I. Introduction

1.1 National Transmission and Dispatch Company Ltd. (NTDC) of Pakistan owns and operates the Transmission Network in the country. Pakistan has plans to develop hydropower potential and in particular priority is given to the Indus Cascade above Tarbela that offers maximum electricity generation due to high flows in the Indus River and changes in elevation. In this context over 30 hydro-power plants have been identified in the upper region of Pakistan and many of them are in the upper Indus River Catchment. Dasu Hydropower Project is in its most advance stages as contracts for its construction have been awarded and financing is secured. The corridors for construction of Transmission lines are very limited and terrain is very difficult. The corridor along Indus River offers best option and even that is very narrow, with very steep slopes, landslides, snow and ice and avalanches as river cuts through the high mountains. Due to limited options for routes, the transmission line to be constructed along Indus River should have enough built-in capacity to evacuate power from future hydropower plants that are planned to be constructed along the Indus River. Various plants for which the proposed Dasu Transmission Line (DTL) is to be used in future are listed below (this is just an indicative list):

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Hydropower Project</th>
<th>Generating Capacity (MW)</th>
<th>Expected Year of Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dasu (Stage-I)</td>
<td>2,160</td>
<td>2022</td>
</tr>
<tr>
<td>2</td>
<td>Dasu (Stage-II)</td>
<td>3,240</td>
<td>2023</td>
</tr>
<tr>
<td>3</td>
<td>Upper Spat Gah</td>
<td>277</td>
<td>2025</td>
</tr>
<tr>
<td>4</td>
<td>Middle Spat Gah</td>
<td>501</td>
<td>2025</td>
</tr>
<tr>
<td>5</td>
<td>Lower Spat Gah</td>
<td>496</td>
<td>2023</td>
</tr>
<tr>
<td>6</td>
<td>Keyal Khwar</td>
<td>128</td>
<td>2019</td>
</tr>
<tr>
<td>7</td>
<td>Upper Palas Valley</td>
<td>157</td>
<td>2024</td>
</tr>
<tr>
<td>8</td>
<td>Middle Palas Valley</td>
<td>398</td>
<td>2024</td>
</tr>
<tr>
<td>9</td>
<td>Lower Palas Valley</td>
<td>665</td>
<td>2023</td>
</tr>
<tr>
<td>10</td>
<td>Patan</td>
<td>2,400</td>
<td>2024</td>
</tr>
<tr>
<td>11</td>
<td>Thakot</td>
<td>4,000</td>
<td>2025</td>
</tr>
<tr>
<td>12</td>
<td>Diamer Basha</td>
<td>4,500</td>
<td>2026</td>
</tr>
</tbody>
</table>

| Total Generating Capacity | 18,922 MW |

1.2 Dasu Hydropower Project (DHP) is one of the main hydropower plants on the Indus River with a total planned capacity of 5,400 MW and is being constructed by WAPDA. Its first stage of 2,160 MW is expected to be online by December 2022 while full generation of 5,400 MW will be available by December 2023. NTDC has carried out design studies for construction of the Dasu Transmission line which needs to be confirmed, upgraded and the details are to be sorted out and the detailed design, and the bidding documents are to be prepared under this consultancy assignment. According to the study and NTDC plans at this stage, the interconnection scheme for evacuation of this power includes construction of a double circuit 765 kV transmission line from Dasu Hydropower Project (DHP) to Islamabad and two sub-stations at Mansehra and Islamabad West. Dasu Transmission Line Project (the Project) is required to
be completed by NTDCL six months before commercial operation date of first unit of DHP. In addition to evacuation of power to be generated by DHP, the Project would cater to other downstream hydropower projects as listed in the Table above. Single Line Diagram (SLD) for the proposed network is shown below:

1.3 These consultancy services are for: (A) the preparing and completing detailed design of the DTL, preparation of the design report, Project PC-I and the bidding documents as well as support in procurement of the contracts for construction of the line; and (B) construction supervision, contract management and project management support.

II. Detailed Scope of Work and Terms of Reference

Objective Of the Services

2.1 The prime objective of the proposed Consulting Services is to support NTDCL (the Client) in preparation, construction supervision and implementation of the Project. The Consultants shall aim to achieve technically viable, optimal, and cost effective design, development of the Project for evacuation of power from Dasu and other HPPs keeping in view environmental and social aspects of the Project.

2.2 These works will be carried out according to international standards and good engineering practices which will form the basis for project appraisal by the Government of Pakistan, the World Bank, and/or other international financial institutions.

Scope of Consultancy Services

2.3 The consulting services will be divided in two parts, Assignment A, and Assignment B and would include, but not limited to the following:

2.4 ASSIGNMENT-A, would include but not limited to the following:

(A1) Review, revise and update tender level engineering design for the Dasu Transmission Line (DTL) and its components. carry out and/or update the System Integration Studies (SIA) for integrating the transmission line into the network and to work out the design parameters for the DTL and prepare the design report and the Project PC-I;

(A2) Prepare detailed design, optimization of layout and equipment, specifications for Mansehra and Islamabad West Substations;

(A3) Prepare and/or update bidding documents for the transmission line and all components including conductors, towers and their foundations, hardware, grounding arrangements and shield wires etc. And prepare bidding documents for the Mansehra and Islamabad West substations covering all aspects of the substations such as substation layouts, buildings and equipment etc.;

(A4) Prepare, cost estimates for the project, implementation arrangements, implementation and supervision costs, monitoring and evaluation costs; and prepare project cost benefit and economic
analysis for the project and for each component such as Transmission line, Manshera substation, and Islamabad West station, etc.

(A5) Prepare and update the social and environmental management plans;

(A6) Provide support to NTDC on pre-qualification, bidding, preparing bid evaluation reports, tendering, and contracting; and Project Management;

2.5 **ASSIGNMENT-B.** would include but not limited to the following:

(B1) Provide support on procurement and construction supervision. Provide additional designs as may be required during construction.


(B3) Support on Implementation of EMP and RAP;

(B4) Assist on Program for Post Construction Services; and

(B5) Provide Technical and Professional Assistance and Training to Client’s Staff.

2.6 The detailed scope of each task is given below but the Consultant will be required to undertake any additional or other activities to achieve the overall objectives of the Project. First, the contract for Assignment A would be signed and depending upon the financing of the project and satisfactory completion of Assignment A contract would be signed for the Assignment B. The implementation period of Assignment A would be Eight Months though the contract would be signed for a period of 12 months, and Period for Assignment B would be Six Years covering construction and defect liability period though the construction period for the transmission line and the substations would not be more than 3.5 (Three and a Half) years.

**Detailed Scope of work for ASSIGNMENT-A**

2.7 **Task A1: Preparation of engineering design of transmission line.** This would include, but not limited to, the following:

(i) **Review of existing designs and bidding documents.** An earlier consultant, M/s. KEPCO/ENMASS have prepared design of the Dasu Transmission Line for a proposed voltage of 765 KV. The consultants would carry out a detailed review of these designs and identify sections and parts of the designs, route alignment, surveys and investigations, other analysis and calculations etc. that can be used, and gaps and additional work that is required to complete design of DTL. The review would include, but not limited to, the criteria and standards used in the design of various components of the DTL, route of the line, design of towers, conductor design, insulation and hardware design. The consultants would write a report on the review and submit to the client and the international panel of experts, identifying the deficiencies in these designs and what part if any can be used for the final design for the proposed DTL;

(ii) **Transmission Line Route and Alignment.** The consultants would review the currently proposed route, update and make changes as required for the DTL and carry out the route alignment and provide optimal route for the DTL from Dasu, Manshera, and Islamabad West substations;

(iii) **Geotechnical and topographic surveys and investigations.** The consultant would carry out the required topographical surveys and geo-technical investigations covering at least 10% of the foundations of the towers in each zone of the route distinguished by the geological conditions through which the DTL would be passing. The topography through which the line would go through (Dasu-Manshera-Islamabad west) is dominated by high mountains, varying in elevation from 1,000 to 3,200 meters above sea level which entails geological/environmental hazards of active faults and earthquakes,
landslides, rock fall, river scouring and flooding, snow drifts and avalanches, etc. the
consultants would ensure that adequate surveys and investigations are carried out in each
type zone through which the DTL passes as indicated above.

(iv) The consultants would be responsible for all investigations required for the Assignment
A and these investigations should be described in the technical proposals including the
methodology as well as their costs should be included in the financial proposals. If the
cost is not separately included in the financial proposals then it would be assumed that
the financial proposals include the survey and investigation costs;

(v) **Optimization of the voltage and System Integration Studies.** Currently a 765 KV line
is proposed from Dasu to Islamabad as the best option. The consultants would carry out
and properly document the optimization study for the voltage to be used for this line
based on the life cycle cost and prepare a report on this considering all alternatives and
provide sound justification for the selected voltage for the DTL;

(vi) The consultant would also review, and carry out and/or update the System Integration
Studies for integrating the line into the transmission system and for determining proper
design parameters for the DTL;

(vii) **Design Criteria.** Prepare, review and/or update overall design criteria for the DTL based
on international standards for such lines as well as for each component of DTL including
the design criteria for the towers and their foundations, conductors, insulations,
grounding wires and arrangements, shield wires, hardware for hanging conductors and
other nuts and bolts etc. used in each component of the DTL, substations, layout for the
substations and potential for expansion in future as required, buildings, offices, and each
and every equipment to be installed in the substations;

(viii) **Conductor selection and optimization.** The consultants would carryout the conductor
optimization study considering all the conductors available in the market or if required
specially design for the DTL and the number of conductors to be used, and propose best
option considering technical and cost benefits analysis using the life cycle costs other
specific conditions that are prevalent in the project area. The consultant would provide a
comparison for use of various conductors and justify that proposed conductor is optimal;

(ix) **Tower Design.** The consultants would carry out the detailed design of various types of
towers such as straight tower, angle towers with various angles needed, towers at slopes,
in the river etc. that would be used in the DTL, and carry out structural design of each
type of tower and their foundations, detailed stability analysis considering all types of
loading and forces and optimize the design of each type of towers prepare drawings and
prepare design of the foundations for these towers using the relevant geotechnical data
and the international standards for such lines that would be lifeline for the Pakistan’s
electricity grid. Using the design of each type of towers, estimate the quantities (BoQs)
for each type of tower as well as quantities for the DTL project as a whole;

(x) **Design of the insulation and hardware.** The consultants would provide optimized
design and drawings for extra high strength shield wire, ground wire, dampers, disc
insulators or other proper forms of insulators including accessories and associated
hardware/equipment and grounding materials etc.

(xi) **Preparation of BOQ and Costs.** Based on the above, prepare and/or update the BOQ
for the DTL, and Engineer’s Cost Estimates based on the optimized and accepted
designs;

(xii) **Preparation of the detailed design and Tender Drawings and specifications.** The
consultants would prepare detailed drawings for all components of DTL including the
towers and their foundations, grounding wires and arrangements, conductors, hardware,
insulators and hanging arrangements, and equipment for the substations etc.;

(xiii) **Cost Benefit or Economic Analysis.** The consultants would carry out the cost benefit
and economic analysis for the DTL project using the internationally and acceptable and
suitable methodology used for the evacuation of power using the extra high voltage transmission lines;

(xiv) **Preparation of the Detailed Design Report.** The consultant would prepare a detailed design report documenting all the above analysis in easily understandable and readable form covering all technical economic aspects of the project, specifications, BOQs, and drawings etc. divided in suitable volumes.

2.8 List of engineering studies and documents required at the minimum for 765 kV DASU DC Transmission Line Design Concept Evaluation and Approval by NTDC:

i. Collect data and produce Design Requirement document.

ii. Evaluate and comment on the selected TL voltage.

iii. Provide input to SIA studies for Islamabad West S/S and Mansuha S/S.

iv. Evaluate and optimize the proposed route(s) of the line from the construction point of view.

v. Produce preliminary line cost evaluation matrix in support of selected line design.

2.9 Furthermore, the following major engineering drawings and documents shall be produced for NTDC review and approval prior to commencing detail design.

i. Line Route Map

ii. Provide rational soil investigation support as mentioned above into foundation design, provide specification of civil works and materials.

iii. Produce Towers type classification.

iv. Select Towers GPS.

v. Optimize conductor selection.

vi. Discuss TL losses including corona losses.

vii. Produce specification for line insulation and ancillary materials.

viii. Investigate and discuss grounding objectives and design.

ix. Describe arrangement of Tie-Lines for Mansuha and Islamabad West S/Ss.

x. Propose Tele-communication means for TL.

xi. Produce map and description of access road, list the required road construction/upgrade effort and existing structures relocation needs.

xii. Select and describe for the purpose of Tender Document, the possible lay-down areas (at least three) along the line route for contractor equipment and office.

2.10 The following engineering documents shall be produced for NTDC review and approval in a course of assignment:

i. Design Description

ii. Towers Detail Design and engineering calculation in support of the design

iii. Towers Shop Drawings adequate for the mill

iv. Foundation Detail Design and engineering calculation in support of the design

v. Grounding details drawings

vi. All other engineering calculations and drawings required for the construction of the line

vii. Drawings for Tie-Off(s) specific towers/gantries

viii. Commissioning Program

ix. Safety and Operation Instruction

x. Operators and Maintenance Crew Training Plan
2.11 **Task A2: Prepare Detailed Design for Substations of Mansehra and Islamabad west.** The Mansehra Substation would receive power from Indus Cascade starting with 2,160 MW from DHP-I and as further plants are installed on the Indus Cascade. The Islamabad West Substation would receive power from Indus Cascade starting with 2,160 MW from Dasu Hydropower Stage 1 Project and Tarbela around 1400 MW through a 500 KV double circuit line and then distribute to the other parts of the country and connected to the national grid possibly with 500 KV and 220 KV lines. The substations would take 765 kV lines from Dasu and would have conversion and bus bars of 765 kV, 500 kV and 220 kV. The substations would distribute power locally also through 132 KV or lower voltage lines and would also be connected to some other cities in the east, west and south.

2.12 The consultants would prepare an optimal design for the Mansehra and Islamabad West substations making proper provisions for expansion in the future as the generation along the Indus cascade expands. The 765 KV, 500 KV, 220 KV and 132 KV bays would be designed, bays and reactors buss bars would have to be provided at these stations providing the most optimal solution. Also the design and specification of the equipment, transformers, reactors, switch gears buss bars would be provided by the consultants. The civil works required for constructing the substations would be designed as well and the houses, offices and other buildings to make these substation operational. All these designs and specification would be according to the international standards. In this context the consultants shall:

(i) Prepare equipment and substation layout plans, select design parameters, develop design and specifications of the equipment to be installed in the substation and associated civil works, estimate quantities and prepare bid drawings;

(ii) Prepare detailed designs and for that purpose carry out surveys, site investigations, analysis, and prepare detailed designs reports for function and use design covering the contracting agency’s requirements with respect to the procurement, in particular requirements related to the following:

- site conditions and circumstances;
- technical standard and use;
- technological innovation to meet the requirements with least cost solutions including technology and construction methods;
- architectural and aesthetic,
- functionality, durability and sustainability
- services according to the acceptable international standards.

2.13 The consultants would carry connection assessment of the substations that would include but not limited to the following:

i. Review and comments on available NTDC files associated with two substations and NTDC Grid

ii. NTDC System Requirements and Data for Connection Assessment Study

iii. Load Flow Analysis including planned stages of DASU HP construction

iv. Short Circuit Assessment

v. Reactive Power Capability

vi. Line & Tap-Line Switching Analysis

vii. Thermal Analysis

viii. Voltage Analysis

ix. Transient Stability Performance

x. Voltage Ride-Through Capability

xi. Equipment Rating Selection

xii. Protection & Control (P&C) Requirements

2.14 The following major engineering drawings shall be produced for NTDC review and approval prior to detail design
i. Design Requirements Document
ii. 1 & 3 line diagrams including protection
iii. Substation(s) General Arrangement Drawing(s)
iv. Outdoor Switchyard and Indoor Switchgear Room(s) drawings
v. T/L gantries and HV connection arrangement drawings
vi. Control & Protection Building(s)
vii. Maintenance Building(s) for Substations and TL
viii. Control and protection Rooms
ix. Station Services Requirements and Drawings
x. Communication and SCADA circuits conceptual and drawings
xi. In line with the World Bank associated practices, address the Social and Environmental
    issues associated with construction of two substations
xii. Optimize and Evaluate the cost of the Project

2.15 The following engineering documents shall be produced for NTDC review and approval in a
course of assignment
   i. Design Description Document
   ii. Drawings and Documents Organization and Classification Chart(s)
   iii. Equipment Specification
   iv. Protection & Control Description(s) and Specification
   v. Elementary Diagram Drawings
   vi. Connection Diagram Drawings
   vii. Relay Setting Matrix and Protection Coordination Study
   viii. Tele-communication and supervision (SCADA) design drawings and specification
   ix. Arrangement Drawings and Vendor Drawings
   x. Commissioning Program
   xi. Safety Instruction
   xii. Operation Instruction
   xiii. Operators and Maintenance Training Plan

2.16 The consultants would prepare cost estimate based on the optimized and accepted design and
   prepare engineer’s cost estimate and carry out the cost benefit and economic analysis for these
   substations.

2.17 Task A3: Prepare Procurement Plan, and Bidding Documents for the project and its
   components such as Transmission line, and Substations at Mansehra and Islamabad West. This
   would include, but not limited to, the following:

   (i) Prepare an optimal procurement plan and method of procurement and packaging of various works,
       equipment and materials and their installation for construction of the DTL and the substation. The
       procurement plan and procurement method would be according to the World Bank Guidelines.
   (ii) Prepare bidding documents with all the packages identified for construction of the transmission line,
        and the substations using the World Bank’s Standard Bidding Documents.
   (iii) Prepare BoQs, technical specifications, for each package and also prepare engineer’s cost estimates
        for each package for design, supply, installation, testing and commissioning of plant and
        construction of associated civil works for the substation according to the guidelines of the World
        Bank;
(iv) Ensure that the performance criteria as set out by the Environmental Management Plan (EMP), Social Management Plan (SMP) and Resettlement Action Plan (RAP) are met by the specifications.

2.18 Task A4: Project Cost Estimates, Benefits, Economic and Financial Analysis. This would include but not limited to the following:

(i) Based on the detailed analysis for project and using appropriate methods to extrapolate various parameters for preparing an overall project design, prepare project cost estimates. These cost estimates would include cost of all components of the project, namely: (i) civil works for construction of towers and substations, offices colonies, and other related structures; (ii) material, and equipment and machines for construction of the transmission line, towers, conductor, insulation, grounding, shield wires, hardware, and for substations, transformers, reactors, switchgears and other ancillary and associated equipment and plants; (ii) project management cost, engineering, construction supervision and other institutional strengthening costs; (iii) other services, and equipment that are proposed to be provided under the project or financial and economic costs; (iv) monitoring and evaluation of the project implementation and project impact in long run; and (v) surveys and detailed design of the works, contract management, field engineers requirement, operation of the project offices etc.

(ii) Estimate total project cost, benefits and economic and financial returns for the total project. Identify project risks and carry out sensitivity analysis, switching values and impact on the economic rate of return.

2.19 Operation and Maintenance (O&M). This would include, but not limited to, the following activities:

(i) Estimate O&M requirements of the project facilities over the project life, estimate materials required, implementation arrangements and cost estimates. Consider participation of local administration in O&M of the project facilities, of the project beneficiaries and develop mechanisms to ensure their participation, etc.;

(ii) Propose effective institutional arrangements, for ensuring the proper O&M project facilities including performance based contracting for O&M, define the role of public and private institutions in O&M of the project facilities and identify training requirements and develop a training program;

(iii) Prepare a detailed O&M manual reflecting the above; and

(iv) Identify equipment, office and other facilities required for O&M of the project facilities.

2.20 Monitoring and Evaluation. Develop framework for: (a) monitoring and evaluation of project implementation performance, mechanisms for feedback to the implementing agencies, mechanisms for ensuring that the lessons learnt are accounted for, and for development of management information systems to monitor the project performance effectively; (b) assigning the impact of the project on the physical, economic and other environmental and social aspects, monitoring indicators and establish baseline for the indicators; (c) monitoring and supervision of the environment, social, and resettlement action plans; (d) preparing required cost estimates for continuous monitoring and evaluation during project implementation and terms of reference for an independent consultancy services and supervision of environmental management plan and Resettlement Action Plan, etc.,

2.21 Task A5.1 Environmental Assessment, Environmental Management Plan, EIAs etc.

(i) The Consultant will review the existing environmental reports that have been prepared and identify the gaps and additional work to be carried out. The consultants would then carry out and or update the site specific EIAs as required under the Pakistani Laws. The project is to be implemented following Pakistani Environmental Regulations and the World Bank Guidelines and Operational
Policies (Operational Policies 4.01). Therefore, the consultants will be responsible for preparing and updating these documents as needed to meet such requirements;

(ii) The Consultant will gather necessary data and information and prepare all the environment related documents for all works to be implemented under the project that may be necessary for getting location, construction and other permits for constructing works and carrying out activities for obtaining financing from the World Bank.

(iii) The consultant will help to operationalize the finding of the EAs and EIAs and implementation of Environment Management Plan (EMP) plans for any adverse impact of the construction activities, and operation of the project may have on the environment. EMP will consist of mitigation measures, monitoring program and institutional development/strengthening program for implementation of EMP. Prepare cost estimates for implementation of EMP, scope of work, terms of reference and a plan of how various mitigating measures will be implemented either through modification of construction contracts for project facilities or through additional works for which consultants will prepare designs or through technical assistance and training which the consultants will carry out for operation of the project facilities.
2.22 Task A5.2. Social Impact Assessment and beneficiary participation aspects and Preparation of Resettlement Action Plan (RAP). The consultants would review the SIAs and RAPS already prepared and identify the gaps and additional work require to complete. The consultants will then carry out a Social Assessment as needed by GOP and World Bank Guidelines for various project activities/works. Based on findings of the Social Assessment, if land or property is to be acquired permanently or temporarily or people are affected in a significant way, the consultants will prepare a Social Management and Resettlement Policy Framework for the area and activities. For the works to be included in the first year’s contract for which detailed designs would be prepared, a full Resettlement Action Plan (RAP) would be necessary. In this context major activities to be carried out will include, but not limited to the following:

(i) Carry out social assessment studies of the project and prepare a RAP according to the GOP policies, and the World Bank OP 4.12 involuntary resettlement;
(ii) Collect data for the preparation of the RAP;
(iii) Prepare alternatives to minimize resettlement and displacement, prior to project start as well as during project implementation. Prepare alternatives to minimize the amount of impact of resettlement by selecting relocation sites, which are suitable and acceptable to the communities;
(iv) Design and implement a program to involve beneficiaries in project conceptualization, planning and implementation and to facilitate public awareness of the project; and to enhance its ownership;
(v) Identify sites for relocation, involve PAPs in preparing alternatives for relocation sites, and preparing strategy for site and housing replacement.
(vi) Describe legal framework for RAP, relevant local laws, customs that apply to resettlement; describe entitlement policies for each category of impact and specify that resettlement implementation will be based on specific provisions of agreed RAP; describe method of valuation used for affected structures, land, trees, and other assets; and prepare entitlement matrix; describe grievance redress procedures, for registering complaints, mechanisms for appeal, and process for approaching the civil courts;
(vii) In respect of social impact and RAP preparation:
   (a) Carry out socio-economic surveys and identify project affected peoples and (PAPs) and extent of the adverse impact on the socio-economic conditions due to the project facilities during construction as well as after completion;
   (b) Prepare a resettlement plan entitlement and policy matrix;
   (c) Establish a benchmark situation, sketch our property, houses and other structures, trees, vegetation, geo-profile in a map covered by the project works. Video taping maybe used to support the benchmark situation;
   (d) Propose institutional and organizational arrangement for the implementation of RAP including linkages with the project implementing agencies, local administration, Non Governmental Organizations (NGOs) and other related organizations;
   (e) Prepare cost estimates of RAP implementation separately identifying the administrative costs, consulting services, equipment, and compensation under major categories, such as land, houses, trees, other property, cost of preparation of alternative sites, etc;
   (f) Prepare RAP implementation arrangements and identify critical path actions for timely implementation of the project;
(viii) Conduct surveys to determine ‘cultural property’ (according to the definition of GOP and United Nations) including sites having archaeological, paleontological, historic, religious, and unique natural values in the project area and prepare proper documentation for such a cultural property; determine effect, if any, the project, may have on the cultural project and develop plan for its preservation;
(ix) The RAP would be updated and modified time to time and once a year showing the status of its implementation, changes in the RAP implementation that would be necessary due to changes on ground over the previous period; and

(x) Provide support on implementation of RAP (though much of this would during assignment B); the activities during the project implementation, including support to purchase of properties, for that purpose, preparation of documentation to help in negotiations with the beneficiaries, in obtaining of local permits, etc. This may also include identification of alternative sites for resettling people and related assets and cultural properties, development of the sites, including planning, infrastructure, utilities, and replacement houses etc.

2.23 Task A5: Provide Support to Client on Tendering and Contracting. The Consultant shall provide professional services to assist the Client throughout the tendering process for the Project including prequalification stage, issuance of bidding documents, pre-bid meetings, evaluation of offers/bids, negotiations and the award of contracts ensuring that the relevant guidelines of the World Bank are followed. This task comprises, but is not limited to the following activities:

(i) Propose an optimal procurement strategy and packaging for implementation of the Project.

(ii) Assist the Client on setting up the logistics for the tender process and in any pre-tendering meeting;

(iii) Assist the Client on any clarifications requested by the prospective bidder/suppliers (drafting replies to written requests for additional information);

(iv) Advise the Client during prequalification and tender evaluation process;

(v) Prepare pre-qualification and tender evaluation reports in a format suitable for submission to the World Bank, and make recommendations concerning the overall technical adequacy and reasonableness of the proposed contract price; and

(vi) Assist the Client on the preparation of contract documents, the contract negotiations with the winning tenderer and the award of the Contracts.

Detailed Scope of work for ASSIGNMENT-B.

2.24 Task B1: Provide Procurement and Construction Supervision. The Consultant would be responsible for supporting NTDC on implementation of the Project in particular on the procurement of goods and supervision of installation/construction works ensuring that the World Bank Guidelines are followed. This task comprises, but is not limited to the following activities:

- **Review and Approval of Contractor’s Detailed Design**
  
  (i) The Consultant shall provide professional services as required to review the winning tenderer’s drawings and detailed designs for compliance with all specified contract requirements and technical specifications, industry standards and good engineering practice.

  (ii) The Consultant shall review and approve the Contractor’s detailed design and drawings, technical data/schedules, line routes, plan and profile drawings, construction methodologies and procedures, design of tower foundation & protections, sag & tension charts, equipment and material specifications/drawings, etc., covering all the aspects of the construction/installation & commissioning of Dasu Transmission Line to ensure conformance with applicable codes, standards, manuals, work requirements and provisions of the contract.

  (iii) Review and approve equipment/materials design & drawings, data, schedules plan and profile drawings, design & drawings of associated civil works for Islamabad West and Mansehra Substations.

  (iv) If the Consultant is not satisfied with the design proposed by the contractor(s), it may recommend changes necessary to meet the project’s overall requirements and provide designs for implementation of the project.
• **Supervise Procurement of Equipment and Material**

  (i) As far as practicable, quality of materials, workmanship and performance of the major items of the work and equipment to be furnished under the Contract shall be inspected at the places of manufacturers. The Consultant shall carry out the joint inspections with the Client in the Contractor workshops, assigning experts for these services who are conversant with the job and cognizant in the relevant codes and standards as well as acquainted with international practices for testing. The compliance of the materials, workmanship and erection methods with the specifications will be checked and any deviations will be recorded. Decisions will be made in co-ordination with the Client whether to accept or reject the deviations.

  (ii) In addition to the quality and production tests, shop assembly work and tests shall be made to check measurements, fittings and functioning. As far as possible, equipment to be furnished shall be shop assembled to a status sufficient to prove that the design and workmanship have been executed in accordance with the specifications, that the delivery is complete, and that no work remains to be done at site which reasonably can or should be done in the shop. Where applicable, each item of the equipment shall be assembled completely prior to shipment.

  (iii) Before shipment, tests will be performed by the Contractors as may be required to demonstrate the adequacy of the equipment and its component parts to the satisfaction of the specifications. All tests will be simulated to normal operating conditions. Tests at the manufacturers shop will be performed in accordance with the requirements of the specifications and approved test procedure. The Consultant will witness inspections and tests at the manufacturer’s shops on major equipment. The Consultant will prepare the respective Inspection Certificates and Inspection Reports for above activities.

• **Supervision of Construction/Installation Work**

  (i) The Consultant shall supervise the construction of the Project and shall make a diligent effort to ensure the expeditious and economical construction thereof in accordance with the Plans and Specifications and the terms of the contract or contracts and ensure that all specified environmental and social criteria are followed. The Consultant shall carefully inspect all materials and equipment/plants prior to their incorporation in the Project and shall promptly reject those not in compliance with the Specifications. The Consultant shall also supervise and inspect the incorporation of the materials in the Project and the workmanship with which such materials are incorporated. The Consultant, as representative of the Employer/Client, shall have sole responsibility for requiring the Contractor to perform the Construction/installation work in accordance with its terms and the Plans and Specifications; and, in performing the duties incident to such responsibility, the Consultant shall issue to the Contractor such directives and impose such restrictions as may be required to obtain reasonable and proper compliance by the Contractor with the terms of the Construction Contract(s) and the Plans and Specifications, in construction of the Project.

  (ii) The Consultant shall maintain at the site of the Project during the entire period of construction a competent resident Consultant with full authority to act for the Consultant, unless specifically directed otherwise by the Employer/Client in writing. When necessary to assure adequate inspection, one or more competent inspectors shall also be maintained when construction/installation or corrective work is being performed. The Consultant shall report, in writing, defects in workmanship or materials to the Contractor and the Employer/Client and shall instruct the Contractor to correct such defects immediately, in accordance with the terms of the Construction Contract. A resident Consultant shall be present during the final inspection of completed construction.

  (iii) For substation, supervision by the Consultant will encompass civil works, erection of gantries and steel structures, plant installation, cabling & wiring, station auxiliary power supplies, grounding & lightning protection, control, protection, metering, monitoring, telecommunication systems, testing and commissioning of plant and systems provided under the contract.
(iv) In case of more than one contract the Consultant will play a leading role to coordinate the work schedule among various contracts to ensure timely completion of the Project.

- **Verification/Certification of Contractor’s Invoices**
  (i) The Consultant shall measure and determine quantities for certification or progress payments due to the Contractor in accordance with the provisions of the respective Contract Documents.
  (ii) The Consultant shall review and check Contractor’s Monthly Statements and issue Interim Payment Certificates to the Client for payments to the Contractor.
  (iii) The Consultant shall scrutinize Contractor’s progress, bills and claims and submit recommendations to the Client. The claims will also be checked and countersigned by the Client.
  (iv) The Consultant shall measure final quantities and prepare final statement of payments due to the contractors.
  (v) The Consultant shall also assist in liaison and final settlements of the claims between the Client and the Contractor except in cases of litigation and arbitration.

- **Testing, Pre-commissioning & Commissioning/Completion of the Project**
  (i) The Consultant shall supervise testing, pre-commissioning and commissioning of the Plant supplied by the Contractor(s) and issuing Taking-Over Certificate(s) upon completion of the Transmission Line and Substations.
  (ii) The Consultant shall further review test and initial operation procedures and recommend acceptance of or changes to them. The Consultant will particularly witness tests (electrical, mechanical, instrumentation and civil works, if applicable) of contractors to verify that components and systems are ready for initial operation; provide assistance to the Client personnel in the initial operation and maintain close contact with the contractors’ personnel to resolve problems which may arise during initial operation; review the training programme and plant operation manuals, prepared by the contractors in English, for adequacy; witness and review performance testing to all equipment and systems in order to verify test results.
  (iii) The Consultant shall assist the Client in performing final inspection and testing of facilities and in determining final acceptability of them, and provide the same assistance with regard to the civil works.

- **Review of Contractor’s As Built Manuals/Drawings.** The Consultants shall review, comment and finally approve the drawings, which include revisions made during the construction. These drawings will be prepared by the Contractor upon completion of the Project. The As-built documents will include the following:
  (i) As-built route alignment, profile & plan table drawings, structure list of transmission lines prepared and revised by the contractor.
  (ii) As-built drawings for tower foundations and protective structures.
  (iii) Towards the end of the construction and installation of transmission line the Consultant shall prepare a punch list recording all works and installations which may require completion or remedial measures for incorrect execution/defects, and will monitor the completion of all incomplete or defect works and installations to ensure that a fully completed project of high quality is achieved.
  (iv) Operation and Maintenance Manuals, As-built Data and Drawings and Project Completion Reports for substations.
  (v) The As-built drawings and documents shall be prepared in four set of hard and soft copies, three of them to be handed over to the Client, and another one for the Consultants files. The Consultant will store one complete set of the as-built drawings and documents as a hard copy and a softcopy in a safe manner in his files.
2.25 **Task B2: Assist Client on Project and Contract Management.** This task comprises, but is not limited to the following activities:

(i) **Monitoring of Project Progress**
   (a) The Consultant shall assist the Client on the preparation of the reports required for the World Bank, insofar as they are directly linked to progress in implementing and in administrating the Project.
   (b) The Consultants shall prepare and update the procurement, implementation, delivery and disbursement schedules for the Contractors employed on site, to be used as basis for reporting on the progress of project implementation;
   (c) The Consultants shall prepare appropriate progress reports and cost reports and assist the Client in the preparation of those reports necessary to comply with the reporting requirements of World Bank.

(ii) **Quality Control and Quality Assurance.** For the quality control and quality assurance, the consultants will carry out, but not limited to the following activities:
   (a) The Consultants shall prepare Quality Assurance Plan including a detailed description of the Contractor's required organization, procedures and facilities proposed to ensure that the construction is carried out in accordance with the Contract, Specifications and Drawings; and
   (b) The Plan shall include a system to ensure that the documentation necessary to attest completion of any phase of the works, use of correct materials, completion of required inspections and tests, and acceptability of results generated, reviewed, maintained and submitted by the Contractor to the Project Manager of the Consultant. Contractor's test program shall be suitably documented and address pertinent test pre-requisites, such as test instrument selection and calibration, acceptance criteria, documentation of test results and evaluation of test results by qualified personnel.

(iii) **Monitoring of Project Budgets and Development of Financial Management System**
   (a) The Consultant shall maintain a computerized cost control system within the Project Management System (PMS) for budget monitoring and cash flow forecasting. The system will be linked with the MS PROJECT CPM network to provide information on project costs for the periodic reports required by Client.
   (b) Payments to be made to the Contractor will either be on the basis of monthly invoicing for the construction works and will be linked to relevant milestones for delivery of plants or a combination of various construction/installation activities.
   (c) The Consultant will develop a computerized project and financial management system which is appropriate for the size and scope of the project. The computerized project financial management system should be capable of generating periodic progress reports required for project management. The Financial Management System would be documented in a Project Financial Management Manual which would include the following: (a) flow of funds process; (b) accounting system including internal controls; (c) financial and accounting policies; (d) planning and budgeting system; (e) financial forecasting system; (f) procurement and control of administration monitoring system; (g) financial reporting (quarterly reports and annual financial statements); (h) auditing arrangements; and (i) Organization, staffing, training, and technical support for financial management.

(iv) **Project Coordination and Communication**
   (a) The Consultant shall establish and coordinate communication between the various entities involved in the Project as there are:
   - Employer/Owner
   - Consultants head office
- Consultant’s supervision team
- Consultants EMP and RAP team
- Contractors
- Government Authorities

(b) Consultant will play a leading role to coordinate the work schedule among various contracts to ensure timely completion of the Project.

c) The Consultant shall be incharge of the coordination of all communication of the project team, i.e. defining the responsibilities of each project unit. A database comprising the contact data, such as telephone numbers, e-mail addresses, fax numbers etc. of each project party and their concurring key personnel will be established, regularly updated and made available to all project parties.

d) The Consultant shall organize and document regular project meetings with all involved parties in order to assure a good working communication between the project parties and to assure that everyone works based on the latest information. The Consultant will prepare respective Minutes of Meeting of all meetings and subsequent agendas which will be distributed to the parties involved. All protocols, Minutes of Meetings, agendas and so on will be filed according to the filing system introduced through the Quality Management System.

(v) Review and Reporting. At the start and during the course of construction, the Contractor will have to submit details working methods, equipment, plant and temporary works design details in shop drawing before the start of construction/installation of the relevant part of the works. These revised methods and equipment/plant will be checked for conformance with the design concepts, the technical specifications and applicable national and international standards to ensure quality and safe working methods. The Consultant shall check the Contractor operations against the approved revised method statements.

2.26 Task B3: Provide support to Client on implementation of EMP and RAP. The Consultant shall make sure that appropriate measures are taken to ensure adequate health, safety and environmental standards during construction and commissioning and will monitor the compliance of all construction activities with the EMP and RAP. Furthermore the Consultant shall elaborate the detailed and final EMP for the operation stage of the project and shall prepare and submit the respective report. This task comprises, but is not limited to the following activities:

(i) The Consultant would provide support in the implementation of the EMP. The EMP activities would be incorporated in the main construction contracts to the extent possible. The EMP activities which cannot be included in the main construction contract would be implemented through additional construction contracts, management, institutional, or technical assistance. The Consultant would carry out the designs of such program and help, monitor and supervise their implementation.

(ii) Provide support in implementation of RAP activities during the project implementation, including support to purchase of properties, for that purpose, preparation of documentation to help in negotiations with the affectees, in obtaining of local permits, etc. This may also include identification of alternative sites for resettling people and related assets and cultural properties, development of the sites for resettlement, including planning, infrastructure, utilities, and replacement houses etc.

2.27 Task B4: Assist on Program for Post-Construction Services. The work program for post-construction services will refer to: Operations monitoring; Reporting; Claims management;
Monitoring during the Defect Liability Period (DLP). This task comprises, but is not limited to the following activities:

(i) The Consultant shall co-ordinate the post-construction services to be carried out by the contractors during the guarantee period.
(ii) The Consultant shall recommend to the Client the procedure to ensure a satisfactory management and operation of the project during the entire life time. Advise the Client on the staffing pattern and organisation of the transmission line and substations operation & maintenance teams.
(iii) The Consultant shall advise the Client to establish maintenance, repair works and operation procedures to ensure safe and reliable operation of the transmission line and substations during their life time, including the setting-up of maintenance services. The Consultant will advise the Client on any additional training programmes for the Client's staff which are necessary to ensure successful operation of the project and outline those requirements (i.e. prepare terms of reference).
(iv) The Consultant shall prepare a detailed O&M manual reflecting the above; and identify equipment, office and other facilities required for O&M of the project facilities.
(v) During the three-month period of trial runs and initial operation, the Consultant will update the program and prepare a manual for post construction services to be provided by the Contractors during the guarantee period. Included will be a program for regular monitoring of efficiency, security and maintenance/repair requirements of operation of the transmission line and substations during the guarantee period. A program for final acceptance at the end of the guarantee period will be proposed to Client.

2.28 Task B5: Provide Technical & Professional Assistance and Training to Client’s Staff. This task comprises, but is not limited to the following activities:
(i) The Consultant shall assist the Client in establishing suitable procedures and in the capacity building for contract management, monitoring and administration, including monitoring of costs, accounting and certification of contractors' invoices and statements; detailed engineering activities; environmental and social management procedures; quality assurance and effective communication lines between the Client and the contractors operating on site.
(ii) The Consultant shall provide and/or recommend training to this effect. A training program for the on-the-job training will be established for the Client personnel integrated in the design and construction management teams.
(iii) The Consultants will write Terms of Reference (TORs) for any additional work that have to be carried out under the Project for which additional services will be required and identified during project implementation.

III. Implementation Arrangements

3.1 Implementation Arrangements. The Consultant shall be responsible for preparation/updation and finalization of the design and other studies and for construction supervision of all contracts under the Project. The Project Director of Dasu PMU of NTDCL will oversee the execution of these Consultancy Services. The Consultant will work closely with the office of Dasu PMU and coordinate with other relevant units of NTDC, local administration, relevant ministries and agencies and WAPDA and its consultants. The Consultant’s team leader will be the principal contact and will be expected to be readily available in person during the assignment period. The Consultant will be responsible for all aspects of performance of services set forth in the TORs. The Client will be responsible for providing the existing data and information and supporting arrangement for the necessary field investigations. Immediately after mobilization and commencement of consultancy services, the
Consultants shall prepare a detailed schedule and task-flow diagram, which depicts the interrelationship of various tasks in the assignment which lead to the completion works and mechanism of coordination with the Client and other related entities. This will be kept updated throughout the duration of the Assignment.

3.2 **Duration of the Assignment/Consultancy Services.**

(i) **ASSIGNMENT-A.** Part A of the Assignment will be completed in Eight Months from the date of commencement of services though the contract would be signed for a period of twelve (12) months.

(ii) **ASSIGNMENT-B.** Part B of the assignment will cover the project implementation period six year though the construction period for the DTL and substations would be 3.5 years. The contract would be signed for a period of six years covering the construction and defect liability period.

3.3 **Baseline Schedule.** The baseline schedule shall be prepared by the Consultant for Assignment-A and for the Assignment-B. A critical path schedule for the project from contract date to the final completion date shall be prepared using Primavera P6 or any other suitable scheduling software. The project schedule shall provide basis for determining status of the work. The said baseline schedule shall be submitted showing ‘S’ curve to NTDC duly vetted by the Consultant.

3.4 **Method Statements:** Prior to commencing any section of the work, the Consultant shall submit method statement in accordance with the requirement of the Consulting Services. When requested by the Client, the Consultant shall provide additional method statements related to specific item of work.

3.5 **Progress Meetings:** The Consultant shall hold periodic progress meetings with the Client, at a minimum of monthly and following receipt of the Client comments on the submission of the Consultant. Additional meetings shall be scheduled as required by the Consultant’s design. The intent of these meetings will be for the Client to provide input and to discuss options for addressing the Client comments. The Consultant shall fully cooperate with the Client in scheduling and attending such meetings as requested by the Client. The Minutes of Meetings will be prepared by the Consultant and distributed to participants for review and comment. The Minutes of Meetings will, however, be issued by the Client.

3.6 **Monthly/Quarterly Progress Reports:** The Consultant shall furnish the Client with a written Monthly/Quarterly physical and financial Progress Reports that summarize all aspects of the completed month/quarter and cumulative work progress. All progress reports shall be in English and the format/contents of progress reports should be acceptable to NTDC and the World Bank. The objectives of the Monthly/Quarterly Progress Reports are to:

(i) Provide a reliable and readily accessible summary record of the Project activities and progress during the just completed month/quarter.

(ii) Provide a detailed description of all work actually completed to date and revision to the Project schedule required, which shall reflect changes in the critical path since the date of the last revision.

(iii) Identify issues and problems requiring action by the Client or Consultant, including issues of conflicting priorities.

(iv) Provide a forecast of the work to be accomplished in the next month/quarter.

(v) Provide information to help substantiate Consultant’s pay request.

3.7 **Submittal Protocol:** No later than thirty (30) days after the Contract Date, the Consultant shall submit a submittal protocol for the Consulting Services. The submittal protocol shall identify the
submittal packages to be prepared by the Consultant, including a detailed listing of the content, the expected dates of the submittals, number of copies, and distribution of the submittals by the Consultant based on distribution information provided by the Client. The submittal protocol shall include the time allowed for the Client’s review, which at a minimum shall be twenty (20) days. For large or complex submittals, the Client may require a submittal review period longer and the Consultant shall coordinate with the Client inclusion of these review periods in the submittal protocol. The submittal protocol shall avoid the simultaneous submittal of a large number of submittals for the concurrent Client review.

3.8 Consultant’s Obligations: The Consultant shall provide submittals for review consistent with the submittal dates. The Consultant shall acknowledge that the Client’s review will often involve input from, or consultation with, a number of individuals. Therefore, should submittal dates to the Client be delayed, the Consultant shall provide prompt notice to the Client of the delay. In no case shall this notice be given less than ten (10) calendar days prior to the scheduled submittal date for that submittal. The submittals shall identify any proposed change to the requirements, or the design concept, project delivery approach, or the project schedule provided in the consultant’s proposal, accompanied by the rationale behind the proposed change. No changes shall be implemented without Client’s acceptance. Such acceptance shall not, however, relieve the Consultant of any of its obligations under the contract.

3.9 Form of Submittals: Each submittal shall be transmitted electronically and in hard copy, unless otherwise required by other sections of the contract, with a cover letter. Unless otherwise specified in the contract, the Consultant shall prepare up to Four (05) hard & soft copies of each submittal for distribution. The Consultant is responsible for distribution of submittals to reviewers based on distribution information provided by the Client. Electronic submittals shall be in the original file format. The Consultant is responsible for the accuracy and completeness of the information submitted.

3.10 The Consultant shall make submittals far enough in advance of subsequent activities to allow time for reviews, consultations with other entities, for securing necessary acceptance, for possible revisions and re-submittals. The Client intends to process Consultant’s submittals as quickly as practical.

3.11 Client’s Review: The Client will review submittals for consistency with the design concept presented in the Consultant’s proposal. The primary purpose of the Client’s review is to satisfy itself that the submittals generally conform to the intent of the contract. The Client’s review shall not relieve the Consultant of the sole risk and responsibility for all defects, errors or omissions, or of sole responsibility for meeting all requirements of the contract. The Consultant shall not proceed with implementation of any work affected by a submittal until review by the Client is complete and the submittal is returned with review comments.

3.12 Indicative Staff Requirements: The Consultants are required to propose a staffing plan and skill mix necessary to meet the objectives and scope of services according to the best practices and international standards. They would detail the staffing plan and staff months required as well as timing of the development. They would list all the professional and support staff required for the consultancy services. The Consultants would also provide estimates in their proposals and plans for any studies and investigations required for the assignment as well as all the logistic costs and any other costs that may be required ensuring security of the personnel. If all the required skills are not available within the consulting firms, they are encouraged to make joint ventures with other firms. The following is an indicative list of personnel and skills required for carrying out the Assignment-A and Assignment-B of consultancy services.
Staff Skills

(1) Project Manager/Electrical Engineer
with experience in construction of Extra High Voltage line

(2) System Planning and integration (Studies) expert

(3) Transmission Line Design and Engineering Expert

(4) Tower Design Expert

(5) Conductor, insulation and hardware expert

(6) Substation Design and Engineering expert

(7) Procurement and contract management Expert

(8) Civil works design and engineering expert

(9) Geo-technical expert

(10) Financial Management expert

(11) Construction Supervision Expert Transmission line

(12) Construction Supervision Expert Substations

(13) Construction Supervision expert for civil works

(14) Environmental Specialist

(15) Social and Resettlement Specialist

(16) Human Health and safety expert

(17) Testing and commissioning expert for Transmission line

(18) Testing and Commissioning expert for substations

(19) Geo technical Engineer

(20) Field Staff

In addition to the above mentioned key personnel, other technical and professional personnel as well as support staff required for carrying out the Assignment-A and Assignment-B of the Consultancy Services may also be included in the proposals.

3.13 **Deliverables and Submission of Reports.** A tentative list of various reports the Consultants are likely to prepare is given below. Additional, reports may have to be prepared as needed by the investor, project authorities or based on needs.

<table>
<thead>
<tr>
<th>Deliverables</th>
<th>Timeline/Frequency</th>
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<tbody>
<tr>
<td>Review report of the existing design, bidding documents and other studies</td>
<td>Within one month of the start of Assignment</td>
</tr>
<tr>
<td>1. Engineering Design Report for Dasu Hydropower Transmission Line</td>
<td>Within five month of the start of Assignment</td>
</tr>
<tr>
<td>3. Design Reports for Mansehra and Islamabad West Substations</td>
<td>Within Six month of the start of Assignment</td>
</tr>
<tr>
<td>4. Bidding Documents for Transmission line and Mansehra and Islamabad West Substations</td>
<td>Within Seven month of the start of Assignment</td>
</tr>
<tr>
<td>5. Contractors Bids Evaluation Reports, Pre-qualification reports, etc as required</td>
<td>As determined by implementation schedule</td>
</tr>
<tr>
<td>6. Preparation of special reports/memoranda to elicit Client’s consent/approval on specific issues</td>
<td>As and when required</td>
</tr>
<tr>
<td>7.</td>
<td>Construction reports, monthly, quarterly reports, annual work plans</td>
</tr>
<tr>
<td>8.</td>
<td>Project implementation status reports quarterly, annually</td>
</tr>
<tr>
<td>9.</td>
<td>Implementation status report for EMP, SAP, RAP and work plans etc.</td>
</tr>
<tr>
<td>10.</td>
<td>Minutes of Weekly/biweekly/monthly meetings held with Contractors</td>
</tr>
<tr>
<td>11.</td>
<td>Correction/Amendment in Drawing submitted by Contractor</td>
</tr>
<tr>
<td>12.</td>
<td>As built Drawings</td>
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<tr>
<td>15.</td>
<td>Project Completion Reports</td>
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<tr>
<td>16.</td>
<td>Responses to any technical queries during the defect liability period</td>
</tr>
<tr>
<td>16.</td>
<td>Any special report relevant to the Project, as requested by the Client</td>
</tr>
</tbody>
</table>

3.14 **Housing and Office Facilities for the Consultant.** The Consultant shall establish their office close to the Client’s office in Lahore. For Assignment B, in particular, the Construction Manager/Resident Manager and field engineers will establish/maintain their field offices/camps in the project area. The Consultant will make their own arrangements to furnish their offices. However, they will provide cost estimates and details of their equipment in this respect under Direct Costs in their proposal.

3.15 **Procurement of Goods.** Purchase of Equipment / Tools & Plants (T&P) will be carried out according to the need of the Assignment. The Consultants shall maintain inventory list of all purchased equipment, vehicles and other T&P items etc. and submit details in quarterly reports. All these items shall be returned to NTDC upon completion of the contract with fair wear & tear condition.

3.16 **Transport.** The Consultant will arrange transport for carrying out Assignment-A of the Consultancy Services themselves and the cost will be included in the Direct Cost. Operation and maintenance of the vehicles will also be covered under Direct Cost of the Consultant. For Assignment-B of the Consultancy Services, consultants would be responsible for basic requirements that can be supplemented by the vehicles that would be included in the Bidding Documents to be provided by the Contractor(s) including the O&M of such vehicles.