge approximately 1,255.2 m ³ /s
Total stated spillway capacity	Approximately 3,556 m ³ /s; independently verify against PMF/IDF and reservoir routing
Outlet tunnel	Approximately 254 m long; historical information indicates about 184 m was unlined and requires inspection/design verification
Road interface	Realignment/raising of Route Bearer Highway and associated drainage/structures

2.2 Components Included in the Review

- Existing main dam raising, including construction sequence, old/new embankment interfaces, crest and abutment tie-ins.
- Main dam left-abutment shear/weathered zone, including investigation adequacy and treatment design.
- Saddle Dams SD-01 through SD-06, each reviewed and certified separately, including extensions and reservoir-rim continuity.
- Spillway 1 and Spillway 2, including approach, control, conveyance, gates where applicable, energy dissipation and downstream protection.
- Intake tower, trash racks, access bridge, gates, hoists, stoplogs and embedded parts.
- Outlet tunnel, proposed lining/repair, irrigation outlet, hydropower penstock outlet and water-supply outlet interfaces.
- Grouting, foundation treatment, drainage, filters, erosion protection and site dewatering.



- Dam-safety instrumentation, electrification, controls, communication and emergency power.
- Diversion and flood management during construction, temporary works and reservoir restrictions.
- Route Bearer Highway realignment, access roads, culverts, bridges, causeways, road drainage and reservoir-slope interfaces.
- Site-security fence, staff colony/security camp and other associated works only to the extent they affect dam safety, constructability, access, utilities or tender completeness.
- Technical specifications, drawings, calculations, models, BoQ, estimate, construction schedule, tender documents, O&M and dam-safety plans for Component 1.

Spillway clarification: The source Detailed Design TOR refers to two spillways. This review TOR therefore covers both Spillway 1 and Spillway 2. At inception, MEW shall identify whether each package is new, replacement, rehabilitation or modification work and shall freeze the corresponding document baseline.

2.3 Known Baseline Discrepancies Requiring Formal Resolution

The source Detailed Design TOR contains feasibility-level alternatives and internally inconsistent values. These are not editorial matters: they affect storage, loading, flood safety quantities and project economics. The Consultant shall establish the authoritative data source, reproduce the governing analyses and obtain a recorded MEW design-basis decision before using any of the following values for certification.

Topic	Source Discrepancy / Alternative	Mandatory Review Resolution
Existing storage	The source text refers to approximately 288 MCM in one location while the principal-data table indicates approximately 478 MCM.	Reconcile survey datum, sediment condition and elevation-area-capacity curve.
Dam raising	USACE concept approximately 8 m versus feasibility concept approximately 13.6 m.	Verify technical feasibility, safety, storage benefit and final MEW-selected raise.
PMF / spillway basis	Original stated combined discharge approximately 3,760 m ³ /s; feasibility total approximately 3,556 m ³ /s; a preliminary PMF inflow estimate of approximately 7,963 m ³ /s is also cited.	Confirm PMP/PMF, inflow hydrograph, reservoir routing, peak outflow, freeboard and both spillway capacities.



Topic	Source Discrepancy / Alternative	Mandatory Review Resolution
Crest and core levels	Proposed crest approximately El. 1,154 m; feasibility narrative also refers to core raised to about El. 1,152 m with a 2 m retaining/parapet wall.	Confirm impervious-element elevation, flood surcharge, wall function, wave allowance and settlement.
Spillway configuration	Spillway 1 and Spillway 2 are described using feasibility types and capacities that remain subject to optimization.	Freeze whether each structure is new, modified or replaced and certify its final arrangement and operating philosophy.

3. Purpose of the Assignment

The purpose is to obtain an independent, documented and professionally accountable determination that the Ministry-prepared detailed design for Dahla Dam Component 1 is technically sound, internally coordinated, safe, constructible, complete and suitable for tendering and/or construction, as applicable to the certified issue status.

The Consultant shall review, verify, certify and, only to the extent expressly delegated by MEW, technically approve the controlled detailed-design baseline. MEW retains final administrative, procurement, statutory and governmental approval authority.

4. Objectives

- Validate the design basis, adopted raising level, reservoir operating levels, loading conditions, standards and dam-safety philosophy.
- Confirm that surveys, investigations, laboratory results, monitoring history and material parameters are adequate and representative.
- Independently check the principal hydrologic, hydraulic, geotechnical, seismic, structural and hydromechanical analyses.
- Assess the existing dam condition and behavior and verify compatibility of old and new works.
- Verify each of the six saddle dams and continuity of the complete reservoir-retaining rim.
- Verify that both spillway systems safely pass the adopted IDF/PMF under credible gate, power, debris and downstream conditions.



- Confirm safe construction staging, diversion, temporary works, reservoir restrictions and emergency arrangements.
- Check consistency among reports, models, calculations, drawings, specifications, BoQ, cost estimate, schedule and tender documents.
- Identify, classify and close all findings through an auditable comment-response process.
- Issue component and consolidated approval certificates only after the acceptance criteria are satisfied.

5. Definitions and Interpretation

Term	Interpretation
Approval / Technical Approval	The Consultant's signed professional determination that the controlled design baseline satisfies this TOR. It does not replace MEW statutory or administrative approval.
Certification	A signed statement by the Consulting Firm and responsible key experts identifying the exact documents reviewed, checks performed, conclusions and limitations.
Controlled Design Baseline	The indexed set of reports, drawings, calculations, models, specifications and schedules identified by document code, revision and date.
Independent Check	A calculation, model run, reasonableness check or alternative method performed by the reviewer without merely repeating the designer's conclusion.
Original Designer / MEW Design Team	The Ministry team and any supporting party responsible for preparing and revising the detailed design.
Reviewer / Consultant	The independent firm engaged under this TOR.
Safety-Significant Finding	A deficiency that could affect dam safety, public safety, design function, code compliance, construction-stage risk or reliable operation.
Associated Works	All Component 1 works necessary for a complete, operable and safe upgraded dam system.



6. Independence, Ethics and Conflict of Interest

- The firm and all proposed experts shall be independent of the MEW design team, construction contractor, suppliers and entities whose work or interests are under review.
- All previous or current involvement in Dahla Dam, related studies, designs, procurement, supply or construction shall be fully disclosed in the proposal.
- No expert shall review or certify work that the same expert prepared, directed or previously approved.
- Findings, assumptions, limitations and dissenting opinions shall be recorded. Safety-significant dissent shall be escalated to MEW and shall not be deleted to protect schedule or payment.
- The Consultant shall report any attempted interference with its professional judgment and shall follow applicable confidentiality, integrity and anti-corruption requirements.

7. Governing Requirements and Reference Framework

Afghan laws, regulations, approved MEW requirements and the project-approved Design Basis shall govern. Where national requirements are silent, internationally recognized dam engineering practice shall be applied with MEW concurrence. The Consultant shall prepare a project-specific Standards and Criteria Compliance Matrix and shall not combine incompatible code provisions or select the least conservative requirement without documented justification.

- ICOLD bulletins and guidance applicable to existing dam modification, embankment dams, spillways, risk assessment, monitoring and dam safety.
- USBR Design Standards and Safety Evaluation of Existing Dams (SEED) guidance.
- USACE engineering manuals for dam safety, earth/rockfill dams, hydraulic design of spillways and related structures.
- World Bank Environmental and Social Framework, ESS4 dam-safety provisions and Good Practice Note on Dam Safety, where applicable.
- ACI, ASTM, AASHTO, ASCE, AWS, IEC, IEEE, ISO, DIN/EN and other approved standards relevant to civil, hydromechanical, electrical and road works.
- The hydromechanical standards listed in Dahla Detailed Design TOR Annex A and the electrical standards listed in Annex B, subject to edition, compatibility, applicability and international-practice review.



Edition control: The Consultant shall identify the exact title, number, edition and amendment of every governing standard. If the Ministry design used an obsolete or conflicting edition, the Consultant shall assess the safety effect and recommend a controlled resolution.

8. Information and Facilities to Be Provided by MEW

- The Dahla feasibility studies, the Detailed Design TOR dated December 2025, Annex A hydromechanical requirements, Annex B electrical technical requirements, and all related appendices.
- All Ministry-prepared detailed-design submissions: Inception, Interim 1, Interim 2, Draft Final, Final and subsequent revisions.
- As-built drawings, original design/construction records, material tests, foundation mapping, grouting records and modifications to existing works.
- Topographic, bathymetric, geological, geotechnical, geophysical, hydrological, meteorological, sediment, seismic and construction-material data.
- Inspection, incident, maintenance, reservoir operation, seepage, deformation and instrumentation records in original and processed forms.
- Native model and calculation files, spreadsheets with formulas, CAD/Civil 3D/GIS files, hydraulic and structural models and supporting metadata.
- Detailed drawings, specifications, BoQ, estimate, schedule, construction methodology and bidding documents.
- PFMA, dam-break/inundation studies, dam-safety plans, O&M Plan, Instrumentation Plan, EPP/EAP and reservoir first-filling/raising plan.
- Reasonable access to the site, existing facilities, Ministry personnel and records, subject to security arrangements.

Provision of information by MEW does not imply that the information is complete or correct. The Consultant remains responsible for identifying gaps, contradictions and limitations affecting its review.

9. Scope of Services

The following activities are minimum requirements and do not limit the Consultant's obligation to address issues reasonably necessary for a competent independent review of this safety-critical project.



9.1 Mobilization, Document Control and Review Planning

- Hold a kick-off meeting; confirm communication, delegated decision authority, security procedures and submission/review timeframes.
- Establish the controlled design baseline with document codes, revisions, native-file inventory and completeness status.
- Prepare a Review Management Plan, discipline responsibility matrix, independent-check plan, model register, workshop plan and internal QA/QC plan.
- Prepare a Standards and Criteria Compliance Matrix, Data Gap Register, Interface Register and review risk register.
- Map the Ministry design submissions to the original Dahla design stages: Inception, Interim 1, Interim 2, Draft Final and Final.

9.2 Site Inspection and Existing-Dam Condition Assessment

- Undertake at least **(One)** multidisciplinary site missions: an initial condition/data mission and a targeted verification/closure mission unless MEW approves another arrangement.
- Inspect crest, upstream/downstream faces, abutments, contacts, galleries, drains, seepage areas, outlets, tunnel, intake, existing spillways, reservoir rim, saddle dams and proposed work areas.
- Record cracking, settlement, erosion, sloughing, wet areas, seepage, sinkholes, concrete deterioration, cavitation, corrosion, gate condition and unauthorized modifications.
- Reconcile as-built information with observed conditions using georeferenced photographs and marked-up drawings.
- Review historical instrumentation and performance trends and determine whether the proposed raising is compatible with observed behavior.
- Identify supplemental investigations or testing required for a defensible decision; separately priced/authorized fieldwork is outside the base scope unless included in the RFP.

9.3 Surveying, Mapping, Bathymetry and GIS

- Verify horizontal/vertical datums, coordinate reference system, survey control benchmarks, accuracy, closure and transformations.



- Check topographic coverage for main dam, both spillways, all saddle dams, road realignment, downstream channels, borrow areas and temporary works.
- Review bathymetric methods, reservoir surface/elevation-volume-area curves, sediment volume and uncertainty.
- Check terrain models, profiles, cross-sections, quantity surfaces, CAD/Civil 3D/GIS consistency and version control.
- Verify physical tie-ins, excavation limits, interfaces, clearances, tolerances and constructability envelopes.

9.4 Hydrology, Meteorology, Climate, Reservoir Operation and Sediment

- Review data sources, record length, quality control, regionalization, catchment delineation, loss assumptions and uncertainty.
- Verify PMP/PMF or adopted IDF, flood-frequency analysis, seasonal/construction floods, hydrographs and downstream/tailwater conditions.
- Independently reproduce the critical flood hydrographs and reservoir routing with the final operating rules and available outlet/spillway capacity.
- Review freeboard components, wind-wave setup/run-up, settlement allowance, blockage/debris and gate-unavailability cases.
- Review water balance and operating levels to the extent they determine raising, outlet sizing and multipurpose performance.
- Review sediment yield, trap efficiency, delta progression, abrasion/blockage risks and impacts on intake, outlets and spillways.
- Perform a proportionate climate-resilience stress test and identify decisions sensitive to plausible future hydrology.

9.5 Engineering Geology, Geotechnics, Materials and Seismic Hazard

- Review regional/site geology, geomorphology, stratigraphy, weathering, discontinuities, permeability, landslides and reservoir-rim stability.
- Verify adequacy, locations, depths, logging, recovery, testing and representativeness of investigations at all components and borrow areas.
- Review geological models/sections, design parameters, characteristic values, correlations and sensitivity ranges.



- Review seismic source characterization, active faults, deterministic/probabilistic hazard, MCE/MDE/OBE, spectra, time histories and vertical components.
- Evaluate fault displacement, liquefaction/cyclic softening, seismic settlement, cracking and deformation where credible.
- Review material zoning, gradation, filter compatibility, durability, availability, variability and construction processing requirements.
- Verify foundation excavation, dental concrete, cutoffs, grouting, drainage, abutment treatment and geological construction hold points.

9.6 Existing Main Dam Raising

- Confirm the selected downstream-raising concept and final raise height against credible alternatives, existing condition, foundation and reservoir constraints.
- Review the proposed excavation into the existing core, stripping/benching, moisture conditioning and old/new material contact preparation.
- Verify core, shell, filters, transitions, chimney/blanket drains, cutoffs, slope protection, crest and erosion-control details.
- Independently check end-of-construction, steady-state, rapid-drawdown, flood and seismic stability; seepage/uplift; settlement/deformation; and parameter sensitivity.
- Evaluate differential settlement, stress transfer, cracking, hydraulic fracture and internal-erosion paths at old/new interfaces.
- Review crest elevation, width, freeboard, parapet/retaining wall, abutment tie-ins, road/utilities, penetrations and post-construction settlement allowance.
- Verify construction stages and reservoir restrictions maintain acceptable safety throughout the works.

9.7 Main Dam Left-Abutment Shear / Weathered Zone

- Review historical descriptions and current interpretation of the approximately 1.22-6.10 m wide shear/weathered zone near the left abutment.
- Verify adequacy of test pits, boreholes, geophysics, permeability testing and geological mapping proposed/performed for the zone.
- Assess seepage pathways parallel to the river, erosion susceptibility, deformation and connection to dam/foundation drainage.



- Independently review the selected treatment: removal/replacement, compacted core/engineered fill, grouting, filters, drainage or combined measures.
- Define construction mapping, verification testing and hold points needed before treatment acceptance.

9.8 Saddle Dams SD-01 to SD-06 and Reservoir Rim

- Review each saddle dam as a separate safety component; generic acceptance is prohibited where height, geology, geometry or consequence differs.
- Verify site-specific topography, foundations, abutment contacts, seepage paths, low points and continuity of containment between structures.
- Review type, raising/extension height, zoning, core excavation, filters/drains, cutoffs/grouting, slope protection, crest and access details.
- Independently check stability, seepage/piping, settlement/deformation, seismic response, freeboard and overtopping/erosion vulnerability for each dam.
- Assess reported foundation seepage at Saddle Dams 1-5 and confirm whether any historical fuse-plug function exists and how it is resolved.
- Review Saddle Dam 6 abutment treatment, extension interfaces, spillway interfaces and instrumentation.
- Issue one compliance and approval sheet for each saddle dam and one reservoir-rim assurance statement.

9.9 Spillway 1, Spillway 2 and Hydraulic Structures

- Verify location, alignment, type, crest/control configuration and interaction with the raised reservoir and existing works.
- Independently check rating curves, approach flow, submergence, gates, transitions, flow profiles, wall freeboard and discharge capacity.
- Review physical and/or numerical hydraulic models, boundary conditions, calibration, sensitivity, air entrainment, cavitation, pressure fluctuation, vibration and scale effects.
- Review chute/side-channel/tunnel elements, joints, anchors, drains, uplift relief, underdrainage, stilling basins/flip buckets, plunge pools and downstream scour protection.
- Check debris/sediment blockage, access, inspection and maintenance provisions.



- Verify structural design of crest structures, piers, walls, slabs, bridges, gates, hoists, embedded parts, stoplogs and foundations.
- Confirm safe flood passage for credible equipment outage, power failure, gate malfunction and adverse tailwater scenarios.

9.10 Intake Tower, Trash Rack, Access Bridge and Outlet Tunnel

- Review the joint structural, geotechnical, rock-mechanics and hydromechanical inspection of existing intake/outlet facilities.
- Verify whether raising, strengthening or replacement of the intake tower and trash rack is justified and fully detailed.
- Review access bridge loads, seismic response, bearings, connections, maintenance access and construction sequence.
- Review tunnel condition data, leakage history, rock support and the proposed lining/repair of previously unlined sections.
- Check hydraulic transients, internal/external pressure, uplift, drainage, lining joints, contact grouting and dewatering/inspection provisions.
- Verify interfaces with irrigation, hydropower and water-supply outlets and emergency drawdown requirements.

9.11 Structural, Concrete and Durability Review

- Review structural idealization, load paths, boundary conditions, material properties, exposure/durability classes and construction joints.
- Verify governing combinations for self-weight, hydrostatic/hydrodynamic, sediment, uplift, earth/rock, temperature, shrinkage, seismic, impact, equipment and construction loads.
- Check sliding, overturning, flotation, bearing, global/local stability, strength, serviceability, crack control, fatigue and deformation.
- Review reinforcement, anchorage, congestion, cover, water stops, embedded items, mass-concrete thermal control, chemical exposure and repair interfaces.
- Verify that analysis results are correctly translated into coordinated, buildable and inspectable drawings and bar schedules.

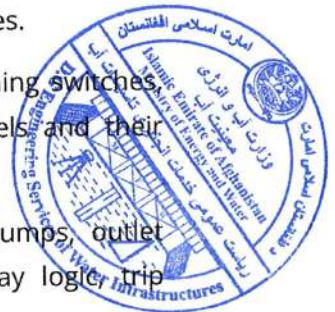


9.12 Hydromechanical Systems

- Review gates, fixed-wheel gates, radial gates where applicable, stoplogs, trash racks, valves, hoists, lifting appliances, embedded parts, penstocks, pipes and supports.
- Verify design heads, hydrostatic/hydrodynamic loads, down pull/uplift, friction, impact, seismic loads, fatigue, buckling, vibration and emergency operating forces.
- Review materials, allowable stresses, weld categories, welding procedures/qualifications, NDT, dimensional tolerances, corrosion protection, seals, guides and maintainability.
- Verify FEM stress/deformation analyses for major mechanical components and CFD/hydraulic analyses where required.
- Check normal/emergency operating sequences, redundant/manual operation, hoist capacity, braking, locking, limit switches, position indication and safe access.
- Review design/manufacturing/installation drawings, calculations, material schedules, motor data, spare parts, tools, FAT/SAT schedules, inspection and release requirements.
- Review installation, pre-commissioning, commissioning and performance test procedures and English/Dari/Pashto O&M documentation requirements.

9.13 Electrical Systems

- Prepare an Applicability and Compliance Matrix. Distinguish Component 1 systems required for safe dam, spillway, outlet, gate, hoist, instrumentation and site operation from Component 4 generation, 110 kV transmission and distribution systems.
- Review connected-load lists, demand/diversity, AC and DC station-service calculations, voltage drop, motor starting, short-circuit/fault levels, protection coordination, insulation coordination and equipment ratings.
- Review normal, essential and emergency supplies, service transformers, AC/DC boards, rectifiers/chargers, batteries, UPS and standby diesel generation; verify autonomy, redundancy, black-start/manual recovery and loss-of-power failure modes.
- Review switchgear/switchboards, circuit breakers, disconnectors, earthing switches, CTs/VTs, surge arresters, metering, motor-control centers, local panels and their environmental/seismic ratings.
- Review protection philosophy and settings for gate/hoist motors, pumps, outlet equipment, station services and interfaces, including selectivity, relay logic trip matrices, alarms and testing provisions.



- Review control and monitoring architecture: PLCs, HMI/SCADA, local/manual/remote modes, interlocks, permissive, fail-safe states, sequence logic, communications, time synchronization, event recording, cybersecurity and degraded-mode operation.
- Review power, control, protection, instrumentation, signaling and communications cables; verify sizing, ampacity, derating, voltage drop, short-circuit withstand, segregation, routing, fire performance, glands, terminations, cable schedules and identification.
- Review interior/exterior lighting, receptacles, small power and emergency lighting for spillways, galleries, intake/outlet areas, crest, control rooms, access roads, staff/security facilities and maintenance work areas.
- Review grounding/earthing and lightning protection, including soil resistivity, grid/conductor sizing, touch/step voltage, bonding, surge protection, lightning-risk assessment, interfaces with embedded metalwork and test points.
- Review fire detection, alarm and electrical fire-safety interfaces, including detectors, manual call points, alarm panels, annunciation, cause-and-effect logic, cabling and emergency power.
- Verify equipment specifications, single-line diagrams, schematics, wiring/terminal diagrams, panel layouts, cable schedules, I/O lists, logic/cause-and-effect diagrams, calculations, FAT/SAT/commissioning procedures, spares/tools and O&M manuals.
- Confirm that electrical systems support safe flood passage and emergency drawdown during a single credible equipment failure or loss of normal power.

9.14 Dam Instrumentation, Monitoring and Communications

- Verify instrumentation objectives, types, ranges, accuracy, redundancy, locations, installation details, baselines, thresholds and response actions.
- Confirm PFMA-based monitoring coverage of the main dam, old/new interfaces, foundations, both spillways, left-abutment zone and all six saddle dams.
- Review data acquisition units, telemetry, communications, time synchronization backup power, calibration, lightning/surge protection, data ownership and secure archiving.
- Check compatibility of instrument outputs, control systems, SCADA/HMI, alarms, inspection procedures, O&M arrangements and emergency-action decision thresholds.



9.15 Roads, Drainage, Access and Utility Interfaces

- Review Route Bearer Highway and access-road horizontal/vertical geometry, design speed, profiles, cross-sections, sight distance and reservoir clearances.
- Review pavement design, traffic loading, subgrade/CBR, material sources, drainage, slope stability, erosion and reservoir fluctuation effects.
- Review culverts, bridges, causeways, retaining structures, road safety furniture and connections to existing routes.
- Confirm that roads, utilities and access do not compromise embankment zoning, filters, drainage, spillway flow paths or inspection/emergency access.

9.16 Construction Staging, Diversion, Temporary Works and Constructability

- Review diversion philosophy, coffer dams, temporary conduits, construction-flood criteria, site dewatering and flood-warning arrangements.
- Check sequence of core excavation, old/new tie-ins, foundation treatment, embankment placement, spillway cutover and outlet shutdowns.
- Assess interim failure modes and demonstrate that construction-stage risks are controlled and not allowed to become unacceptably greater than existing risk.
- Review access, plant space, haul roads, borrow processing, quality-control laboratories, material balances, schedule logic and seasonal constraints.
- Identify safety-critical hold/witness points, temporary instrumentation and contingency measures.

9.17 Dam Safety, PFMA, Inundation, O&M and Emergency Preparedness

- Facilitate or independently review PFMA for existing condition, construction stages, reservoir raising/initial filling and long-term operation.
- Review breach parameters, dam-break models, inundation maps, downstream consequences and hazard classification for main and relevant saddle-dam failures.
- Review Construction Supervision and QA Plan, Instrumentation Plan, O&M Plan and Emergency Preparedness Plan for consistency with final design.
- Review surveillance, thresholds, escalation, emergency drawdown, warning/communication and access during extreme events.



- Review staged first filling to the raised reservoir level, hold points, inspections, monitoring criteria, reporting and contingency drawdown.
- Maintain a Dam Safety Issues and Residual Risk Register with owners, controls and required construction/operation follow-up.

9.18 Environmental and Social Design Interfaces

- Check that design incorporates relevant ESIA/ESMP commitments, resettlement boundaries, reservoir-rim impacts, environmental flows and downstream safety measures.
- Review erosion/sediment, spoil, borrow areas, hazardous materials, worker/community safety and access interfaces reflected in technical documents.
- Identify conflicts between technical design and environmental/social commitments; the assignment does not replace formal environmental or social approval.

9.19 Specifications, BoQ, Cost Estimate, Schedule and Tender Documents

- Check correspondence among drawings, specifications, BoQ, method of measurement, cost estimate and construction schedule.
- Review completeness and technical accuracy of general/particular specifications, material and workmanship requirements, tolerances, tests and acceptance criteria.
- Verify quantity take-offs on a risk-based sample, unit descriptions, measurement rules, provisional items and coverage of temporary works and dam-safety plans.
- Review cost-estimate basis, rates, escalation/currency assumptions, contingencies and market availability of specialist equipment/materials.
- Review construction schedule logic, critical path, hydrology windows, procurement/manufacturing lead times, reservoir constraints and commissioning.
- Review bidder/contractor qualification requirements for large-dam, spillway, grouting, hydromechanical, instrumentation, laboratory and specialist subcontracting experience.
- Confirm the tender package is coordinated and does not shift unresolved design decisions to the construction contractor without controlled design responsibility.



9.20 Integrated Interface and Completeness Review

- Maintain an Interface Register covering civil-geotechnical-hydraulic-hydromechanical-electrical-road-environmental boundaries.
- Check elevations, dimensions, loads, openings, embedded parts, access, utilities, construction sequence and document references across disciplines.
- Verify drawing registers, revision consistency, cross-references, design notes, schedules and issue status.
- Confirm that all Component 1 works required for a complete, operable and safe upgraded project are included even if not explicitly listed.

10. Independent Verification Method and Minimum Check Depth

The Consultant shall select check depth according to risk, complexity, uncertainty, novelty and failure consequences. At minimum, every safety-critical design assumption and governing result shall be independently tested by one or more of the following methods:

- independent hand calculations or simplified bounding calculations;
- recreation of critical model cases using the original native model after input verification;
- independent model or alternative recognized method for high-consequence results;
- sensitivity and uncertainty analysis for material parameters, loading and boundary conditions;
- back-analysis against observed existing-dam behavior and instrumentation;
- cross-check against applicable standards, precedent projects and physical plausibility;
- traceability check from design basis to calculations, drawings, specification and BoQ.

Discipline / Component	Minimum Independent Verification
Hydrology / reservoir	Critical PMF/IDF hydrograph and routing; freeboard; gate/outlet availability; climate sensitivity
Main dam raising	At least one governing stability case per stage; seepage/internal erosion; settlement/deformation; old/new interface
Each saddle dam	Site-specific seepage/stability/freeboard check and reservoir-rim continuity



Discipline / Component	Minimum Independent Verification
Spillways 1 and 2	Rating/discharge; flow profile; energy dissipation/scour; structural governing cases; gate outage where relevant
Abutment/shear zone	Geological model, seepage pathway and treatment adequacy
Tunnel/intake/outlets	Hydraulic, structural, rock-support/lining and transient/operability checks
Hydromechanical	Gate/hoist load and capacity; FEM/CFD spot verification; redundancy; FAT/SAT and maintainability
Electrical	Load flow/voltage drop; short circuit; protection coordination; AC/DC/UPS autonomy; cable sizing; earthing/touch-step voltage; control/interlock logic
Instrumentation	PFMA coverage, thresholds, redundancy, data acquisition, telemetry, backup power and response actions
Tender package	Risk-based quantity check; cross-document coordination; unresolved-design review

11. Comment Classification, Response and Closure

Class	Meaning and Required Disposition
S1 - Critical	Could lead to dam failure, uncontrolled release, loss of life, failure to pass design flood, unstable structure or unacceptable construction-stage risk. Must be closed before approval.
S2 - Major	Material non-compliance, unreliable analysis, incomplete investigation, major interface or constructability defect. Must be closed before approval.
S3 - Minor	Does not invalidate the design but requires correction for completeness, coordination, durability, clarity or tender readiness.
S4 - Advisory	Improvement, optimization or good-practice recommendation not required for safety/code compliance.

- Every comment shall identify the document/drawing/model, revision, page/section, discipline, finding, technical basis and required action.



- MEW shall provide a response, exact revision reference and evidence. General responses such as noted, will comply or corrected without references are not acceptable.
- The same responsible reviewer who raised the comment, or an approved replacement, shall verify closure.
- Closed comments shall state the evidence checked, closure date and reviewer. Rejected/withdrawn comments shall have a documented technical reason.
- S1 and S2 comments shall be fully closed before any component or consolidated approval certificate. S3 items may remain only as a controlled minor punch list that does not affect safety or tender/IFC use.

12. Review, Certification and Technical Approval Protocol

- MEW submits a controlled design package with signed transmittal and complete document/native-file register.
- The Consultant performs completeness screening and either accepts the package for review or returns a deficiency notice.
- The Consultant performs discipline and interface reviews, independent checks and site verification and issues the classified comment register.
- MEW revises the design and submits a signed response matrix with all changed documents and consequential revisions.
- The Consultant verifies the revisions, conducts closure meetings and updates component status.
- Responsible discipline experts sign the Component Approval Sheet when acceptance criteria are satisfied.
- The Team Leader and authorized firm representative issue the Consolidated Review Approval Certificate against the frozen final document register.
- Any later change to a certified design is subject to change control and re-review proportional to its effect.



Permitted final status:

- The final certificate shall state either APPROVED (for the defined issue purpose and document baseline) or NOT APPROVED with reasons. Conditional language shall not be used to bypass open S1/S2 findings. A limited S3 punch list may be attached only when it does not affect safety, function, quantities or tender/IFC clarity.
- Certification does not relieve MEW, the original design team, manufacturers, suppliers or construction contractors of their contractual or professional responsibilities. The Consultant remains responsible for the competence, completeness and professional care of its independent review.

12.1 MEW Internal Acceptance and Approval Route

Stage	Minimum Responsibility
1. Project Management Office	Completeness, contractual compliance, consolidated Ministry comments and recommendation for technical review.
2. MEW Technical Board	Technical consideration of the final review report, certificates and residual risks, and recommendation to the competent authority.
3. Director General / Competent Authority	Final Ministry administrative/statutory approval in accordance with delegated authority and applicable requirements.

The Consultant's technical certificate is an independent professional determination. MEW receipt, review or approval does not alter, transfer or reduce the Consultant's review responsibility, nor the original designer's responsibility for the detailed design.



13. Deliverables and Reporting Requirements

Ref.	Deliverable	Due	Minimum Content
D1	Inception Report and Review Management Plan	Week 1	Controlled baseline; work plan; staffing; standards matrix; Annex A/B applicability matrices; initial gaps; independent-check/model plan; QA/QC and communication protocol.
D2	Site Inspection and Existing Dam Condition Assessment	Week 3	Condition findings; photographs; as-built discrepancies; instrumentation/performance review; electrical/HM interfaces; urgent issues; supplemental investigation recommendations.
D3	Design Basis, Data Adequacy and Dam Safety Memorandum	Week 4	Criteria/standards; data reliability; raise level; hydrology/seismic basis; PFMA issues; Annex B electrical design basis; principal decisions and hold points.
D4	Draft Comprehensive Detailed Design Review Report	Week 8	Discipline findings; independent calculations/models; Annex A/B compliance; component assessments; interfaces; consolidated comment matrix; preliminary status.
D5	Review Workshops and Updated Comment / Decision Register	Weeks 8-12	Signed minutes; MEW responses; decisions; updated class/status; actions, owners and deadlines.
D6	Final Detailed Design Review and Comment Closure Report	Week 14	Verification of corrections; final discipline conclusions; compliance; residual risks; tender/IFC readiness; complete closure evidence.
D7	Component and Consolidated Review Approval Certificates	Week 15	Signed certificates for main dam, abutment, both spillways, intake/outlet/tunnel, SD-01 to SD-06, HM, electrical/I&C/instrumentation, road/associated works and consolidated system.
D8	Final Approved Review Record and Electronic Archive	Week 16	Final reports; check calculations; native independent models; signed matrices/certificates; decision log; presentation; indexed electronic archive



13.1 Report Content Requirements

- Executive decision summary and clear approval status for each component.
- Documents reviewed and exact revision/date; reviewers and checkers; site activities and meetings.
- Design basis and adopted standards; data adequacy; assumptions and limitations.
- Independent calculations/models with inputs, outputs, files and reproducible methods.
- Findings by discipline and component; interface conclusions; PFMA/residual-risk implications.
- Complete comment register and closure evidence; unresolved issues and reasoned non-approval where applicable.
- Signed conclusions by responsible discipline leads and Team Leader.

13.2 Submission Formats and Quantities

- one signed hard-copy sets of final reports and certificates, unless the RFP states otherwise.
- complete electronic sets on approved media, together with secure electronic transfer.
- Searchable signed PDF plus editable Word/Excel, CAD, Civil 3D, GIS and native model files.
- Calculation sheets with formulas, input data, software version and read-me instructions.
- A3 or larger drawings in readable PDF and native CAD; reports in A4/Letter as directed by MEW.
- An indexed master document register and checksum/read-only archive of the certified baseline.

14. Assignment Duration and Indicative Work Programme

The base assignment duration is 16 calendar weeks from NTP and applies to the E1 Base Component 1 electrical scope. It assumes that MEW provides the complete controlled detailed-design package, editable/native files and supporting data at commencement, and returns consolidated decisions, responses and revisions within the agreed review windows. The Consultant shall mobilize disciplines in parallel. Major redesign, additional field investigation, physical hydraulic modelling, activation of Option E2 or changes outside the frozen baseline require written change control and shall not be absorbed by weakening the review depth.



Included Review Cycles: The base scope includes the initial review and up to two consolidated comment-closure cycles for each principal submission. Additional cycles caused by incomplete responses, material redesign or changes to the frozen baseline shall be managed through written change control.

Week(s)	Activity
1	Mobilization, baseline control, inception, Annex A/B applicability and initial gap screening
1-3	Initial site mission and existing-dam/HM/electrical interface condition assessment
2-4	Design basis, standards, data, hydrology/seismic, dam-safety and electrical design-basis review
3-8	Parallel discipline review and independent calculations/models
8	Draft comprehensive report and first consolidated review workshop
8-12	MEW revisions, response cycles and focused technical workshops
12-14	Closure checks, targeted verification and final review report
15	Component and consolidated certification
16	Final archive, presentation and closeout

15. Meetings, Workshops and Site Missions

- Kick-off and baseline-control meeting within five working days of NTP
- Initial multidisciplinary Dahla site mission no later than Week 2.
- Design-basis and dam-safety workshop around Week 4.
- Comprehensive discipline review workshop following D4.
- Focused closure workshops during Weeks 8-12, including hydrology/spillway, geotechnical/embankment, hydromechanical and electrical/I&C sessions.
- Targeted second site mission or physical-interface verification before final certification.
- Final decision and archive handover presentation.



16. Required Key Experts and Minimum Qualifications (International)

Ref.	Position	Education	Minimum Relevant Experience
K1	Team Leader / Senior Dam Safety Review Expert	Civil/Dam Engineering; MSc preferred; recognized professional registration	20 years' total professional experience, including 15 years in large dams; led at least three independent design or dam-safety reviews, including one existing large-dam raising, rehabilitation or major modification
K2	Embankment, Geotechnical, Engineering Geology, Foundation and Grouting Expert	Geotechnical/Civil/Engineering Geology; MSc preferred; registration where applicable	15 years in large embankment dams, geological models, foundations, abutments, shear zones, filters, seepage, stability, old/new interfaces, grouting and construction mapping
K3	Hydrology, Flood, Climate and Sediment Expert	Hydrology/Water Resources; MSc preferred	15 years in PMP/PMF/IDF studies, flood-frequency analysis, reservoir routing, freeboard, climate-resilience assessment and sediment studies for large dams
K4	Spillway and Hydraulic Structures Expert	Hydraulic/Civil Engineering; MSc preferred; registration where applicable	15 years in large spillways, hydraulic modelling, gates and outlet interfaces, energy dissipation, cavitation, downstream scour and hydraulic structure design
K5	Seismic Hazard / Earthquake Engineering Specialist	Seismology/Geotechnical/Structural Engineering; MSc/PhD preferred	15 years in PSHA/DSHA, seismic source characterization, spectral time histories, liquefaction and seismic evaluation of large dams; intermittent specialist input acceptable
K6	Structural, Concrete, Tunnel and Outlet Works Expert	Structural/Civil/Geotechnical Engineering; MSc preferred; professional registration	15 years in hydraulic structures, mass concrete, intake/outlet structures, pressure or outlet tunnels, lining and support, bridges, structural rehabilitation and seismic design



Ref.	Position	Education	Minimum Relevant Experience
K7	Hydromechanical Expert	Mechanical/Hydraulic Engineering; professional registration	15 years in gates, hoists, stoplogs, valves, penstocks, embedded parts, FEM, welding/NDT, corrosion protection, FAT/SAT and commissioning
K8	Electrical Power, Protection, Control, SCADA and Communications Expert	Electrical Power/Electronics/I &C Engineering; MSc preferred; professional registration	15 years in station-service systems, switchgear, short-circuit and protection studies, AC/DC/UPS, emergency power, cables, grounding, PLC/SCADA, gate controls, communications and cybersecurity
K9	Dam Instrumentation, O&M and Emergency Planning Expert	Civil/Geotechnical/Instrumentation Engineering	12 years in dam-monitoring systems, instrumentation thresholds, data acquisition, first filling, O&M plans and Emergency Preparedness/Action Plans
K10	Survey, Bathymetry and GIS Expert	Surveying/Geomatics Engineering	10 years in dam surveys, coordinate and datum control, bathymetry, topographic verification, Civil 3D/GIS and terrain-surface modelling
K11	Constructability, Planning, Specifications, BoQ, Cost and Procurement Expert	Civil/Construction Management/Quantity Surveying/Contract; relevant professional qualification	12 years in dam construction staging, diversion and temporary works, schedules, specifications, quantity measurement, BoQ, cost estimates, tender documents and bidder qualification
NK1	Road, Highway and Drainage Specialist — non-key, intermittent	Highway/Civil Engineering; registration where applicable	10 years in mountainous roads, reservoir interfaces, pavement, culverts, bridges, slope protection and road drainage
NK2	Environmental and Social Design Interface Specialist — non-key, intermittent	Environmental/Social/Civil Engineering	10 years in large-dam safeguards, ESIA/ESMP design integration, environmental flows, land/resettlement interfaces and community safety



The proposal shall include an expert input schedule. K1 and all discipline leads shall remain available through comment closure and certification. **One person may fill two roles only where the proposal proves full competence**, adequate input and no conflict, and MEW gives written acceptance.

17. Minimum Qualifications of the Consulting Firm

- Legally registered consulting firm or JV with at least 10 years of professional engineering practice.
- At least two successfully completed assignments in the last 10 years involving independent design review, dam-safety assessment or detailed design of large dams and major hydraulic structures.
- At least one assignment involving raising, rehabilitation or major modification of an existing large embankment dam.
- At least one assignment involving a high-capacity spillway and energy-dissipation/scour-protection works.
- Demonstrated experience with saddle dams/dikes, PFMA, dam-break analysis, instrumentation and dam-safety plans.
- Demonstrated hydromechanical design/review capability for large gates, hoists, valves, stoplogs and embedded parts.
- Demonstrated electrical review capability for dam station services, protection, switchgear, PLC/SCADA, cabling, grounding and emergency power; full power-generation/transmission experience is required only if Option E2 below is activated.
- Documented corporate QA/QC system and professional indemnity insurance meeting the RFP requirement.
- Access to licensed technical software and specialists necessary to reproduce or independently check the Ministry models.

Similarity requirement: Generic irrigation, road, building or small hydraulic structure experience without a substantive large-dam safety and independent-review component shall not satisfy the similar-assignment requirement.



18. Consultant Inputs, Facilities and Logistics

- Provide all professional staff, office facilities, computers, licensed software, communications, travel, accommodation, PPE and security coordination included in the proposal.
- Provide or arrange specialist laboratories/model facilities only when included in the contract or authorized as additional services.
- Maintain a Kabul liaison/contact function and a single authorized focal point for document control.
- Include translation/interpretation necessary for field interaction; technical reports and certificates shall be in English unless MEW specifies bilingual deliverables.

19. Quality Assurance and Quality Control

- Submit a project-specific QA/QC Plan with D1 identifying preparer, independent checker and approver for every deliverable.
- No discipline finding or certificate may be signed solely by the person who prepared the underlying review calculation.
- Use controlled templates, revision history, file naming, software/version and license registers, model input/output registers, validation/calibration records, calculation-check sheets, independent-check signatures and read-me instructions.
- Maintain an audit trail linking each conclusion to evidence, check calculation/model and closed comment.
- Correct Consultant errors or omissions without additional payment and reissue affected deliverables under controlled revision.

20. Health, Safety, Security and Environmental Requirements

The Consultant shall prepare a proportionate mission HSE and security plan, follow MEW/site requirements, conduct task risk assessments and provide suitable PPE. The Consultant shall not enter confined spaces, tunnels, galleries, water-adjacent areas or unstable slopes without approved permits, competent supervision and rescue arrangements. Site observations shall avoid disturbance to operating facilities and communities.

21. Data Ownership, Confidentiality and Cybersecurity

- All assignment-specific reports, comments, calculations, models, certificates and archives become MEW property upon payment, subject to identified pre-existing proprietary methods/software.



- Project information shall be used only for this assignment and disclosed only with MEW authorization.
- Cloud storage, removable media, model transfer and access permissions shall follow MEW-approved controls.
- Final electronic records shall be malware-scanned, indexed and free of password restrictions except where MEW requires controlled protection.

22. MEW Responsibilities

- Appoint an authorized Project Manager and technical focal points.
- Provide available design documents/data and coordinate access to the site, records and Ministry design team.
- Freeze and transmit each review baseline and maintain document/change control.
- Provide consolidated comments, decisions, responses and revised documents within five working days of each formal workshop or review notice, unless another period is agreed in writing. MEW-caused delay shall support a corresponding program adjustment under the contract.
- Arrange management decisions where the Consultant identifies alternatives or unresolved risk acceptance issues.
- Review Consultant deliverables and process accepted payments under the contract.

23. Payment Schedule

A lump-sum, deliverable-based contract is recommended. Payment becomes due only after MEW's written acceptance of the specified deliverable; submission alone does not constitute acceptance. MEW shall issue acceptance or consolidated comments within ten working days after a complete submission. Silence or expiry of the review period does not constitute deemed acceptance.

Each payment request shall include the signed invoice, deliverable acceptance record, updated comment/decision register, applicable tax documentation and confirmation of required S1/S2 closure. Timesheets or expert-input records shall be provided where required by the contract.

Milestone	Payment Basis
1	Acceptance of D1 - Inception Report and Review Management Plan



Milestone	Payment Basis	Share
2	Acceptance of D2 and D3 - Site/condition and design-basis/data/dam-safety reviews	20%
3	Acceptance of D4 - Draft Comprehensive Detailed Design Review Report	30%
4	Acceptance of D6 - Final Review and Comment Closure Report	20%
5	Acceptance of D7 and D8 - Signed certificates and complete final archive	20%

24. Proposal Submission and Recommended Evaluation

24.1 Technical Proposal

- Firm/JV organization and registration, together with signed conflict-of-interest declarations from the firm/JV, each key expert and every proposed subconsultant.
- Relevant assignment sheets with client contacts, scope, dates, contract value and expert inputs.
- Technical approach, review methodology, independent-check strategy and understanding of Dahla-specific risks.
- Work plan, 16-week schedule, discipline interfaces, site missions, workshops and deliverable plan.
- Key expert CVs, signed availability, professional registrations and input schedule.
- Corporate and assignment QA/QC, HSE/security and data-management arrangements.
- List of licensed software and proposed check models, identifying software name/version, license status, validation approach, responsible modeler and independent checker.

24.2 Recommended Technical Evaluation Criteria

Ref.	Criterion	Points
A	Firm/JV relevant experience in large-dam independent review and existing-dam modification	10
B	Adequacy of methodology, Dahla risk understanding, independent checks and work plan	25



Ref.	Criterion	Points
C	Qualifications and relevant experience of key experts	60
D	Knowledge transfer, QA/QC and local coordination arrangements	5
	Total	100

- Recommended minimum passing technical score: 75/100, subject to procurement rules. K1, K2, K4, K5, K7 and K8 should be treated as pass/fail critical positions in addition to scoring.

25. Contract Administration and Professional Liability

- The Consultant shall perform with the skill, care and diligence expected of internationally competent large-dam reviewers.
- Replacement of key experts requires prior MEW approval and an equal or better replacement at no additional cost caused by replacement.
- Subconsultants remain under the Consultant's full responsibility and shall meet independence/conflict requirements.
- Changes in scope, additional investigations, physical modelling, redesign or extended review cycles require written authorization under the contract.
- MEW may reject deficient deliverables and require correction within an agreed period without additional payment for consultant-caused deficiencies.

26. Acceptance and Final Approval Criteria

A component and consolidated design baseline may be certified APPROVED only when all applicable criteria below are satisfied:

Criterion	Required Condition
Controlled baseline	Complete final document/native-file register, revisions and issue purpose frozen.
Data and criteria	Adequate for design; assumptions/limitations identified and acceptable.
Independent checks	Required checks completed, reproducible and supporting the design conclusions.
Safety findings	All S1 and S2 comments closed with verified evidence.



Criterion	Required Condition
Minor findings	Only non-safety S3 punch-list items remain, with owner/date and no effect on quantities or use.
Interfaces	Civil, geological, hydraulic, HM, electrical, road and safeguard interfaces coordinated.
Dam safety plans	PFMA, instrumentation, QA, O&M, EPP/EAP and first-filling requirements consistent with final design.
Tender / IFC readiness	Reports, drawings, specifications, BoQ and schedule are complete for the certified issue purpose.
Signatures	Discipline leads, Team Leader and authorized firm representative sign the required certificates.

Non-approval: If the criteria are not satisfied by the contractual deadline, the Consultant shall issue a reasoned NOT APPROVED notice identifying the exact open items, consequences and actions required. Non-approval is a valid professional deliverable and shall not be suppressed.

27. Knowledge Transfer

- Conduct structured technical sessions with MEW reviewers on hydrology/routing, embankment raising, spillway hydraulics, PFMA and hydromechanical review.
- Explain independent calculations/models and provide editable files and read-me notes.
- Train MEW staff in comment classification, closure evidence, design baseline/change control and certification procedures.
- Provide a final lessons-learned and recommended construction-phase independent review/Panel of Experts roadmap.

28. Services Excluded Unless Separately Authorized

- Preparation of the original detailed design, wholesale redesign of deficient works, or review cycles beyond the two consolidated closure cycles included in the Base Scope.
- Drilling, test pits, laboratory testing, geophysics, underwater inspection or physical hydraulic model testing not expressly included in the contract.
- Construction supervision, resident engineering, contract administration, manufacture inspection or defects-liability services.



- Legal, financial, procurement or statutory approval beyond technical review of qualification, specifications, BoQ and tender readiness.
- Formal environmental/social studies or resettlement implementation, except review of design interfaces.



Appendix A - Minimum MEW Design Submission Dossier



Ref.	Required Design Information	Minimum Format
A1	Signed transmittal and master document register	PDF + editable register
A2	Inception, Interim 1, Interim 2, Draft Final and Final design submissions	Signed PDF + editable reports
A3	Approved design basis and standards matrix	PDF + Word/Excel
A4	Survey, topographic, bathymetric and GIS data	Reports + raw/processed data + Civil 3D/GIS
A5	Geology, geotechnical, geophysical, seismic and materials packages	Reports + logs + lab data + models
A6	Hydrology, PMF/IDF, routing, climate and sediment studies	PDF + datasets + native models
A7	Existing-dam condition, as-built, O&M, incidents and instrumentation history	PDF + drawings + time-series data
A8	Main dam raising and left-abutment treatment package	Reports + calculations + drawings + native models
A9	Separate packages for SD-01 through SD-06	Reports + calculations + drawings + models
A10	Spillway 1 and Spillway 2 packages	Hydraulic/structural reports + models + drawings
A11	Intake tower, trash rack, bridge, tunnel and outlet packages	Reports + calculations + drawings + inspection records
A12	Hydromechanical package	Calculations + FEM/CFD + drawings + schedules + specifications
A13	Electrical package applicable to Component 1: load/short-circuit/protection studies; AC/DC/UPS; switchgear; cables; lighting; fire alarm; grounding/lightning; PLC/SCADA/communications	Reports + calculations + SLDs/schematics + cable/I/O/settings schedules + native study files
A14	Road realignment, access, drainage, bridges and utility packages	Reports + calculations + drawings + quantities
A15	Construction method, diversion, dewatering, staging and schedule	PDF + P6/XER or approved editable schedule

Ref.	Required Design Information	Minimum Format
A16	PFMA, dam-break/inundation, risk and residual-risk registers	PDF + GIS/native model files
A17	Construction QA Plan, Instrumentation Plan, O&M Plan, EPP/EAP and first-filling plan	PDF + editable files
A18	Specifications, BoQ, estimate and bidding documents	PDF + Word + Excel with formulas
A19	MEW internal QA/QC, prior comments and approval records	Signed records + editable matrices



Appendix B - Comment-Response Matrix Template

No.	Document / Rev.	Clause / Drawing	Discipline	Class	Reviewer Finding / Required Action	MEW Response / Revision Evidence	Status
001	[Code / Rev.]	[Ref.]	[HYD/GTE/S TR/HM/etc.]	S1-S4	[Finding, consequence, technical basis and action]	[Response; changed file; exact clause/drawing/model reference]	OPN/RE S/CLD
002							



Appendix C - Component Compliance and Approval Checklist

Check	Acceptance Test	Result	Evidence
Design baseline controlled	Document register complete; revision/date/issue status verified	Yes / No / N/A	[Ref.]
Data adequate	Survey/investigation/monitoring supports design	Yes / No / N/A	[Ref.]
Criteria compliant	Approved standards and load cases applied consistently	Yes / No / N/A	[Ref.]
Independent checks complete	Required calculations/models independently verified	Yes / No / N/A	[Ref.]
PFMA / safety issues addressed	Failure modes and controls reflected in design	Yes / No / N/A	[Ref.]
Interfaces coordinated	Civil/geotechnical/hydraulic/HM/E&I/road interfaces resolved	Yes / No / N/A	[Ref.]
S1/S2 findings closed	No critical or major open comments	Yes / No	[Register]
Tender/IFC documents consistent	Drawings/specifications/BoQ/schedule aligned	Yes / No / N/A	[Ref.]
Residual risks controlled	Register includes owners, actions and hold points	Yes / No	[Ref.]



Appendix D - Component Approval Sheet

Field	Required Entry
Component	[Main Dam / Left Abutment / Spillway 1 / Spillway 2 / Intake-Tunnel-Outlets / SD-01...SD-06 / HM-E&I / Road & Associated Works]
Certified issue purpose	[For Tender / IFC / Other clearly defined purpose]
Controlled final document register	[Register code, revision and date]
Applicable criteria	[Design Basis and standards matrix reference]
Independent checks completed	[List check notes/models]
S1 comments	Total [] / Closed [] / Open []
S2 comments	Total [] / Closed [] / Open []
S3/S4 disposition	[Minor punch list/advisories or none]
Residual risks / hold points	[List or state none beyond final risk register]
Technical status	APPROVED / NOT APPROVED
Discipline expert	Name, registration, signature and date
Independent checker	Name, registration, signature and date
Team Leader concurrence	Name, registration, signature and date



Appendix E - Consolidated Review Approval Certificate

Certificate No.: MEW-DHL-DDR-CER-[###] Revision: [] Date: []	
Project: Upgrading of Dahla Multipurpose Dam - Shah Wali Kot District, Kandahar Province	
Certified issue purpose: [For Tender / IFC / Other]	
Certified design baseline: [Final document register number, revision and date]	
We, [full legal name of Consulting Firm/JV], confirm that we have performed an independent third-party review, verification and certification of the above detailed design in accordance with Contract [number] and this TOR. The reviewed scope comprises the raising/modification of the existing main dam, the left-abutment treatment, Spillway 1 and Spillway 2, six saddle dams SD-01 through SD-06, intake/outlet/tunnel and hydromechanical/electrical/instrumentation works, road and associated safety/tender documents identified in the certified register. Based on the documents, data, independent checks, site observations, Ministry responses and final revisions reviewed, our determination is: TECHNICAL STATUS: APPROVED / NOT APPROVED (delete one). The detailed basis, limitations and any non-safety minor punch-list items are attached to this certificate.	
Signatory	Entry
Team Leader / Senior Dam Safety Expert	[Name / registration / signature / date]
Authorized Firm Representative	[Name / authority / signature / seal / date]
MEW Receipt / Administrative Approval	[Name / title / signature / date - does not transfer reviewer responsibility]



Appendix F - Mapping of Original Dahla Design Stages to Review

Original Design Stage	Principal Content	Third-Party Review Output
Inception	Feasibility review; site visit; gaps; options/configuration; investigation and design work plan	D1/D3 baseline and design-basis review
Interim Report No.1	Hydrology; survey; bathymetry; geology/geotechnics/geophysics; seismic; sediment; materials; infrastructure	D2/D3 data-adequacy and existing-condition review
Interim Report No.2	Main dam raising; six saddle dams; two spillways; intake tower; tunnel lining; abutment shear zone; outlets; HM; instrumentation; electrification	D4 discipline review and independent checks
Draft Final	Integrated calculations, drawings, specifications, BoQ, costs, safety plans, risk, schedule and bidding documents	D4/D5 full integrated review and comment cycles
Final	All MEW comments incorporated; final editable/native package and controlled copies	D6-D8 closure, certification and archive



Appendix G - Indicative Key-Expert Input Schedule (International)



Expert	Indicative Person-Months	Main Input
K1 – Team Leader / Dam Safety	4	Overall coordination, all stages, site missions, risk decisions and certification
K2 – Embankment / Geotechnical / Geology / Foundation / Grouting	3	Main dam, SD-01–SD-06, abutments, foundations, shear zone and reservoir rim
K3 – Hydrology / Flood / Climate / Sediment	2	PMP/PMF/IDF, reservoir routing, freeboard, climate resilience and sediment
K4 – Spillway / Hydraulics	2.5	Spillways 1 and 2, hydraulic modelling, energy dissipation and scour
K5 – Seismic Hazard / Earthquake Engineering	1	Seismic hazard, spectra, time histories and seismic design basis
K6 – Structural / Concrete / Tunnel / Outlet Works	2.5	Spillways, intake, tunnel lining, outlets, walls, bridge and civil interfaces
K7 – Hydromechanical	2	Gates, hoists, valves, stoplogs, penstocks, FEM, FAT/SAT and Annex A
K8 – Electrical Power / Protection / Control / SCADA	2.5	Loads, protection, AC/DC/UPS, cables, grounding, PLC/SCADA and communications
K9 – Instrumentation / O&M / EPP	1	Monitoring, thresholds, first filling, O&M and emergency planning
K10 – Survey / Bathymetry / GIS	1	Datum, bathymetry, terrain/GIS models and survey verification
K11 – Constructability / Planning / Specifications / Cost / Procurement	2	Staging, diversion, schedule, specifications, BoQ, cost estimate and tender readiness
Total Key-Expert Input	21.5	Full review scope within 16 weeks

Expert	Indicative Person-Months	Main Input
Non-Key Specialists	As required	Road/highway and drainage, environmental and social interfaces, materials and specialist modelling

Note: Inputs are indicative for proposal comparison and shall be finalized in the RFP. The Consultant remains responsible for adequate parallel staffing to complete the scope within 16 weeks.



Appendix H - Principal Source and Reference Documents

- MEW, Terms of Reference for Detailed Design of Upgrading the Dahla Dam, Kandahar Water Supply System, Hydropower and Arghandab Irrigation System.
- MEW, Dahla Dam Detailed Design TOR - Hydromechanical Technical Requirements.
- MEW, Terms of Reference for Detailed Design of Dahla Dam - Electrical Technical Requirements.
- World Bank, Good Practice Note on Dam Safety and Appendix 6: Sample TOR for Independent Safety Assessment for Existing Dams.
- World Bank, Appendix 5: Sample TOR for Panel of Experts for New Dam Safety Review.
- USBR, Safety Evaluation of Existing Dams (SEED) and applicable Design Standards.
- USACE, ER 1110-2-1156 Safety of Dams and applicable engineering manuals for spillways and earth/rockfill dams.
- Applicable ICOLD bulletins and the final project-specific Design Basis and Standards Compliance Matrix approved by MEW

Reference Status: The documents listed in this appendix are guidance or source documents unless expressly incorporated into the approved project-specific Design Basis and Standards Compliance Matrix. Where requirements conflict, the Consultant shall identify the conflict and obtain a recorded MEW decision without reducing dam safety requirements.



Appendix I - Annex B Electrical Applicability and Compliance Matrix

Option E1 is the mandatory Base Scope included in the 16-week assignment. Option E2 is excluded from the Base Scope and may be activated only by an express RFP/contract provision, separate pricing, adequate additional staffing and an approved program adjustment. No bidder shall include Option E2 in its base price unless MEW expressly instructs otherwise.

Option	Electrical Scope	Contract Treatment
E1 - Base Component 1 review	Dam/spillway/outlet gate and hoist supplies; essential/emergency AC/DC/UPS; switchboards/MCCs; protection; PLC/SCADA; cables; lighting; fire alarm; grounding/lightning; instrumentation and communications.	Mandatory Base Scope; included in the 16-week assignment
E2 - Full Annex B review	E1 plus two powerhouses, generators/excitation, main and auxiliary transformers, Dahla 110 kV substation, line to Breshna-Kot, grid connection, towers, distribution and LV network.	Excluded from Base Scope; separately activate, price, staff and program

Annex B Ref.	System	Review Applicability / Required Check
B.1	Scope / system boundaries	E1: review only Component 1 and safety/critical interfaces; E2: full Annex B system
B.2	Standards; drawings; calculations; English and local-language O&M	Applicable; verify exact current editions, hierarchy, compatibility and deliverable completeness
B.3	Generators and excitation	E2 only, except auxiliaries/interfaces that affect Component 1 emergency operation
B.4	Main and auxiliary transformers	E1 for dam station-service transformers; full power transformers under E2
B.5	Protection system	Applicable to all included electrical systems; verify studies, settings, selectivity and testability
B.6	Control and monitoring	Applicable to gates, hoists, outlets, dam instrumentation, PLC/SCADA, communications and alarms
B.7	Station service AC/DC	Applicable; verify load, redundancy, battery/UPS autonomy, diesel backup and failure modes



Annex B Ref.	System	Review Applicability / Required Check
B.8	Power/control/communication cables	Applicable; verify sizing, derating, routing, segregation, fire performance and schedules
B.9	Lighting and wiring	Applicable to Component 1 operational, maintenance, access and emergency areas
B.10	Fire detection and alarm	Applicable to control/electrical rooms and Component 1 facilities
B.11	Grounding and lightning protection	Applicable; verify soil data, grid, touch/step voltage, bonding, surge and lightning risk
B.12	Switchgear / switchyard	E1 for Component 1 switchgear/MCCs; 110 kV switchyard under E2
B.13-B.15	Transmission line, towers and distribution	E2 only, except physical/electrical interface points expressly identified by MEW



End of Terms of Reference