Kathmandu Valley Water Supply Management Board
Kathmandu Valley Water Security Improvement Project (KV WaSIP)
Grant Facility for Project Preparation (GFPP)
Terms of Reference for Recruitment of a
Geotechnical Engineer

Assignment	Geotechnical Engineer
Duty Station	Kathmandu, Nepal with frequent Field visit
Contract Duration	17 Months
Full Time/Intermittent	Intermittent for 132 days
Expected Start Date	October 2026

1. Context

Kathmandu Valley anchors Nepal's aspiration for double-digit, jobs-led, inclusive growth. Kathmandu Valley (KV) is Nepal's capital region and home to more than 3 million people. KV is among the fastest growing metropolitans in South Asia, expected to reach 4.5 million by 2041. KV houses a quarter of Nepal's formal jobs, and nearly one in five businesses, and contributes over a third of national GDP (and higher if excluding remittances). KV is already driving Nepal's job-led growth, providing over a quarter of nonfarm employment in promising sectors such as ICT and tourism (KV houses 61% of ICT jobs, and is the gateway to Nepal). But systemic challenges in KV's urban infrastructure and institutions will limit future growth if unaddressed, including heavy traffic congestion and inadequate road infrastructure; limited urban planning and resilient public spaces; a lack of reliable waste management, with almost no wastewater treatment; and a severe water supply shortage.

KV's water supply faces the double challenge of insufficient bulk water and low resilience. Current water supply to the core city is estimated to be about a third of expected demand (average water supply remains around 40 liters per capita per day (lpcd), significantly below the planning standard of approximately 130 lpcd required to ensure adequate and reliable urban service levels). As a result, most households receive water for only about 2 hours a few times a week. The majority of bulk water comes from the Melamchi system, which delivers about 170 million liters per day for part of the year, with plans to increase this supply over the next decade to 510 million liters per day. While reliable estimates of demand have not been conducted, current demand is likely around 490 million liters per day and is expected to increase as the capital's population and economic development grow. Reliance on a single source of bulk water increases the overall vulnerability of KV's water system to disasters, and there is a growing need to increase resilience through additional bulk water options in the event that the Melamchi catchment or bulk water system is affected, as was the case in the 2021 cascade disaster.

The cost of an inadequate water supply is high. Households and businesses supplement municipal water supply through groundwater, public taps, rainwater, or tankers, where possible. People pay up to 4 times the price of public piped water to buy water from vendors. Groundwater has been an overexploited lifeline to the valley, but it faces equity and environmental issues: deep tubewells that hotels, housing colonies, and industries can afford have begun to deplete water tables, drying out shallow tubewells that households rely on and causing land subsidence in parts of the city. The hidden cost of unsafe water is also high. Waterborne diseases are a significant public health concern in KV, with over 60% of households consuming sewage-contaminated water containing E. coli. Common illnesses include typhoid, diarrhea, cholera, dysentery, and jaundice. Risk peaks during the monsoon season (March–September), and contaminated groundwater and jar or tanker water are major sources of infection.

2. Project Description

The proposed KV WaSIP aims to enhance the availability, reliability, and climate resilience of potable bulk water supply for the Kathmandu Valley through the development of a regulated storage-based source on

the Sisneri River in Makawanpur District. The Project responds to the limitation of available river flows, which are insufficient to sustain a run-of-river supply system during the dry season. Earlier studies under the Bagmati River Basin Integrated Master Plan, together with subsequent feasibility and preliminary design work, identified the Sisneri River as a technically viable and strategically important source for augmenting the Valley's bulk water supply.

Based on the latest feasibility assessments, the preferred scheme comprises a storage dam located upstream of the Kogate–Sisneri confluence, with a preliminary crest length of approximately 162 meters and a height of approximately 65 meters. The reservoir is expected to provide an estimated gross storage capacity of approximately 17.77 million cubic meters, including a live storage volume of approximately 15.35 million cubic meters. Preliminary operating levels are defined between a minimum drawdown level of approximately 1,124 masl and a maximum pool level of approximately 1,157 masl. Subject to hydrological conditions, system optimization, and operating rules, the scheme is expected to supply up to approximately 140 MLD during the wet season and approximately 80 MLD during the dry season.

Reservoir regulation is central to the Project design, enabling the capture and regulation of monsoon flows to improve dry-season supply reliability and strengthen long-term water security. Reservoir operations will need to account for environmental flow requirements, sediment management, flood routing, reservoir filling procedures, spillway and outlet operating rules, and potential source augmentation through diversion from the Kogate River and, if required, the Kulekhani Reservoir system. The Project will also include reservoir operation and water balance models to assess system yield under different hydrological and climate scenarios and to establish safe, efficient, and sustainable operating parameters.

The proposed infrastructure includes the dam and reservoir, a dam-integrated raw water intake structure, possible source augmentation works linked to the Kogate River and Kulekhani Reservoir system, and associated ancillary infrastructure, including spillway and outlet works, access roads, power supply, construction camps and staging areas, and administrative and operational facilities. The wider bulk water supply system is expected to include transmission and pumping infrastructure connecting the scheme to downstream treatment and storage facilities, including conveyance arrangements linked to the Sainbu Reservoir system. The intake is proposed to be integrated into the dam structure and designed to accommodate the planned bulk water supply capacity.

Given that earlier investigations were based on limited field data and preliminary site characterization, further technical investigations and validation will be required before final design. These will confirm key hydrological, geological, geotechnical, hydraulic, sedimentation, dam safety, and climate resilience assumptions. The Project will therefore include feasibility confirmation and optimization of dam and reservoir alternatives, followed by detailed engineering design, cost estimates, implementation planning, operation and maintenance arrangements, dam safety documentation, environmental and social risk management inputs, and bidding documents to support construction and implementation.

3. Objectives of the Assignment

As a team member of the Project Management Unit (PMU), the overall objective of this assignment is to provide specialist geotechnical expertise, independent technical review, and quality assurance support to the PMU for the planning, feasibility confirmation, detailed engineering design, and implementation readiness of the KV WaSIP. The Geotechnical Engineer will help ensure that site investigations, geological and geotechnical interpretations, foundation assessments, construction material evaluations, slope stability analyses, and related design inputs for the proposed dam and associated bulk water supply infrastructure are technically robust, risk-informed, constructible, and consistent with applicable national requirements, World Bank requirements, and international good industry practice.

4. Scope of Services

The Geotechnical Engineer shall support the PMU in assessing the adequacy, reliability, and implementation readiness of geotechnical investigations, geological interpretations, engineering assumptions, design inputs, and draft deliverables prepared by the Consultant during the feasibility update and detailed design stages. The expert shall help ensure that the geotechnical aspects of the proposed dam, reservoir, and associated bulk water supply infrastructure are technically sound, risk-informed, constructible, and consistent with applicable national requirements, World Bank requirements, and international good industry practice for dam foundations, slope stability, seepage control, construction materials, seismic resilience, and long-term geotechnical performance.

Specific tasks and responsibilities include, but are not limited to, the following:

- Review[1] and provide technical guidance on geotechnical investigation programs for the proposed dam and associated infrastructure, including drilling, test pits, trenches, in-situ testing, laboratory testing, geophysical surveys, groundwater observations, permeability testing, construction material investigations, and other field investigations required to support feasibility confirmation and detailed design.
- Assess the adequacy, reliability, and completeness of geological and geotechnical interpretations prepared by the Consultant, including foundation conditions, overburden depth, rock mass quality, discontinuities, weathering profiles, permeability, groundwater regime, faulting, seismicity, landslide susceptibility, reservoir rim stability, and other geological hazards relevant to the proposed scheme.
- Review and advise on geotechnical design criteria, assumptions, parameters, analyses, calculations, drawings, and recommendations related to dam foundations, abutments, spillway and outlet works, diversion arrangements, intake structures, service reservoirs, access roads, slopes, and other associated infrastructure.
- Review the suitability, adequacy, and constructability of proposed foundation treatment and seepage control measures, including excavation and foundation preparation, dental treatment, grouting, cut-off arrangements, drainage provisions, filters, seepage blankets, internal erosion and piping protection, uplift control, and related monitoring requirements.
- Review geotechnical analyses related to slope stability, excavation stability, settlement and deformation, bearing capacity, seepage and uplift, internal erosion, liquefaction where relevant, reservoir-induced effects, and seismic performance, and advise on required mitigation measures and design refinements.
- Review the assessment of construction materials and borrow areas, including the suitability, availability, quantity, quality, testing requirements, processing needs, and haulage implications of materials for embankment zones, filters, drains, rockfill, aggregates, concrete, riprap, and other construction uses.
- Advise on the geotechnical implications of material availability and quality for dam type selection, zoning, construction specifications, quality control requirements, construction methodology, cost, schedule, and long-term performance.
- Support the PMU in identifying, evaluating, and tracking geotechnical risks affecting the scheme, including foundation uncertainty, adverse geological conditions, slope instability, landslides, reservoir

[1] For the purposes of this TOR, "review" means the systematic examination of a document, design, deliverable, or process to assess its quality, completeness, accuracy, consistency, and compliance with applicable requirements, and to provide clear comments and recommendations for improvement, where needed.

rim instability, weathering, seismic vulnerability, seepage and piping risks, settlement and deformation, material shortages, and construction-related geotechnical risks.

- Review the geotechnical adequacy of dam safety and monitoring provisions, including instrumentation concepts, performance thresholds, baseline data requirements, seepage monitoring, groundwater monitoring, deformation monitoring, reservoir filling controls, construction-stage monitoring, and long-term surveillance arrangements.
- Provide geotechnical inputs to key dam safety and operational documents, including the Dam Safety Plan, Construction Supervision and Quality Assurance Plan, Instrumentation Plan, Operation and Maintenance Plan, Emergency Preparedness Plan, reservoir filling plan, and other relevant procedures.
- Review geotechnical aspects of associated infrastructure and project interfaces, including access roads, service reservoirs, camp and staging areas, spoil disposal areas, slope stabilization works, flood protection measures, power supply corridors, transmission alignments, and other ancillary facilities, ensuring that geotechnical constraints and mitigation measures are reflected in design and implementation planning.
- Provide technical input on implementation readiness from a geotechnical perspective, including construction sequencing, excavation methods, foundation preparation, temporary works, slope protection, material handling, borrow area development, spoil disposal, interface management, construction QA/QC, and contractor monitoring requirements.
- Review the technical adequacy of bidding and procurement documents related to geotechnical works, including specifications, drawings, bills of quantities, investigation requirements, material testing provisions, method statement requirements, instrumentation requirements, and contractor qualification criteria.
- Coordinate closely with specialists across geology, hydrology, hydraulics, dam engineering, structural engineering, electromechanical systems, environmental and social risk management, conveyance, treatment, storage, and distribution disciplines to ensure that geotechnical considerations are properly integrated into the overall scheme and resolved in a timely manner.
- Provide structured review comments, practical recommendations, technical briefs, and quality assurance support to strengthen geotechnical outputs, improve PMU decision-making, and support institutional capacity building and knowledge transfer relevant to geotechnical risk management, dam safety, construction readiness, reservoir operation, and long-term asset performance.

5. Expected Outputs

The Geotechnical Engineer will be responsible for the following key deliverables:

- Inception Note outlining the geotechnical review methodology, work plan, QA/QC procedures, and key geotechnical risks and priorities.
- Technical review reports on geotechnical investigations, geological interpretations, foundation conditions, groundwater regime, seismicity, landslide susceptibility, and reservoir rim stability.
- Independent assessment and recommendations on geotechnical design criteria, foundation treatment, seepage control measures, slope stabilization, excavation support, and geotechnical risk mitigation.
- Review of soil and earth materials and borrow area investigations, including material source, suitability, availability, quality, quantity, testing requirements, and implications for dam design and construction.
- Technical review of geotechnical analyses related to stability, settlement, deformation, seepage, uplift, liquefaction, seismic performance, and long-term dam safety.

- Inputs and recommendations for dam safety documentation, including the Dam Safety Plan, Construction Supervision and QA Plan, Instrumentation Plan, Reservoir Filling Plan, O&M Plan, and Emergency Preparedness Plan.
- Technical support for implementation readiness and procurement, including review of specifications, drawings, BOQs, contractor requirements, construction methodologies, QA/QC provisions, and geotechnical monitoring requirements.
- Consolidated geotechnical review reports, risk registers, technical briefs, presentations, and final recommendations to support PMU decision-making, dam safety, construction readiness, and long-term asset performance.

6. Qualifications and Experience Requirements

All applications will be evaluated against the assignment's required qualifications (Table 1).

Candidates who comply with the qualifications will be scored according to predefined criteria. A minimum of three candidates will be shortlisted and interviewed. The candidate with the highest score will be invited to negotiate a contract. Referees of the selected candidate may be contacted to verify prior experience, performance, and interpersonal skills.

The Geotechnical Engineer shall possess strong academic qualifications and demonstrated professional experience relevant to geotechnical engineering, dam foundations, slope stability, seepage control, construction materials, and multidisciplinary technical review of major water infrastructure projects. The expert should have proven capability to assess the adequacy of site investigations and geotechnical analyses, review engineering assumptions and design inputs, and advise on constructability, dam safety, geotechnical risk, and long-term performance of dam and associated bulk water supply infrastructure.

Table 1. Qualifications and Relevant Experience

Education	• The expert shall hold at least a bachelor's degree in civil engineering, geotechnical engineering, geological engineering, engineering geology, water resources engineering, or a related discipline. • A master's degree in geotechnical engineering, engineering geology, dam engineering, or a closely related field is required, and a PhD will be considered an added advantage.
Work Experience	• At least 15 years of relevant geotechnical engineering experience, including site investigations, dam foundation assessment, and design review or implementation support for major water resources, dam, or bulk water infrastructure projects. • Demonstrated expertise in geotechnical assessment and design review for large dams and associated infrastructure, including foundations, abutments, slopes, spillways, outlet works, access roads, reservoirs, and related facilities. • Proven capability in interpreting geotechnical investigations and advising on dam safety, long-term performance, and construction materials, including seepage, grouting, slope stability, seismic effects, monitoring, borrow areas, and constructability.
Interpersonal Skills	• The expert shall have strong analytical, report writing, and communication skills, and shall be able to communicate clearly and effectively in spoken and written English.

7. Evaluation and Selection Method

The Geotechnical Engineer will be hired by the PMU using the Open Competitive Selection of Individual Consultants method following "**World Bank Procurement Regulations for Investment Project Financing Goods, Works, Non-Consulting and Consulting Services**" (July 2016) Seventh Edition 2025.[2]

The attention of interested Consultants is drawn to Section III, paragraphs 3.14, 3.16, and 3.17 of the World Bank's "Procurement Regulations".

8. Duration of the Assignment

The Geotechnical Engineer is expected to provide support to the PMU for an expected input of 132 person days during a 17 month project period on an intermittent basis. The Project Manager shall plan the inputs of the Engineer based on the project schedule and report deliverables of the Design Consultant.

9. Remuneration

A market-based salary package commensurate with the candidate's experience and qualifications will be offered.

10. Reporting

The Geotechnical Engineer will report directly to the Project Manager, PMU.

11. Location

- The Consultant will be based at the PMU office and may be required to travel outside the valley as needed for project-related procurement activities.
- The Project shall provide following facilities to consultant during his tenure of service:
    - Office space
    - Email and internet access
    - Required office stationery and other materials
    - Photocopying/printing facilities

12. Application Process

Interested candidates shall submit a complete application package comprising:

(i) Up-to-date curriculum vitae (CV).
(ii) Copies of academic and professional certificates.
(iii) Contact details for at least three (03) professional references familiar with the candidate's relevant work.

Applications shall be submitted electronically no later than 17.00 PM on 11th September 2026 to the following e-mail address: sisnerikvwsmb@gmail.com. Only complete applications received by the deadline will be considered.

[2] The World Bank Procurement Regulations can be accessed via this link.