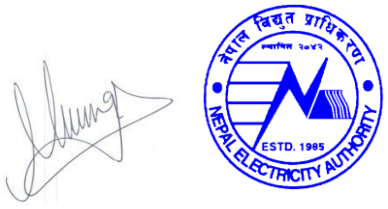
Expression of Interest
(EOI)

Consulting Service
for
Detailed Engineering Design and Preparation of Tender Documents

International Competitive Bidding
(ICB)

Project Name : Sunkoshi 3 Hydropower Project
EOI :SU-3/80/81/EoI-1
Office Name : Nepal Electricity Authority
Office Address: Durbarmarg, Kathmandu
Issued on : 10th January ,2024

Financing Agency: Government Budget



Abbreviations

CV	-	Curriculum Vitae
DO	-	Development Partner
EA	-	Executive Agency
EOI	-	Expression of Interest
GON	-	Government of Nepal
PAN	-	Permanent Account Number
PPA	-	Public Procurement Act
PPR	-	Public Procurement Regulation
TOR	-	Terms of Reference
VAT	-	Value Added Tax

Contents

A. Request for Expression of Interest

Government of Nepal
[Nepal Electricity Authority]

Date: 10th January, 2024

Name of Project: Sunkoshi 3 Hydropower Project

1. Government of Nepal (GoN) and Nepal Electricity Authority (NEA) have allocated fund **toward the cost of** Sunkoshi 3 Hydropower Project and intends to apply a portion of this **fund** to eligible payments under the Contract for which this Expression of Interest is invited for **International Consulting Service**.
2. The **Nepal Electricity Authority** now invites Expression of Interest (EOI) from eligible consulting firms ("Consultant") to provide the following consulting services:
   Detailed Engineering Design and Preparation of Tender Documents
3. Interested eligible consultants may obtain further information and EOI document free of cost at the address **Durbar Marg, Kathmandu, Nepal** during office hours on or before **[insert date and time]** or visit e-GP system www.bolpatra.gov.np/egp or visit the client's website **www.nea.org.np**.
4. Consultants may associate with other consultants to enhance their qualifications.
5. All submittals from the Consulting Firm shall be in **English Language**.
6. All the submitted reference projects should be completed and commissioned by the date of submission of EoI. Not commissioned projects shall not be considered for the evaluation.
7. Expressions of interest shall be delivered online through e-GP system www.bolpatra.gov.np/egp on or before 12 hrs. local time on 14th February, 2024.
8. EoI must also be delivered along with one copy in hard copy, a copy in USB drive as softcopy to the address mentioned below (In person or by courier) within 15 days from the last date of submission of EoI.
   Project Development Department,
   Engineering Service Directorate,
   Nepal Electricity Authority,
   Durbarmarg,Kathmandu, Nepal
   Email: info@nea.org.np
9. In case the last date of obtaining and submission of the EOI documents happens to be a holiday, the next working day will be deemed as the due date but the time will be the same as stipulated.
10. EoI evaluation is based on **Qualification 30%, Experience 60 %, and Capacity 10%** of Consulting Firm and Key Personnel. Based on evaluation of EOI, only shortlisted Firms will be invited to submit Technical and Financial proposal through a Request for Proposal (RFP).
11. A Consulting Firm will be selected under **Quality and Cost-Based Selection (QCBS)** method.
12. The client reserves the right to reject any or all of the application for EoIs at any stage without assigning any reason whatsoever and without incurring any liabilities to the affected applicant(s). The client will not be responsible for any cost of expenses incurred by the firms in connection with the preparation or delivery of the EoI.

Instructions for submission of Expression of Interest

1. Expression of Interest may be submitted by a sole firm or a joint venture of Consulting Firms and the maximum number of partners in JV shall be limited to three.
2. Interested Consulting Firms must provide information indicating that they are qualified to perform the services (descriptions, organization and employee and of the firm or company, description of assignments of similar nature completed within the last 7 years and their location, experience in similar conditions, general qualifications and the key personnel to be involved in the proposed assignment).
3. This Expression of Interest (EOI) is open to all eligible **consulting firm/ company/ organization.**
4. The assignment has been scheduled for a period of **24 months.** Expected date of commencement of the assignment is **2025/01/21.**
5. A Consulting Firms will be selected in accordance with the **ICB** method.
6. Expression of Interest should contain following information:
   (i) A covering letter addressed to the representative of the client on the official letter head of company duly signed by authorized signatory.
   (ii) Applicants shall provide the following information in the respective formats given in the EOI document:
      - EOI Form: Letter of Application (Form 1)
      - EOI Form: Applicant's Information (Form 2)
      - EOI Form: Work Experience Details (Form 3(A), 3(B) & 3(C))
      - EOI Form: Capacity Details (Form 4)
      - EOI Form: Key Experts List (Form 5)
7. Applicants may submit additional information with their application but shortlisting will be based on the evaluation of information requested and included in the formats provided in the EOI document.
8. The Firms submitting EOI as JV partners, if short – listed, must submit their proposals in the same JV name while submitting Technical and Financial proposal based on RFP. The references and qualification documents submitted from their parent or subsidiary companies shall not be considered for their evaluation.
9. Consulting Firms' work experiences shall be evidenced by duly certified (by Authorized Agency) and notarized copies of client's references with contact name, number and email addresses on the letterhead of the client's organization and shall be written in English. If the references are in other languages then English, it shall be accompanied by an accurate translation into the English language duly authenticated by notary agencies or the nationally /internationally recognized translating body / agency. Any experiences without client's/employer's reference shall not be considered for evaluation.
10. The Expression of Interest (EOI) document must be duly completed and submitted **"by electronically only using the forms and instructions provided by the system" and / by hand / by courier in sealed envelope"**

11. The sealed envelope shall be clearly marked as “EOI Application for Short-listing for the **Sunkoshi 3 Hydropower Project.** The Envelope shall also clearly indicate the **name and address of the Applicant**.
12. The completed EOI document must be submitted on or before the date and address mentioned in the **“Request for Expression of Interest.”** In case the submission falls on public holiday the submission can be made on the immediate next working day. Any EOI Document received after the closing time for submission of proposals shall not be considered for evaluation.

B. Objective of Consultancy Services or Brief TOR

Terms of Reference

for

Consulting Services for Detailed Engineering Design and Preparation of Tender Documents of Sunkoshi-3 Hydropower Project (683 MW)

Background

Sunkoshi-3 (SU-3) Hydropower project was identified during the master plan studies of the Koshi basin. The study focused on the water resources development of the same river basin which was conducted by the Japan International Cooperation Agency (JICA) in 1985 AD. SU-3 was identified as the storage project during that study. Joint Venture (JV) of ERMC (P.) Ltd. and SIDRI Co. Ltd has undertaken the Feasibility and Environmental study of the Sunkoshi-3 Storage Project under the contract agreement with the Department of Electricity Development, Ministry of Energy, Water Resources and Irrigation, Government of Nepal signed on the 11th of May 2017 (2074/01/28).

The proposed Sunkoshi-3 Hydropower project is located in the Kavre and Ramechhap districts of Nepal in Bagmati Province. The dam site is located at the boundary between Temal Rural Municipality of Kavre District and Khadadevi Rural Municipality of Ramechhap District. The proposed project area lies at an elevation between 535 m to 700 m above mean sea level. SU-3 HPP is located in the northeastern part of Nepal, about 95 km from the capital city, Kathmandu. The total length of the reservoir area is about 45.5 km. The project boundary lies in between 27° 29' 30" N to 27° 45' 30" N and 85° 35' 55" E to 85° 50' 00" E. The latitude, longitude and altitude of the SU-3 HPP dam site is 27° 29’ 50.5” N, 85° 48’ 14.3” E and 568 m, respectively. The latitude, longitude and elevation of powerhouse site 27°29'27"N, 85°48'14"E and 564 m, respectively.

In this backdrop, Nepal Electricity Authority (NEA) desires to procure the services of internationally recognized consulting firm ("Consultant") having competent team of specialists to perform Detailed Engineering Design and Preparation of Tender Documents for development of Sunkoshi-3 Hydropower project. All services of the Consultant described in the following shall be performed in close co-operation with NEA, the Project Executing Agency. This Terms of Reference (TOR) attempts to outline the Consultant’s tasks during execution of the services as detailed as possible. However, the Consultant shall note that the list of tasks and activities can by no means be considered as the complete and

comprehensive description of the Consultant's duties. It is rather the consultant's responsibility to critically verify the scope of services indicated and to extend, reduce or amend it wherever he deems necessary, according to his own professional judgment and the knowledge he will acquire during preparation of the proposal. It is understood that the Consultant performs all works as necessary to fulfill the objectives of the Project.

Objective

The main objective of present study is to prepare the project for early implementation of Sunkoshi-3 Hydropower project from the current stage of Feasibility Study. The overall objective of the consulting service is to carry out Detailed Engineering Design along with necessary field investigation works and to prepare tender documents inclusive of tender drawings and construction plan to meet NEA, Government of Nepal and lending multilateral agencies requirements for construction of the project.

The specific objectives of the consulting services are outlined as follows:

- Review of Feasibility Study and other available relevant reports/data, documents and identify the gaps in data,
- Prepare topographic maps for dam site, powerhouse site and other project areas as necessary,
- Conduct geological and geotechnical studies/ investigations,
- Update hydrological and sedimentological studies,
- Conduct power evacuation study,
- Prepare Detail Engineering Design of the project components,
- Prepare quantity and cost estimate and construction plan,
- Prepare complete tender documents and tender drawings,
- Prepare updated economic/financial analysis based on detailed project cost, refined implementation schedule, risk analysis, etc.
- Analyze financial structure, financing plan and recommend the most appropriate structure/plan

- Analyze and recommend appropriate institutional arrangement for project implementation,

The Client intends that the Consultant appointed to this role for carrying out the Detail Engineering Design and preparation of Tender Documents of the project shall comply with the standard requirements practiced in this industry for the project of this size and magnitude. Final review and approval of the Consultant's work shall be done by the Client or any independent consultant authorized by the Client.

Project Information and Previous Studies

Following Project Information are based on the Feasibility Study and Environmental Impact Assessment of the project carried out in 2021.

Location & Access

SU-3 HPP is a multipurpose storage project with an installed capacity of about 683 MW. The project site is located in Kavrepalanchwok, Ramechaap and Sindhupalchowk District of Bagmati Province of Nepal. The dam site and powerhouse are located at the boundary between Temal Rural Municipality of Kavre District and Khadadevi Rural Municipality of Ramechhap District. Similarly, the Reservoir area lies in Bhumlu Rural Municipality of Sindulpalchwok District. The project boundary lies in between 27° 29' 30" N to 27° 45' 30" N & 85° 35' 55" E to 85° 50' 00" E. Japan International Cooperation Agency (JICA) updated the Master plan for Water Resources Development of the Koshi Basin in 2014, and the location was moved to the downstream 1.5km of the confluence of Chauri Khola River and Sunkoshi River, and the coordination is Longitude 85°48' 14.3" Latitude 27°29' 50.5" which is 4 km downstream of the location in JICA 1985. Please refer to the Figure below for the previous and updated dam site of SU-3.

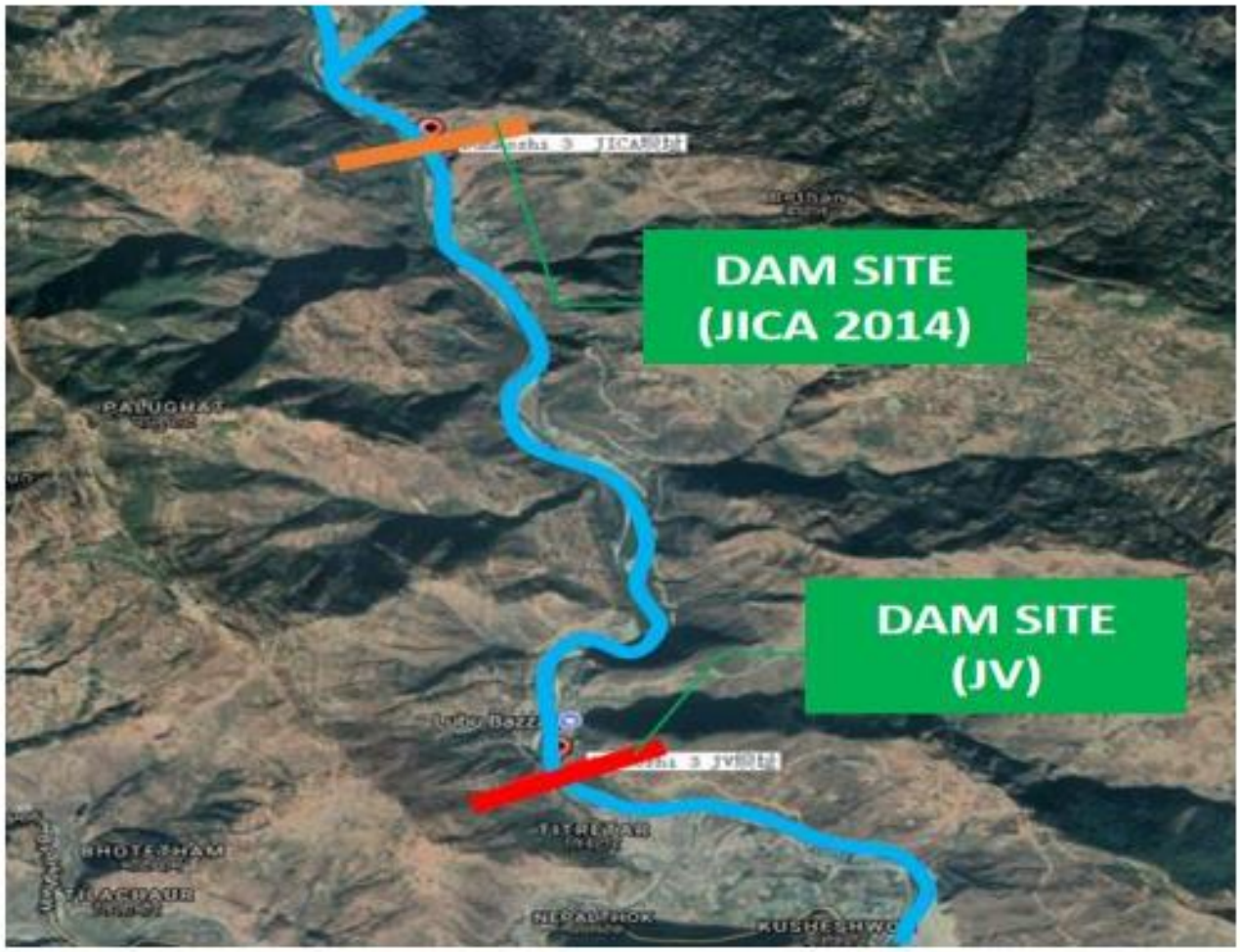


Figure 1: Location map of JICA and DoED dam site

The dam site is near Parsel Village, just upstream or downstream of the confluence of Chauri Khola and Sunkoshi River, and is about 20 kilometers away from the town of Dolalghat. The dam site is located at the border of the Parsel VDC in Kavrepalanchok District and the Madan Kudari VDC in Ramechhap District. The site is 5 kilometers downstream of the Pachuwar Village and is only about 1 kilometer away from the earthen road built along with the Village. The dam site can be reached in about 6 hours from Kathmandu via the Araniko Highway. The Pushpalal (Mid-Hill) Highway also traverses nearby the project core area, and is only about 5 kilometers away.

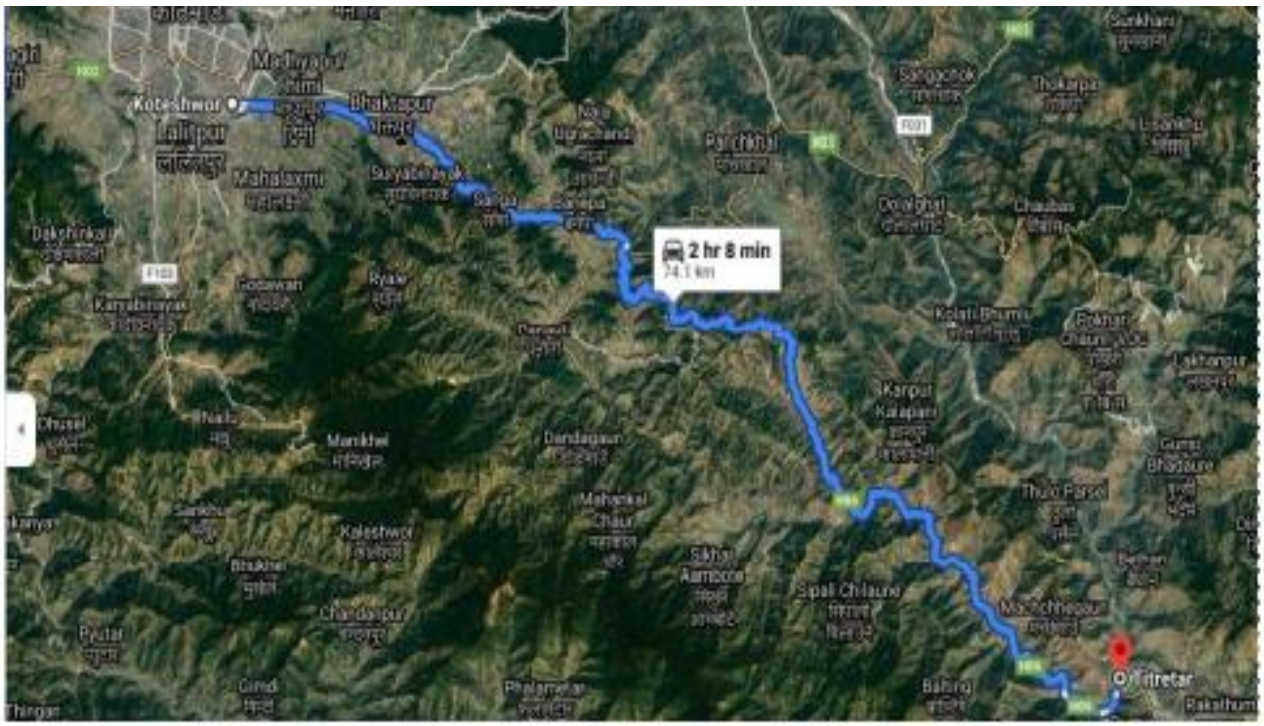


Figure 2: Location of Damsite of SU-3 HPP

Previous Studies

From 1983 to 1985, JICA identified 52 hydropower projects on the Sun Koshi River and the Sapta Koshi River, and 36 projects were planned on the Sun Koshi River, of which 13 multifunctional hydropower projects were listed as priority projects. The Plan for Sun Koshi River is presented by JICA in its planning report in 1985. The cascade projects are Sun Koshi 3 (SU-3), Sun Koshi 2 (SU-2) and Sun Koshi 1 (SU-1) respectively. The project boundary of Sun Koshi 3 Hydropower project lies in between 27° 29' 30" N to 27° 45' 30" N & 85° 35' 55" E to 85°50'00" E.

JICA updated the Master plan for Water Resources Development of the Koshi Basin in 2014, and the location was moved to the downstream 1.5km of the confluence of Chauri Khola River and Sunkoshi River, and the coordination is Longitude 85°48' 14.3"Latitude 27°29' 50.5" which is 4 km downstream of the location in JICA 1985.

Joint Venture (JV) of ERMC (P.) Ltd. and SIDRI Co. Ltd has undertaken the Feasibility and Environmental study of the Sunkoshi-3 Storage Project under the contract agreement with the Department of Electricity Development, Ministry of Energy, Water Resources and Irrigation, Government of Nepal (signed on the 11th of May 2017 (2074/01/28)) and submitted their report on 2021.

Site Investigation and studies

During the Feasibility and Environmental study of the Sunkoshi-3 Hydropower Project undertaken in 2021, various site investigations including topographic surveying and mapping, regional structure survey, Geological surveying and mapping, Drilling, Geophysical prospecting, Laboratory test, In-situ test, geologic investigation, site specific seismicity studies, Hydrology and sedimentology studies and socioeconomic and environmental field data collection programme, and so on were carried out.

The geological and geotechnical investigations carried out for the underground works comprises five elements: geological mapping, geophysical survey, core drilling, and rock testing. The investigation includes about 980 m of exploratory core drilling, Electric Resistivity Tomography (2D ERT) survey totaling to about 3,100.5 m. Points of particular interest are angled drilling under the river.

Hydrology and Meteorological analysis

Daily stream flow records for a 51 years period were available at stations 630 which was used for the hydrological analysis during Feasibility and Environmental study of the Sunkoshi-3 Storage Project. The catchment area and the annual average flow at the dam axis (pre dam condition) are 5243 km2 and 232.3 m3 /s. The PMP and the PMF for the SU-3 HPP was 267.01 mm and 9707 m3 /s respectively. The result of the sediment analysis conducted by using the measured flow only suggests that the specific sediment yield (suspended) for SU-3 HPP is 1663.98 ton/km2 /year when the dry season and wet season rating curve are used and 1656.33 ton/km2 when overall rating curve is used. However, the recommended value opted for the project is 3738 ton/km2 /year.

Sedimentation

Sediments produced by various mass wasting activities in the Sunkoshi River Basin ultimately deposits in the reservoir. Flash flood of 2016 in Bhotekoshi, landslide damming at Jure in 2014 are mega events in the Sunkoshi Basin. Such events are inevitable in future and add tremendous amount of sediment in the reservoir. Tributaries such Balephi, Indrawati, Cha Khola, Jhiku Khola, Chauri Khola and Gopi Khola and their tributaries contribute significant amount of sediments in the reservoir. Increase in pore water pressure due to inundation on the hill slopes may trigger mass wasting activities supplementing sediments in the reservoir.

In December of 2017 during Feasibility study; Consultant started to set up a temporary hydrometric station at dam site reach of SU-3 HPP for sediment observation. In flood season,

sampling is conducted twice a day and once more when river water is turbid in order to better control of the sediment inflow process. In non-flood season, the sampling is conducted once a week. Based on the short data records from December 2017 to May 2019, the sediment analysis has been conducted. The precipitation data from the nearby station also has been collected for the reference.

The sediment analysis has been conducted in two stages in Feasibility study. Firstly, all the measured sediment data has been collected corresponding to the measured discharge at the dam site (by using current meter). Then the rating curve has been developed by using all the dry and wet season data. In addition, the separate dry season and wet season rating curve has been developed and quantify the difference between the overall rating curve sediment evaluation and the season wise rating curve sediment evaluation

The result of the sediment analysis conducted by using the measured flow only suggests that the specific sediment yield (suspended) for SU-3 HPP is 1663.98 ton/km2 /year when overall rating curve is used and 1656.33 ton/km2 /year when the dry season and wet season rating curve are used.

The specific sediment yield of SU-3 HPP site is estimated to be 4486 t/km2 /year. Trapping efficiency is 94%, it is gotten from the experience curve which is drawn on the basis of many reservoirs in America and China. The life of reservoir of SU-3 HPP is estimated to be 51 years. Moreover, the model has been built by SUSBED-2 and Hec-Rac for reservoir sedimentation study.

Geology, Seismology and Construction Materials

Geology

In December 2017, desk study and survey were started for the feasibility study stage of the project. In May 2019, geological mapping and drilling at Sunkoshi-3 hydropower stations were completed.

As part of geotechnical investigation, drilling was performed on various locations of the project site. Core drilling was performed using the conventional rotary type drilling and telescopic method. Water was used for the flushing and the samples were collected using different core bits and barrels which are carefully analyzed by geologist.

2D-ERT (Electrical Resistivity Tomography) survey was carried out in Sindhuli, Kavrepalanchowk and Ramechhap district along the Sunkoshi River for the indirect subsurface exploration of geological formations.

The Dam site

The dam site area is a middle-low mountainous and canyon area, which is V- shaped wide valley. There are residual class III terrace on both banks. The dam site is located about 1 km upstream from the intersection of the Sunkoshi River and Roshi Khola. The Sunkoshi River flows into the dam site from north to south, and transits to SEE direction. The terrain of the dam site is flat, and the ground elevation is about 537.0~541.0 masl. Wide flood plains are distributed on the left bank of the dam site and downstream at right bank. Valley floor width is about 200 m, overburden thickness is about 25～66 m, and bedrock elevation is about 516.0～475.0 masl. Dam front on the left bank is stripe ridge held between Gopi Khola tributary and Sunkoshi River. Overall distribution is nearly EW direction. Mountaintop elevation is 790.0~810.0 masl. Overall strike of the left bank slope is NE. The gradient is steep and about 40°~60°. Slope crest is gentle. No large gully is developed on the slope face. The terrain is intact. The elevation of right bank mountaintop exceeds 1200.0 masl. The right bank slope face is straight. The gradient is steep, and mostly 40°~60°. Five small gullies are developed on the slope face. The terrain is intact. Vegetation on both banks of the dam site area is mainly composed of low shrubs and grasses. The vegetation is flourishing during rainy season, and coverage is high. The vegetation is dry during dry season, and coverage is poor. There is a lot of exposed bedrock on the slope face of both banks. The riverbed flood plains and some slope faces are covered by Quaternary alluvial deposits, residual talus deposits or colluvium.

Reservoir Area:

The reservoir area comprises of deposits of residual soil, colluvium, and alluvium along with rock outcrops of different rocks of the Nawakot Complex and Kathmandu Complex. The main rock types found in the area are schist, gneiss, phyllite, metasandstone, quartzite, and dolomite. Rock mass rating (RMR) of Bieniawski (1989) was carried out at six locations along this river. Unadjusted RMR value ranges between 55 and 86 suggesting fair rock (class III) to very good rock (class I). The dam site area is middle-low Mountain and canyon area, which is V shaped wide valley. There are residual Class III terrace on both banks. The dam site is located about 1km upstream the intersection of Sunkoshi River and Roshi Khola. Sunkoshi River flows into the dam site from north to south, and transits to SEE flow direction. The terrain of the dam site is flat, and the ground elevation is about 537.0~541.0 m. Wide flood plains are distributed on the left bank of the dam site and downstream its right bank. Valley floor width is about 200 m, overburden thickness is about 25～66 m, and bedrock depth elevation is about 516.0～475.0 m.

Seismology

Field based seismic hazard analysis has also been carried out for the Sunkoshi-3 Hydropower Project. Two techniques have been applied to evaluate the seismic hazard:

- Probabilistic Seismic Hazard Analysis (PSHA)
- Deterministic Seismic Hazard Analysis (DSHA)

Seismic hazard assessment shows OBE-1 as 0.4g and MCE as 1.32g.

Construction Materials

Concrete aggregate of this project and sand gravel material required for dam filling will come from a gravel material yard downstream the dam site, which is 8 km~11 km from the dam site. The reserve of sand gravel in this material yard is 38.64 million m3. The mining thickness of the material yard is large, and there is an all-weather road, which creates conditions for mechanized mining. Gravel earth material for this project comes from an earth material yard downstream of the dam site, which is 5 km~16 km from the dam site. There are a total of four material yards, with total reserve of about 4.065 million m3. The block stone material for this project comes from the left bank of Roshi Khola tributary downstream the dam site. The material yard is a strip-shaped mountain close to Dumja Local Road, transport conditions are good, and haul distance is about 20km.

A construction material market in Kathmandu is the main source of external construction materials for the project. Materials other than those that can be sourced locally will be imported from India or China. According to investigation, there are only few cement manufacturers in Nepal. In addition to local qualified cement, the cement required for this project will be imported from India. Rebars will be imported from India. Section steel and steel will be imported from India or China. Pyrotechnic materials will be provided by Nepal military. Oil will be imported from India. Other construction materials will be purchased in Kathmandu. To sum up, cement and additives of SU-3 HPP are mainly from India and can be purchased through local suppliers, they can be transported to the project area by highway. Concrete aggregate of this project will come from a gravel material yard downstream the dam site, which is 8km~11km from the dam site. The reserve of sand gravel in this material yard is 38.64 million m3. The mining thickness of the material yard is large, and there is a road already, which creates conditions for mechanized mining

Laboratory tests were conducted to determine physical properties of materials. Construction materials are adequate both in quality and quantity for dam construction.

Project Configuration and General arrangement

Impervious core wall rock-fill dam is arranged in the main riverbed of the project; open

spillway is arranged on the ridge of the left bank, and uses trajectory bucket type energy dissipation mode;

flood discharge and sediment sluicing tunnel is arranged on the right bank in combination with diversion tunnel, and uses energy dissipation by hydraulic jump mode; the diversion system of the power station is arranged on the right bank, intake tunnel is separately excavated and formed, cylindrical tower intake is used, and 2 layers of water intake is provided; power plant is arranged on the right bank shore about 1km downstream the dam axis, and is a ground surface powerhouse.

Main Dam

The impervious core rockfill dam has the maximum dam height of 180 m and a dam crest axis length of 538 m. The spillway is located on dam abutment of left bank. The controlling section is provided with a 5-opening crest outlet, 12 m wide each opening. The weir crest is at the elevation of 685.00 masl and each opening is controlled by a 12m×15m (width x height) radial gate. The tunnel for flood discharge and sand flushing is arranged on the left side of the intake of water diversion & power generation system, with a total length of about 1436.50m and the tunnel entrance is at the elevation 625 masl, 16.00 m lower than the intake of water diversion & power generation system. The tunnel opening has a dimension of 9.5mx13.0m (width x height). The project intake is arranged upstream of right bank of the dam, about 270 m from the dam axis. Two D=9m headrace tunnels are connected to the rear part of intake, their respective axis lengths are 420 m and 534 m. The surge shaft is located almost in the middle part of the water conveyance system, and two D=8m penstocks are connected to the rear part of Surge tank, their respective axis lengths are 464 m and 437 m. The powerhouse is arranged about 470 m downstream of the dam site on right bank terrace. The layout of one tunnel-to-two units is applied. The type of powerhouse is surface powerhouse. And the tailwater from the powerhouse will join to Sunkoshi River channel through about 300 m-around-long tailrace. Two diversion tunnels are arranged one each on the left bank and the right bank respectively. The cross section is inverted D-shaped. The section size is 9.5m × 13.0m (width × height). The elevation of the tunnel inlet floor is 540.00 masl, and the outlet floor elevation is 535.00 masl. The length of the diversion tunnel on the left bank is about 708.1 masl, with an average bottom slope of 0.71%; the length of the diversion tunnel on the right bank is about 1436.5m, with an average bottom slope of 0.35%. The diversion tunnel on the right bank will be reconstructed into a flood discharge and sand flushing tunnel in the later stage.

Power House

The power houses are located on river side including main powerhouse, auxiliary powerhouse and erection bays. The total installed capacity of the power station is 683MW. There are 4 units. The capacity of a single unit is 170.75 MW and available flow of single unit is 122.50 m3 /s. The main powerhouse is installed with 4 sets of vertical shaft mixed flow hydraulic turbine-generator units with rated capacity of single unit of 170.75 MW. The distance between units is 14 m and distance between end units is 11 m. The main powerhouse is 64m long, 28.2 m wide, and 39 m high. As for the installation elevation, the turbines in the powerhouse is 528.00 masl, the tail water bottom plate is 520.00 m, the turbine floor is 531 masl, the generator floor is 536.00 masl and the top of the crane beam is 550.00 masl

Power Evacuation Facilities

A 400 KV Double Circuit 2* Bison Transmission Line from Project to 400 KV Sunkoshi Hub s/s is proposed for the power evacuation from Sunkoshi-3 Hydropower Project.

Socio-Economic and Environmental Issues

SU-3 HPP is located in Ramechhap and Kavrepalanchok Districts, where with a relatively low (110 persons/km2) density of population compared to other hill districts (186 person/km2) but also compared to the national average density (180 person/sq km) according to the 2011 census. Agriculture is the main bases of the economy and livelihood of the project districts people. However, remittance income, small business and trades are also contributing in the household income in the recent years. The project districts have a total land area of 553,487 hectare, of which 20% is cultivable. More than one third of the land area (34%) is unusable and occupied by river, rock, road, residence area, land slide, etc. Forest area occupies one third of the land area. Of the total cultivated land only 40% is irrigated. Major agriculture production in the districts is cereal crops (paddy, maize, millet and wheat), oilseed and pulses. However, these days the districts are famous for vegetable production which is supplied to the capital city and other major town areas. Livestock is an important component of farming system in the districts and regarded as one of the major assets of farm household. The districts are producing significant volume of livestock products such as meat, milk, egg and wool. More than 2700 small and cottage industries are registered in the two of the districts. Of the total industries, 91% are small in scale and 62% are service type.

Environmental Impact Assessment (EIA) of the project is approved by Ministry of Forest and Environment on 2079/07/28 B.S.

Capital Cost

The total estimated cost of the SU-3 project is about 1458.01 million US dollar (Excluding IDC) out of which the civil construction cost is about 580.29 million US dollar, Hydro Electromechanical and Transmission line cost is about 174.9 million US dollar, and Environmental cost is about 370.35 million US dollar. The cost has been calculated based on the latest available district rates and standard norms.

(1) The estimate of the project is calculated in USD.

(2) In the estimation of the project, VAT 13%, preferential rate of duty 1.5% and local tax 1.5% levied by the Nepalese side is considered.

(3) The exchange rate adopts the middle rate announced by the China's State Administration of Foreign Exchange, i.e., USD: NRS. = 1:113.24, USD: RMB = 7.07.

Economic Evaluation

The economic cost of SU-3 project is about 1458.01 million US dollar (Excluding IDC). The benefit/cost ratio is 1.637 and the corresponding internal rate of return is 12.39%. These economic measures demonstrate that the project is feasible and economically very attractive.

Scope of Services

The scope of consulting services is to prepare SU-3 hydropower project for implementation. Furthermore, the scope of the services is to update the feasibility study of the project in order to develop it as a regional project of multipurpose nature having storage for irrigation, electricity generation, flood mitigations, etc.

The scope of consulting services covers Detailed Engineering Design and Preparation of complete Tender Documents, Qualification Criteria, Tender Drawings for the project construction and to suggest the contract modality (design-built or EPC in consultation with Client). It covers the followings;

Task 1	Inception report on the assignment
Task 2	Review, Recommend and update site investigation and associated studies including additional field investigations, if any
Task 3	Hydrological, meteorological and sedimentological studies etc.
Task 4	Reservoir simulation
Task 5	Project configuration
Task 6	Project optimization Study
Task 7	Power evacuation Study

Task 8	Detailed Engineering Design, Drawing and Specification
Task 9	Construction Planning and Scheduling
Task 10	Project Cost & quantity estimation,
Task 11	Upstream and downstream project benefits/ Impacts
Task 12	Economic and Financial Analysis
Task 13	Risk Analysis Assessment
Task 14	Power market studies
Task 15	Model test study (physical and mathematical)
Task 16	Preparation of Complete Tender Documents, specifications and Tender Drawings
Task 17	Analysis of institutional arrangement for project implementation
Task 18	Study of Jhiku Khola Pumped Storage Project

The detailed scope of works under this assignment is presented in the following paragraphs.

Task 1: Inception report on the assignment

The Consultant shall collect all available reports, data and maps from related to the project and carry out the detailed review study. In the project review, all available information/data related to the project should be subjected to critical analysis and scrutiny in order to establish a realistic understanding of the type and scope of additional information/investigation/data required for subsequent analysis and Detailed Engineering Design. As part of the project review, the Consultant shall carry out the following but not limited to:

a. Identify key areas, which will require additional field work or demand major efforts in data collection/ investigation;
b. Review the Feasibility Study Report and other relevant documents, information and available data related to the Project.
c. Establish methods and procedures for further studies
d. Prepare Design Based Memorandum (DBM)

The Consultant shall undertake an Inception visit to the project site covering all project components and carry out engineering studies with respect to the topographical, geographical, hydrological, meteorological and sedimentological aspects of the project area. In parallel with data collection and field reconnaissance, the Inception Report shall also include the updated methodology and work plan for the studies, detailed schedule for each task, detailed field investigation plan, manning schedule of each personnel for effective mobilization. This schedule shall be submitted by the Consultant as part of the inception report, with justification for the requirements of additional information/ data/ investigation.

The Inception Report shall summarize the results of the review of existing data/ reports, summarize the results of the field reconnaissance, discuss the key data/ information/ investigation gaps requiring additional field work/investigation, data collection, data verification, and describe the approaches and methodology that the Consultant intends to follow in carrying out various activities to complete the assignment. The Consultant shall make a presentation of the Inception findings to the Client with the use of appropriate visual aids. The date, time and location for the presentation will be finalized in consultation with the client.

Task 2: Review, Recommend and update site investigation and associated studies including additional field investigations, if any

The objective of this task is to collect all relevant reports of previous field studies and investigations of the project, review this report and accordingly update them. The review shall be focused on identifying the necessary data gaps to update the study based on refinements to the Project arrangement required by engineering tasks being performed in parallel. The consultant shall then carry out required supplementary field investigation after getting approval from the client. Finally, after obtaining the report of those supplementary investigations, the consultant shall update and validate the respective field investigations. The results of this activity together with the details of the field investigation shall be presented in the Detailed Engineering Design and Tender Documents of the project. The review and updating of site investigation shall include but not limited to the followings.

2.1 Light Detection and Ranging (LiDAR) Survey:

LIDAR Survey includes the LiDAR data acquisition, Aerial photography and primary data processing, to create orthophoto map production and Topographical features digitization from 1:5000 orthophoto map (@5 sq.km/sheet) for 1:500 scaled contour map. It includes the production of ortho photographs and mapping of reservoir area and its periphery including possible resettlement area. LIDAR mapping also includes on the job training program on data acquisition and data processing for the NEA Engineers.

The coordinate system for LiDAR survey should be in Universal Transverse Mercator (UTM) system and should be transformed into MUTM taking the reference of Third or higher Order control point. The elevation reference should be taken from the nearest Bench Mark established by Survey Department, GoN and same bench mark should be used for expansion of further bench marks in the project area.

2.2 Topographical Survey

The Consultant shall review the topographical maps prepared in the previous studies including feasibility study 2021 and conduct site verification works to identify any data gaps in topographic maps, established datum and field survey works conducted earlier. The data gaps shall also be identified with respect to the planned engineering design changes under the scope of current study. If some of the earlier investigations or the topographical survey needs to be verified through fresh investigations or additional topographical survey, it must be performed for the planned engineering studies acceptable for the proposed detail design work. The consultant shall list all the required additional topographical survey works and propose the required additional investigations to the client. The Consultant shall carry out additional topographical survey after getting approval from the Client. After obtaining the survey data and topographical maps of any supplementary field investigations, the consultant shall update the topographical maps in standard scale and incorporate them in the engineering studies under the current study. LIDAR mapping with ground verification shall be carried out to update the topographical maps of the reservoir area.

The Consultant shall perform, among others, the following activities:

- Establishment of survey control network within the project area connecting the national grid for underground works and other topographic mappings;
- Detailed mapping of the project sites including area of reservoir, powerhouse area, surge tank area, at weak zone and diversion tunnel areas in scale of 1:500 and 1m contour interval;
- Detailed mapping of foundation areas in scale 1: 500 and 1 m level contour interval for detail design of surface structures;
- Detail mapping of the tunnel alignment strip in scale of 1:5000 and 5m contour interval;
- Cross section survey (Bathymetric) at an interval not more than 200m of the entire stretch of reservoir and its upstream covering 5 km from the upper point of the reservoir and downstream covering about 10 km from the powerhouse.
- Cross section survey at the interval of 50 m around the tailrace site from dam axis to 500 m downstream of the tailrace outlet;
- Detail mapping of project road alignment, camp facilities, spoil disposal area, quarry site and so on;

- Detail mapping of transmission line route alignment.

The Consultant shall prepare a Topographic Survey and Mapping Report analyzing and synthesis the ground survey and LiDAR survey. The report shall describe the activities undertaken including all necessary basic data and records relating to the topographic surveys to allow the reference points and mapping to be used with confidence during the future stages of the project. These survey data should be in line with international standards and Department of Electricity Development (DoED) Guidelines.

2.3 Hydrological, Meteorological and Sedimentological Investigation

The Consultant shall review the hydrological, meteorological and sedimentological investigation carried out in the previous studies including feasibility study 2021 and identify data gaps, if any, and acquire all relevant data from different sources to update the feasibility study. The Consultant shall perform, inter alia, the following activities:

- Acquire all the data related to stream flow and other hydro-meteorological data (Precipitation, temperature, relative humidity, evaporation, solar radiation, wind speed, rainfall data etc.) from the gauging and climatic stations in the catchment area of SU-3 Project.
- Supplementary data collection on hydrology and sedimentation during the study period to refine them,
- As a part of sediment/hydrological investigation, study and monitoring, the consultant shall:
  - Acquire the historical suspended and bed load sediment data/information on Sunkoshi River
  - Establish and carry out water level observations and water flow measurements at the powerhouse location;
  - Study catchment characteristics from sediment point of view
  - Establish and conduct sediment sampling and analysis program of suspended and bed load sediments. At least 2 sets of samples per day shall be collected at dam site for rainy seasons (6 months) and one set of samples per week shall be collected for the remaining period in a year for concentration analysis. For the purpose of this clause, a “set of samples” shall be defined as a number of individual samples collected by depth-integrating sampler at not less than three verticals (mid channel and at two quarter points) across the river so as to have a good representation of the

mean sediment concentration of the river at the time of sampling;

- Collect one set of samples per week for rainy season and one set of samples per month for the remaining period in a year for particle size distribution and mineralogical (petrography) analysis;
- Develop a rating curve of suspended sediment load of the river;
- Estimate the bed load contribution to the total sediment load by means of site measurements or other means appropriate;
- Carry out reservoir sedimentation studies
- Estimate the possible ranges of sediment load to the power stations and recommend suitable value for design;
- Carryout the water quality analysis to determine the corrosive effectiveness (hardness).
- Investigation on possibility of aggravated erosion in the catchment area due to change in land use pattern, road and other infrastructure construction in the catchment which may result in rapid sedimentation. The consultant shall make a comprehensive investigation of the problems with a view to propose measures to reduce the long term sedimentation in the catchment area.

- Carryout the environmental flow analysis for the project as per the approved Environment Impact Assessment (EIA) and other International Environmental Practices,
- Collect necessary data on climate change to examine its potential impact on the project;
- Carry out the GLOF study and examine the potential hazard to the various project components along with the reservoir sedimentation

2.4 Geological, Geotechnical, and Construction Material Investigation

The consultant shall review the geotechnical; geological and geophysical investigation carried out in the previous studies including feasibility study 2021; identify data gaps, if any and conduct necessary investigations to update the feasibility study and relevant investigations required for detailed engineering study. The consultant will check and verify the locations of boreholes, ERT and relate them with project requirement. The Consultant shall perform, inter alia, the following activities:

i. The consultant shall review the regional geological study and geological setup at and around the project area. That study gives the active and non-active geological structures like thrust, fault near to project. The Consultant shall also

review the seismic hazard and landslide hazard condition around the project area based on regional geological study.

ii. The consultant shall review and check the engineering geological mapping prepared based on the topographic maps at 1:200 scale at the dam site, spillways, intake, power facilities including power tunnel, diversion tunnel, surge tank, powerhouse, switch yard, tailrace, etc. in order to obtain more data in respect to rock mass confirmation and slope stability condition.

iii. The consultant shall review and check the engineering geological mapping prepared based on topographic maps at 1: 5000 scale of the reservoir for assessment of slope stability, and leakage.

iv. The consultant shall review the geology at the reservoir, dam site and update as necessary, and identify the additional geological and geotechnical investigations to be carried out and accordingly carry out those investigations. The consultant shall review and check the core drilling and geotechnical investigation in rock/overburden at dam site, tunnel, powerhouse sites, and other areas carried out in the previous study.

v. The consultant shall review and check the Electrical Resistivity Tomography (ERT) carried out in the previous study for assessment of depth of overburden and rock quality in the project area along with SRT and MASW.

vi. The consultant shall review and check and finalize geological and geotechnical investigations performed at the borrow areas and quarry areas for construction materials such as sand, aggregates, filter materials, core materials and other necessary materials for construction of the Project and etc. The consultant shall also identify and perform any investigation/tests related to suitability of construction materials and determination of their physical, chemical properties, strength etc. The Consultant shall perform these investigation/tests after getting approval from Client. The Consultant shall assess and make fair estimate of volume of each material from each of the borrow areas available for use during construction.

vii. The Consultant shall examine the need of further geological/geotechnical investigations for the detailed engineering design of the project including in-situ tests, rock mechanical testing for initial ground stress measurement, block shear, plate bearing, and so on at the locations deemed necessary by the Consultant. It is estimated to have these tests in one location; however, it is consultant's responsibility to determine the requirements of tests at different sites and propose accordingly;

viii. The Consultant shall carry out investigation on geological and hydraulic conditions in the fan area affecting design and cost of the reregulating facility.

ix. Necessary in-situ and laboratory tests in the drill holes and core samples including but not limited to permeability test, lugeon test, UCS of core sample, point load test, Dynamic Cone Penetration Test (DCPT) and SPT in overburden etc.

x. Further testing of material for concrete aggregate for evaluating requirements for crushing and milling and type of cement and admixtures to be used in order to obtain required quality of concrete and shotcrete;

xi. The consultant shall prepare/update and finalize the Geotechnical Baseline Report (GBR) prepared in the previous study in line with FIDIC Emerald book for EPC contract.

2.5 Seismological Investigation

The reservoir created by dam of the SU-3 project will be a major structure located in an environment with a potential for extreme event of earthquakes. The security of all aspects of the design under such conditions is of paramount importance and must be fully investigated. The consultant shall review the seismological investigation carried out in the previous studies including feasibility study 2021; identify data gaps and conduct necessary investigations to update the feasibility study and relevant investigations required for detailed engineering study. The Consultant shall perform, among others, the assessment of magnitudes and locations of past earthquake events. Dam, Headrace tunnel, Surge tank, Powerhouse and its peripherals will be the major structures of SU-3 Project with a potential vulnerability for extreme event earthquakes. The security of all aspects of the design under such conditions is of paramount importance and must be fully investigated. The Consultant shall perform, among others, the following activities:

- Detailed investigation of fault structure in the project area and its surrounding. The program should include determination of fault plane and focal depth for some of the larger events near the dam site, headrace tunnel alignment, powerhouse site, within and in the vicinity of project area. Information available from Department of Mines, Government of Nepal and any other reliable sources may be used for this purpose. Information and the data of recent earthquake that occur in April 25, 2015 need to be used for this purpose.
- Determination of dynamic response profiles for accelerations and velocities applicable at different elevations shall be carried out for the Design Basis Earthquake (DBE) and Maximum Credible Earthquake (MCE) including likely

damage to structures for each case.

- Seismic safety evaluation should be carried out to specify Category II site basic seismic peak ground acceleration of project area and seismic precautionary intensity.
- Seismic safety assessment is required to study the regional tectonic stability and seismic basic intensity.
- Investigation on possibility of reservoir induced seismicity after the impoundment of the reservoir.
- Recommends on the needs for establishment of the seismic network in the project area and preparation of the technical specification of the equipment (seismographs, accelerometers etc) for procurement and installation by NEA.

2.6 Investigation Related to Glacier Lake Outburst Flood (GLOF)

Detail investigation on existence and possibility on development of glacial lakes which may prove to be a considerable risk for the project and recommendation on the measures to minimize the risks of potential GLOF. The activities to be carried out by the consultant shall include but not limited to the followings:

- Detail investigation and monitoring by remote sensing with satellite imagery on existence and possibility of development of glacier lakes, which may prove hazardous for the project structures;
- Collect the historical GLOF data;
- Review the assessment of occurrence of floods, GLOFs, Cloud Outburst Floods (CLOFs) and Landslide Dam Floods (LDFs);
- Analyse & estimate potential GLOF hazard for the project; and
- Study impact assessment of flood risks due to floods of different return periods including GLOF with possible mitigation measures.
- Perform a study of the hydraulic behaviour on the Koshi river plain of incoming GLOFs by applying a hydraulic mathematical model;
- Perform a feasibility study of technical systems and operation of a comprehensive early warning of GLOFs to the communities along the Sunkoshi valley and propose a solution.

Task 3: Hydrological, Meteorological & Sedimentological Study

The consultant shall review the hydrological, meteorological and sedimentological studies carried out in the previous studies including feasibility study 2021; assess the adequacy

of available data and identify the gaps, if any and undertake the respective studies with the use of additional data series collected after the 2021 study to refine/update the long-term stream flow, flood frequency analysis including PMP and PMF, reservoir simulation, power potential, sediment flow assessment, reservoir sedimentation and climate change impacts which will be used for the Detailed Engineering Design. Dam Break analysis shall be performed for the GLOF and PMF studies as necessary. The Consultant shall perform and update, inter alia, the following activities:

1. **Hydrological Study**
    i. Long-term stream flow at Project site.
    ii. Flood frequency analysis and re-assessment of appropriate design flood.
2. **Meteorological Study**
3. **Sedimentological Study**
    i. Sediment Yield Study
    ii. Sediment Management Study
    iii. Qualitative analysis of Sediment
4. **Climate Change Impact Study.**

The Consultant shall analyse the effect of climate change such as erratic rainfall pattern on the river discharge.

The activities to be carried out by the Consultant under this task include but not limited to the followings:

a) Assessment and estimation of long term mean flow of the Sunkoshi River by using appropriate methods at the locations where appropriate.

b) Flood frequency analysis for determination of floods at different return periods and refinement of probable maximum flood (PMF) in appropriate locations particularly at the dam and powerhouse sites in consideration of meteorological data and determination of the design flood for spillway and diversion during construction considering, among others, the economic aspects.

c) Dam Break Analysis (DBA) for the planned SU-3 dam to determine the possible peak flood and associated water stages in the downstream reaches in the event of dam failure. The analysis shall generate, among others, necessary data leading to recommendation of a framework for early warning

system and evacuation plan.

d) Assessment and estimation of sediment inflow into the planned reservoir. The assessment shall estimate the sediment yield by using appropriate methods to determine the dead storage capacity and identify the needs of sediment management measures.

e) Assessment and estimation of flood flow due to Glacier Lake Outburst Floods (GLOFs), Cloud Outburst Floods (CLOFs) and Landslide Dam Floods (LDFs) for dam spillway design & safety.

f) Investigation of alternative sediment management options. The Consultant shall investigate the possibility of application of flushing, sluicing, density current venting, etc., through mathematical calculations or numerical modeling to determine the most appropriate method to be applied. Assessment of effect of dam construction on the river flow regime, particularly of downstream degradation and upstream aggradations, and recommendation for appropriate measures to minimize the adverse effects shall be presented.

g) Assessment of possible impact of climate change on hydrological characteristics by using different scenarios (without climate change, low climate change and high climate change) drawing from existing literature and data.

h) Assessment of meteorological aspects relevant to construction phase, such as duration of the rainy season, rainfall characteristics, number and duration of rainfall events, dry interval between rainfall events, temperature etc.

i) Reservoir operation simulation studies using appropriate computer model(s) in view of the regional power market and future demand.

j) Determination of reservoir storage in consideration to load pattern and its growth potential, technical and economic aspects.

k) Assessment of possible impact of upstream/downstream hydropower projects on the planned SU-3 project

Task-4: Reservoir Simulation

The objective of this task is to assess the overall power and energy capability of Sunkoshi-3 Hydropower Project. The consultant shall review the reservoir simulation study performed in Feasibility study, 2021 and update them adopting standard approach practiced in this industry, which however, shall not be inferior to the approach adopted in feasibility study, 2021. The consultant shall carry out the system simulation in light of the upstream/downstream development in the Sunkoshi River basin (on-going and proposed),

and current generation capacities (in the regional countries/beyond the borders and the demand for electricity). The other upstream storage type hydropower development will further firm up the energy generation capacity of Sunkoshi-3 Hydropower project. The Consultant shall also consider the influence of these developments on project benefits such as irrigation and flood control.

Task-5: Project configuration

The objective of this Task is to confirm the optimum overall project configuration. The Consultant shall review the general arrangement of Sunkoshi-3 Hydropower Project consisting of the following main features and refine the project layout and make necessary design based on the field studies and investigations but not limited to:

- Main civil structures consisting of
  - (i) Dam and spillway;
  - (ii) Power facilities including intake,
  - (iii) Power tunnels,
  - (iv) Diversion tunnel,
  - (v) Penstock shafts together with penstock,
  - (vi) Powerhouse,
  - (vi) Tailrace and other relevant structures.

The consultant shall review the project arrangement and dimensioning of various project structures and refine them by necessary physical and computational (numeric) hydraulic modelling studies.

Task 6.: Project Optimization Study

6.1 Capacity Optimization

The objective of this task is to determine the optimum size of the project taking into account of energy benefits. The consultant shall review the optimization study performed in Feasibility study, 2021 and update them adopting standard approach practiced in this industry, however the same shall not be inferior to the approach adopted in feasibility study, 2021.

The Consultant shall carry out the optimization study in consideration of:

(i) Domestic Power Market

(ii) BBIN (Bangladesh, Bhutan, India and Nepal) power market,

(iii) Financial and institutional concerns from the regional perspective,

In addition to accounting energy benefits and the long-term potential for development in the Sunkoshi River basin.

6.2 Project Component Optimization

The Consultant shall carryout optimization studies including optimization of project capacity, dam height, headrace tunnel and penstock diameter etc and the number and size of the turbine units along with hydro-mechanical and electro-mechanical design to determine the type of gates, turbine, generator, substation, and transmission line etc including the outlet of tailrace tunnel and powerhouse location based on updated database.

Task 7: Power Evacuation Study

A review of power evacuation study will inter-alia help identify the internal consumption of electricity and the volume of cross border energy flows from Sunkoshi-3 Hydropower project that can be facilitated through the existing and proposed transmission systems in and between countries and also identify the additional internal as well as cross border interconnections required to facilitate energy flows from Sunkoshi-3 Hydropower project. Associated transmission systems to transmit the energy from Sunkoshi-3 Hydropower project to load centers in participating countries should form an integral part of the study. Therefore, the power evacuation study for the Sunkoshi-3 Hydropower project should take cognizance of the findings of the above study which should include the following but not limited to:

a) Assessment of the locations of the load centers.

b) Transmission Line Studies (Load flow and transient studies)

c) Delivery point for the power transmission requirement, such as voltage and number of circuits, reactive power requirements, etc.

d) Interface with the existing system and preferred substation arrangement at the receiving end.

e) Transmission voltage and alternatives (asynchronous or synchronous interconnection),

f) Substation requirements at interconnection points to the regional electricity network.

g) Review of system load curves and load forecast.

The consultants shall carry out the grid impact study and plan for the transmission system for the evacuation of power. In particular the study shall include:

(i) Load flow (internal and cross border) analysis
(ii) Short circuit study
(iii) Transient Stability analysis

The Consultant shall also carry out a comprehensive study of Integrated Nepal Power System (INPS) and Cross Border Power Evacuation System to identify reinforcement needs and suggest the appropriate measures. The Consultant shall carryout power evacuation studies to determine the proper power evacuation route.

Task-8:Detailed Engineering Design, Drawings and Specifications

The primary objective of this task is to prepare Detailed Engineering Design, preparation of tender documents & necessary drawings of the project configuration. The detailed engineering design shall include reinforcement details of all the structures sufficient for the tender purposes. The Detailed Engineering Design shall cover each component of major structures e.g. dam, spillway, other outlets, intake, water ways, surge tank, powerhouse, tailrace, Hydro-Mechanical structures, Electro-Mechanical works, transmission line and substations for power evacuation, roads, bridge, employer's camp, landscaping in necessary areas, and so on.

For every component of the project, the consultant shall formulate prior to Detailed Engineering Design, a Design Basis Memorandum (DBM) to record the basis on which a design will be developed. It shall establish the design and functional criteria, and prepare the layout and design concepts of all project facilities/ components; state the assumptions, parameters, and standards applied, loading conditions, factors of safety, allowable stresses, stability criteria, and all other factors which are necessary to fully carry out the detailed design. The design criteria shall describe in sufficient detail methodologies and analysis methods, database and international standards or codes and prudent practices employed.

The consultant shall prepare confirmatory stability, stress analysis and reinforcement details for the various features and section/s, not limited to, main dam, spillway facilities, intake, headrace tunnel, pressure shaft and steel lined tunnel, powerhouse, tailrace, and other associated structures using the state-of-the-art techniques in consistent manner by matching the methods to needs.

The major activities to be performed by the Consultant shall include but not limited to the followings:

- The Consultant shall carry out hydraulic, geotechnical and detailed structural design (Tender design with all typical reinforcement section) of main dam, spillway facilities, intake, headrace tunnel, diversion tunnel surge tank(s), powerhouse, tailrace, and other associated structures. The Consultant shall carry out Hydraulic

design for all hydraulic structures/water conveyance system including hydraulic transient analysis with water hammer effect for surge tank as necessary to verify the principal dimensions, design parameter and proper hydraulic performance of the project. The study shall also include access roads and bridges, cofferdams, diversion tunnels etc.

- Review previous reports and finalize / reconfirm the location of camp for client and contractors, spoil disposal and establish the need for construction of additional access road and bridge including finalization of road alignment and site for bridge. The study should also include relocation of existing highway and bridge/s as necessary. The quantum of construction power required shall be reviewed and updated and recommend appropriate option along with cost estimates and other necessary details.
- Carryout Hydro-mechanical and Electro-mechanical design of gates, valves, turbine, generator, substation, and transmission line etc.
- Prepare engineering drawings of all the components of the project including Hydro and Electro-Mechanical works, transmission lines and substations.
- Carry out comprehensive power system study of the BBIN countries to identify the system reinforcement needs for the power evacuation for Sunkoshi-3 Hydropower project.
- Collect information on the latest load profile and suggest power plant maintenance schedule accordingly.
- The Consultant shall review the technological options for the switchyard schemes in light of the current level of technology, and recommend the one which is technologically superior and economically feasible. The study should also look into the unit size of the turbine generators, as there is a possibility of having higher capacity Francis turbines.

The engineering design shall be based on stability analysis, confirmatory stress analysis and the information collected during the investigation. The design shall include, but not limited to, the complete design of hydraulic structures, structural design, foundation treatment and grouting, instrumentation, seepage analyses, stability, deformation and stress analysis and architectural work and finishing of powerhouse. Structures shall be designed for steady state and transient conditions. The designs shall conform to and be suitable for the site conditions and shall aim at achieving minimum overall cost and a minimum consumption of land, without adversely affecting safety, security, efficiency or longevity of the works or the environment The consultant shall provide detailed calculation regarding design of each component.

Electro-Mechanical, Hydro-Mechanical, transmission line and substation design work shall be based on internationally accepted practices and shall include drawings and supporting calculations. The Electro-Mechanical design shall involve, among others, selection of proper electrical and mechanical systems and equipment, dimensioning/sizing of the equipment, etc. Electro- Mechanical works including transmission line and sub-station design work shall be based on the approved design criteria and internationally accepted practices and shall include drawings and supporting calculations.

The consultant shall have full discretion on the method, procedure, tools and approaches for the performance of the design work. The performance of the designs ultimately accepted, shall be demonstrated by a "Confirmatory Analyses" with the state-of-art structural and hydraulic methods.

The Consultant shall prepare Engineering Drawings and Specifications of all the components of the project including hydro and electro-mechanical works, transmission lines and substations; describing work in terms of measurements, tolerance, and material and as necessary in process tests. Engineering design and associated drawings shall be prepared in accordance with the Design Base Memorandum and show the general outline and enough detail regarding the structures, material and equipment to enable the contractors and suppliers to prepare and submit competitive bids.

Detailed Engineering Design and Technical Performance Specifications shall be prepared to the international standards using Indian Standard and British Standard codes. They shall be carried out to a level of detail so as to enable contractors and suppliers to clearly interpret type and scope of works involved and to submit competitive tenders.

Task-9: Construction Planning and Scheduling

9.1 Construction Planning and Scheduling

The objective of construction planning is to prepare a realistic and practical construction and equipment plan (Master Schedule) and schedule with milestones which aligns with detailed engineering design. The Consultant shall review the Construction Planning and Scheduling performed in the Feasibility study and update them from a contractor's point of view of operation, for carrying out a realistic and practical construction with proper equipment planning along with construction power supply. The consultant shall suggest the construction methods in light of the current construction practices. The slicing of the contract packages shall also be reviewed and suggest changes if there is a possibility of reducing the project costs, implementation time and construction risks. This plan shall serve to establish construction schedules, with start and finish and interim critical milestone dates as

well as key dates for interfaces between civil, hydro-mechanical and electro-mechanical works.

The Consultant shall carryout material handling studies which will aid the contractor to efficiently quarry, store, haul, use and dispose huge amount of construction material required for construction of the project. The result of material handling studies shall be incorporated in the construction plan which shall be supported by network and logic diagram showing the sequence in which construction activities are to be performed, their interdependencies, constraints and the critical path of the execution of the work, and so on.

The Consultant shall prepare a construction plan and schedule, aligned with the construction sequencing and methods identified in layout. It shall update with inclusion and integration of missing activities. The plan will be supported by network and logic diagrams showing the sequence of construction activities, their interdependencies, constraints, and resulting critical path. The approach to construction planning shall be based on latest industry practices for construction method and techniques and construction equipment planning, considering regional aspects and limitations.

9.2 Transportation planning for all necessary equipment and materials including Powerhouse Equipment and Machineries

The Consultant shall identify the nearest seaport for the import of powerhouse equipment and machineries, and the most direct mode of inland transportation (railways or road or both) taking into consideration the condition of the existing roads and bridges on the transportation route from the nearest seaport to the project site. In light of the capacity of the bridges along the transportation route, the Consultant shall recommend the maximum weight of a single consignment that can be safely transported along the identified route for the identified transportation mode, and suggest a need for improving load-bearing capacity of specific bridges especially within Nepal. The consultant shall collect the load bearing information of the bridges and the road /railway track along the identified route.

Task-10: Project Cost & Quantity Estimation

The consultant shall update the project costs to reflect the current cost of materials, labor and equipment, and the costs of land acquisition and rehabilitation of the project affected people.

Based on the information obtained from the Detailed Engineering Drawings, the Consultant shall prepare detailed BoQ and cost estimation consistent with the construction plan and schedule, and in accordance with recognized standard methods of measurement of civil engineering works.

The cost estimation shall comprise of a basic cost, contingencies, infrastructures cost, social environmental cost and other cost associated for the project construction.

For civil works, the unit cost for each individual item shall be composed of labour and staff costs, construction materials, plant and equipment costs, fuel and lubrication, transport, electrical power etc. The cost estimate needs to be based on construction methodology and planning as determined. Cost for hydro-mechanical and electro- mechanical equipment (turbines, generators, substation, switchgear, gates, Balance of Plant (BoP) and their auxiliaries) shall be based on previous similar projects, extrapolations of international references, and similar offers. Estimates of major equipment costs shall also be derived from manufacturers' quotations, recent comparable bid prices and other relevant empirical data.

The cost estimates shall be prepared from a contractor's point of view using resource-based costing and shall follow international standard practice (Cost and Performance Calculations of the Construction Industry).

Task 11 Upstream and downstream project benefits/ Impacts.

The objective of this task is to review the project benefits/Impacts identified in the feasibility study, 2021 and to estimate the power benefits, irrigation benefits, water supply and flood control benefits and any other additional benefits/impacts using updated information along the river stretch within the country and beyond the borders.

Power Benefits: The consultant shall review the power benefits computed in the feasibility study 2021 and revise it based on the current power market both in Nepal and in the region (National and International). For this, the consultant shall prepare electricity demand forecasts in the regional countries, and the generation technologies that are likely to be displaced by the project and then determine the power benefits of the Sunkoshi-3 Hydropower project.

Fish Farming: The Consultant shall carry out the study for fish farming and its economic benefits collecting relevant data.

Flood Control Benefits: The Consultant shall review the flood control benefits computed in feasibility study, 2021 and refine them collecting relevant data

Irrigation Benefits: The Consultant shall carry out the study on the Irrigation benefits collecting relevant data.

Navigation and Recreational Benefits:

The project area has scope of development of Recreational Destination Area. The main concept of development is to offer economic benefit to local businesses and communities respecting local people and culture without creating impact on environment. This area can

be developed as the recreational touristic spot to the tourist travelling from the surrounding. The Consultant shall review the potential Navigation and Recreational Benefits and carry out detailed analysis to compute these benefits.

Task-12: Economic and Financial Analysis of the Project.

The consultant shall carry out the economic and financial analysis of the project adopting standard approach. In the detailed design study, the consultants shall carry out direct and indirect benefits from the project taking into account the current opportunity cost of electricity in the internal as well as regional countries from this project. The current (projected) generation mix and the electricity prices from competing generation technologies, will determine the type of electricity generation, which will potentially be displaced by the Sunkoshi-3 Hydropower project, and hence the power benefits. Further the irrigation and flood control benefits should also be re-evaluated taking into account the current opportunities for the same. In respect of navigation and recreational benefits, the consultants shall review if there are new opportunities for enhanced navigation upstream and downstream of the project.

The Consultant shall analyse demand, supply, and economic viability, and assess tariff pricing. The Consultant shall also analyse the financial viability and suggest the financial structuring of the project. The Consultants shall perform all necessary activities. The following being the major activities:

a. Analyse the economic viability of the project. Identify all economic costs and benefits with sensitivity analyses and evaluate economic internal rates of return;
b. Review the forecasted load growth and revenues and costs in relation to tariffs, cost recovery and the cost of generation from renewable sources of energy that came in to play after the 2021 feasibility study. Determine future sustainable tariffs to support the project;
c. Asses and analyse the financial viability of the project. Identify all risks for revenues and costs with sensitivity analyses, and evaluate financial internal rates of return. Include risk mitigation and risk transfer plans as necessary;
d. Analyse the alternative possibilities of promoting the project, ranging from the public sector development to the public and private development approach. Simulate and evaluate optimal financial structuring and modelling in terms of profits, costs, and risks through all measures such as equity, loans, or an insurance (guarantee) mechanism from private investors and lenders, export credit agencies, multilateral development banks, and bilateral donors;
e. Calculate the cost of electricity and royalty or water value of irrigation and flood control benefits.

f. Develop financial projection models comprising financial statements and financial ratios for the next 30 years to assess the project and its institutional financial viability and impacts using key performance indicators.

Task 13 Project Risk Assessment:

Risk analysis and assessment play a crucial role in the successful execution of any hydropower project. It helps identify potential risks, evaluate their impact, and develop appropriate risk mitigation strategies.

The Consultant shall carry out the compressive assessment of technical and financial risk including risk identification, risk assessment, risk mitigation, risk monitoring etc. for the project within the country and beyond the borders. The consultant on the basis of risk analysis and assessment shall prepare a Risk Matrix with their mitigation measures.

The Consultant shall carry out the following but not limited to:

- Comparison of all types of risks including potential delays, conflicts and other impacts so as to prioritize resources and plan accordingly
- Environmental and Social risks to be addressed through the EIA/ESMP/RAP planning process and through consultations with all stakeholders
- Prepare all hydrological risks, geological risks, environmental and social risks, health risks, etc on the project risk matrix applying the same criteria to all types of project risk for comparison.
- Need to prioritize risks and allocate adequate resources

Task 14 Power Market study

In order to ensure that the upcoming project meets the expectations of the countries participating in the project, there is need to carry out the Power markets study of National and BBIN for the project. All requisite activities, but not limited to the following should form part of the Power Market Study:

a) Review power market in National and BBIN countries.

b) Review the present and projected electricity demand-supply scenario of each of the above countries,

c) Review their load growth forecast at low, medium and high economic growth rate scenarios,

d) Review their existing and planned generation capacity additions to meet the demand;

e) Evaluate the potential of National and BBIN countries meeting its own demand

with and without commissioning of Sunkoshi-3 Hydropower project.

f) Evaluate whether implementation of Sunkoshi-3 Hydropower project would be a superior option for the participating member states to meet their demand, over their existing development plans and other options, such as the inter-regional power trade with Central Asia and South East Asia.

g) Review the seasonal variation of energy and capacity demand, and ability of the power systems to meet the energy and capacity demand of the relevant Member States;

h) Examine the existing and planned additions and alternative supply options.

Task-15: Model test study (Hydraulic and Numeric)

The consultant shall carry out numeric modelling for the spillway, plunge pool/ energy dissipating structures, dam, power intake, sediment flushing outlets, low level outlets, and so on. To confirm the results of the numeric modelling, the consultant shall carry out physical modelling of key hydraulic structures to be identified in consultation with the Employer.

15.1 Numeric Model: The consultant shall carryout 2D and 3D computational hydraulic model studies of dam, intake, overflow spillway and the plunge pool or stilling basin, energy dissipating structure, intake, sediment flushing outlet, and other structures if necessary to finalize the design, using internationally accepted standard analysis methods. The consultant shall conduct skill development program (Training) on Numeric Model to the client engineers.

15.2 Physical Model: Following the Hydraulic analysis, as confirmatory tests, the consultant shall carryout Physical modelling studies of key hydraulic structures to be identified in consultation with the Employer.

Task-16: Preparation of Complete Tender Documents and Tender Drawings

The Consultant shall prepare complete Tender Documents complete with Tender Drawings for all works with appropriate details and specifications, BoQ and other necessary documents as per International Standard e.g., FIDIC / WB/ADB etc book (in consultation with the client). The Tender Documents shall describe the works, including temporary works as necessary in sufficient detail to allow bidders to confidently determine the cost of construction and ensure competitive and comparable tenders. The extent to which bidders should be permitted to suggest alternative designs, construction methods or temporary works.

The Consultant shall prepare complete Tender Documents complete with Tender Drawings for all works with appropriate details and specifications, BoQ and other necessary documents for Tender purpose. The title and contents of the Tender Documents shall be finalized in consultation with NEA.

The Consultant shall make his recommendations and discuss in detail with NEA for the extent to which bidders should be permitted to suggest alternative designs, construction methods or temporary works.

Tender Documents shall be prepared in the following volume:

Volume 1 General Conditions

Volume 2 Particular Applications

Volume 3 Specifications

Volume 4 Drawings

Volume 5 Information for Bidders shall include factual information and the Consultant's evaluation of geological information.

The tender documents shall be prepared as follows:

Lot-1 Temporary and Permanent Infrastructure inclusive of power supply during construction

Lot-2 Civil works and Hydro-mechanical Equipment

Lot-3 Electro-mechanical Equipment

Lot-4: Transmission Line, Substations and Switchyard

Task-17: Analysis of Institutional Arrangement for Project Implementation

The Consultant shall make an assessment of the institutional arrangement required for implementation of physical project of this size and complexity. The Consultant shall first recommend the institutional set up for the implementation of the Project and its governance structure. The consultant shall analyse the alternative institutional setups for the implementation of the project and recommend appropriate institutional arrangement for project implementation backed by analysis. For the recommended institutional setup, the Consultant shall propose organizational structure clearly defining the role of each position and responsibility. The consultant shall also clearly identify the requirement of resources including but not limited to capacity building measures (trainings, workshops etc.), physical infrastructures, requirement of software, equipment etc. The Consultant's recommendations shall also include the aspects of coordination among the stakeholder governments in the region.

The Consultant shall also analyse financing structure and plan including potential sources of financing (including investment by stakeholder member states, international financial

institutions, etc.) for implementation of the project as a regional hydropower project. Besides risk analysis with respect to the implementation of the project as a regional hydropower project shall be carried out.

Task 18: Study of Jhiku Khola Pumped Storage Project

Project Development Department (PDD) of Nepal Electricity Authority has carried out the prefeasibility study of Jhiku Khola Pump Storage Project (45 MW) in 2003 A.D in which water from Sunkoshi River will be pumped during off peak hour in the night and stored in dam site of Jhiku Khola to be used in peak power generation. The total proposed length of water conveyance system is approximately 3 kilometers.

In this regard, following the further assessment of the project by NEA, the consultant may require to carry out study for development of Jhiku Khola Pump Storage Project along with Sunkoshi 3 HPP. The Consultant may carry out the alternative layout and component study of the project. The study would be carried out in such a way that the optimum generation capacity of Sunkoshi-3 Hydropower project will not be affected.

Duration of Services

The estimated time for completion of the assignment is **24 months**.

Reporting Requirements and Time Schedule for Deliverables

Reporting Requirements

The reports to be prepared and submitted by the Consultant in compliance with this Terms of Reference fall under the categories of progress reports and technical reports. Each report shall be complete with an Executive Summary and shall include maps, drawings, primary data collected and/or used in the analysis. The consultant shall also submit electronic versions (in Word and PDF) of report in addition to the hard copies of the reports in number as mentioned in the following section. The electronic versions of these reports shall include the complete documents including all data, analysis, design calculations etc. The consultant shall discuss their interim findings with client at review meetings on regular basis.

1. Progress Reports

The Progress Reports shall comprise quarterly progress reports and monthly progress reports concerning physical progress/status of works, expenditures, etc. in formats acceptable to client covering all the activities of the consultant during the period and shall be submitted within two weeks after completion of each quarter and within one week after completion of each month. The Progress Reports shall contain summary of the progress of the different activities achieved in the particular period and shall also include the plan and program for the subsequent period. All communications from the client to the consultant and by the Consultant to client shall be in writing. Each party will designate a representative to interact and interface with each other, who will be the sole authority to exchange communications between the parties. Minutes of all meetings will be recorded and signed by both the parties, in token of having arrived at decisions taken in each meeting.

2. Technical Reports

These shall comprise a series of Reports covering the main technical studies, investigation, issues, etc., related to the project. Each report shall be complete with an Executive Summary and shall include maps, drawings figures, diagrams and calculations as necessary. The reports shall include Annexes providing the basic data used in the analysis.

2.1 Inception Report

The Inception Report shall present details of the assignment and reporting requirement stated in Task-1.

2.2 Topographical Survey and Mapping Report

The Consultant shall prepare, among others, a Topographic Survey and Mapping Report stated in Task-2.

2.3 Geotechnical Studies and Investigations Report

The Consultant shall provide separate report(s) or a comprehensive report on geological investigations, geological mapping, refraction survey and ERT, SRT , MASW etc. The results of geotechnical studies and investigations shall cover in-situ and lab tests, tests on construction materials, soil tests specified in the TOR and all findings, test reports, calculations, and conclusions organized in the form of a Geotechnical Report.

2.4 Geotechnical Baseline Report

The results of geotechnical and geological studies, investigations, all findings, test reports, calculations, and conclusions shall be organized in the form of a Geotechnical Baseline Report. The results, data and interpretations uncovered from the geotechnical studies and site investigations and the corresponding interpretations and recommendations shall be presented in such a manner that it can be used as a stand-alone document for further development of the projects. The baseline statements shall be in quantitative terms that can be measured and verified during construction. The principal aim of the Geotechnical Baseline Report is to establish an understanding of the surface and subsurface site conditions, referred to as a baseline, which can form the basis of contractual conditions in construction contracts. GBR should be in line with the requirements of FIDIC Emerald book for EPC contract.

2.5 Hydrology and Sedimentation Report

The Hydrology and Sedimentation Report shall describe the hydrological activities required in the TOR.

2.6 Water Resources Management Report

The Water Resources Management Report shall present analysis/synthesis/interpretation of the data to be used in construction of dam and regulation of the flow at the downstream water resources projects including irrigation. Besides, details of the estimated energy output for the various options considered shall also be presented in the report.

2.7 Power System Analysis Report

The power Market, Power System and Power Evacuation Study Report shall describe the power market in the BBIN countries. The report shall present all the results of the power system studies and power evacuation studies. The report shall cover, among others, preparation of long-term electricity demand forecast for the regional countries, a review of the existing and planned transmission and generation plans in the study countries, electricity prices studies, contribution of power generated from Sunkoshi 3 Hydropower Project to meet the electricity demands, and in the provision of ancillary services. The consultant then shall prepare the scope of transmission network requirements (both green

field and reinforcement) to evacuate the power from the Sunkoshi 3 Hydropower Project backed up by a detailed analysis (technical and financial) of alternative options such as asynchronous links, or HVDC.

The study shall also summarise the findings of the study on willingness and affordability of consumers to pay for the power from the project and any challenges that might be posed to the project viability due to the deployment of the latest renewable energy technologies for power generation as an alternative source for electric energy within the region. The focus of the findings shall be the evaluation of alternatives emerging from the solar and wind energy, the prices of which are coming down at an accelerated pace, thereby having the potential to challenge the viability of the project.

3. Design Criteria Report

The Design Criteria report shall be prepared incorporating design philosophy and design criteria in designing different project components including civil structures, hydraulic steel structures, electromechanical and hydro mechanical equipment, etc.

4. Design Basis Memorandum

The consultant shall submit Design Basis Memorandum report for the project. The report shall include the design and functional criteria, and include the layout and design concepts of all project facilities/ components; state the assumptions, parameters, and standards applied, loading conditions, factors of safety, allowable stresses, stability criteria, and all other factors which are necessary to fully carry out the detailed design.

5. Financial Report

The financial report shall be prepared based on the detailed design studies of the project.

6. Draft Final Detailed Design Report

Draft Final Detailed Design Report shall include, among others, the following:

- Design Criteria Report
- Detail Design Calculation
- Methods used in design, reasons for technical decisions and reference to all technical memoranda and design reports
- Detailed Quantity Estimate
- Detailed Cost Estimate
- Construction Planning and Scheduling
- Economic and financial analysis
- Engineering Drawings

7. Final Detailed Design Report

Final Detail Engineering Design Report shall be submitted after incorporating comments from Client. It shall include, among others, the following:

- Design Criteria Report
- Detail Design Calculation
- Methods used in design, reasons for technical decisions and reference to all technical memoranda and design reports
- Detailed Quantity Estimate
- Detailed Cost Estimate
- Construction Planning and Scheduling
- Economic and financial analysis
- Engineering Drawings

8. Draft Final Tender Documents/Drawings

The consultant shall submit draft tender document along with all necessary document in both hard copy and soft copy.

9. Final Tender Documents/Drawings

Final Tender Documents/Drawings shall be submitted in both hard and soft copy after incorporating comments from Client.

Notes: The Consultant shall arrange the presentation after submission of draft documents to the Client.

10. Study Report (Draft) of Jhiku Khola Pumped Storage Project

The consultant shall submit draft tender document along with all necessary document in both hard copy and soft copy.

11. Study Report (Final) of Jhiku Khola Pumped Storage Project

Final Study Report of Jhiku Khola Pumped Storage Project shall be submitted in both hard and soft copy after incorporating comments from Client. Notes: The Consultant shall arrange the presentation after submission of draft documents to the Client.

Organization, Project Team Composition, and Qualification Requirements for the Experts

Organization

The services shall be provided and managed with a functional organization directly responsive and responsible through the Project Manager of Consultant. NEA shall be informed of the status of the project design in regular basis. For effective implementation, works shall be carried out by as fully integrated team of expatriates and Nepali personnel and shall operate as an independent and self-sufficient entity with the Project Manager entrusted with full responsibility and authority to act on behalf of the consultant.

Members of the project team shall be assigned for the full duration of their involvement. They shall report to the Project Manager directly, or to assigned supervisors within the project team. This accountability shall be binding on each team member regardless of origin. It holds equally for expatriates and Nepali professionals, whether seconded from NEA for duration of the project or recruited elsewhere.

Project Team Composition

The project team will consist of international key and non-key experts and national/local key and non-key experts to accomplish the study. It is envisaged that the international team of experts will be resident in Nepal for the entire duration of the services. Coordination activities only will be carried out in the home office of the Consultant with the possible exception of studies that may require specialist input that cannot be supplied from Nepal.

The work shall be performed by an integrated team of Nepali and expatriate professional and support staff. The local participation shall be maximized within the framework of quality, timely performance of the services and liability. The local staff shall be assigned to and perform clearly defined tasks, commensurate with their background, qualification and experience based on shared responsibility.

It is estimated that about one hundred eight (108) person-months of international experts; two hundred and six (206) person-months of national experts and two hundred fifty-seven (257) person-months of Nepal Electricity Authority will be needed to complete the assigned tasks. The breakdown of the estimated inputs (person months) of international experts is given in the following table.

International Experts

The following table (Table 1) presents the international experts for the Detailed Design Study and Preparation of Tender Documents:

Table 1: International Experts

S.No.	Description	Units	Quantity
A.	**Key International Expert**		
1	Project Manager/Team Leader/Hydropower Engineer	Man Month	22
2	Reservoirs/ Dams Engineer	Man Month	9
3	Water resources, Planning and Impact studies (Water Resources/Hydrologist/ sedimentologist)	Man Month	7
4	Hydraulic Engineer/ Hydraulic Modeling Expert	Man Month	4
5	Tunnel Engineer/Geotechnical Engineer	Man Month	6.5
6	Power Market Studies, Electricity Pricing Study and Power System Economist	Man Month	5
	Sub-total A		**53.5**
B.	**Non-Key International Expert**		
7	Engineering Geologist	Man Month	3.5
8	Structural Engineer	Man Month	6
9	Multi Criteria Decision Analysis Expert (irrigation/agriculture/natural resources management)	Man Month	1.5
10	Construction Planning and Scheduling Engineer	Man Month	2.5
11	Cost Engineer/ Quantity Surveyor	Man Month	3.5
12	Project economist – Economic & financial Analysis	Man Month	2.0
13	Power Risk Analyst	Man Month	1.5
14	Power System Planning Expert	Man Month	0.5
15	Electrical Engineer/ Powerhouse Engineer	Man Month	2.5
16	Hydro- mechanical Engineer	Man Month	2.5
17	Mechanical Engineer (Powerhouse)	Man Month	2.5
18	Transmission Line & Sub-station Engineer	Man Month	2.5
19	Contract Specialist	Man Month	6
20	GLOF Expert	Man Month	1.25
21	Climate change Expert	Man Month	1.25
22	Pool of Experts	Man Month	15
	Sub-total B		**54.5**
	Total (A+B)	**Man Month**	**108**

National/Local Professionals

The expertise of the national experts is given in the following table (Table 2):

Table 2: National Experts

S. No.	Description	Units	Quantity
A.	**National Key Manpower**		
1	Deputy Team leader/ Hydropower Engineer	Man Month	24
2	Reservoirs/ Dams Engineer	Man Month	10
3	Water resources, Planning and Impact studies (Hydrologist/sedimentologist)	Man Month	10
B.	**National Non Key Manpower**		
4	Power System Planning, Power Market Studies, Electricity Pricing Study (Power System Planning Expert and/or Power System Economist)	Man Month	10
5	Geologist	Man Month	12
6	Hydraulic Engineer/ Hydraulic Modeling Expert	Man Month	6
7	Tunnel Engineer/Geotechnical Engineer	Man Month	8
8	Structural Engineer	Man Month	10
9	Multi Criteria Decision Analysis Expert (irrigation/agriculture/natural resources management)	Man Month	4
10	Construction Planning and Scheduling Engineer	Man Month	4
11	Cost Engineer/ Quantity Surveyor	Man Month	10
12	Project economist – Economic & financial Analysis	Man Month	5
13	Power System Engineer	Man Month	2
14	Hydro- mechanical Engineer	Man Month	6
15	Mechanical Engineer (Powerhouse)	Man Month	6
16	Transmission Line & Sub-station Engineer	Man Month	5
17	Contract Specialist	Man Month	10
18	Transportation Engineer	Man Month	4
19	Civil Engineers	Man Month	48
20	Electrical Engineers	Man Month	12
	Sub total A	Man Month	**206**

Table 3: NEA Manpower (Counterpart Staff)

S. No.	Description	Units	Quantity
A.	**National Manpower**		
1	Hydropower Engineer	Man Month	24
2	Design Engineer	Man Month	24
3	Geologist	Man Month	15
4	Geotechnical Engineer	Man Month	20
5	Hydrologist/Sedimentologist	Man Month	20
6	Electrical Engineer /Control Power System Engineer	Man Month	10
7	Mechanical Engineer /Hydromechanical Engineer	Man Month	10
8	Hydraulic Engineer	Man Month	12
9	Structural Engineer	Man Month	20
10	Transmission Line/Substation Engineer	Man Month	8
11	Survey Engineer	Man Month	10
12	Cost Engineer/ Quantity Surveyor	Man Month	12
13	Contract Engineer	Man Month	18
14	Construction Planner	Man Month	6
15	Civil Engineer	Man Month	24
16	Draft person	Man Month	24
	Sub total A		**257**

Qualification Requirements

A. International Key Expert

(i) Project Manager/Team Leader/ Hydropower Engineer:

The Team Leader shall preferably have a Master's degree or equivalent civil/hydropower/water resources/hydraulic/structure engineering or related discipline and must have preferably twenty (20) years of professional experience, ten (10) years of which in planning, design, specification, tender document preparation, construction supervision of hydropower projects.

The focal point of the project organization is the Team Leader / Hydropower Engineer, the principal contact and communication channel with NEA.

The Project manager shall have total project responsibility for the work in Nepal and for providing the requisite leadership, direction and supervision. He shall be accountable to

the NEA and Consultant for day-to-day performance of the project team and shall be vested with sufficient authority to act. He shall exercise all standard management functions including planning, scheduling, directing, organizing, and controlling, and as much as possible shall be involved in technical activities and assigned to specific technical tasks to achieve maximum efficiency and benefit to the project. The Project manager will be dedicated full time to Sunkoshi-3 Project with residence in Kathmandu.

The expert shall also have previous experience of working as hydropower engineer in conducting feasibility studies and detailed engineering design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with capacity not less than 200 MW involving dam with height of at least 110m. Experience shall also cover detailed engineering design, or construction supervision of reservoir projects of similar size to the Sunkoshi-3 Project. Experience in feasibility, detailed design, construction supervision of hydropower project in South Asia as hydropower engineer will be an added advantage of the expert. It is expected that the expert will be resident in Kathmandu for approximately 22 months, with frequent visits to the project site. It is expected to complete the task at an approximately twenty-four (24) person-months.

(ii) Reservoirs/Dams Engineer:

Reservoirs/ Dam Engineer shall have preferably Master's degree or equivalent in civil/hydropower/water resources engineering or related discipline and must have preferably twenty (20) years of professional experience in planning, design and construction supervision of hydropower projects of similar nature and magnitude to the Sunkoshi-3 Hydropower Project.

The expert shall have previous experience as Reservoir/Dam engineer in feasibility studies and detailed engineering design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with capacity of not less than 100 MW involving dam with height of at least 110m. It is expected that the expert will be resident in Kathmandu for approximately 8 months with frequent visits to the project site. It is expected to complete the task at an approximately nine (9) person-months.

(iii) Water Resources, Planning and Impact studies (Water Resources/Hydrologist/Sedimentologist):

The Lead Engineer – Water Resources, Planning and Impact studies shall have preferably Master's degree or equivalent in water resources engineering/ Hydrology/civil or related discipline and must have preferably twenty (20) years of professional experience in planning, design and construction supervision of hydropower projects of similar nature and scale to the Sunkoshi-3 Project.

The expert shall have previous experience of working in multiple projects as water resources engineer, hydrologist/sediment engineer for carrying out in feasibility studies and

detailed engineering design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with installed capacity not less than 100MW. Experience of hydrological investigation, analysis and design of hydropower projects in South Asia as hydrologist/ hydraulic/ sediment engineer will be an added advantage of the expert.

It is expected that the expert will be resident in Kathmandu for approximately 6 months with frequent visits to the project site. It is expected to complete the task at an approximately seven (7) person-months.

(iv) Hydraulic Engineer/ Hydraulic Modelling Expert

The Hydraulic Engineer/ Hydraulic Modelling Expert shall preferably have a Master's degree or equivalent in civil/hydraulic engineering or related discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have previous working experience in the design of hydraulic structures as well as in the physical and computational (numeric) modeling (computational fluid dynamics) of hydraulic structures in feasibility study and detailed engineering design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with capacity not less than 100 MW and involving dam of at least 110 m height as a hydraulic engineer.

Experience shall also have experience in physical and computational modeling of hydraulic structures of a project of reservoir projects of similar size to the Sunkoshi-3 Project.

It is expected that the expert will be resident in Kathmandu for approximately four (4) months with frequent visit and stay at the project site.

(v) Tunnel/Geotechnical Engineer:

The Tunnel/Geotechnical Engineer shall have preferably Master's degree or equivalent in geotechnical or civil engineering, engineering geology or related discipline and must have preferably fifteen (15) years of professional experience in planning, design and construction supervision of hydropower projects of similar nature and scale as the Sunkoshi-3 Hydropower project.

The expert shall have experience in field investigation, tests, design and construction supervision of successfully completed (Constructed and Commissioned) hydropower projects with power tunnel length totaling 1,000 m having its diameter not less than 5.4 m and powerhouse of width not less than 17m as tunnel engineer/expert or geotechnical engineer.

Experience shall also cover planning, design, specification, tender document preparation, construction supervision of reservoir projects of similar size to the Sunkoshi-3 Hydropower

Project. Experience in the coordination and planning of field investigation of reservoir project of size similar to Sunkoshi-3 Hydropower project will have added advantages.

It is expected that the expert will be resident in Kathmandu for approximately 6 months with frequent visit and stay at the project site. It is expected to complete the task at an approximately Six and half (6.5) person-months.

(vi) Power Market Studies, Electricity Pricing Study (Power System Economics)

The expert shall preferably have a Master's degree or equivalent in electrical power engineering, or related discipline and must have preferably fifteen (15) years of professional experience in power market studies including evacuation studies, load forecasting, electricity pricing, and various aspects of regional power trade, such as technical issues related to systems interconnection, system control, electricity pricing, and regulations (including the areas needing harmonization).

It is expected that the expert will be resident in Kathmandu for approximately 4 months with frequent visit and stay at the project site. It is expected to complete the task at an approximately five (5) person-months.

The Expert will also coordinate with the national agencies of the BBIN countries for power market data, and for their inputs.

B. Non -Key International Expert

i. Engineering Geologist

The Geologist shall preferably have a Master's degree or equivalent in engineering geology or related discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience of geological investigation, studies and design in feasibility study and detailed engineering design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as a geologist.

It is expected that the expert will be resident in Kathmandu for approximately 3.5 months with frequent visit and stay at the project site. It is expected to complete the task at an approximately three and half (3.5) person-months.

ii. Structural Engineer

The Structural Engineer shall preferably have a Master's degree or equivalent in civil/structural engineering or related discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have previous working experience in feasibility study and detailed engineering design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects involving dam of at least 110 m height as a structural engineer.

It is expected that the expert will be resident in Kathmandu for approximately 6 months with frequent visit and stay at the project site to complete the task.

iii. Multi Criteria Decision Analysis (irrigation/agriculture/natural resources management) Expert

The Multi Criteria Decision Analysis (MCDA) Expert shall preferably have Master's degree or equivalent in planning and management for infrastructure development with bachelor's degree in civil engineering or most related combination and must have preferably fifteen (15) years of professional experience.

The expert shall have previous working experience in feasibility study and detailed engineering design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as a Multi Criteria Decision Analysis Expert.

It is expected that the expert will be resident in Kathmandu for approximately one and half (1.5) months.

iv. Construction Planning and Scheduling Expert

The Construction Planner shall preferably have a Master's degree or equivalent in civil engineering or construction management or other engineering discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in preparation of construction plan and schedule of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as construction planner.

It is expected that the expert will be resident in Kathmandu for approximately 2.5 months with frequent visit and stay at the project site. It is expected to completed the task at an approximately two and half (2.5) person-months.

v. Cost Engineer/Quantity Surveyor

The Cost Engineer/Quantity Surveyor shall preferably have a Master's degree or equivalent in civil/mechanical engineering or other related discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have previous experience as cost engineer/estimator of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as cost engineer/estimator.

It is expected that the expert will be resident in Kathmandu for approximately 3.5 months with frequent visit and stay at the project site. It is expected to complete the task at an approximately three and half (3.5) person-months.

vi. Project Economist – Economic & financial Analysis

The Project Economist shall preferably have a Master's degree or equivalent in economics or finance or Engineering economics or Business Administration or other relevant discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in economic analysis of hydropower projects, economic study of the displaced people and project area in reservoir type hydropower project involving permanent resettlement of Project Affected Families as economist. The expert shall also have experience in financial analysis of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as financial specialist.

It is expected that the expert will be resident in Kathmandu for approximately 2.0 months with frequent visit and stay at the project site. It is expected to completed the task at an approximately two (2.0) person-months.

vii. Project Risk Analyst

The Project Risk Analyst shall preferably have a Master's degree or equivalent in engineering economics, energy economics or finance or business administration or other relevant discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in compressive assessment of technical and financial risk including risk identification, risk assessment, risk mitigation, risk monitoring etc. for the similar project.

It is expected that the expert will be resident in Kathmandu for approximately 1.5 months with frequent visit and stay at the project site. It is expected to completed the task at an approximately One and half (1.5) person-months.

viii. Power System Planning Expert

The expert shall preferably have a Master's degree or equivalent in power system planning, or related discipline and must have preferably fifteen (15) years of professional experience in power System planning or related discipline. It is expected to completed the task at an approximately half (0.5) person-months. The Expert will also coordinate with the national agencies of the BBIN countries for power system data, and for their inputs.

ix. Electrical/Powerhouse engineer

The Electrical/Powerhouse Engineer shall preferably have a Master's degree or equivalent in electrical engineering or related discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in the design and preparation of specifications of powerhouse electrical equipment at the detailed engineering study of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as an electrical engineer.

It is expected that the expert will be resident in Kathmandu for approximately 2 months with frequent visit and stay at the project site. It is expected to completed the task at an approximately two and half (2.5) person-months.

x. Hydro-mechanical Engineer

The Hydro-mechanical Engineer shall preferably have a Master's degree or equivalent in mechanical engineering or other related discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in the preparation of hydro-mechanical design specifications of hydro-mechanical components of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as mechanical/hydro- mechanical engineer.

It is expected that the expert will be resident in Kathmandu for approximately 2 months with frequent visit and stay at the project site. It is expected to completed the task at an approximately two and half (2.5) person-months.

xi. Mechanical Engineer (Powerhouse)

The Mechanical Engineer (Powerhouse) shall preferably have a Master's degree or equivalent in mechanical engineering or related discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in the preparation of powerhouse mechanical equipment design specifications, conditions of contract at the detailed engineering study of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as an electro-mechanical engineer.

It is expected that the expert will be resident in Kathmandu for approximately 2 months with frequent visit and stay at the project site. It is expected to completed the task at an approximately two and half (2.5) person-months.

xii. Transmission Line & Sub-station Engineer

The Transmission Line & Sub-station Engineer shall preferably have a Master's degree or equivalent in high voltage/electrical engineering or related discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in design of transmission lines and substations of 400 kV or above voltage class as transmission line & substation engineer.

It is expected that the expert will be resident in Kathmandu for approximately 2.5 months with frequent visit and stay at the project site.

xiii. Contract Specialist

The Contract Specialist shall preferably have a Master's degree or equivalent in Construction management or law or engineering or other relevant discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in the preparation of conditions of contract of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as contract specialist. Experience shall also cover tender document preparation, negotiation, and arbitration of reservoir projects of similar size and scale to Sunkoshi-3 Hydropower Project.

It is expected that the expert will be resident in Kathmandu for approximately 5 months with frequent visit and stay at the project site. It is expected to complete the task at an approximately Six (6) person-months.

xiv. GLOF Expert

The GLOF Expert shall preferably have a Master's degree or equivalent in engineering /natural science/hydrology or other relevant discipline and must have preferably fifteen (15) years of professional experience.

The expert shall have experience in the study and analysis of GLOF and in the study of climate change of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as GLOF expert. Experience in hydrological and meteorological studies including GLOF and climate change for hydropower projects in the Hindu Kush region as hydrologist or GLOF expert will be an added advantage of the expert.

It is expected that the expert will be resident in Kathmandu for approximately 1.0 months with frequent visit and stay at the project site. It is expected to completed the task at an approximately 1.25 person-months.

xv. Climate Change Expert

The Climate Change Expert shall preferably have a Master's degree or equivalent in engineering /natural science/hydrology or other relevant discipline and must have preferably ten (10) years of professional experience.

The expert shall have experience in the study and analysis of impact of climate change of successfully completed (Constructed and Commissioned) reservoir type hydropower projects as Climate change expert, preferably in the Hindu Kush region.

It is expected that the expert will be resident in Kathmandu for approximately 1.25 months with frequent visit and stay at the project site.

xvi. Pool of Experts, if required

The Consultant shall propose experts in different fields deemed necessary to complete the assignments. These experts shall preferably have a Master's degree or equivalent in relevant field and must have preferably fifteen (15) years of professional experience.

It is expected that the expert will be resident at the home office of the Consultant for approximately fifteen (15) months with frequent necessary visit to the project site.

(C) National Experts

It is recognized that local expertise will be needed in several areas of the study. Hence budgetary provision with breakdown of man months has been made to take advantage of the experience of the most senior professionals in Nepal in field, such as, water resources, hydrology, hydropower, transportation, geotechnical, geology etc. Involvement of such individual consultants or firms with specialization in respective fields will help in sharing of knowledge and transfer of technology and expertise to local engineers and scientists during the study. However, the prime responsibility for quality advice will remain with the international Consultant. It is really difficult to define precisely the number of man months needed. However, a tentative input of local professionals required for the study is estimated and presented in the following.

i) National Key Expert

a. Deputy Team Leader/ Hydropower Engineer:

The Deputy Team Leader shall preferably have a Master's degree or equivalent civil/hydropower/water resources/hydraulic/structure engineering discipline and must have preferably fifteen (15) years of professional experience, ten (10) years of which in planning, design, specification, tender document preparation, construction supervision of hydropower projects.

The Deputy Team Leader shall assist Team Leader (International Key) for the work in Nepal. The Deputy Team Leader will be dedicated full time to Sunkoshi-3 Hydropower Project in Kathmandu.

The expert shall also have previous experience of working as hydropower engineer in conducting feasibility studies and detailed engineering design of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20MW. Experience shall also cover planning, design, specification, tender document preparation, construction supervision of reservoir projects of similar size to the Sunkoshi-3 Hydropower Project. It is expected to complete the task at an approximately twenty-four (24) person-months.

b. Reservoirs/Dams Engineer:

Reservoirs/ Dam Engineer shall have preferably Master's degree or equivalent in civil/hydropower/water resources engineering and must have preferably fifteen (15) years of professional experience in planning, design and construction supervision of hydropower projects of similar nature and magnitude to the Sunkoshi-3 Hydropower Project.

The expert shall assist Reservoir/Dam engineer (International Key Expert) in detailed engineering design of Sunkoshi-3 Project. The expert shall also have previous experience of working as hydropower engineer in conducting feasibility studies and detailed engineering design of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20MW. It is expected to complete the task at an approximately ten (10) person-months.

c. Water Resources, Planning and Impact studies (Water Resources/Hydrologist /Sedimentologist):

Water Resources, Planning and Impact studies shall have preferably Master's degree or equivalent in water resources engineering/ Hydrology/civil and must have preferably fifteen (15) years of professional experience in planning, design and construction supervision of

hydropower projects of similar nature and scale to the Sunkoshi-3 Hydropower Project.

The expert shall assist Hydrologist (International Key Expert) as water resources engineer, hydrologist/sediment engineer for carrying out detailed engineering design of Sunkoshi-3 Hydropower Project.

The expert shall also have previous experience of working as hydropower engineer in conducting feasibility studies and detailed engineering design of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20MW. It is expected to complete the task at an approximately ten (10) person-months.

ii) National Non-Key Expert

Other national professionals, except civil engineers and electrical engineers shall have preferably Master's degree or equivalent in relevant field and must have preferably fifteen (15) years of professional experience. Civil Engineers and electrical engineers shall preferably have a Master's degree or equivalent in relevant field and must have preferably five (5) years of professional experience.

Local Consultant and Counterpart Staff

In carrying out their duties, the Consultant shall involve local consultants as much as possible with technical responsibility and assume the transfer of technology to strengthen institutional capabilities of local consultants.

In addition, NEA will provide counterpart staffs particularly technical personnel in carrying out the works related to the study as on the job training. The consultant shall carry out the works including but not limited to following activities:

- Involve NEA counterpart staffs in the technical and related field from the beginning of the project as on the job training;
- Provide on the job training to the NEA engineers during the course of the assignments;
- Identify training needs of NEA engineers in related fields and organize trainings at Consultant's home country; or at appropriate country

Arrange a review meeting of the project works with the senior engineers of NEA at the home office of the consultant.

Employer's Input

Data and Reports

NEA will provide the following inputs, project data and reports to facilitate preparation of the Proposals to the short-listed Consultants.

(i) The following reports and data will be made available to the consultants:

- Feasibility Study Report of Sunkoshi-3 Project – 2021 along with annexes,

(ii) Assistance to facilitate site visit if required by shortlisted consultant with prior notice to NEA.

Duration of Services

The estimated time for completion of the complete assignment is about twenty-four (24) months. Out of the total 24 months, it has been estimated that twenty (20) months will be utilized in inception, field investigation, detailed engineering design and four (4) months for preparation of tender documents and finalization of the detailed engineering design.

Training and Capacity Building

One of the basic objectives of the consulting services is transfer of technology in the field of hydropower planning, design and development to the NEA's engineers. This will be achieved by involving the NEA's engineers in various activities of the project implementation during the execution of detailed engineering design in the field investigation as well as in the home office of the consultant.

During the inception phase of the contract, the consultant shall perform a skills assessment and develop a training program for NEA counterpart staff. All international experts are expected to work closely with the NEA counterpart and shall ensure that the NEA counterpart will achieve higher skill levels as result of their involvement in the project.

NEA's ten (10) senior engineers will visit the consultant's home office for observation and study of hydropower projects in the consultant's home office country for total period of ten (10) days. Main objective of this visit is to observe the working environment, design team, construction supervision and planning procedures of the project adopted by consultant.

In addition to above mentioned, consultant shall arrange workshops session/s in its home office for the total of 10 (ten) engineers in the following disciplines for 10 (Ten) days.

- Reservoir Simulation
- Project planning and design
- Hydraulic and structural design of hydropower projects
- Transient analysis
- Power transmission system
- Project management and contract administration for engineers

Administrative support for Consultant Team

If required by local regulations, NEA will provide Consultant with necessary support letters for obtaining visas for consultant staff and other personnel permits. The cost and timing of obtaining the above is entirely consultant responsibility.

Other Facilities and Support Services

- All other facilities such as vehicles, computers photocopy machines, fax machines, furniture, fixtures, office space, office equipment, accommodation for its staffs shall be managed by the Consultant and the cost of all the facilities required by the consultant to carry out the assignment shall be included in the consultant's proposal. After the completion of the assignment, the above facilities shall be handed over to the Client.

EVALUATION OF CONSULTANT'S EOI APPLICATION

Consultant's EOI application which meets the eligibility criteria will be ranked on the basis of the Ranking Criteria.

EVALUATION PROCEDURE FOR SCREENING OF CONSULTING FIRMS

The list will be prepared of those consulting firms which have submitted EoI within the scheduled time in response to the notice of EoI for consulting services published by NEA. The general notes in the evaluation procedures are as follows:

i) Qualification and experience of the consulting firm associated as sub-consultancy or in association will not be considered for evaluation for shortlisting;
ii) The experience of the consulting firms (single entity or as JV partners) carried out in association or sub -consultancy will not be evaluated;
iii) The references and the qualification documents submitted from their parent or subsidiary companies as applicable shall not be considered for their evaluation;
iv) Consulting firms work experiences shall be evidenced by duly certified (by authorized agency) copies of client's references with contact addresses on the letter head of the client's organization and shall be written in English. If the references are in other languages, it shall be accompanied by accurate translation into the English language duly authenticated by notary agency or nationally/internationally recognized translating agency.

The evaluation for short listing will be carried out in following three steps.

STEP I: PRELIMINARY SCREENING OF CONSULTING FIRMS

In this step, a preliminary screening of the received EoI proposals will be carried out. The consulting firms will be evaluated on 'Pass' or 'Fail' basis. Each consulting firm must 'pass' each and every threshold criterion mentioned below. Any consulting firm not complying with any of the specified threshold criteria (A, B, C and D) shall be disqualified and shall not be considered for further evaluation.

A. General Threshold Criteria

i) EOI proposal shall be duly received within the last date and time of submission as mentioned in the notice of EOI;
ii) Notarized/Certified (by authorized agency) Certificates of incorporation or Registration.
iii) VAT/PAN Registration (for National Consulting Firm only)
iv) Tax clearance/ Tax returns submission/ Letter of time extension for Tax Return Submission for fiscal Year 2079/80. (For national Consulting Firm only)
v) Company Profile

vi) At the time of submission of EOI proposal, consulting firms must not be black listed by Multi-lateral Financial Institutions, Public Procurement Monitoring Office (PPMO) of Nepal, Government of Nepal (GoN) and Nepal Electricity Authority (NEA);

vii) Consulting firms (single entity or each partner of JV) must have been legally registered for at least ten (10) years prior to the deadline date for submission of EOI.

viii) Minimum average annual turnover of the best three years over the last seven fiscal years shall be USD 7.0 Million or equivalent. In case of JV, cumulative strength of JV partners will be evaluated for annual turnover. If annual turnover is in other currency than US$, equivalent to US$ shall be considered by calculation Nepal Rastra Bank's Buying Rate on last date of submission of EOI document.

ix) Notarized/Certified (by authorized agency) Financial Statement or document (Annual report) to support annual turnover of last seven fiscal years from the last date of submission of EOI.

x) Following firm Attached

- EOI Form: Letter of Application (Form 1)
- EOI Form: Applicant's Information (Form 2)
- EOI Form: Work Experience Details (Form 3(A), 3(B) & 3(C))
- EOI Form: Capacity Details (Form 4)
- EOI Form: Key Experts List (form 5).

B. Technical Threshold Criteria

Evaluation under these criteria will be based on the experience of the consulting firms on the study of the hydropower projects, which are **constructed and commissioned** only. Ongoing and planned projects will not be considered for the evaluation. All of the criteria listed below could be fulfilled by one single or separate project/s. Only those projects completed in the last seven (7) years preceding from the last date of submission of EoI will be considered for evaluation.

i) Consulting firms must have the experience of completion of Detailed Engineering Design of at least one (1) storage type hydroelectric projects (HEP), installed capacity not less than 200 MW

ii) Consulting firms must have the experience of completion of Detailed Engineering Design of at least one (1) hydroelectric project having dam height not less than one hundred ten meters, 110 m;

iii) Consulting firms must have the experience of completion of Detailed Engineering Design of at least one (1) hydroelectric project consisting of headrace tunnel of length not less than one km, 1 km;

iv) Consulting firms must have the experience of completion of Detailed Engineering Design of at least one (1) hydroelectric project consisting of power house of area not less than two thousand square meter, 2000 m^2;

v) Consulting firms must have the experience of Preparation of Tender Documents of at least one (1) hydroelectric project having installed capacity not less than 100 MW.

C. Threshold Criteria for Joint Venture Firms

(i) The lead partner of the Joint Venture firm must be the international firm with at least 40% share and each of the other JV partners must have at least 25 % of the share;

(ii) Each partner of JV shall meet the above criteria A (ii), (iii), (iv) and (v)

(iii) Each partner of JV shall have the experience of completion of Detailed Engineering Design of at least one (1) hydroelectric project (HEP) with the installed capacity not less than 100 MW which are constructed and commissioned;

(iv) The cumulative experience of the JV partners shall meet all the Criteria mentioned in B above;

(v) Joint Venture firms shall submit the Joint Venture Agreement or MoU of JV agreement or intendant JV agreement along with their EoI proposal;

(vi) An Applicant must not submit more than one (1) EOI proposal as either a single entity or as a partner in JV.

D. Management competency of consulting firm:

1.1 Standard policies, procedures, and practices to assure quality interaction with clients and outputs including ISO registration;

1.2 Complaint handling mechanism concerning performance of experts or quality of the reports and internal controls to address and resolve complaints;

1.3 Strategy to improve quality of firm/association's performance for the assignment;

1.4Firm/association's standard policies, procedures and practices to avoid changes/Replacements of personnel and continuity of professional services;

1.5 Firm/association social protection practices to safeguard the well-being of proposed experts;

STEP II: DETAILED EVALUATION OF CONSULTING FIRMS

The Consulting firms determined ''Pass'' in the Step I, are further evaluated in the Step II. The cumulative Technical Competency of Consulting Firm, Geographical Experiences of the Consulting Firm, Qualification of Key Experts and Financial Capacity of the Consulting Firm shall be considered in the evaluation. A scoring system is adopted to rank these firms in order of merit based on the criteria mentioned below. The maximum overall score that any Consulting firms can obtain is set at 1,000 points, which are distributed as follows:

Criteria 1:	Experience of Consulting Firm	: **600 points**
Criteria 2:	Qualification of Key Experts	**: 300 points**
Criteria 3:	Financial Capacity of the Consulting firm	**: 100 points**

STEP III: SHORT-LISTING OF CONSULTING FIRMS

The consulting firms or JV firms scoring less than 600 points out of total points of 1000 and 60% points in **Criteria-1. Experience of the Consulting Firm** will not be qualified for short listing.

a) Rank the firms in order of merit according to the points secured by them;

b) Select the top six consulting firms as short-listed firms, to which RFP will be addressed.

c) In case of JV, origin of Lead firms shall be considered for the Evaluation.

In case of tie of total scored marks between firms during evaluation, the firm with a greater number of project's experience on **the Sub Criteria 1.2.1 Detailed Engineering Design of Hydroelectric Projects having dam height not less than one hundred ten-meter, 110 m**, will be prioritized.

C. EoI Forms & Formats

Form 1. Letter of Application

Form 2. Applicant's information

Form 3.Experience (General, Specific and Geographical)

Form 4. Capacity

Form 5. Qualification of Key Experts

1. Letter of Application

(Letterhead paper of the Applicant or partner responsible for a joint venture, including full postal address, telephone no., fax and email address)

Date: .....

To,

Full Name of Client: _____

Full Address of Client: _____

Telephone No.: _____

Fax No.: _____

Email Address: _____

Sir/Madam,

1. Being duly authorized to represent and act on behalf of (hereinafter "the Applicant"), and having reviewed and fully understood all the short-listing information provided, the undersigned hereby apply to be short-listed by **[Insert name** of Client) as Consultant for **{Insert brief description** of Work/Services}.

2. Attached to this letter are photocopies of original documents defining:

   a) the Applicant's legal status;

   b) the principal place of business;

3. **[Insert name of Client]** and its authorized representatives are hereby authorized to verify the statements, documents, and information submitted in connection with this application. This Letter of Application will also serve as authorization to any individual or authorized representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by yourselves to verify statements and information provided in this application, or with regard to the resources, experience, and competence of the Applicant.

4. **[Insert name** of Client) and its authorized representatives are authorized to contact any of the signatories to this letter for any further information.[1]

5. All further communication concerning this Application should be addressed to the following person,

   [Person]

   [Company]

   [Address]

[1] Applications by joint ventures should provide on a separate sheet, relevant information for each party to the Application.

[Phone, Fax, Email]

6. We declare that, we have no conflict of interest in the proposed procurement proceedings and we have not been punished for an offense relating to the concerned profession or business and our Company/firm has not been declared ineligible.

7. We further confirm that, if any of our experts is engaged to prepare the TOR for any ensuing assignment resulting from our work product under this assignment, our firm, JV member or sub-consultant, and the expert(s) will be disqualified from short-listing and participation in the assignment.

8. The undersigned declares that the statements made and the information provided in the duly completed application are complete, true and correct in every detail.

Signed **:**

Name **:**

For and on behalf of (name of Applicant or partner of a joint venture):

2. Applicant's Information Form

(In case of joint venture of two or more firms to be filled separately for each constituent member)

1. Name of Firm/Company:

2. Type of Constitution (Partnership/ Pvt. Ltd/Public Ltd/ Public Sector/ NGO)

3. Date of Registration / Commencement of Business (Please specify):

4. Country of Registration:

5. Registered Office/Place of Business:

6. Telephone No; Fax No; E-Mail Address

7. Name of Authorized Contact Person / Designation/ Address/Telephone:

8. Name of Authorized Local Agent /Address/Telephone:

9. Consultant's Organization:

10. Total number of staff:

11. Number of regular professional staff:

(Provide Company Profile with description of the background and organization of the Consultant and, if applicable, for each joint venture partner for this assignment.)

3. Experience

3(A). General Work Experience

(Details of assignments undertaken. Each consultant or member of a JV must fill in this form.)

S. N.	Name of assignment	Location	Value of Contract	Year Completed	Client	Description of work carried out
1.						
2.						
3.						
4.						
5.						
6.						
7.						

1. Criteria-1:Experience of Consulting Firm (600)

1.1 General Experience of Consulting Firm (200)

1.1.1 Detailed Engineering Design of Hydroelectric Projects having Installed Capacity not less than 200 MW.

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience:

S. No	Name of the project	Installed Capacity(MW)	Completed or Commissioned Year
1			
2			
3			

1.1.2 Detailed Engineering Design of Storage type Hydroelectric Projects having Installed Capacity not less than 200 MW.

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience:

S. No	Name of the project	Installed Capacity(MW)	Type of Project	Completed or Commissioned Year
1				
2				
3				
4				

3(B). Specific Experience

Details of similar assignments undertaken in the previous seven years
(In case of joint venture of two or more firms to be filled separately for each constituent member)

Assignment name:	Approx. value of the contract (in current NRs; US$ or Euro)[2]:
Country: Location within country:	Duration of assignment (months):
Name of Client:	Total No. of person-months of the assignment:
Address:	Approx. value of the services provided by your firm under the contract (in current NRs; US$ or Euro):
Start date (month/year): Completion date (month/year):	No. of professional person-months provided by the joint venture partners or the Sub-Consultants:
Name of joint venture partner or sub-Consultants, if any:	Narrative description of Project:

[2] Consultant should state value in the currency as mentioned in the contract

Description of actual services provided in the assignment: **Note: Provide highlight on similar services provided by the consultant as required by the EOI assignment.**

Firm's Name: _____

1.2. Specific Experience of Consulting Firm (375 Points)

1.2.1 Detailed Engineering Design of Hydroelectric Projects having dam height not less than one hundred ten meter, 110 m

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience:

S. No	Name of the project	Installed Capacity(MW)	Height of Dam(m)	Completed or Commissioned Year
1				
2				
3				
4				

1.2.2 Detailed Engineering Design of Hydroelectric Projects having Spillway of capacity not less than 4000 m3/s

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Spillway capacity (m3/s)	Completed or Commissioned Year
1			
2			
3			
4			

1.2.3 Detailed Engineering Design of Hydroelectric Projects having Headrace Tunnel of Length not less than One Thousand (1000) meter

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Tunnel Length (m)	Completed or Commissioned Year
1			
2			
3			

1.2.4 Detailed Engineering Design of Hydroelectric Projects having Power House of installed capacity not less than 200 MW

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Type of Powerhouse	Completed or Commissioned Year
1				
2				
3				
4				

1.2.5 Preparation of Tender Documents of Hydroelectric Projects funded by the multinational development agencies having Installed Capacity not less than 100 MW.

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience:

S. No	Name of the project	Installed Capacity(MW)	Funding Agency	Completed or Commissioned Year
1				
2				
3				

1.2.6 Construction Supervision of Hydroelectric Projects having Installed Capacity not less than 200 MW

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Completed or Commissioned Year
1			
2			
3			

3(C). Geographic Experience

Experience of working in similar geographic region or country

(In case of joint venture of two or more firms to be filled separately for each constituent member)

No	Name of the Project	Location (Country/ Region)	Execution Year and Duration
1.			
2.			
3.			
4.			
5.			
6.			
7.			

1.3 Geographical Experiences of Consulting Firm (25 Points)

Evaluation under this criterion is based on the experience of consulting firms in Detailed Engineering Design of hydroelectric projects, completed within the last seven (7) years preceding from the last date of submission of EoI in countries falling under Hindu Kush Himalayan Region as defined by ICIMOD (International Centre for Integrated Mountain Development). The cumulative experience of the JV partners shall be evaluated. The following is the breakdown of this particular criterion:

1.3.1 Detailed Engineering Design of Hydroelectric Projects with installed capacity not less than 100 MW in countries falling under Hindu Kush Himalayan Region.

☐Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Region of the country	Completed or Commissioned Year
1				
2				
3				

4. Capacity

4(A). Financial Capacity

(In case of joint venture of two or more firms to be filled separately for each constituent member)

Annual Turnover	
Year	**Amount Currency**

- **Average Annual Turnover of Best of 3 Fiscal Year Of Last 7 Fiscal Years**

Note:

1. Supporting documents for Average Turnover should be submitted for the above.
2. Supporting documents for Average Turnover should be duly signed and stamped by the certified auditor.
3. For the purpose of determining the equivalent amount of the required amount of the required average annual turnover shall be provided in freely convertible currency.
4. The exchange rate (Selling Exchange Rate) published by Nepal Rastra Bank prevailing on the last date of submission of EoI document shall be applied.

Criteria- 3: Financial Capacity of the Consulting firm (100 Points)

Evaluation under this criterion is based on the financial capacity of the Consulting Firm (Average Annual Turnover (AAT) of Best of 3 Fiscal Year of Last 7 Fiscal Years in consulting business) from the last date of submission of EOI.

Note: For the purpose of determining the equivalent amount of the required amount of the required average annual turnover shall be provided in freely convertible currency. The exchange rate (Selling exchange rate) published by Nepal Rastra Bank prevailing on the last date of submission of EOI document shall be applied.

5. Key Experts (Include details of Key Experts only)

(In case of joint venture of two or more firms to be filled separately for each constituent member)

SN	Name	Position	Highest Qualification	Work Experience (in year)	Specific Work Experience (in year)	Nationality
1						
2						
3						
4						
5						

(Please insert more rows as necessary)

Criteria-2: Qualification of Key Experts (300 Points)

P1. Team Leader/Project Manager/Contract Specialist

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of Professional Experiences:……

I) As a Team Leader/ Project Manager

Professional experience in Detailed Engineering Design or Construction Supervision of successfully completed (Constructed and Commissioned) hydropower projects with capacity not less than 200 MW as team leader

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						
4						

II) As a Hydropower Engineer

Professional experience in Feasibility Studies of successfully completed (Constructed and Commissioned) reservoir type hydropower project with dam height of at least 110 m as hydropower engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Dam Height(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						
4						

Professional experience Detailed Engineering Design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with dam height of at least 110 m as hydropower engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Dam Height .0(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						
4						

Team leader must be full-time employee of the Consultant. If the Team leader is not a full-time employee of the consultant, only 80 % of the points will be given in sub criterion B.

Points shall only be given if the Team leader's involvement in individual project is equal to or in excess of 12 (Twelve) person-months

C) Regional Experience (Outside Home Country) within Asian countries:

Regional experience in Detailed Engineering Design or Construction Supervision of at least one successfully completed (Constructed and Commissioned) hydropower project with capacity not less than 100 MW as Hydropower Engineer.

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity (MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						

3						

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member:_____

Full name of authorized representative: _____

P2. Reservoirs/ Dams Engineer (International)

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of Professional Experiences:……

Professional experience in Feasibility Studies of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with dam height of at least 110 m as reservoir/dam engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Dam height (m)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						

Professional experience in Detailed Engineering Design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with dam height of at least 110 m as reservoir/dam engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Dam Height(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						

Points shall only be given if the Reservoir/Dam Engineer's involvement in individual project is equal to or in excess of 3 (three) person months.

C) Regional Experience (Outside Home Country) within Asian countries:

Regional experience in Feasibility/ Detailed Engineering Design/ Construction Supervision of at least one successfully completed (Constructed and Commissioned) hydropower project with capacity not less than 100 MW as Reservoir/Dam engineer.

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						
4						

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member:_____

Full name of authorized representative: _____

P3. Water resources, Planning and Impact studies (Water Resources/Hydrologist/ sedimentologist)

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of Professional Experiences:……

Professional experience in Feasibility Studies of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with installed capacity not less than 100 MW, as water resources engineer/ hydrologist/sediment engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Dam height (m)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						

Professional experience in Detailed Engineering Design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with installed capacity not less than 100 MW, as water resources engineer, hydrologist/sediment engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Dam Height(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						

Points shall only be given if the expert involvement in individual project is equal to or in excess of 3 (Three) person months.

C) Regional Experience (Outside Home Country) within Asian countries:
Regional experience in hydrological studies or design of at least one successfully completed (Constructed and Commissioned) hydropower project with capacity not less than 100 MW as hydrologist/ hydraulic/ sediment engineer.

☐ Three or more projects ☐ Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						
4						

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member:_____

Full name of authorized representative: _____

P4. Hydraulic Engineer/ Hydraulic Modelling Expert

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of Professional Experiences:……

Professional experience in design of hydraulic structures as well as in the physical and computational (numeric) modeling (computational fluid dynamics) of hydraulic structures in feasibility of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with installed capacity not less than 100 MW or dam height of at least 110 m , as hydraulic engineer

☐ Three or more projects ☐ Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Dam height (m)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1							
2							
3							
4							

Professional experience in design of hydraulic structures as well as in the physical and computational (numeric) modeling (computational fluid dynamics) of hydraulic structures in detailed engineering design of successfully completed (Constructed and Commissioned) reservoir type hydropower projects with installed capacity not less than 100 MW or dam height of at least 110 m , as hydraulic engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Dam height (m)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1							
2							
3							

Points shall only be given if the expert involvement in individual project is equal to or in excess of 3 (three) person months.

C) Regional Experience (Outside Home Country) within Asian countries:
Regional experience in hydrological studies or design of at least one successfully completed (Constructed and Commissioned) hydropower project with capacity not less than 100 MW as hydrologist/ hydraulic/ sediment engineer.

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						
4						

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member:_____

Full name of authorized representative: _____

P5. Tunnel Engineer/Geotechnical Engineer

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of Professional Experiences:……

Professional experience in field investigation, tests, design and construction supervision of successfully completed (Constructed and Commissioned) hydropower projects with power tunnel length totaling 1,000 m having its diameter not less than 5.4 m as tunnel engineer or geotechnical engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Country	Tunnel Length (m)	Tunnel Diameter (m)	Powerhouse size(L*B*H)	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1								
2								
3								
4								

Points shall only be given if the expert involvement in individual project is equal to or in excess of 3 (three) person months.

C) Regional Experience (Outside Home Country) within Asian countries:

Regional experience in detail engineering design or construction supervision of at least one successfully completed (Constructed and Commissioned) hydropower project with capacity not less than 100 MW as Tunnel/ Geotechnical engineer.

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						
4						

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member:_____

Full name of authorized representative: _____

P6. Power Market Studies, Electricity Pricing Study (Power System Economics)

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of Professional Experiences:……

Professional experience in power system studies including evacuation studies, load forecasting, electricity pricing, and various aspects of regional power trade

☐ Three or more projects ☐ Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1					
2					
3					
4					

Points shall only be given if the expert involvement in individual project is equal to or in excess of 3 (three) person months.

C) Regional Experience (Outside Home Country) within Asian countries:

Regional experience in Detail Engineering Design or Construction Supervision of at least one successfully completed (Constructed and Commissioned) hydropower project with capacity not less than 100 MW as Power System Planning Expert and/or Power System Economics

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Installed Capacity(MW)	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1						
2						
3						

4						

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member: _____

Full name of authorized representative: _____

N1. Deputy Team leader/ Hydropower Engineer (Local)

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of Professional Experiences:……

Professional experience in Feasibility Studies of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20 MW as hydropower engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1					
2					
3					

Professional experience in Detailed Engineering Design of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20 MW as hydropower engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1					
2					
3					

Points shall only be given if the expert involvement in individual project is equal to or in excess of 2 (two) person months.

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member:_____

Full name of authorized representative: _____

N2. Reservoirs/Dams Engineer

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of Professional Experiences:……

Professional experience in conducting feasibility studies of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20 MW hydropower engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1					
2					
3					

Professional experience in conducting Detailed Engineering Design of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20 MW as hydropower engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1					
2					
3					

Points shall only be given if the expert involvement in individual project is equal to or in excess of 2 (two) person months.

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member:_____

Full name of authorized representative: _____

N3: Water Resources, Planning and Impact Studies (Water Resource/Hydrologist/Sedimentoloy and Reservoir Simulation)

Name of Professional:

A) Academic Qualifications:

S.N	Academic Degree	Graduation Years	Faculty	Program
1	Bachelor			
2	Masters			

B) Work Experience of Key Expert proposed

Years of professional Experiences:……

Professional experience in conducting Feasibility Studies of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20 MW as hydropower engineer

☐ Three or more projects ☐Two projects ☐ One project ☐ None

Project Details for above Experience

S. No	Name of the project	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1					
2					
3					

Professional experience in conducting Detailed Engineering Design of successfully completed (Constructed and Commissioned) hydropower projects with installed capacity not less than 20 MW as hydropower engineer

☐ Three or more projects ☐Two projects ☐ One project ☐None

Project Details for above Experience

S. No	Name of the project	Country	Position Held	No. of person month in the project	Project Commissioned Year (AD)
1					
2					
3					

Points shall only be given if the expert involvement in individual project is equal to or in excess of 2 (two) person months.

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly

describe me, my qualifications, and my experience.

_____Date: _____
[Signature of staff member and authorized representative of the consultant]Day/Month/Year

Full name of staff member:_____

Full name of authorized representative: _____

CURRICULUM VITAE (CV)

Position Title and No.	{e.g., K-1, TEAM LEADER}
Name of Firm	Insert name of firm proposing the expert
Name of Expert:	{Insert full name}
Date of Birth:	{day/month/year}
Citizenship	

Education: {List college/university or other specialized education, giving names of educational institutions, dates attended, degree(s)/diploma(s) obtained}

_____

_____

Employment record relevant to the assignment: {Starting with present position, list in reverse order. Please provide dates, name of employing organization, titles of positions held,type of employment (full time, part time, contractual),types of activities performed and location of the assignment, and contact information of previous clients and employing organization(s) who can be contacted for references. Past employment that is not relevant to the assignment does not need to be included.}

Period	**Employing organization and your title/position. Contact information for references**	**Country**	**Summary of activities performed relevant to the Assignment**
[e.g., May 2005-present]	[e.g., Ministry of ……, advisor/consultant to… For references: Tel……/e-mail……; Mr. Bb, deputy minister]		

Membership in Professional Associations and Publications:

_____

Language Skills (indicate only languages in which you can work): _____

_____

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	**Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks**
{List all deliverables/tasks as in TECH- 5 in which the Expert will be involved)	

Expert's contact information: (E-mail…….. phone……)

Certification:

I, the undersigned, certify to the best of my knowledge and belief that

(i) This CV correctly describes my qualifications and experience
(ii) I am not a current employee of the GoN (Applicable to National Expert)
(iii) In the absence of medical incapacity, I will undertake this assignment for the duration and in terms of the inputs specified for me in Form TECH 6 provided team mobilization takes place within the validity of this proposal.
(iv) I was not part of the team who wrote the terms of reference for this consulting services assignment
(v) I am not currently debarred by a multilateral development bank (In case of DP funded project]
(vi) I certify that I have been informed by the firm that it is including my CV in the Proposal for the {name of project and contract}. I confirm that I will be available to carry out the assignment for which my CV has been submitted in accordance with the implementation arrangements and schedule set out in the Proposal.
(vii) I declare that Corruption Case is not filed against me.

I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

_____ Date: _____
[Signature of expert] Day/Month/Year

_____ Date: _____
[Signature of authorized representative of the firm] Day/Month/Year

Full name of authorized representative:

_____