



## DELIBERASAUN N. 95/VII/CAFI/2025

Conselho de Administração do Fundo das Infraestruturas – CAFI, bazeia ba artigo 10º (1) e (3) DL Nº. 25/2024, de 22 de maio, Primeira Alteração ao DL Nº.13/2016, 18 de Maio, realiza reuniaun Extraordinária iha loron Quinta-feira, 17 de julho de 2025, e halo deliberasaun ba assunto tuir mai ne’e:

**Asuntu:** Pedidu Aprovasaun no autorizasaun despesas nune’e mos Konfirma Finansiamentu iha FI 2025 ba *Projetu Consultancy Services of Detailed Engineering Design for New Bridges and River Training in Naktuka River – RAEOA, Timor-Leste;*

**Proponente:** Ministério do Planeamento e Investimento Estratégico – MPIE/ ADN, I.P.

### Notas/justifikasioun:

- Bazeia ba pedidu husi Ministro do Planeamento e Investimento Estratégico, hodi Agenda asuntu refere iha parte III: Diversus iha reuniaun CAFI;
- Bazeia ba resultadu verifikasioun husi ADN, I.P. ho no. ref.: 362/UAP/ADN, I.P./VII/2025, data 3 de julho de 2025 ho asuntu: resultadu verifikasioun – Projetu Terms of Reference (ToR) *Consultancy Services of Detailed Engineering Design for New Bridges and River Training in Naktuka River – RAEOA, Timor-Leste* ho montante \$ 323,300.00;
- Projetu ne’e la inskreve iha Fundo das Infraestruturas 2025, no laiha Kabimentu orsamental iha Livru FI 2025;
- Desizaun kona ba abertura ka inisiasioun prosesu aprovisionamentu bazeia, Artigo 24 & 25, Decreto Lei No.43/2024, de 20 de Dezembro, regra ezekusaun OGE 2025;
- DL Nº. 25/2024, de 22 de maio, Primeira Alteração ao DL Nº.13/2016, 18 de Maio, kona ba Regulamentu Fundo da Infraestrutura, determina katak aprovisionamento projetu FI nian sei lao tuir Regime Juridiku Aprovizionamento em vigor;
- Modalidade aprovisionamento sei lao tuir Regime Juridiku Aprovizionamento em vigor, (Decreto-Lei No.22/2022 de 11 de Maio);
- Projetu nain sei assume responsabilidade hodi assegura orsamentu ba Ezekusaun no Implementasaun projetu;



- Projetu nain konfirma katak sei assume responsabilidade ba monitorizasaun e akompanhamentu ba ezekusaun projetu ne'e no sei garante kualidade servisu nian tuir padraun no espesifikasi saun ne'ebé aprova ona;

- Lista proposta:

Naran Projetu	Resultadu Verifikasi saun ADN,I.P./referensia	Alokasaun orsamentu iha FI 2025	Presiza Aprovasaun CAFI
<i>Consultancy Services of Detailed Engineering Design for New Bridges and River Training in Naktuka River – RAEOA, Timor-Leste</i>	\$ 323,300.00; no. ref.: 362/UAP/ADN, I.P./VII/2025, data 3 de julho de 2025	<ul style="list-style-type: none"> <li>• Laiha Kabimentu orsamental ba Projetu refere;</li> <li>• Presiza Kria kodigu atividade iha FI-Programa 026: Estradas e Pontes, Sub Programa Pontes;</li> <li>• Presiza regista iha sistema GRP e DBFT;</li> </ul>	<ol style="list-style-type: none"> <li>1. Kustu Projetu;</li> <li>2. Inskrisaun iha Livro Orsamentu FI 2026;</li> <li>3. Kria kodigu atividade iha Programa FI (estradas e Pontes);</li> <li>4. Regista iha sistema GRP e DBFT</li> </ol>

**Rekomendasaun:**

- 1) CAFI atu aprova no autoriza despeza no kustu total ba projetu nune'e mos konfirma finansiamentu iha FI 2025 ba *Consultancy Services of Detailed Engineering Design for New Bridges and River Training in Naktuka River – RAEOA, Timor-Leste* ho montante verifikasi adu \$ 323,300.00;
- 2) Desizaun kona ba abertura ka inisiasi saun prosesu aprovisionamentu bazeia, Artigo 24 & 25, Decreto Lei No.43/2024, de 20 de Dezembro, regra ezekusaun OGE 2025;
- 3) DL Nº. 25/2024, de 22 de maio, Primeira Alteração ao DL Nº.13/2016, 18 de Maio, kona ba Regulamentu Fundo da Infraestrutura, determina katak aprovisionamento projetu FI nian sei lao tuir Regime Juridiku Aprovizionamento em vigor;
- 4) Modalidade aprovisionamento sei lao tuir Regime Juridiku Aprovizionamento em vigor, (Decreto-Lei No.22/2022 de 11 de Maio);
- 5) Projetu nain sei assume responsabilidade hodi assegura orsamentu ba Ezekusaun no Implementasaun projetu;
- 6) Projetu nain sei assume responsabilidade ba koordena saun entre entidade relevantes ba implementasaun projetu ne'e, e ba supervizaun, monitorizasaun e akompanhamentu ba projetu ne'e iha faze implementasaun, e sei garante kualidade servisu nian tuir espesifikasi saun nebe aprova ona;

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J.



## IX GOVERNO CONSTITUCIONAL

**MINISTÉRIO DO PLANEAMENTO E INVESTIMENTO ESTRATÉGICO  
FUNDO DAS INFRAESTRUTURAS**



**Conselho de  
Administração**

**Desizaun:**

1. CAFI aprova no autoriza despeza no kustu total ba projetu nune'e mos konfirma finansiamentu iha FI 2025 bazeia ba pedidu husi projeto nain MPIE;
2. Desizaun kona ba abertura ka inisiasaun prosesu aprovisionamentu bazeia, Artigo 24 & 25, Decreto Lei No.43/2024, de 20 de Dezembro, regra ezekusaun OGE 2025;
3. DL N°. 25/2024, de 22 de maio, Primeira Alteração ao DL N°.13/2016, 18 de Maio, kona ba Regulamentu Fundo da Infraestrutura, determina katak aprovisionamento projetu FI nian sei lao tuir Regime Juridiku Aprovizionamento em vigor;
4. Modalidade aprovisionamento sei lao tuir Regime Juridiku Aprovizionamento em vigor, (Decreto-Lei No.22/2022 de 11 de Maio);
5. Projetu nain sei assume responsabilidade hodi assegura orsamentu ba Ezekusaun no Implementasaun projetu;
6. Projetu nain sei asume responsabilidade ba koordenasaun entre entidade relevantes ba implementasaun projetu ne'e, e ba supervizaun, monitorizasaun e akompanhamentu ba projetu ne'e iha faze implementasaun, e sei garante kualidade servisu nian tuir espesifikasiada nebe aprova ona;

7. Lista aprovasaun CAFI:

Naran projetu	Kustu estimativa verifikadu husi ADN,IP	Alokasaun orsamentu iha FI 2025	Presiza Aprovasaun CAFI	Orgaun Kompetênti - DL No. 23/2022, 19 de Maio
<i>Consultancy Services of Detailed Engineering Design for New Bridges and River Training in Naktuka River – RAEOA, Timor-Leste</i>	\$ 323,300.00; no. ref.: 362/UAP/ADN, I.P./VII/2025, data 3 de julho de 2025	<ul style="list-style-type: none"> <li>• Laiha Kabimentu orsamental ba Projetu refere;</li> <li>• Presiza Kria kodigu atividade iha FI- Programa 026: Estradas e Pontes, Sub Programa Pontes; Presiza regista iha sistema GRP e DBFT;</li> </ul>	<ol style="list-style-type: none"> <li>1. Kustu Projetu;</li> <li>2. Inskrisaun iha Livro Orsamentu FI 2026;</li> <li>3. Kria kodigu atividade iha Programa FI (estradas e Pontes);</li> <li>4. Regista iha sistema GRP e DBFT</li> </ol>	<ul style="list-style-type: none"> <li>• CAFI : Konfirmasasaun Finansiamentu;</li> <li>• CAFI: alinea 1 (b) Artigo Artigo 5.º Competência para a autorização da despesa.</li> </ul>



IX GOVERNO CONSTITUCIONAL  
MINISTÉRIO DO PLANEAMENTO E INVESTIMENTO ESTRATÉGICO  
FUNDO DAS INFRAESTRUTURAS



Conselho de  
Administração

Aprovado husi CAFI iha loron 17 de Julho de 2025.

O Conselho de Administração do Fundo das Infraestruturas  
O presidente,



Gastão Francisco de Sousa

Ministro do Planeamento e Investimento Estratégico

---

Santina José Rodrigues Ferreira Viegas Cardoso

Ministra das Finanças

(La Participa iha Reuniaun)



Miguel Marques Gonçalves Manetelu

Ministro dos Transportes e Comunicações



Samuel Marçal

Ministro das Obras Públicas

DELIBERASAUN N.º95/VII/CAFI/2025



**IX GOVERNO CONSTITUCIONAL  
MINISTÉRIO DO PLANEAMENTO E INVESTIMENTO ESTRATÉGICO  
FUNDO DAS INFRAESTRUTURAS**



**Conselho de  
Administração**

**Annexo:**

**DELIBERASAUN N.º95/VII/CAFI/2025**

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REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
Ministério do Planeamento e Investimento Estratégico  
Fundo das Infraestruturas

## NOTA DE DESPAICHO

### 1. ORIGEM DO DOCUMENTO

### Proveniência do Documento

N Ref; 362/UAP/ADN, I.P/ VII/2025

Data do Documento : 03/07/2025

ADN, I.P

### 2. DETALHES DO DOCUMENTO

Enviado ao:

Data Entrada do Documento: 25/07/2025

1. Sr/ Mauricio Borges

2. Sr/a \_\_\_\_\_

3. Sr/a \_\_\_\_\_

4. Assessores Nacionais / Internacionais

Assunto:

Resultadu Verifikasiun-Terms of Reference (ToR) Consultancy Services of the New Bridges And River Training in Naktuwa River RAEOA-Timor-Leste

### 3. INSTRUÇÃO DO DIRETOR DO SGP

Data do Despacho: 25/7/2025

Para Sr/a

1. Sr/a Mauricio X

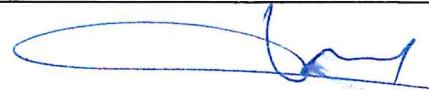
2. Sr/a Dona X

3. Sr/a Maria F

Despacho:

Hore Anthe iha ihe

Assinatura :



Mauricio Borges



AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

Dili, 03 de Julho de 2025

Ref : 362 /UAP/ADN, I.P./VII/2025

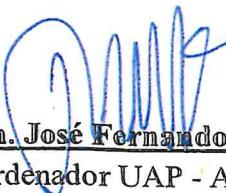
Hato' o ba : Sr. Januario Maia Guterres  
Director Adjunto e Diretor Executivo Interino - ADN, I.P.

Assuntu : Rezultado Verifikasiisaun – Terms of Reference (ToR) Consultancy Services  
of the New Bridges and River Training in Naktuka River RAEOA – Timor  
Leste

Ho Respeito,

Bazeia ba asuntu ne'ebe mensiona iha leten, ekipa verifikasiisaun Unidade Avaliação do  
Projetos – ADN, I.P. hala'o ona verifikasiisaun Terms of Reference (ToR) Consultancy Services  
of the New Bridgees and River Training in Naktuta River - RAEOA ho rezultado  
verifikasiisaun iha (*aneksu*), tanba ne'e ami relata ba senhor Director Adjunto e Diretor Executivo  
Interino atu hare ba prosesu kontinuasaun.

Ba ita bo'ot nia atensaun ami hato' o agradecimento wain no subkreve ho konsiderasaun  
a'as tebes.

  
Arch. José Fernando Liu Soares  
Koordenador UAP - ADN, I.P.



Bedik-Hun, Fatuh  
Dili – Timor-Leste  
info@mpie.gov.tl  
+670 3310 289



AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

Consultant Services of Detailed Engineering Design For New Bridges and River Training in Naktuka River  
RAEOA-Timor Leste.

ESTIMATION COST

No.	Descriptions	Unit	Quantity		Unit Price (US \$)	Cost (US \$)
			Personnel	Duration/Qty		
<b>A</b>	<b>International Key Experts</b>					
1	Team Leader/Senior Bridge Engineer	Month	1	5	\$ 14,825.00	\$ 74,125.00
2	Senior Structural Engineer	Month	1	4	\$ 8,850.00	\$ 35,400.00
3	Senior Quantity Engineer	Month	1	3	\$ 8,850.00	\$ 26,550.00
4	Hydrologist/Hydraulic Engineer	Month	1	3	\$ 8,850.00	\$ 26,550.00
5	Geodetic Engineer	Month	1	3	\$ 7,425.00	\$ 22,275.00
<b>Sub-Total International Key Experts</b>			5	18		\$ 184,900.00
<b>B</b>	<b>National Key Experts</b>					
1	Surveyor Engineer / Quantity Survey / QS	Month	1	4	\$ 3,325.00	\$ 13,300.00
2	Environmental & Social Safeguard Specialist	Month	1	3	\$ 3,325.00	\$ 9,975.00
3	Geotechnical Engineer	Month	1	3	\$ 3,325.00	\$ 9,975.00
4	Contract Specialist	Month	1	2	\$ 3,325.00	\$ 6,650.00
<b>Sub-Total National Key Experts</b>			4	12		\$ 39,900.00
<b>C</b>	<b>Supporting Personnel</b>					
1	Office Manager	Month	1	5	\$ 750.00	\$ 3,750.00
2	Office Boy	Month	1	5	\$ 300.00	\$ 1,500.00
3	Driver	Month	1	5	\$ 300.00	\$ 1,500.00
<b>Sub-Total Supporting Personnel</b>			3	15		\$ 6,750.00
<b>D</b>	<b>Reimbursables</b>					
1	International Transportation	R. Trip	2	5	\$ 1,500.00	\$ 15,000.00
2	Local Transportation (Vehicle Rent & Fuel)	Month	1	5	\$ 1,650.00	\$ 8,250.00
3	Communication Cost	Month	9	5	\$ 50.00	\$ 2,250.00
<b>Sub-Total Reimbursables</b>					\$ 25,500.00	
<b>E</b>	<b>Reporting</b>					
1	Inception Report ( 6 bundles)	Ls			\$ 1,500.00	\$ 1,500.00
2	Interim Report ( 6 bundles)	Ls			\$ 1,500.00	\$ 1,500.00
3	Draft Final Report ( 6 bundles)	Ls			\$ 1,500.00	\$ 1,500.00
4	Final Report ( 6 bundles)	Ls			\$ 1,500.00	\$ 1,500.00
<b>Sub-Total Reporting</b>					\$ 6,000.00	
<b>F</b>	<b>Site Investigation</b>					
1	Topographical Survey	Ls			\$ 15,000.00	\$ 15,000.00
3	Soil Investigation	Ls			\$ 20,000.00	\$ 20,000.00
4	Material Quality Test	Ls			\$ 3,500.00	\$ 3,500.00
<b>Sub-Total Site Investigation</b>					\$ 38,500.00	



AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

Consultant Services of Detailed Engineering Design For New Bridges and River Training in Nakluka River  
RAEOA-Timor Leste.

ESTIMATION COST

No.	Descriptions	Unit	Quantity		Unit Price (US \$)	Cost (US \$)
			Personnel	Duration/Qty		
<b>G</b>	<b>Facilities</b>					
1	Office Establishment (Office space, etc.)	Month		5	\$ 2,000.00	\$ 10,000.00
2	Office Equipment and Furniture (Comp, Printer, Scanner, etc)	Ls			\$ 10,000.00	\$ 10,000.00
3	Office Operations (Office supplies, software, toner, etc)	Month		5	\$ 350.00	\$ 1,750.00
<b>Sub-Total Fasilites</b>						<b>\$ 21,750.00</b>
<b>GRAND TOTAL (A+B+C+D+E+F+G)</b>						<b>\$ 323,300.00</b>

Prepared by :

Antonia de F. Moraes Soares  
Engineer - ADN.IP

Checked by:

Rogerio Matcal Pires  
Chefe Dep ITIAS - ADN.IP

Certified by:

Jose Fernando Liu Soares  
Coordinator UAP - ADN.IP  
*25/5/25*

Melenia M. Barros  
Adviser National - ADN.IP



**MINISTÉRIO DO PLANEAMENTO  
E INVESTIMENTO ESTRATÉGICO  
IX GOVERNO CONSTITUCIONAL  
GABINETE DO MINISTRO**



Dili, 14 de Março de 2025

Nu. Ref : 392/CG-GMPIE/III/2025

Hato' o ba : Directur Executivo ADN I.P  
Sr. Rui Lourenço da Costa

Asuntu : Encaminha Despacho Ministro, MPIE

Ho Respeito

Liu husi oficio ida ne'e hakarak encaminha despacho Ministro MPIE kona ba karta husi Shabryca Construction Unip Lda ho assunto Proposta Installa Ponte iha Citrana ba Naktuka, Oecusse no despacho Ministro iha anexo.

Despacho Ministro : Para ADN

Verificarem e apresentarem na reunião do CAFI

Data despaçho : 03.I4.2025

Mak ne'e deit ba atensaun, lahaluha hato'o obrigado wain.

Hau nia melhores Kumprimentos

Tomás de Fatima da Silva  
Chefe do Gabinete do MPIE

ADN + SGP

No. : 199/SBC/III/25

Verificarem e apresentarem  
Hato'o Ba : Sua Ex<sup>a</sup> Sr. Eng. Gastão Francisco de Sousa  
Ministru Planeamento e Investimento Estratégico

an resul S do CAF

Asunto : Proposta Instala Ponte Iha Citrana ba Naktuka, Oecusse

Ho Respeito; as. IV. m/s

Relaciona ho Visita Sua Excelencia Sr. Primeiro Ministro ba iha Populasau Oecusse Citrana ho Naktuka, nebe'e mak hare ba kondisaun tempo udan sempre halo movimento ou asesu dalan husi Citrana ba Naktuka susar tebes ba Populasau fatin rua ne'e, tama wainhira tempo udan mota tun ho korenii mota nebe'e boot tebes. Afeitos husi mota tun ne'e halo impacto makas ba aktividade ou movimento ba Komunidadade fatin rua ne'e. hodi nune'e ami husi kompanhia Shabryca Construction Unipessoal Lda, ho laran no iha iniciativo hakarak tebes atu halo ponte iha area refere atu nune'e wainhira tempo udan karik Populasau Citrana no Naktuka bele iha asesu dalan nebe'e mak diak no seguru ba sira.

Baseia esperencia kompanhia Shabryca Construction Unipessoal Lda, nebe'e mak halo ona Ponte iha Villa Maria no Manusae Municipio Ermera, hanesan esperencia nebe'e mak forte ba kompanhia atu implementa filia fai servisu refere ba iha Ligasaun Citrana no Naktuka. Kompanhia Shabryca Construction Unipessoal Lda fier katak wainhira hetan komfiansa husi Governo Kompanhia sei servisu ho kualidade nebe'e mak diak no tuir tempo nebe'e mak Governo fo. Tamba hare ba kondisaun tereno tempo udan presija tebes iha asaun nebe'e urgenci atu atua.

Maka ne'e deit kompanhia nia Proposta ba Sua Exelencia Sr. Ministro Planeamento e Investimento Estratégico espera katak ami nia intensaun no iniciativo ida ne'e bele hetan resultado nebe'e diak hodi bele atinji ita hotu nia objectivu ba dezenvolvimento. No ba ita hotu nia atensaun no servisu hamutuk la haluha ami hato'o obrigado wain.

Dili, 07 Março 2025

Ami nia respeito;

  
Shabryca Const. Unip. Lda

Rafael J

Director Kompanhia

Cc: 1. Arquivo

GABINETE DO

Ministro do Planeamento e  
Investimento Estratégico

RECIBIDO

DIA 12 POR Thocinha 526  
3 2025



AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

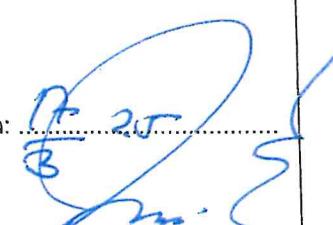
## FORMULARIO DESPACHO

Data de Entrada Documentos: 14 / Mar / 2025

Data do Documentos: 14 / Mar / 2025

Husi: MINISTERIO DO PLANEAMENTO INVESTIMENTO ESTRATEGICO

No Ref : 392/CG-GMPIE/III/2025

Projeto :	Quantidade Documentos : 0
	Anexo :
Assuntos :	
Encaminha Despacho Ministro, MPIE (Proposta Instala Ponte iha Citrana ba Naktuka, Oecusse).	
No. Tf : 3310320	
Companhia : Shabryca Contruction, Lda	
<b>Despacho :</b>	
<input type="checkbox"/> Unidade de Gestão Administrativa <input checked="" type="checkbox"/> Unidade de Avaliação de Projectos <input type="checkbox"/> Unidade de Controlo e Validação de Qualidade <input type="checkbox"/> Unidade de Estudo e Desenvolvimento de Competências	
<input checked="" type="checkbox"/> Adjunto <input type="checkbox"/> Assessor/a <i>Bug. Seselhas</i> <input type="checkbox"/> Gabinete DE / Base de Dadus <input type="checkbox"/> Other	
Data: ..... 25 .....  Rui Lourenço da Costa Director Executivo ADN	

*Solicit Eng. Geselhas  
 ales kandee lu PA RACOS,  
 CCP mo nos Kompanhia  
 kod. atende la dia.*



**MINISTERIO DO PLANEAMENTO  
E INVESTIMENTO ESTRATÉGICO  
IX GOVERNO CONSTITUCIONAL**



MINISTÉRIO DO PLANEAMENTO E INVESTIMENTO ESTRATÉGICO  
IX GOVERNO CONSTITUCIONAL

**Terms of Reference (ToR) for  
Consultants Services for Preparation of Detailed Engineering Design (DED)  
for New Bridges and River Training in Naktuka River,  
RAEOA-Timor Leste.**

June 2025



MINISTERIO DO PLANEAMENTO  
E INVESTIMENTO ESTRATÉGICO  
IX GOVERNO CONSTITUCIONAL



MINISTÉRIO DO PLANEAMENTO E INVESTIMENTO ESTRATÉGICO  
IX GOVERNO CONSTITUCIONAL

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**MINISTERIO DO PLANEAMENTO  
E INVESTIMENTO ESTRATÉGICO  
IX GOVERNO CONSTITUCIONAL**



## I. INTRODUCTION

### 1.1. Definition

#### a. Name of Project

The Project is Consultants Services for Preparation of Detailed Engineering Design for New Bridges and river training in Naktuka river in Oecuse Municipality.

#### b. The Owner

The Project Owner is the Ministry of Planning and Strategic Investment

#### c. Management of Activities

The overall Management of activities will be held by a Project Manager appointed by Ministry of Planning and Strategic Investment in cooperation with the relevant Line Ministries.

#### d. Procurement Process

The Procurement process will be carried out by the National Procurement Commission (NPC).

NPC will arrange pre-bid meeting, receive the proposals, evaluate the proposals and propose the winner.

#### e. Design Consultant

The Design Consultant is the consulting company which has been determined the winner of the procurement process and who will sign the contract together with the Owner.

### 1.2. Background

The Naktuka River, located in the Oe-Cusse Ambeno Special Administrative Region of Timor-Leste, forms a critical natural boundary between Timor-Leste and Indonesia. Despite its strategic geographic position, the region faces significant challenges related to connectivity and infrastructure, particularly in facilitating efficient cross-border movement. Currently, the lack of adequate bridging infrastructure and river training systems has limited access and contributed to difficulties in transportation, trade, emergency response, and community interaction between the two countries.

In recent years, there has been increasing recognition of the importance of improving border infrastructure to enhance regional cooperation, promote economic development, and support local communities living in this isolated region. The Naktuka area, while remote, holds potential as a key access point for bilateral connectivity, however remains underdeveloped due to seasonal flooding, riverbank erosion, and lack of formal bridges or engineered crossings.

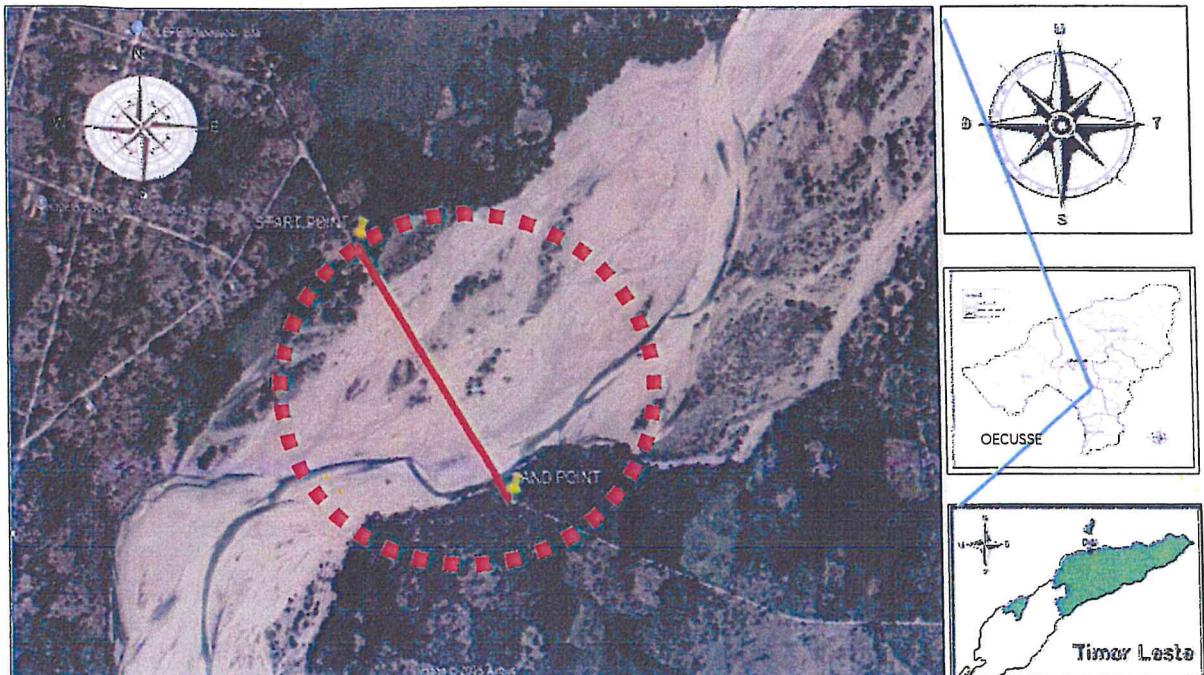
This project proposes the construction of New Bridges and Implementation of river training works along the Naktuka River to ensure stable river flow, reduce flood risk, and provide reliable, year-round access between Timor-Leste and Indonesia. These improvements will not only support better transportation and logistics but will also cross-border trade, and strengthen socio-economic ties in the region.



### 1.3. Objectives

- This Terms of Reference (TOR) should be used for guidance for the satisfactory and timely completion of the project. This TOR sets out the output, principles, criteria, process and input.
- In this task, the Design Consultant will implement the duties in a professional manner so as to deliver the outputs in accordance with the technical specifications and standards stated in this TOR.
- The objective of this TOR is to provide technical guidance and instructions to interested consulting companies so that they can fulfil the technical specifications in terms of structural and functional aspects.

### 1.4. Location



Source : Google Maps



## II. SCOPE OF WORKS

### 1. OBLIGATION OF THE CONSULTANT

Undertake Detailed Engineering Design (DED) for the New Bridge and the River Training Works, with the corresponding Detailed Unit Price Analysis (DUPA) per item subject to evaluation and acceptability by the MPIE, and the Geological and Geotechnical Report that will provide the foundation conditions, which conforms with the performance specifications of minimum design standards prescribed by the Ministry of Public Works (MPW) book.

### 2. PRELIMINARY SITE INVESTIGATION

#### 1) Data Collection

At the beginning of the project all relevant documents, reports and drawings relating to the proposed bridges and structure protections will be collected by the Consultant for review. This initial data collection process will be essential to form the basis for development of appropriate agreed standard and approaches, a basis to refine and support the detailed data collection.

The information to be collected will include the following:

- a) Detailed Reconnaissance.
- b) Regulations, laws and codes of practice in force in Timor-Leste.
- c) Inventory and condition surveys for bridges, river trainings and drainage provisions.
- d) Climatic rainfall and temperature.
- e) All available mapping and aerial photography of the project area.
- f) National survey reference marks.
- g) Traffic studies including traffic surveys and axle load survey and demand for next 30 (thirty) years.

#### 2) Visual Survey and Investigation

Concurrently with the preliminary data collection, the Consultant will undertake a field investigation. This reconnaissance survey will include:

- a) Condition and utilization of the bridge at various times-of-day, including general physical and logistical characteristics and constraints.
- b) Traffic characteristics.
- c) The location and condition of existing structures at the site if any.
- d) The overall geometric design options.
- e) River and morphologic data.



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**3) Additional Site Investigations**

Once the investigation and preliminary studies have been completed, with the interaction of the MPIE, design programs will be refined and further surveys and investigations, if considered necessary, will be conducted to collect all the information required to the detailed engineering design.

This investigation will include:

- a) Topography Survey.
- b) Assessment of local community needs.
- c) Baseline environmental conditions.
- d) Environmental Reference for Bridge Design.

**4) Topographic Survey**

Topography surveys will be undertaken using electronic total stations, automated data recording and computation in dedicated terrain modelling packages. The processing of field data quickly is essential to ensure sufficient coverage has been achieved and to quickly verify the accuracy of the surveys to minimize delay in design. A critical aspect of the survey is the logical and systematic basis on which it is undertaken, allowing quality assurance plans to ensure production rates and quality output on a large-scale data collection exercise. Survey shall include detail of position of existing structure (if any), hydraulic information, and pickup of additional geological investigation sites.

**5) Applicable Design Standards**

There is no consistent set of bridge design standards in Timor-Leste. Therefore, the Consultant should propose internationally acceptable design standards for this project in accordance with a recognized International Bridge Code of practice suitable for application in the Timor-Leste environment.

The Consultant shall also consider the seismic activities in the country. Unless otherwise instructed, the geometric characteristics of the bridge itself shall be designed generally in accordance with the bridge standards that shall be subject to approved standards by the MPIE. These standards shall generally be consistent with the achievement of minimum requirement for land acquisition and safety.

**6) Bridge Safety Audit of both Preliminary Design and Final Design**

The Consultant should note that MPIE will review the adequacy of both the preliminary design and Detailed Designs for bridge safety and traffic calming measures. The MPIE will also review other aspects of the rehabilitation designs and in particular the junction layout and geometric elements of the roads. The comments and recommendations of the MPIE shall be incorporated in the final detailed



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engineering design. The recommendations of the MPIE should also be included in the Bidding Documents as guidance to the Contractor in preparing the final design and should, in addition, note that the Contractor final design and shall be subjected to the same safety audit as part of the design review. The Contractor shall take full account of the findings of such audit and make all necessary modifications to the design.

**7) Drawings and Plan**

Each bridge and each retaining wall must have basic illustration drawings and plans. A detailed Engineering Design bill of quantities shall be prepared generally under the following sections: general items, preparatory works, Earth works, pavement, drainage, bridges, road junctions, safety elements, utilities lines, slope protection measures, environmental mitigation measures, insurance, miscellaneous and contingencies.

**8) Bidding Documents**

- a) The detailed engineering design (DED) shall have all elements needed to support MPIE on drafting the technical aspects of the bidding documents for the build contract.

The detailed engineering design (DED) should present the following:

- ✓ The Bill of Quantity and Cost Estimate of the bridge.
- ✓ The location of the bridge.
- ✓ The cost estimate for the bridge signage, marking and furniture for each study.
- ✓ The cost estimate for emergency works for each study, if needed.
- ✓ The cost estimate for provisional sum for unforeseen conditions for the bridge study, if needed.
- ✓ Specifications for final design to be done by the contractor.
- ✓ Specifications for construction to be done by the contractor.
- ✓ Minimum equipment required for the Contractor to have available.
- ✓ Service level required for the design to be done by the contractor.
- ✓ Service levels required to be achieved by the contractor on the completed bridge and river training works.
- ✓ The requirements to comply with environmental and social safeguards and legislation.



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- b) The Consultant should prepare the following documents to be included on the bidding documents to provide relevant information to the bidders.
- ✓ Detailed Engineering Design (DED) Input data. Presenting all the input data collected and used on the DED.
  - ✓ DED report presenting the results of the detailed engineering design analysis.
  - ✓ DED design illustrative Drawings and plans.

**9) Environmental Impact Assessment**

a) For environmental aspects:

- ✓ The Consultant should carry out the preliminary environmental screening to assess the direct and induced impact due to the project.
- ✓ Preparation and submission of Project Document (PD) to National Directorate of Pollution Control and Impact Statement (NDPCIA) before submitted to the Owner as final documents.
- ✓ Securing categorization of the project from NDPCIA.
- ✓ Undertake the Simplified Environmental Impact Statement (SEIS) as well the Environmental Management Plan (EMP) and prepare the Reports.
- ✓ The Consultant will address the following issues.
  1. Delineate the environmental impacts of construction activities associated with the project.
  2. Alignment and Standard: The Consultant shall carry out a study of alternative bridge alignment including a preliminary evaluation of technical, financial, environmental, resettlement and cultural heritage aspects.
  3. Describe feasible mitigation measures for minimizing, eliminating, offsetting unavoidable adverse impacts.
  4. Recommend the most appropriate mitigation and/or enhancement measures.
  5. During preparation of the technical documents, the Consultant shall completely comply with provisions of the laws, with particular reference to the environmental protection measures and monitoring program.
  6. Submit the completed Reports of Simplified Environmental Impact Statement (SEIS) which also included the Environmental Management Plan (EMP) to the Employer for consent, both in soft and hardcopy format. In case that either the Employer or Financing Institution discovers deficiencies of the SEIS and EMP, the Consultant



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shall be obliged to correct the said SIES and EMP, the Consultant shall be obliged to correct the said SEIS and EMP if necessary, in accordance with the remarks.

7. For the environmental aspect, if the project is found to be Category C from the National Directorate of Pollution Control and Environmental Impacts (NDPCIA), Consultant should prepare Environmental Protection Guidelines document for implementation during the construction period; should the project be categorized as B project, the Consultant shall prepare and submit the Simplified Environmental Impact Statement (SEIS) which also include the Environmental Management Plan (EMP). The EMP shall include the cost for implementation. The Consultant shall also ensure that environmental license is obtained within the contract duration and ensuring that either the Environmental Protection Guidelines or the SEIS & EMP and its associated costs are reflected in the Bidding documents..

#### 10) Social safeguard requirements

Given the project context and requirements for improvement of local community position, the Consultant's task shall be to take into regard all road elements and contents along the bridge approach that may be of influence on life quality of local community and to benefit the improvement of that quality by his/her design solution within limit of the allowed and possible.

Under this part of the Services, the Consultant shall take into regard the followings:

- a) Assessment on the impact of the project on the poor and vulnerable groups along the project bridge corridor. Based on the identified impacts, developing entitlement matrix for the project affected people.
- b) Intensity and flow of pedestrian movement with the analysis of needs and possibilities for constructing footpaths, fencing, footbridges, etc.
- c) Necessity for crosswalks and related speed reduction measures and signs.
- d) Necessity for relocation of installation, i.e., construction of lighting on certain parts of the section.
- e) Necessity for the relocation or construction of utilities lines.
- f) All other details which based on the Consultant's opinion may be of use for local community.

For the social aspect, the Consultant shall ensure the preparation of abbreviated Land Acquisition and Resettlement Action Plan (LARAP) Report. The abbreviated LARAP shall identify steps for land acquisition and/or population resettlement based on GoTL standards. It is expected that, the Consultant shall consult with relevant stakeholders including but not limited to Direcção Nacional de Terras, Propriedades e de Serviço Cadastrais (DNTPSC) when preparing the abbreviated LARAP. The



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LARAP Report shall also identify relevant legal framework and clarify on procedural steps for land acquisition..

*Note: It is expected that the report shall be a maximum of 15 pages and be completed within 100 days of engagement.*

### 3. DETAILED ENGINEERING DESIGN

Based on the above surveys and investigation, undertake the Detailed Engineering Design should include:

- a) The Final Detailed Engineering Design will be prepared for the bridge.
- b) The New Bridge design shall incorporate reused steel truss components from the dismantled Lamsana in Laleia bridge, Laclo bridge in Manatuto Municipality & Vemase Bridge in Baucau Municipality, in line with sustainable construction practices.
- c) Design the new Bridge to ensure that its hydraulic capacity will allow the flow of 100 years return period storm discharge without surcharging.
- d) Design of the new Bridge shall be carried out in accordance with recognized international code of practice suitable for application in Timor-Leste environment or the standards quoted in the Technical Specifications on MPW's for road and bridge works.
- e) Designs shall be based on the **TIMOR - LESTE STANDARD METHOD OF MEASUREMENTS (TL-SMM)**.
- f) Unless otherwise instructed, the geometric characteristics of the bridge itself shall be designed generally in accordance with the bridge standards that shall be subject to approved standards by the MPIE. These standards will generally be consistent with the achievement of minimum disturbance, minimum requirement for land acquisition without affecting existing permanent private buildings as far as possible and safety.
- g) Examine the requirements for side drainage and identify the most economic type and method of construction. Particular attention shall be giving to erosion and scour protection along river channels discharging into streams and at bridges inlet and outlets.
- h) Identify if any irrigation canals and structures existing along the bridge alignment and prepare the detailed design of all structures that need to be relocated to ensure that their functionality is fully maintained.
- i) Carry out detailed design for ancillary works such as road markings, fencing, guard rails, foot paths, road signs, and prepare the detailed designs as typical drawings.
- j) Prepare detailed cost estimates for the bridge construction, forming contract packages and shall be agree by the Employer as early as possible.



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- k) Prepare the design of new retaining walls and slope protection works to substitute them for new requirements as per site conditions.
- l) During the civil works bidding period, the Consultant's work shall include but not necessarily be limited to the following:
  - 1) Prepare draft bidding documents within 120 days from the commencement date for review by MPIE and incorporate comments as required. Final bidding documents shall be prepared within 4 (four) months from the commencement date of the Consultancy.
  - 2) Assist the MPIE/NPC in the conduct of pre-bid conference and pre-bid site inspection to answer possible queries that may be raised by interested contractors on the design plans and provide other information that might be needed.
  - 3) Prepare for approval any necessary revision or addenda to the tender documents during the bidding period.
  - 4) Assist in the opening of bids, tabulate and evaluate the bids received, and prepare recommendation for contract awards.
  - 5) Assist the MPIE in contract negotiations with the contractors, if any necessary.
  - 6) Prepare standard forms and reporting format to be used during the construction supervision.
  - 7) Prepare and compile all documents for a complete construction contract for the approval of MPIE.
- m) Detailed Engineering Design of structure of bridge and utilities, to conform to the design drawing approved.
- n) Technical Specifications.
- o) Prepare the detailed Bill of Quantities (BoQ) of all works to be undertaken during construction in an approved standard.
- p) Cost Estimate including Unit Price Analysis, Unit Price of Labour, Material and Equipment.
- q) Construction Schedule, Bar Chart and "S" Curve.
- r) Construction Methodology of implementation.
- s) Design Report covering all engineering disciplines.
- t) Develop one (1) design alternative, the consultant is required to develop one (1) conceptual preliminary design prior to prepare detail engineering. One conceptual design shall include video simulation.

In Procurement of Construction Services Stage, the Consultant shall provide support services to the National Procurement Commission (NPC) in the activities of pre-bid meeting. Any cost related to the travel and accommodation such as hotel and plane tickets will be covered by the Employer upon presentation of such



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claims, if any. The Consultant is responsible for validating the information and collect additional field data as may be required for finalising the design.

### **III. OUTPUT OF DESIGN ACTIVITIES**

The output of design activities undertaken by the Consultant shall consist of reports presented to the MPIE for uniformity and cohesiveness in the preparation of related documents, consistent with the latest edition of the Design Guidelines, Criteria and Standards for Public Works, American Association of States Highway and Transportation Officials (AASHTO) guides and other applicable provisions of existing laws. All reports and other related documents prepared by the Consultant shall be in format agreed and accepted by the MPIE.

Consultant shall be required to complete, to the satisfaction of the client all the different stages of study with the time frame indicated in the schedule of submission of reports and presentation of the works:

#### **3. 1. INCEPTION DESIGN REPORT**

The collected information relevant to the proposed bridge solution and location shall be presented in the conceptual design phase.

A comprehensive inception report shall include key persons to be engaged in the Detailed Engineering Design, survey and investigation methodology, schedule of works indicating various activities, and initial findings:

- a. Preparation of Design Concept covering number and qualification of team members and their responsibilities, methodology of implementation, and duration of time required.
- b. Design Concept covering structure program, varies kind of structures, and organization of structure connections.
- c. Scope of services report on validation of existing site data and information covering topographical surveys, environmental program and purposes needed.
- d. Preliminary Site Investigation:

The bridge site investigation is undertaken to select a suitable site at the bridge can be built economically, at the same time satisfying the demands of the stream geometry, traffic expectation, safety and aesthetics.

**Bridge Survey** : Site investigation, reconnaissance, topographic and hydrologic surveys, showing alignment of bridge foundations, retaining walls structure protections and locations of bore holes (soil data/boring test), logs with description of samples taken at every change stratum.

**Environment Condition** : The followings are important environmental condition to be considered, as the Environmental Impact Statement for critical project is defined by the National Authority of Petroleum and Mineral – Timor Leste (ANPM-TL), i.e., land environment; air environment; noise, air, and water pollution; and license for extraction for material for construction.



- e. Graphical presentation of a layout.
- f. Graphical and numerical presentation of the results.
- g. Results of visual condition survey.
- h. Photo documents from field surveys.
- i. Analyses of data and conclusions.

These documents should be submitted in 1 (one) original and 5 (five) copies and 6 (six) digital copies in CD and/or other digital forms.

This Inception Report should be submitted to and approved by the Project Manager or MPIE from the contract signing, before proceeding to the Preliminary Design stage.

Comments on the Inception Report will be prepared and discussed between the Consultant and the Project Manager together with other relevant institutions and an agreed Design Concept will be approved by the Project Manager enabling the Consultant to continue his work with minimal delay.

### 3.2. INTERIM DESIGN REPORT

The Consultant shall prepare and provide the Project Manager/ MPIE with a report on completed engineering and results of field surveys for the new Bridge. The report shall include at least the following:

#### a. Preliminary Design

Preliminary Design will consist of the following:

- 1) Preliminary design concepts and descriptions relating to the proposed Bridges and River Trainings and its major components  
  
Bridge Geometric Requirements:(1) road geometry, bridge length, Bridge carriageway widths, road clearance, cross slope, super elevation, required waterway, services required to be carried by the bridge, aesthetic requirements, available of labour, materials and equipment, provision for pedestrian, grades, horizontal and vertical alignments, cross slope, etc.; (2) Superstructure, abutments, foundations, river training/bank protection structures, approach road/road geometry, etc.  
It shall include location of proposed foundations and arrangement of the bridge components.
- 2) Bridge preliminary design drawings regarding the structure components and the road transitory diversion, illustrating the location map, layout plans, plans, elevations and cross-sections.
- 3) Outline of Technical Specifications:
- 4) Preliminary Cost Estimates.
- 5) Simplified Environmental Impact Statement (SEIS) Reports and Environmental



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Management Plan (EMP) Reports.

- 6) Results of Consultations with the Employer.

**b. Development Design**

Development Design will consist of the following:

- 1) Development design drawings of the new bridge regarding the structure components and the road transitory diversion, based on approved Preliminary Design describing site plan, layout, elevations and cross sections.
- 2) Description of design concept and calculations needed, including foundations design.
- 3) Draft Cost Estimates covering all the structures aspects.

These documents should be submitted in 1 (one) original and 5 (five) copies and 6 (six) digital copies in CD and/or other digital forms.

This Interim Design Report be submitted to and approved by the Project Manager or MPIE before proceeding to the Detailed Engineering Design stage.

Comments on the Interim design report will be prepared and discussed between the Consultant and the Project Manager/ MPIE and an agreed Development Design will be approved by the Project Manager enabling the Consultant to continue his work with minimal delay.

**3.3. DRAFT DESIGN REPORT**

Detailed Engineering Design will consist of the following:

- 1) Bridge Detailed Engineering Design.
- 2) Technical Specifications.
- 3) Bill of Quantities (BoQ).
- 4) Cost Estimates including Unit Price Analysis and Unit Price of Labour, Material and Equipment.
- 5) Construction Schedule, Bar Chart and "S" Curve.
- 6) Structure Analysis and or Design Report covering all engineering disciplines.
- 7) Draft Bidding Documents.

These documents should be submitted in 1 (one) original and 5 (five) copies and 6 (six) digital copies in CD and/or other digital forms.

This Draft Final Report should be submitted to and approved by the Project Manager or MPIE before proceeding to the Final Detailed Engineering Design stage.



Comments on the draft design report will be prepared and discussed between the Consultant and the Project Manager/ MPIE together with the PSC and an agreed technical design report will be approved by the Project Manager/DRBFC enabling the Consultant to continue his work with minimal delay.

### 3.4. FINAL DESIGN REPORT

Final Design Report will be submitted to the Project Manager within the 4 (four) months of assignment as the result of Draft Design Report that has already been discussed and approved by the Project Manager/ MPIE. These documents should be submitted in 1 (one) original and 5 (five) copies and 6 (six) digital copies in CD and/or other digital forms.

**Final Design Report should be presented with a sample miniature design to the new bridge.**

The Final Design Report package shall present the previous reports incorporating all revisions deemed necessary arising from comments received from the Project Manager. In addition, the final design report package shall present a Structure Analysis Design Report and Detail Engineering Design, Specifications, Summaries, Explanatory Notes, Bill of Quantities, Cost Estimates, Maps and Performance Specifications.

The Final Design Report should have at least the following contents:

- 1) Introduction.
- 2) Description of Bridge Project.
- 3) Bridge Surveys.
- 4) Bridge Safety.
- 5) Drainage.
- 6) Bridges and Structures.
- 7) Standard Specification.
- 8) Design of Performance Based Contract (PBC) Template for Routine Base Maintenance.
- 9) Construction Cost Estimates.
- 10) Construction Method and Schedules.
- 11) Environmental Impact Assessment Summary.
- 12) Resettlement.
- 13) Summary of recommended rehabilitation project alternative.
- 14) Bidding Documents and Tender Phase Management.



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The Consultant is obliged to comply with remarks of the Project Manager about technical documents which are subject to final control if such remarks exist. For every remark, the Consultant shall indicate the request for correction, as well as description of manner in which the remark was corrected with appropriate justification.

The bid documents to be prepared by the Consultant with assistance by MPIE shall include all necessary technical documents prepared by the Consultant and sections requested by the valid legislation.

Details of upgrading shall be prepared, bounded and submitted to the Project Manager in hard and soft copies and shall contain relevant textual, graphical and numerical attachments.

Technical documents shall be delivered to the Project Manager/ MPIE in 6 (six) copies with the cover letter which in addition to basic data on the design and consultant, shall include identification of the contract. Copy implies printed version of design and e-form on a CD of appropriate capacity.

While processing the technical documents, the following shall be respected:

- a. E-form of technical documents shall cover all source files (unprotected e documents in form of program used for preparation and processing) and unprotected pdf form. Both e-forms shall be identical.
- b. E-form of technical documents shall be fully compliant with the printed copy.
- c. Document processing (text, graphics, vector, grids) shall imply use of generally accepted and available commercial programs (such as applications from package MS Office, AutoCAD, Bridge Design Software, Civil 3D, Structure Design Software etc.). Forms of these documents shall be compatible with older versions of those programs.
- d. If the Consultant, for processing of documents, uses non-standard programs which are not available to the Project Manager, the consultant shall, with previous agreement with the Project Manager, convert all documents to formats available to the Project Manager before final processing of technical documents.
- e. CD cover shall bear the name of Consultant, title of technical documents and date, where the date represents the month of verification of design by technical control.
- f. Text on the cover shall be printed electronically. Also, the disc shall bear legible name of Technical Documents and Consultant.
- g. Textual parts of design shall be processed, printed and packed in hard covers in A4 format.
- h. Graphical attachments shall be processed & printed in appropriate format A3 and bound in A4 format.
- i. Printed copies shall be bound in hard covers, verified and sealed in accordance with valid regulations.

It shall be considered that the Consultant has not complied with contracted obligations and become entitled to payment in accordance with the contract conditions as long as the Consultant does not meet the above stated requirements.



### 3. 5. DOCUMENTS FOR THE NEW BRIDGE CONSTRUCTION

Documents for the new bridge construction shall be continually monitored and controlled by the Project Manager/ MPIE. The Consultant shall, with the Project Manager's coordination, cooperate with representatives of financing institutions and, with the Project Manager's consent, shall act in accordance with suggestions and request result from such review.

The Consultant is not entitled to compensation of work cost resulting from request of financing institution and it shall be considered that all Works on modifications and amendments of design based on this reason has been included in the contract price.

### 3. 6. TECHNICAL REPORT

Technical Report in electronic files and hard copies for the work prepared must be submitted by the Consultant to the MPIE for review and approval by the National Director of MPIE.

Topographic survey of the bridge area will be carried out through a classic topographic survey at a scale of 1:200.

Whenever there is a need for the relocation of utilities such as telephone, telegraph and electricity poles, etc. as well as buildings, fences, and major trees to be removed, such details shall be indicated in the drawings and a separate list shall be prepared.

To facilitate the process of design review MPIE of the concepts of the proposed structures/facilities, the following activities shall be undertaken:

- a. Presentation to and discussion with MPIE of Inception Design Report.
- b. Presentation to and discussion with MPIE of the Interim Design Report.
- c. Presentation to and discussion with MPIE of the Draft Design Report.
- d. Presentation to and discussion with MPIE of the Final Design Report.

## IV. PRINCIPLES

The Consultant, in the implementation of his tasks, should take notice of the principles of the bridge as follows:

- 1) The bridge should be functional, efficient, attractive but simple.
- 2) The design should not express an imitative style and quality materials, but the ability to sublimate the technical functions and the social functions of the bridge and structure protections.
- 3) The appearance of the bridge should be designed to express the local culture, history and traditional architecture.
- 4) The design should consider minimal consumption of energy by applying a concept of Green Space.



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- 5) By the limitations of not disturbing the works activities, the investment cost and the operation and maintenance cost during the lifetime of the bridge and structure protection of bridges should be undertaken as low as possible.
- 6) The design of the bridge should be made so that the construction works be done in short time and utilized as soon as possible.
- 7) The bridge should increase the quality of the environment surroundings.
- 8) Any design prepared by the Consultant for the Employer under the contract shall belong to and remain the property of the Employer. The Consultant may retain a copy of such document and software and such document shall not be used for other purposes without the expressed written consent of the Employer.

## **V. DESIGN CRITERIA**

The Consultant should take notice of the general criteria of the bridge and retaining walls to conform to its functionality and complexity, and are as follows:

**a. Allotment and intensity conditions:**

- 1) To ensure that the bridge is based on scientific assessment of needs and behaviour of bridge users, as observed in the survey as part of this study.
- 2) To ensure pedestrian safety on the bridge.
- 3) To ensure that all spaces, including footpaths, refuge islands, and pedestrian crossings, are accessible to differently able persons as per the persons with disabilities.
- 4) To ensure that the bridge is constructed based on the regulation of spatial plan determined by the local authority.
- 5) To ensure that the bridge will be used to conform to its functions.
- 6) To ensure the safety of the users, community and environment.
- 7) To conform to the state budget principles:
  - i. Economical, not luxurious, efficient and conforms to the technical purposes specified.
  - ii. To be focused and controlled to conform to the plan, program, and its functions.
  - iii. To utilize local products and resources as much as possible to promote national prosperity.

**b. Environment Conditions:**

- 1) To ensure that the bridge is constructed based on the environment characteristics, determination of the nature of local culture, to obtain balance, harmony and compatibility with the environment.
- 2) To ensure the creation of Green Space that is balanced and in harmony with the environment.



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- 3) To ensure that the bridge is constructed and utilized with no negative impacts to the environment.

**c. Bridge structure conditions:**

- 1) To ensure the structural stability of the bridge to support the rising loads as the result of its utilization to conform to its functions, and as the result of the natural and human behaviour.
- 2) To ensure the safety of the people from possible accidents or injury due to the failure of the bridge or structure protections of bridges.

**d. Drainage conditions :**

- 1) To ensure the provision of drainage canals could retain the rainwater before discharging to the main drainage canals.
- 2) To ensure the provision of drainage canals could manage the flood that historically happened in the plot of land.

**e. Electrical installations conditions :**

- 1) To ensure that the installations of electrical facilities adequately and safely support the activities on the road to conform to its functions.

**f. Lighting conditions :**

- 1) To ensure the fulfilment of lighting needed adequately, either natural or man-made to support the activities on the bridge to conform to its functions.
- 2) To ensure that lighting facilities are in good running condition during testing and commissioning.

**g. Noises and trembles conditions :**

- 1) To ensure the creation of comfortable situation from unexpected noises and trembles disturbance.
- 2) To adopt environmental pollution mitigation measures resulting from construction activities. Cost of such measures should be included in the detailed construction cost estimates.

**h. Fire Conditions :**

To ensure that the bridge will be stable in case of fire:

- 1) Sufficient time for the users to evacuate safely.
- 2) Sufficient time for the fire fighters to come to the location to extinguish the fire.
- 3) To avoid damages to other properties.

**i. Emergency of danger conditions:**

- 1) To ensure the provision of an early warning system if an emergency occurs.
- 2) To ensure the users to evacuate easily and safely in emergency situations.



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j. Specific criteria relate to the construction of bridge and retaining walls to be designed, either from the aspect of special functions or other technical aspects are as follows:

- 1) Ensure serviceability of the bridges.
- 2) Ensure stabilized slopes for bridge protection or approaches.
- 3) Ensure bridge safety.
- 4) Ensure riding surface.
- 5) Ensure optimum travel speed.
- 6) The drainage improvement works should have increased service life of the bridge and ensure serviceability of the bridge during / after heavy rains.
- 7) Effort of conservation for existing building, if any.
- 8) The unity of designing the bridge with its façade, aesthetics, and the scope of services in the surroundings, such as the frameworks of environment.
- 9) Solution and contextual limitations, such as aspects of local social cultures, geography, climate and others.

### 5.1. SPESIFICATIONS

For the purpose of preparing the technical specifications to be incorporated into the bidding documents, the Consultant shall utilize reference documents provided by the Client, drawn from previous bridge infrastructure projects. These documents shall be made available in electronic format. Notwithstanding the use of these reference materials or consultations with the Client, the Consultant shall retain full responsibility for the accuracy, completeness, and adequacy of the technical specifications.

In determining the requirements for material quality, primary emphasis shall be placed on the quality and performance of the final constructed product. Where appropriate, consideration may be given to the reuse of structural materials such as steel components from previously dismantled bridge structures, subject to a thorough assessment of their condition and compliance with applicable technical standards. Should such reused materials be deemed inadequate or unfit for incorporation into the proposed design, the Consultant shall develop and recommend suitable alternative design solutions and material specifications that ensure the structural integrity and durability of the works. Furthermore, materials sourced from the domestic market may be utilized, provided that their use does not compromise the quality or performance of the design solution.

Specifications are part of the bidding documents which should cover identification and description of a construction technology for the designed works, technical conditions for execution of the works, method of measuring and calculation as well any other aspect typical for safe execution of the works and protection of



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structures and surroundings during the works execution. In addition, the bidding documents should include specifications for the final design to be done by the Contractor.

For every item of works stated in the Bill of Quantities, the following shall be provided:

- 1) Detailed technical description of the item.
- 2) Requirements for quality of component materials as well as requirements for acceptance of the constructed item.
- 3) Requirements for technological process for execution of the item (Production, purchase and transport of materials, conditions for executions of the works on the item or incorporation of material. Necessary equipment for execution of the works, safety and protection of the neighbouring structures, requirements for the environmental protection, etc.).
- 4) While preparing the Specifications, special attention shall be paid that numbering and data stated in the Specifications match those stated in the General Bill of Quantity.

### **5.2. CONCEPTUAL BRIDGE REPORT**

The collected information relevant to the proposed bridge solutions and locations shall be presented in the conceptual report prepared by the Bridge Design Engineer. The conceptual report shall present several possible solutions for consideration by MPIE (Ministry of Planning and Strategic Investment –TL). The report shall outline the pros and cons of each solution, anticipated methods of construction, equipment and labour requirements, durability and maintenance requirements and any other significant issues.

Concept design report preferred solutions shall be obtained from MPIE.

### **5.3. DESIGN GUIDELINES AND CODES**

Design Guidelines and Codes to be followed:

- 1) Bridge Design Standards, Bridge Management System 1992
- 2) Bridge Design Specification, AASTHO Highway Bridge – Load Resistance Factor Design. (AAHSTO-LRFD 5th Edition 2012).
- 3) Indonesia Bridge Loading Design Code, SNI 1725-2016, *Pembebanan Untuk Jembatan*
- 4) Indonesia Earthquake Resistant Bridge Design Code, SNI 2833-2016, *Perancangan Jembatan terhadap Beban Gempa* (refer to AASHTO LRFD Bridge Design Specification, 5th Edition, 2012).
- 5) Design for these bridges should satisfy the provisions under the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications and shall conform to the requirements of MPW Design Standards for Roads and Bridges.



- 6) Design Guidelines, Criteria and Standard by infrastructure Technical Assistance ADB-4942 BRIDGE Geometric Design Standards Ministry of Infrastructure latest edition.
- 7) Ministry of Transport Communication and Public Works (MTCPW) Standard Specification of Highway, November 2014 Edition.
- 8) Timor-Leste – Standard Method of Measurements (TL-SMM).
- 9) And any other design code suitable for the project.

#### 5.4. LOADING SPECIFICATIONS

The requirements of design loads according to the principles of the AASHTO LRFD Bridge Design Specification:

- 1) **Permanent Loads**
  - ✓ Structure Dead loads (DL) shall consist of the weight of structural material in the bridge of all of components of superstructures and substructures both structural and non-structural.
  - ✓ Superimposed load (SDL) the weight of non-structural materials on the bridge, such as road surfacing, parapets, sidewalks, car tails, pipe conduits, cables, and other public utility services. Additional loads for future wearing surface should be added.
  - ✓ All loads caused due to fill (vertical and horizontal earth pressure).
- 2) **Live Load**

Live loads shall consist of the weight of the applied moving loads of vehicles, cars, and pedestrians which are equivalent to MS 18 (HS20) design live load. The structure shall also be checked against alternative military loading and permit design live load.
- 3) **Transient Loads (vehicular traffic and pedestrian loads)**
- 4) **Impact or Dynamic effects of the live loads**
- 5) **Wind Loads**

Wind loads shall consist of the windward pressure/Positive pressure, leeward pressure/negative pressure, wind uplift, wind speed, and wind force.
- 6) **Other Forces**

Other forces shall consist of the longitudinal forces, centrifugal forces, thermal forces, earth pressures, buoyancy shrinkage stresses, rib shortening, erection stresses, current pressures, and earthquake stresses.

#### 5.5. MINIMUM LOADING

Table-1: The Bridge shall be designed using the minimum loading

Loading Parameter	Minimum Loading
Traffic loadings	AASHTO Load 125% Truck (HS 20-44) Truck loading or an alternate military loading of two axles 1.2 meters apart with each axle weighing 110 kN or permit loading.
Dead Load	



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Bituminous Wearing Surfaces	22.5 kN/m <sup>3</sup>
Concrete	25 kN/m <sup>3</sup>
Steel	78.5 kN/m <sup>3</sup>
Loose Sand and Silt	16.00 kN/m <sup>3</sup>
Earth / Soft Clay	16.00 kN/m <sup>3</sup>
Gravel / Rolled Gravel	22.00 kN/m <sup>3</sup>
Pedestrian load	3.0 kN/m <sup>2</sup>
Water	10.0 kN/m <sup>2</sup>
Wind Load	3.59 kPa
Seismic Loading	In accordance with division 1A of the 2002 AASHTO Standard Specifications for Highway Bridges using Acceleration Coefficient of 0.40

## 5.6. GEOMETRIC STANDARD/DESIGN SPECIFICATION

Table-2: The Bridge shall be designed using the geometric specifications

Description		Unit	Specifications
1	Design Speed	km/h	60
2	Bridge Width	m	7 to 9 meters, depends on Class of Road
3	Minimum Sidewalk Width	m	2,0
4	Clear Roadway Width	m	2 x 3,5
5	Span Length	m	Propose by Design

## VI. DESIGN PROCESS

1. In the process of design services to produce the outputs required, the Consultant should prepare a schedule of periodic meetings with the Project Manager/MPIE.
2. In the periodic meetings, it should be determined which inception products, intermediate products, and main products shall be provided by the Consultant to conform to output plan determined in the TOR.
3. In the implementation of the tasks, the Consultant should always consider that the work time schedule is fixed.
4. The work time schedule is 6 (Six) Months from the date of signing of the Contract.



## VII. DESIGN INPUT

### 7.1. Information

- 1) To implement the tasks, the Consultant should collect additional information/data apart from the information provided by the Project Manager/ MPIE.
- 2) The Consultant should check the validity of information to be used in the implementation of his tasks. The faults of design work as the result of lack of information shall be the responsibility of the Consultant.
- 3) The information required that should be obtained for design are as follows:
  - a. Information regarding the land covers:
    - ✓ Physical condition of the location, such as the extent of the area, boundaries, and topography.
    - ✓ Soil conditions as the result of soil tests.
    - ✓ Condition of ground water.
    - ✓ Allotment of land use.
    - ✓ Break down of land use, pavement, green land and others.
    - ✓ Rainfall and drainage: (i). Location of main drainage.(ii). Discharging to outlet of the site.

### 7.2. Personnel

The Consultant is expected to have appropriate experience in the engineering design of bridge, retaining walls projects and environmental issues.

The Consultant should provide personnel who fulfil the requirements to implement the services based on the scope of services or the level of complexity of the works.

The Key Experts specified in the proposal cannot be replaced, except in cases and under conditions clearly stated in general and contract particular conditions.

The personnel required for this design services should consist of the followings:

#### A. Key Experts

##### 1) Team Leader/Senior Bridge Design Engineer

The Team Leader should have a master's degree in civil engineering from an internationally recognized University, with minimum 15 years relevant international experience in designing bridge project and preferably registered in an internationally recognized professional engineering body.

The Team Leader will have at least minimum 5 years' experience as Team Leader and demonstrated ability to manage interdisciplinary team, cultural empathy, and strong organizational, communication and reporting skill. The Team Leader will have to submit in this bid a Certificate of Expertise issued by a professional institution. The Team Leader must have expertise in contract management for bridge engineering works. Previous work experience in Timor-Leste and proficiency in Tetum or Bahasa Indonesia or Portuguese will be an added advantage.



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The tasks of the Team Leader are the following:

- ✓ To report to the Team Leader or MPIE.
- ✓ To be responsible for planning and implement all activities covering design of bridge works.
- ✓ Training for counterpart personnel in the use of automated drafting software (i.e. Structural Calculation Software's, SAP2000, MIDAS or similar software).
- ✓ To give input to the other experts related to this design services.

**2) Senior Structural Engineer**

The Senior Structural Engineer should have a bachelor's degree or higher level of Civil Engineering from an internationally recognized University, with minimum 10 years relevant international experience in designing bridge and structure drainage project.

The Consultant is preferably registered in an internationally recognized professional engineering body. The Consultant will have to submit in this bid a Certificate of Expertise issued by a professional institution. Previous work experience in Timor-Leste and proficiency in Tetum or Bahasa Indonesia or Portuguese will be an added advantage.

The tasks for Senior Structural Engineer are the following:

- ✓ To report to the Team Leader.
- ✓ To be responsible for planning and implement all activities covering design of bridge works.
- ✓ Training for counterpart personnel in the use of automated drafting software (i.e. Structural Calculation Software, SAP2000, ETAB, MIDAS or similar software).
- ✓ To give input to the other experts related to this design services.

**3) Senior Quantity Engineer**

Quantity Engineer should have a bachelor's degree or higher level of education in Civil Engineering from an internationally recognized University, with minimum 10 years relevant international experience in technical specification, bill of quantities, and cost estimates of bridge projects. Previous work experience in Timor-Leste and proficiency in Tetum or Bahasa Indonesia or Portuguese will be an added advantage.

The tasks of Quantity Engineer are the following:

- ✓ To report to the Team Leader.
- ✓ To plan and implement all activities covering technical specifications, bill of quantities, and cost estimates.
- ✓ To give input to the other experts related to this design services.



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**4) Hydrologist/Hydraulics Engineer**

Hydrologist/Hydraulic should have a bachelor's degree or higher level of education in Water Resources Engineering from an internationally recognized University, with minimum 10 years relevant international experience in data analysis of catchment area calculations for culverts. The Consultant is preferably registered in an internationally recognized professional engineering body. The Consultant will have to submit in this bid a Certificate of Expertise issued by a professional institution. Previous work experience in Timor-Leste and proficiency in Tetum or Bahasa Indonesia or Portuguese will be an added advantage.

The tasks of Hydrologist are the following:

- ✓ To report to the Team Leader.
- ✓ To be responsible for planning and implement all activities covering data analysis of catchments area calculations for culverts.
- ✓ To give input to the other experts related to this design services.

**5) Geodetic Engineer**

Geodetic Engineer should have a bachelor's degree or higher level of education in Geodetic Engineering from an internationally recognized University, with minimum 8 years relevant international experience in topographic survey of bridge and road design. The Consultant is preferably registered in an internationally recognized professional engineering body. The Consultant will have to submit in this bid a Certificate of Expertise issued by a professional institution. Previous work experience in Timor-Leste and proficiency in Tetum or Bahasa Indonesia or Portuguese will be an added advantage.

The tasks of Geodetic Engineer are the following:

- ✓ To report to the Team Leader.
- ✓ To be responsible for planning and implement all activities covering topographical survey and demarcation of site of Bridges.
- ✓ To give input to the other experts related to this design services.

**a. National Staff**

**1) Surveyor Engineer / Quantity Survey / QS**

Education : Bachelor's degree in Geodetic Engineering  
Experiences : Minimum 5 years

**2) Environmental Specialist**

Education : Bachelor's Degree in Civil Engineering  
Experiences : Minimum 5 years

**3) Geotechnical Engineer**

Education : Bachelor's Degree in Civil Engineering  
Experiences : Minimum 5 years



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**4) Contract Specialist**

Education : Bachelor's degree in Civil Engineering  
Experiences : Minimum 5 years

**b. Additional Technical and Administrative Support Staff**

The Design Consultant Company is responsible for ensuring adequate technical support and administrative staff which may include but not limited to Office Manager, Secretary, and Finance Officer, etc.

**7.3. Person-Month Requirement**

The person-months of International Staff and National Staff will be required as tabulated below.

No.	Descriptions	Unit	Quantity	
			Personnel	Duration/Qty
A	<b>International Key Experts</b>			
1	Team Leader/Senior Bridge Engineer	Month	1	5
2	Senior Structural Engineer	Month	1	4
3	Senior Quantity Engineer	Month	1	3
4	Hydrologist/Hydraulic Engineer	Month	1	3
5	Geodetic Engineer	Month	1	3
<b>Sub-Total International Key Experts</b>			<b>5</b>	<b>18</b>
B	<b>National Key Experts</b>			
1	Surveyor Engineer / Quantity Survey / QS	Month	1	4
2	Environmental & Social Safeguard Specialist	Month	1	3
3	Geotechnical Engineer	Month	1	3
4	Contract Specialist	Month	1	
<b>Sub-Total National Key Experts</b>			<b>4</b>	<b>12</b>
C	<b>Supporting Personnel</b>			
1	Office Manager	Month	1	5
2	Office Boy	Month	1	5
3	Driver	Month	1	5
<b>Sub-Total Supporting Personnel</b>			<b>3</b>	<b>15</b>



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#### **7.4. Facilities Provided by the Employer**

The Employer will provide the following:

- a. Counterparts staff according to availability for assistance with progress monitoring.
- b. Make available copies of all relevant reports, Maps and other relevant reference material.
- c. Provide liaison with other government agencies, as required to carry out the consulting assignment.
- d. Allow the Consultant any reasonable use of equipment apparatus/facilities required to execute the investigations for which provision is not already made under the contract.
- e. Facilitate the issue of work visas and other documents required for carrying out under contract as appropriate and will also assist in the maintenance of peace and order along the project when and if necessary upon the request of the Consultant.

#### **7.5. Facilities Provided by the Consultant**

The Consultant will make his own arrangements for the following facilities and include the cost in his financial proposal:

- a. Office accommodation and all furnishings and office equipment.
- b. All survey equipment as required.
- c. Computing, Drafting and Mapping equipment and Software.
- d. Transport to and from site surveys and for other local transport in Timor-Leste.

No equipment is to be purchased on behalf of the Employer as part of this service contract or transferred to the Employer at the end of this contract.



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### **VIII. DESIGN COST, PAYMENT AND RETENTION**

The consulting services shall be a fixed lump sum cost contract based on the winning Consultant's Financial Proposal and finalized in negotiation with the Owner.

Upon signing of contract, no additional cost will be allowed, unless as subsequently agreed between the Design Consultant and the Owner through, and incorporated in, a written contract amendment.

The payment of these design activities will be scheduled as follows:

- a. The first payment equivalent to 15% of the contract price will be paid to the design consultant after the inception report was discussed and approved by the owner.
- b. The second payment equivalent to 15% of the contract price will be paid to the design consultant after the preliminary design is discussed and approved by the owner.
- c. The third payment equivalent to 20% of the contract price will be paid to the design consultant after the Development design is discussed and approved by the owner.
- d. The fourth payment equivalent to 50% of the contract price will be paid to the design consultant after the Final report has been reviewed, approved and submitted to the owner.
- e. The employer shall retain 5% from each progress payment as Performance and Quality Guarantee for satisfactory performance of the Contract. The 5% of retention money will be paid to the Consultant until the finalization of the procurement process.

### **IX. WORK PLAN**

The Consultant should arrange Work Plan that should cover the allocation of experts and their discipline and expertise.

The Curriculum Vitae and a Letter of Availability to Work of the proposed experts to be based in Timor-Leste during the schedule of assignment should be attached.

Time for performance of the Services and duration of the Contract is **5 (Five) Months**.

Dynamic of performance of the Services represents a mandatory part of Work Plan presented as part of the Consultant's Proposal and shall include proposed time for submission of all reports, as well as the following activities:

1. Mobilization, preparation of appointment decisions for members of key and non-key staff, preparation of initial and updated Work Plan.
2. Examination of available archive documents, obtaining of conditions and consents and necessary documents from the relevant institutions.
3. Pavement condition survey and other field investigations in accordance with the TOR.



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4. Preparation of preliminary version of design documents which includes:
  - a. Prepare Preliminary Design as the Design Concept.
  - b. Prepare Plan Development that covers the followings:
    - ✓ Perform all necessary surveys, investigation work and laboratory testing, if needed.
    - ✓ Design for traffic signage and bridge furniture
5. Delivery of complete technical documents to the Employer.

**Work Plan shall include:**

1. Textual part where the Consultant presents a description of the following:
  - (i.). Manner in which the Consultant intends to perform the assignment.
  - (ii). Method to be used.
  - (iii). Key activities that the Consultant intends to implement during performance of the Services.  
This part shall be prepared by the Consultant in a free form.
2. Organizational chart of the team to be engaged on performance of the Services. The chart shall be prepared in form of an appropriate diagram and shall cover all members of the Consultant's team, including key and other staff.
3. Dynamic for performance of the Services (Time Chart of Activities). The Consultant shall provide the time chart of activities in form of an appropriate linear or net diagram. The diagram shall present all key and other activities and must clearly indicate the critical path of activities. The Consultant submits for the Employer's approval the initial and updated Work Plan after presentation by the Consultant and input provided from the Employer for performing the Services within the schedules.