REABILITAÇÃO E MANUTENÇÃO DO TROÇO DE ESTRADA ENTRE LAUTEM E COM, SEG. 182+040 – 201+ 800 (19.760 KM), MUNICÍPIO DE LAUTEM
Tender/175/MOP-2024

EMENDA Nº 4
Data: 27 de Janeiro de 2025

A presente emenda nº4 é emitida para alterar os seguintes itens do Caderno de Encargos nos termos da Instrução aos Concorrentes 8.1 do referido Caderno de Encargos (Secção I).

Item	Secção/Cláusula/ Nº de pág. do Caderno de Encargos	Conforme o original do Caderno de Encargos	Conforme a Emenda nº 4
1.	Secção 2: Ficha Técnica da Proposta IAC-FTP 22.1 Pág. n.º 5 Volume 1: Caderno de Encargos	Para fins de **apresentação de propostas** apenas, o endereço do Contratante é: **CAIXA DE CONCURSO** **Comissão Nacional de Aprovisionamento** **Av. de Balide, Património do Estado** O prazo para a apresentação de propostas é: Data: **3 de Fevereiro de 2025** Hora: **15:00 horas, hora local** Local: **Comissão Nacional de Aprovisionamento** Av. de Balide, Património do Estado, Díli, Timor-Leste	Para fins de **apresentação de propostas** apenas, o endereço do Contratante é: **CAIXA DE CONCURSO** **Comissão Nacional de Aprovisionamento** **Av. de Balide, Património do Estado** O prazo para a apresentação de propostas é: Data: **10 de Fevereiro de 2025** Hora: **15:00 horas, hora local** Local: **Comissão Nacional de Aprovisionamento** Av. de Balide, Património do Estado, Díli, Timor-Leste
2.	Secção 2: Ficha Técnica da Proposta IAC-FTP 25.1 Pág. n.º 5 Volume 1: Caderno de Encargos	A abertura de Propostas Técnicas terá lugar na: **Comissão Nacional de Aprovisionamento** **Av. de Balide, Património do Estado, Díli, Timor-Leste** Data: **3 de Fevereiro de 2025** Hora: **15:00 horas, hora local** **(imediatamente após a submissão).**	A abertura de Propostas Técnicas terá lugar na: **Comissão Nacional de Aprovisionamento** **Av. de Balide, Património do Estado, Díli, Timor-Leste** Data: **10 de Fevereiro de 2025** Hora: **15:00 horas, hora local** **(imediatamente após a submissão).**

Hermingardo Albano Soares
Diretor-Executivo, Comissão Nacional de Aprovisionamento (CNA)

ROAD UPGRADING AND MAINTENANCE OF LAUTEM – COM SECTION STA. 182+040 – 201+800 (19.760KM), LAUTEM MUNICIPALITY
Tender/175/MOP-2024

ADDENDUM NO. 4
Date: 27 January 2025

This Addendum No.4 is issued to amend following items in the Bidding Document in accordance with ITB 8.1 of the Bidding Documents (Section I).

Item	Section/Clause/ Page No. of Bidding Documents	As is the Original Bidding Document	As amended in the Addendum No. 4
1.	Section 2: Bid Data Sheet ITB-BDS 22.1 Page no. 34 Volume 1 – Bidding Document	For **bid submission purposes** only, the Employer's address is: **TENDER BOX** **National Procurement Commission** **Rua de Balide, Patrimonio Estado** The deadline for bid submission is: Date: **03 February 2025** Time: **15:00 hours local time** Place: **National Procurement Commission** Rua De Balide, Patrimonio Estado, Dili, Timor-Leste	For **bid submission purposes** only, the Employer's address is: **TENDER BOX** **National Procurement Commission** **Rua de Balide, Patrimonio Estado** The deadline for bid submission is: Date: **10 February 2025** Time: **15:00 hours local time** Place: **National Procurement Commission** Rua De Balide, Patrimonio Estado, Dili, Timor-Leste
2.	Section 2: Bid Data Sheet ITB-BDS 25.1 Page no. 35 Volume 1 – Bidding Document	The opening of the Technical Bid shall take place at: **National Procurement Commission** **Rua de Balide, Patrimonio de Estado, Dili, Timor-Leste** Date: **03 February 2025** Time: **15:00 hours local time** **(immediately after submission)**	The opening of the Technical Bid shall take place at: **National Procurement Commission** **Rua de Balide, Patrimonio de Estado, Dili, Timor-Leste** Date: **10 February 2025** Time: **15:00 hours local time** **(immediately after submission)**

Hermingardo Albano Soares
Executive Director of National Procurement Commission (NPC)

MINISTÉRIO DO PLANEAMENTO
E INVESTIMENTO ESTRATÉGICO
IX GOVERNO CONSTITUCIONAL

CNA
Comissão Nacional de Aprovisionamento

ROAD UPGRADING AND MAINTENANCE OF LAUTEM – COM SECTION STA. 182+040 – 201+800 (19.760KM), LAUTEM MUNICIPALITY

TENDER/175/MOP-2024

23 January 2025

Clarification No.4

S.N.	Questions/Queries	Answers/ Responses
1.	On Bill of Quantities, Pay Item 104.3(c) Construction of Combined Field Office, Laboratory and Living Quarters building for the Engineer l.s.; and 104.3(c) provide, operate and maintain Communication Equipment for the Engineer mo. Are they the same Item?	Please refer to APPENDIX-1, Page 3-4 Under Pay Item 104.3(c) includes the cost of Construction of Combined Field Office, Laboratory and Living Quarters building for the Engineer on lump-sum basis except cell phone(s), provision, operation and maintenance cost While in Pay Item 104.6. Provide, Operate and Maintain Communication Equipment for the refers to cellphone under Item 104.3(c) on monthly basis.
2.	On Bill of Quantities, Pay Item 506(1) Structural Concrete for RCBC and Minor Structure cu.m; but on APPENDIX-1 page 18 Pay Item 506(1)b Structural Concrete Class A, (Bridge Structures, fc'= 21.0 Mpa. Or which one?	The Quantities Refers in BoQ is Structural Concrete Class A
3.	On Bill of Quantities, Pay Item 603(3)c-1 Catch Basin, 1-1020mm diameter each.; but on APPENDIX-1 page 21 Pay Item 603(3)c-1 Catch Basin, 1-1070mm diameter RCPC Concrete Type. Each.?	Please correct the numbering in the Bill of Quantities from Pay Item 603(3)c-1 to 1070 mm diameter RCPC Concrete type. Refer to Addendum No.3
4.	On Bill of Quantities, Pay Item 704(3) Metal Guardrail (Metal Beam) including Concrete Posts l.m. and Pay Item 704(3) Metal Guardrail End Piece each; but on APPENDIX-1 page 25 Pay Item 704(3)a Metal Guardrail (Metal Beam) including Concrete Posts l.m and Pay Item 704(3)b Metal Guardrail End Piece each.?	Please correct the numbering in the Bill of Quantities accordingly to APPENDIX-1 in Addendum no. 2. Refer to Addendum No.3

S.N.	Questions/Queries	Answers/ Responses
5.	On Bill of Quantities, Pay Item 706(2) Regulatory Signs (R1-1) and Pay Item 706(2) Regulatory Signs (R2-1); but on APPENDIX-1 page 26. Pay Item706(2)a Regulatory Signs (R1-1) and Pay Item 706(2)b Regulatory Signs (R1-2) or Pay Item 706(2)c Regulatory Signs (R2-1) which one?	Please correct the numbering in the Bill of Quantities accordingly to APPENDIX-1 in Addendum no.2. Refer to Addendum No.3
6.	On Bill of Quantities, Pay Item 710 Reflectorized Thermoplastic Pavement Markings (White) Sq.m. and Pay Item 710 Reflectorized Thermoplastic Pavement Markings (Yellow) Sq.m.; but on APPENDIX-1 page 27. Pay Item 710(1)a Reflectorized Thermoplastic Pavement Markings (White) Sq.m. and Pay Item 710(1)b Reflectorized Thermoplastic Pavement Markings (Yellow) Sq.m.?	Please correct the numbering in the Bill of Quantities accordingly to APPENDIX-1 in Addendum no. 2, page 27. Pay Item 710(1)a Reflectorized Thermoplastic Pavement Markings (White) Sq.m. and Pay Item 710(1)b Reflectorized Thermoplastic Pavement Markings (Yellow) Sq.m. Refer to Addendum No.3
7.	On Bill of Quantities, Pay Item SPL 1001(3) DW302 Fine Aggregate for Concrete work cu.m.: but on APPENDIX-1 page 55 Pay Item DW302 Fine Aggregate for Masonry works m3.?	Please follow the BoQ
8.	DED Drawings H- Facilities for the Engineer (H-04) 1. Schedule of Doors and Windows. Quantity is not in accordance with the Plan (H-02) and (H-03)?	Please follow the drawings.

Hermingardo Albano Soares
Executive Director of National Procurement Commission (NPC)

ROAD UPGRADING AND MAINTENANCE OF LAUTEM – COM SECTION STA. 182+040 – 201+800 (19.760KM), LAUTEM MUNICIPALITY
Tender/175/MOP-2024
ADDENDUM NO. 3
Date: 23 January 2025

This Addendum No.3 is issued to amend following items in the Bidding Document in accordance with ITB 8.1 of the Bidding Documents (Section I).

Item	Section/Clause/Page No. of Bidding Documents	As is the Addendum no. 2	As amended in the Addendum No. 3
1.	Volume 2 – Bill of Quantities	New Bill of Quantities BOQ -Tender-175-MOP-2024 New	Revised Bill of Quantities is attached. BOQ - Tender-175-MOP-2024 New (Revised)

Hermingardo Albano Soares
Executive Director of National Procurement Commission (NPC)

SUMMARY BILL OF QUANTITIES

PROJECT NAME: ROAD UPGRADING AND MAINTENANCE OF LAUTEM – COM SECTION STA. 182+040 – 201+800 (19.760KM), LOSPALOS MUNICIPALITY (TENDER/175/MOP-2024)
LOCATION: LOSPALOS, TIMOR-LESTE

Pay Item	DESCRIPTION	TOTAL AMOUNT (US$)
100	GENERAL REQUIREMENTS	-
200	EARTHWORKS	-
300	SUBBASE AND BASE COURSE	-
400	SURFACE COURSES	-
600	DRAINAGE AND SLOPE PROTECTION STRUCTURES	-
700	MISCELLANEOUS	-
800	BIO-ENGINEERING WORKS	-
DW	DAYWORKS	-
A	**TOTAL FOR UPGRADING WORKS**	**-**
PBM	PERFORMANCE BASED MAINTENANCE	-
B	**TOTAL FOR COMPETITIVE COMPONENT (A+PBM)**	**-**
PS	PROVISIONAL SUMS (UTILITIES)	275,000.00
CON	CONTINGENCY	500,000.00
C	**TOTAL FOR NON-COMPETITIVE COMPONENT (PS+CON)**	**775,000.00**
	TOTAL CONSTRUCTION COST	

TOTAL CONSTRUCTION COST IN WORDS (US$_____

_____

_____

Date: _____

Signature: _____

Printed Name of Authorized Signatory: _____

Designation: _____

Company Name: _____

BILL OF QUANTITIES

PROJECT NAME: ROAD UPGRADING AND MAINTENANCE OF LAUTEM – COM SECTION STA. 182+040 – 201+800 (19.760KM), LOSPALOS MUNICIPALITY (TENDER/175/MOP-2024)
LOCATION: LOSPALOS, TIMOR-LESTE

Pay Item	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE (US$)	TOTAL AMOUNT (US$)
100	**GENERAL REQUIREMENTS**				
102	Mobilization	l.s.	1.00		$ -
102.1.4	Demobilization	l.s.	1.00		$ -
104.3(a)	Provision of Temporary Office and Laboratory for the Engineer (Rental Basis)	mo.	3.00		$ -
104.3(b)	Provision of Temporary Living Quarters for the Engineer (Rental Basis)	mo.	3.00		$ -
104.3(c)	Construction of Combined Field Office, Laboratory and Living Quarters Building for the Engineer	l.s.	1.00		$ -
104(4)	Operation and Maintenance of the combined Field Office, Laboratory Building and Living Quarters Building for the Engineer (Schedule D, E & F)	mo.	24.00		$ -
104(5)	Provision of Furniture, Fixtures Equipment and Appliances for Field Office and Living Quartersfor the Engineer (Schedule A & B)	l.s.	1.00		$ -
104.6	Provide, Operate and Maintain Communication Equipment for the Engineer	mo.	24.00		$ -
105	Provide, Operate and Maintain 3 Units Vehicles for the Engineer	l.s.	1.00		$ -
106	Furnishing Laboratory Testing Apparatus and Publication (schedule C)	l.s.	1.00		$ -
109	Provision, Operation and Maintenance of Survey Instrument/Equipment for the Engineer (Survey, Shop Drawing and Asbuilt Drawing (Schedule H)	l.s.	1.00		$ -
109(1)	Assistance to the Engineer, Survey Personnel (Schedule G)	mo.	24.00		$ -
112.4	Provision of Progress Photographs	mo.	24.00		$ -
112.5	Project Signboards	each	2.00		$ -
112.6	Project Plaque	each	1.00		$ -
112.7	Preparation and Implementation of STI and HIV/AIDS Prevention Program	l.s.	1.00		$ -
112.8	Transfer of Technical Skills and Knowledge	man-mo.	180.00		$ -
114	Enviromental Safeguard	l.s.	1.00		$ -
	TOTAL FOR SECTION 100				**$ -**
200	**EARTHWORKS**				
201(1)	Clearing and Grubbing	ha.	19.00		$ -
201(3)	Individual Removal of Trees, (150 mm - 900 mm diameter)	each	138.00		$ -
202.5(a)	Removal of existing Box Culvert, 3 x 1.5m or below	l.m	9.00		$ -
202.5(b)	Removal of existing Box Culvert, size above 3 x 1.5m	l.m	8.00		$ -
202(2)	Removal of Existing Kilometer Post	each	20.00		$ -
202(4)	Removal of Existing Pipe, 760mm dia. or below	l.m	98.00		$ -
202(4)	Removal of Existing Pipe, 910mm dia. or above	l.m	83.00		$ -
202(4)	Removal of Existing Lined Ditch	l.m	4,282.00		$ -
202(4)	Removal of Existing Corrugated Metal Culvert	l.m	140.00		$ -
202.5(c)	Removal of Existing Stone Masonry Retaining Wall, 3m high or below	l.m	1,520.00		$ -
203(1)	Unsuitable Excavation	cu.m	5,605.00		$ -
204(1)	Structure Excavation (Common Material)	cu.m	6,625.00		$ -
204(3)	Foundation Fill (Granular Materials)	cu.m	84.00		$ -
204(6)	Pipe Culverts and Drain Excavation	cu.m	1,522.00		$ -
205(1)	Embankment from Roadway Excavation, Common Material	cu.m	10,414.00		$ -
205.5	Embankment from Borrow Excavation	cu.m	64,380.00		$ -
206(1)	Subgrade preparation (Common Material)	sq.m	23,826.00		$ -
SPL 207	Breaking/Cracking of Existing Asphalt Pavement	sq.m	92,468.00		$ -
	TOTAL FOR SECTION 200				**$ -**

300	**SUBBASE AND BASE COURSE**				
301	Aggregate Subbase Course	cu.m	44,720.00		$ -
303	Crushed Aggregate Base Course	cu.m	27,018.00		$ -
	TOTAL FOR SECTION 300				**$ -**
400	**SURFACE COURSES**				
402	Bituminous Prime Coat using MC- Cut back Asphalt	sq.m	128,044.00		$ -
411(3a)	Bituminous Concrete Wearing Course Hot Laid, 50mm thick	sq.m	128,044.00		$ -
	TOTAL FOR SECTION 400				**$ -**
600	**DRAINAGE AND SLOPE PROTECTION STRUCTURES**				
505	Reinforcing Steel , Grade 40	kg	252,929.00		$ -
506(1)	Structural Concrete for RCBC and Minor Structures	cu.m	1,491.00		$ -
506(6)	Lean Concrete	cu.m	203.00		$ -
601(1)b	Reinforced Concrete Pipe Culvert, 910mm diameter	l.m	73.00		$ -
601(1)c-1	Reinforced Concrete Pipe Culvert, 1070mm diameter	l.m	14.00		$ -
601(1)d-1	Reinforced Concrete Pipe Culvert, 1220mm diameter	l.m	152.00		$ -
601(1)e-1	Reinforced Concrete Pipe Culvert, 1520mm diameter	l.m	38.00		$ -
603(3)b-1	Catch Basin, 1-910mm diameter	each	1.00		$ -
603(3)c-1	Catch Basin, 1-1070mm diameter	each	1.00		$ -
603(3)e-1	Catch Basin, 1-1520mm diameter	each	1.00		$ -
603(3)d-2	Catch Basin, 2-1220mm diameter	each	1.00		$ -
604	Cleaning and Reconditioning of Existing Lined Ditch	l.m	1,518.00		$ -
605(5)	Grouted Riprap, Class A	cu.m	1,313.00		$ -
606	Stone Masonry	cu.m	10,931.00		$ -
610(1)a	Gabions, 2000mmx1000mmx1000mm	cu.m	828.00		$ -
610(1)b	Gabions, 2000mmx1000mmx500mm	cu.m	55.00		$ -
	TOTAL FOR SECTION 600				**$ -**
700	**MISCELLANEOUS**				
703.2	Maintenance Marker Post (for RCPC and RCBC)	each	80.00		$ -
703.3	Kilometer Posts	each	19.00		$ -
704(3) a	Metal Guardrail(Metal Beam) including Concrete Posts	l.m	1,032.00		$ -
704(3) b	Metal Guardrail End Piece	each	51.00		$ -
706(1)	Warning signs	each	43.00		$ -
706(2) a	Regulatory signs (R1-1)	each	14.00		$ -
706(2) c	Regulatory signs (R2-1)	each	36.00		$ -
706(3)	Informatory Signs	each	2.00		$ -
706(4)	Chevron Signs (Curve Section)	each	56.00		$ -
710(1) a	Reflectorized Thermoplastic Pavement Marking, White	sq.m	4,423.00		$ -
710(1) b	Reflectorized Thermoplastic Pavement Marking, Yellow	sq.m	1,488.00		$ -
SPL 712	Reflectorized Thermoplastic Rumble Strips	sq.m	378.00		$ -
	TOTAL FOR SECTION 700				**$ -**
800	**BIO-ENGINEERING WORKS**				
SPL 809	Brushlayering Work of Hardwood Cuttings	l.m	16,720.00		$ -
SPL 810	Turfing of Sods	sq.m	12,330.00		$ -
SPL 811(a)	Grass Planting in Contour Lines	m	17,180.00		$ -
SPL 815	Site Protection	man-day	1,640.00		$ -
	TOTAL FOR SECTION 800				**$ -**
DW	**DAYWORKS**				
SPL 1001(1)	**SCHEDULE OF DAYWORK RATES (LABOUR)**				

DW101	Foreman	hr.	496.00		$ -
DW102	Skilled Labour	hr.	1,920.00		$ -
DW103	Unskilled Labour	hr.	1,120.00		$ -
DW104	Operator, Heavy Equipment	hr.	800.00		$ -
DW105	Operator, Light Equipment	hr.	720.00		$ -
DW106	Driver, Heavy duty vehicle	hr.	960.00		$ -
DW107	Driver, Light duty vehicle	hr.	496.00		$ -
DW108	Electtrician	hr.	480.00		$ -
	Sub-Total DW				**$ -**
SPL 1001(2)	**SCHEDULE OF DAYWORK RATES (EQUIPMENT)**				
DW201	Wheel Loader, 1.8 cu.m. bucket capacity, 160hp	hr.	240.00		$ -
DW202	Motor Grader, 160 hp	hr.	80.00		$ -
DW203	Backhoe/Excavator 100 hp	hr.	240.00		$ -
DW204	Low Bed Trailer and Truck, 45 t capacity	hr.	240.00		$ -
DW205	Vibrating Roller Single Smooth Drum, 10t, 150ph	hr.	240.00		$ -
DW206	Portable air compressor	hr.	240.00		$ -
DW207	Plate Compactor, vibrating, 15hp	hr.	240.00		$ -
DW208	Water Pump, 100 mm diameter	hr.	240.00		$ -
DW209	Water Truck with pump. 4500liters with spray	hr.	240.00		$ -
DW210	Dump Truck 6-7 cu. m capacity	hr.	480.00		$ -
DW211	Generator Set, 50 KVA	hr.	480.00		$ -
	Sub-Total SPL DW-E				**$ -**
SPL 1001(3)	**SCHEDULE OF DAYWORK RATES (MATERIAL)**				
DW301	Aggregate Subbase Course	cu.m	300.00		$ -
DW302	Fine Aggregate for concrete work	cu.m	288.00		$ -
DW303	Boulders	cu.m	720.00		$ -
DW304	Portland Cement, 40 kg	Zak	5,184.00		$ -
DW305	Diesel	ltr	19,560.00		$ -
DW306	Petrol	ltr	360.00		$ -
	Sub-Total DW-M				**$ -**
	TOTAL FOR DW				**$ -**
	TOTAL FOR UPGRADING WORKS				
PBM	**PERFORMANCE BASED MAINTENANCE**				
SPL 1003(1)	**Performance Based Maintenance for Year 1**	KM.-Mo	237.12		
SPL 1003(2)	**Performance Based Maintenance for Year 2**	KM.-Mo	237.12		
	TOTALFOR PBM				
	TOTAL FOR COMPETITIVE COMPONENT				
PS	**PROVISIONAL SUMS**				
SPL 1000(1)	Removal and Reinstallation of Water Line Utilities	PS	1.00		
SPL 1000(2)	Removal and Relocation of Existing Electrical Utilities	PS	1.00		
	TOTAL FOR PS				
CON	**CONTINGENCIES**	PS	1.00		
	TOTAL FOR NON-COMPETITIVE COMPONENT				

Date: _____
Signature: _____
Printed Name of Authorized Signatory: _____
Designation: _____
Company Name: _____

ROAD UPGRADING AND MAINTENANCE OF LAUTEM – COM SECTION STA. 182+040 – 201+800 (19.760KM), LAUTEM MUNICIPALITY

TENDER/175/MOP-2024

20 January, 2025

Clarification No.3

S.N.	Questions/Queries	Answers/ Responses
1.	Based on the bidding project, the construction duration of this project is 540 days, which means 18 months. However, it's 24 months for the maintenance of engineering facilities according to Chapter 100, General Requirements. So, we want to know if the final construction is 24 months or 18 months? Also, should we revise the construction period in the tender document to be the same as the BOQ?	Please refer to Addendum no. 2.
2.	Please inform the type of contract for this project whether unit price or ad-measurement or Lump sum basis.	Unit Price.
3.	Is there any limitation of working hour per day?	Please refer to PCC 6.5. "Normal working hours is Eight (8) hours/day The Contractor may work on public holidays subject to approval of the Engineer."
4.	If we bring some resources (material, equipment & labor) from Indonesia, please explain the rules or regulations of taxation that we have to follow	Please refer to ITB-BDS 14.7. All duties, taxes, and other levies payable by the Contractor under the Contract, shall be included in the rates and prices and the total Bid Price submitted by the Bidder. **Information on the tax obligations in the Employer's Country can be found at http://www.mof.gov.tl.**
5.	Please inform the layout of location for contractor facilities	Please follow the Specifications.
6.	Please inform the location of disposal area for unsuitable materials	The contractor will find the location of disposal area with due consultation with owner-MPW.

S.N.	Questions/Queries	Answers/ Responses
7.	Please explain the compressive strength of Structural Concrete for RCBC and Minor Structures, Item 506(1) a.2.	Please refer to Addendum no. 2.
8.	Are there any rock excavations? Please explain	Please see the Bill of Quantities
9.	Are there any public utilities that have to be relocated such as electricity poles or water pipe? If true who is responsible to relocation the utilities? (SPL 1000 (1) & SPL 1000 (2))	This is covered under provisional-sum. The provisional sum can be utilized by the prior approval of Owner-MPW.
10.	According to the BOQ, the quantity of Item SPL 207: Breaking/cracking existing Asphalt Pavement is 92468 m2 which is 15km long if the width of the road is 6 m wide. Is this true that we have to break almost all of the existing Asphalt pavement? Or could we spread the sub base and base course on top of the existing asphalt pavement?	Please refer to Addendum no. 2.
11.	Do I have to show/assign profit & overhead inside of each item in the Unit price analysis or I could show/assign them only on the summary	Please follow exactly the Summary BoQ without any change.
12.	Where is the specification for these items? Please inform us the details for these items below: SPL 207 – Breaking/Cracking of Existing Asphalt Pavement SPL 809 – Brush layering Work of Hardwood Cuttings SPL 810 – Turfing of Sods SPL 811a – Grass Planting in Contour Lines SPL 815 – Site Protection	The specification for these items is issued along the Addendum no.2. Please refer to Addendum no.2.
13.	Please inform us the details about Performance Based Maintenance SPL 1003 (1) Performance Based Maintenance for Year 1 SPL 1003 (2) Performance Based Maintenance for Year 2	Please refer to Addendum no. 2.

S.N.	Questions/Queries	Answers/ Responses
15.	Please give us more details for these items: 104 (1) - Provision of Temporary Office and Laboratory for the Engineer (Rental Basis) (Specification of the area in m2 of the facility) 104 (2) - Provision of Temporary Living Quarters for the Engineer (Rental Basis) (Specification of the area in m2 of the facility) 104 (6) - Provide, Operate and Maintain Communication Equipment for the Engineer (Specification for the Communication Equipment) 105 - Provide, Operate and Maintain 3 Units Vehicles for the Engineer (Specification for vehicle) 104 (5) - Provision of Furniture, Fixtures Equipment and Appliances for Field Office and Living Quarters for the Engineer (Schedule A & B) (Specification for the furnitures, etc) 109 - Provision, Operation and Maintenance of Survey Instrument/Equipment for the Engineer (Survey, Shop Drawing and Asbuilt Drawing (Schedule H)	Please refer to Addendum no. 1 and Addendum no. 2.
16.	For this project how is the Term of Payment?	Please refer to Addendum no. 2.
17.	In the Bill of Quantity there are Performance Based Maintenance items for year 1 and year 2. When will the Performance Based maintenance be started? Whether after the Defect Notification Period has finished or started after Notice to Proceed? How is the Term of Payment regarding the Performance Based Maintenance? Please explain	PBM will start after DNP period. Please refer to Addendum No.2 for further detail.
18.	Please explain regarding duration of contract? 540 days from Notice to Proceed? Or 540 days plus 2 years for Performance Based maintenance hence the total duration become 540 +365+365 = 1270 days?	Refer to the Addendum No.2

S.N.	Questions/Queries	Answers/ Responses
	maintenance hence the total duration become 540 +365+365 = 1270 days?	
19.	Please explain regarding the duration of these items in the BOQ. The duration of the project is 540 days which is 18 months but these items below durations are 24 months in the BOQ, please explain further. 104 (4) - Operation and Maintenance of the combined Field Office, Laboratory Building and Living Quarters Building for the Engineer (Schedule D, E & F) 104 (6) - Provide, Operate and Maintain Communication Equipment for the Engineer 109 (1) - Assistance to the Engineer, Survey Personnel (Schedule G) 101.4 - Provision of Progress Photographs	Please refer to Addendum no.2.
20.	In the Standard Bidding Document Section 2: Bid Data Sheet it is mentioned that the Contract Agreement, Letter of Acceptance and Bill of Quantities has to be translated to either English, Portuguese or Tetum. Is it mandatory to translate all of these documents? or we could only translate the Contract Agreement and Letter of Acceptance because the Bill of Quantities has so many pages.	Yes, it is mandatory to translate Contract Agreement, Letter of Acceptance and Bill of Quantities.
21.	For contract experience with the same size and Nature, can Construction Experience in Main Activities use road widening contract experience? (Section 3)	Yes. Please refer to Section 3. The similarity of the contracts shall be based on Section 6, Works' Requirements and Scope of Works, specify the minimum key requirements in terms of physical size, complexity, construction method, technology and/or other characteristics.
22.	If the Contract Similar Size and Nature, where the Construction Experience in Key Activities does not match the minimum construction experience, can it be disqualified? (Section 3)	No, but bidder will get less technical score.

S.N.	Questions/Queries	Answers/ Responses
	is 75 Points. If the contractor cannot fulfill one of the criteria requirements, is it only a point reduction or is it even disqualified? (Section 3)	
25.	Is the Site Visit of TENDER/175/MOP-2024 mandatory to attend on 10:00 January 15,2025	Yes. Please refer to ITB-BDS 7.2.
26.	With the regards to bid Security, it usually takes nearly one month for a bank to issue a security to open by airmail. As you know, Chinese New Year is coming at the end of this month, we will have an eight-day public holiday which makes no enough time to work on the security by the deadline. May I ask if you accept a bank security to open by cable? In that case, we need to provide your account information to the bank.	For the bid submission, the bidder may submit the copy of the bid security.
27.	We kindly ask the NPC team to consider granting us a two-week extension to ensure a thorough and accurate bid submission.	There is no time extension for bid submission

Hermingardo Albano Soares
Executive Director of National Procurement Commission (NPC)

ROAD UPGRADING AND MAINTENANCE OF LAUTEM – COM SECTION STA. 182+040 – 201+800 (19.760KM), LAUTEM MUNICIPALITY
Tender/175/MOP-2024
ADDENDUM NO. 2
Date: 20 January 2025

This Addendum No.2 is issued to amend following items in the Bidding Documents in accordance with ITB 8.1 of the Bidding Documents (Section I).

Item	Section/Clause/ Page No. of Bidding Documents	As is the Original Bidding Documents						As amended in the Addendum No. 2						
1.	Volume 1 – Bidding Document Section 3: Evaluation and Qualification Criteria Page: 45	**Criteria**	**Compliance Requirements**				**Documents**	**Weight**	**Criteria**	**Compliance Requirements**				**Documents**	**Weight**
		Requirement	**Single Entity**	**Joint Venture**			**Submission Requirements**		**Requirement**	**Single Entity**	**Joint Venture**			**Submission Requirements**	
				All Partners Combined	**Each Partner**	**One Partner**					**All Partners Combined**	**Each Partner**	**One Partner**		
		Financial Resources							**Financial Resources**						
		The Bidder must demonstrate that its financial resources defined in FIN	Must meet requirement	Not applicable	Not applicable	Not applicable	Form FIN – 3 and Form FIN – 4 with	10	The Bidder must demonstrate that its financial resources defined in FIN - 3, less its financial	Must meet requirement	**Must meet requirement**	**Must meet 25% of the requirement**	**Must meet 40% of the requirement**	Form FIN – 3 and Form FIN – 4 with attachments	10

Item	Section/Clause/ Page No. of Bidding Documents	As is the Original Bidding Documents	As amended in the Addendum No. 2
		- 3, less its financial obligations for its current contract commitments defined in FIN - 4, meet or exceed the total requirement for the Subject Contract of US**$2,200,000.00** attachments	obligations for its current contract commitments defined in FIN - 4, meet or exceed the total requirement for the Subject Contract of **US$2,200,000.00**
2.	Volume 1 – Bidding Document Section 8: Particular Conditions of Contract Sub-Clause: 1.1.84	Time for Completion **540 days** from Notice to Proceed.	Time for Completion **730 days** from Notice to Proceed.
3.	Volume 1 – Bidding Document Section 8:	Time for access to the Site The right of access to and possession of the site shall be given within **six months.**	Time for access to the Site The right of access to and possession of the site shall be given within **90 days.**

<table>
<tr><th>Item</th><th>Section/Clause/ Page No. of Bidding Documents</th><th>As is the Original Bidding Documents</th><th>As amended in the Addendum No. 2</th></tr>
<tr><td></td><td>Particular Conditions of Contract

Sub-Clause: 2.1</td><td></td><td></td></tr>
<tr><td>4.</td><td>Volume 1 – Bidding Document

Section 8: Particular Conditions of Contract Sub-Clause: 14.6.2.</td><td>Minimum Amount of Interim Payment Certificates

“No minimum amount applies”</td><td>Minimum Amount of Interim Payment Certificates

Five Percent (5%) of the Accepted Contract Amount.</td></tr>
<tr><td>5.</td><td>Volume 3 - TECHNICAL SPECIFICATIO N

Section 6: Employer’s Requirements (ERQ) Part I REQUIREMEN TS</td><td></td><td>Project Information

This Bidding Documents are specifically intended for the procurement of Road Rehabilitation between Com, Lautem and Lospalos in Lautem Municipality, an approximate length of 19.76 kms.

Scope of Works:

The work will comprise of one (1) section, each with one (1) as follows:

1. Section 1 – Com to Lautem (19.76 km)
(i) Road rehabilitation for seven hundred and thirty (730) days, and
(ii) Performance Based Maintenance Works of 730 days after the 365 days Defects Notification Period for the Road Rehabilitation Works

<table><tr><th>Section</th><th>Periods</th></tr></table></td></tr>
</table>

Item	Section/Clause/ Page No. of Bidding Documents	As is the Original Bidding Documents	As amended in the Addendum No. 2

	Road Rehabilitation	Defects Notification Period	Performance Based Maintenance Works
Section 1 Com to Lautem	730 days	365 days	730 days

Definitions:

"Road Rehabilitation" means the Works consisting of activities needed to construct the Road to achieve the performance standards defined by service levels.

The Works are to be carried out strictly in accordance with the Drawings, Specifications, Special Provisions and the Bill of Quantities. It involves but not limited to the following:

(a) Provision of facilities for the Engineer;

(b) Implementation of Environmental Management Plan;

(c) Preparation and Implementation of STI and HIV-AIDS Prevention Program; and

(d) Construction of main activities such as:

(i) removal and disposal of asphalt pavement

(ii) excavation, all types

(iii) embankment from roadway excavation, (common, soft rock, hard rock)

(iv) sub-grade preparation

(v) aggregate subbase course

(vi) crushed aggregate base course

Item	Section/Clause/ Page No. of Bidding Documents	As is the Original Bidding Documents	As amended in the Addendum No. 2
			(vii) bituminous concrete course hot-laid (viii) Portland concrete cement pavement (ix) RCC pipe culverts, all types (x) catch basins, all types (xi) stone masonry works on retaining walls, grouted riprap, gabions, etc. (xii) concrete blocks (xiii) rubble mound (xiv) metal guard rails (xv) guide posts (xvi) road safety markings (xvii) road signs (xviii) bio-engineering works **"Routine Maintenance"** means all interventions on the Roads which are to be carried out by the contractor in order to achieve and keep the Road performance standards defined by the Service Level included in the Specifications of the Bidding Documents, and all activities related to the management and evaluation of the road network under contract. During the One (1) year Defects Notification Period (DNP), Routine Maintenance activities are to be performed by the Contractor. Any defect that may occur during this period shall be corrected by the Contractor at his own cost except for causes due to natural occurrences. Works attributed to natural occurrences are as follows: (a) Drainage Cleaning (b) Vegetation Control All other maintenance activities are covered by the Defects Notification

Item	Section/Clause/ Page No. of Bidding Documents	As is the Original Bidding Documents	As amended in the Addendum No. 2
			Period The Defects Notification Period covers the remedying of any defect or damage to the pavement and other permanent structures attributable to the contractor. This is not paid for separately but shall be at the risk and cost of the Contractor as warranty of the permanent works. Services covered by the DNP include: (a) pavement repairs such as potholes, cracks, and edge repair (b) shoulder repairs such as potholes, machine grading, correction of inverted shoulder and re-gravelling (c) repair of ditches, culverts and drains (d) repair of bridge approaches During the DNP, routine maintenance works shall be performed by the Contractor. Works necessitated by natural occurrences shall be paid using Dayworks rates quoted by the Bidder in Price Bid of these Bidding Documents. **"Performance Based Maintenance"** is designed to increase the efficiency and effectiveness of the road maintenance operations. It should ensure that the physical condition of the roads under contract is adequate for the need of road users over the entire period of contract. It significantly expands the role of the private sector in the maintenance of road assets from simple execution of works to its management and conservation. Under the Performance Based Road Maintenance Works component, the services to be provided by the Contractor include: (a) Health and safety management; (b) Establishment and maintenance of Self Control Unit (c) Maintenance of main activities such as: (i) cleaning of carriageway surface

Item	Section/Clause/ Page No. of Bidding Documents	As is the Original Bidding Documents	As amended in the Addendum No. 2
			(ii) up-keep of roadside slopes (iii) cutting of branches of trees and bushes (iv) cutting of grass/vegetation within clearway (v) up-keep of traffic and information signs (vi) up-keep kilometer posts and guide posts (vii) repainting of road markings (viii) cleaning of ditches, culverts and drains (ix) cleaning of culverts (pipe and box) (x) up-keep of bridge super structure (xi) up-keep of bridge decks (xii) repainting of bridge (xiii) clearing of waterway For the monthly Performance Base0d Maintenance payment, all parts of the road facility shall be evaluated for non-compliance with performance standards and service levels regardless of the nature of defect or damage. For the **Emergency Works** component, the Contractor shall remedy those locations damaged by natural occurrences, caused traffic closure or poses danger to public for the entire duration of the contract (from Commencement date to issue of Performance Certificate) including any time extension that may be incurred and approved by the Engineer. If Emergency Works clearly caused by "unforeseen Natural Phenomena" or damages to road furniture caused by road accidents, vandalism or theft, the Contractor may make a formal request to the Project Manager to carry out Emergency Works designed specifically to remedy those damages. If the Contractor decides to make a request for Emergency Works, he must: (a) immediately inform the Project Manager of his intention to do so,

Item	Section/Clause/ Page No. of Bidding Documents	As is the Original Bidding Documents	As amended in the Addendum No. 2
			by telephone, radio and other means, (b) document the circumstances of the event and the damages caused, through photographs, video and other suitable means, (c) prepare a written request, stating the type of works he intends to carry out, their exact location and the estimated quantities and costs, including photographic documentation. In any case, a request for Emergency Works must be made immediately after the Contractor gains knowledge of the existence of damages caused by "unforeseen Natural Phenomena".
6.	Volume 3 - TECHNICAL SPECIFICATION Section 6: Employer's Requirements (ERQ) Part I REQUIREMENTS		Specifications for SPL is attached as APPENDIX-1. - Special Specification (Road Rehabilitation Works) - Special Specification (Performance Based Maintenance Works)

<table>
<tr><th>Item</th><th>Section/Clause/ Page No. of Bidding Documents</th><th>As is the Original Bidding Documents</th><th>As amended in the Addendum No. 2</th></tr>
<tr><td>7.</td><td>Volume 3 - TECHNICAL SPECIFICATION

Section 6: Employer's Requirements (ERQ)
Part I
REQUIREMENTS</td><td></td><td>For SPL 207: Breaking/Cracking of Existing Asphalt Pavement please refer to ITEM 202 – Removal of Structures and Obstructions.</td></tr>
<tr><td>8.</td><td>Volume 3 - TECHNICAL SPECIFICATION

Section 6: Employer's Requirements (ERQ)
Part I
REQUIREMENTS</td><td>Item 402 – Bituminous Prime Coat
<table><tr><th>Pay Item number</th><th>Description</th><th>Unit of Measurement</th></tr><tr><td>402</td><td>Prime Coat</td><td>Liter</td></tr></table></td><td>Item 402 – Bituminous Prime Coat
<table><tr><th>Pay Item number</th><th>Description</th><th>Unit of Measurement</th></tr><tr><td>402</td><td>Prime Coat</td><td>Sq.m.</td></tr></table></td></tr>
</table>

Hermingardo Albano Soares
Executive Director of National Procurement Commission (NPC)

Appendix – 1: Specifications – SPL

APPENDIX – 1

SPECCIAL SPECIFICATIONS FOR ROAD REHABILITATION WORKS AND PERFORMANCE BASED MAINTENANCE

SECTION 100 - GENERAL

The following subsections on Offices and Laboratories for the Engineer of the MTCPW Standard Specifications for Roads, Bridges and Airports (2014 edition) is replaced and revised as follows:

ITEM 104 OFFICE AND ACCOMODATIONS

Add the following additional Sub-Clause(s):

104.3(a&b) Provision of Temporary Field Office, Laboratory Building and Living Quarters Building for the Engineer

The Contractor shall provide temporary office, laboratory and quarters for the exclusive use of the Engineer on rental basis for three (3) months during the construction of the permanent buildings. The temporary building shall have a minimum floor area of 340 sq.m. And the lot area shall be a minimum of 600 sq.m. With parking provision for at least six (6) vehicles. The Contractor shall first seek the Engineer's approval of the building proposed to be rented before finalizing any rental agreement. The building for the Engineer shall be supplied with potable water and electricity 24/7, all as approved by the Engineer.

In the event of Contractors default to complete and make ready for occupancy the permanent Field Office Building, Laboratory and Quarters within the three (3) month period, the Contractor will be solely responsible for the cost of extending rental, operation and maintenance of the temporary facilities until such time that the permanent facilities are occupied by the Engineer.

104.3(c) Construction of Combined Field Office and Laboratory Building, and Living Quarters Building for the Engineer

1. Engineers compound

The Contractor shall provide and maintain until final completion and acceptance of the project, one (1) unit combined Field Office and Laboratory Building and one (1) unit of Living Quarters Building for the Engineer to be erected on a designated government-owned site and hereinafter referred to as the "Engineer's Compound". The Engineer will select the area for the Engineer's buildings at the start of the construction contract.

The Engineer's Compound shall be constructed in accordance with the specifications and design shown on the Construction Drawings. The facilities shall be provided with all the necessary internet connection, electricity, potable water, drainage, sewer and security services for twenty-four (24) hours a day, for all days of the contract period, for the exclusive use of the Engineer and his staff. The Contractor shall obtain approval from the Engineer on the detailed layout of the Engineer's Compound before any work is commenced.

The Engineer's Compound shall be fenced with barbed wire (or equivalent) to a height as shown on the Drawings and with necessary gates as directed or as shown on plans. The estimated perimeter of fencing shall be determined and approved by the Engineer. When required, the ground shall be raised to a grade that will keep it completely free from flooding or to prevent inundation during rainy season. The compound shall be provided with a parking area for at least six (6) vehicles. Outside lighting around the building and parking shall be installed to the satisfaction of the Engineer and be maintained at all times. Appropriate signs shall be installed to identify the facility to public and visitors.

The building shall be ready for occupancy and use within three (3) months from the commencement of the Works. Until such time, the Contractor shall be fully responsible to provide temporary office, accommodation and laboratory for the Engineer.

In the absence of water supply system within the area, the Contractor shall, after approval of the Engineer, construct and install a three (3) cubic meters or 3,000 liter capacity elevated water tank, with two (2) horsepower deep well pump, or equivalent capacity, to sufficiently supply the requirements of the Engineer's Compound. Should there be no main electric line available, the Contractor shall also provide a generator or power generating unit with enough capacity to supply the power needed. The generator shall be housed in solid concrete bunkers to minimize the noise of the operation and shall be located remotely from the building it is servicing.

All installations, fixtures, fittings and accessories shown are to be understood as minimum requirements only and shall not restrict the Engineer from ordering the Contractor to provide supplementary provisions. In the absence of any details or specifications or provisions for the purpose of making alterations or amendments to the pay items, the Contractor shall seek approval from the Engineer.

A septic tank, as part of the facilities for the Engineer, shall be constructed as shown in the drawings. The Contractor must provide a drain field with drain tile or a leaching well with adequate capacity for the personnel and the usage of the facility for the duration of the Contract. The Contractor may propose other satisfactory methods for disposing of sanitary waste that may be implemented only after the written approval of the Engineer.
The Contractor shall first obtain approval from the Engineer on equivalent substitute for any article and such approval shall be on the condition that adjustments in prices shall be affected based on the invoice receipt(s) submitted.
At the completion of the Contract, the combined Field Office and Laboratory Building and the Living Quarters Building for the Engineer including all furniture, fixtures, equipment and appliances shall be turned-over and become property of the Government.

2. *Laboratory Staffs*

The Contractor shall provide qualified and experienced laboratory staff to carry out all the materials quality control and all the tests specified in the Contract and required by the Engineer, as indicated in SCHEDULE D. The personnel shall be subject to approval by the Engineer.

All tests shall normally be carried out on the Site, except that, certain special tests may,
subject to the approval of the Engineer, be carried out at an approved independent testing laboratory. The Contractor shall, if so approved, make all necessary arrangements for the supply and delivery of samples to, and collection of samples from such independent laboratory. Unless otherwise specified, the Contractor shall arrange for one copy of the independent testing laboratory test certificate to be delivered to the Engineer or its representative not less than three (3) days before the materials covered by the relevant test certificate are incorporated into the Works, and the test certificate shall be related to the materials from which the samples were taken. The Engineer shall define from the beginning of the Works, and in accordance with the specifications, all tests to be performed for each kind of materials and/or works, together with the corresponding frequencies to be used and amend or change such statement from time to time during the progress of work if deemed necessary.

3. Cellphones

The Contractor shall provide and maintain cellular phones of good quality, brand new, ready for use, complete with accessories including provision for pre-paid cards for the exclusive use of the Engineer.

Description	**Quantity**
Cellular Phone complete with accessories	Five (5) (For each Package)

The Contractor shall also provide prepaid call cards worth US$100.00 every month. The communication equipment shall be provided no later than thirty (30) calendar days after the Notice of Commencement of Works.

4. Facilities Maintenance

By way of maintenance, the Contractor shall provide all the necessary personnel specified under SCHEDULE D to maintain all the facilities in good operating condition, to adequately safeguard and secure the building, equipment and property day and night, and to take care of household help, all as directed and approved by the Engineer.

Pay Item No.	**Description**	**Unit of Measurement**
104.3(a)	Office and Laboratory for the Engineer (Rental Basis)	Month

104.3(b)	Provision of Temporary Living Quarters for the Engineer (Rental Basis)	Month
104.3(c)	Construction of Combined Field Office, Laboratory and Living Quarters Building for the Engineer	Lump sum

104.6 Provide, Operate and Maintain Communication Equipment for the Engineer

For details, please refer to cellphone under Item 104.3(c).

ITEM 112 CONSTRUCTION SCHEDULES

112.4 Provision of Progress Photographs

The Contractor shall provide a photographic record of the Construction Work. Such photographs shall be taken before, during and after construction on the same angle of reference and as directed by the Engineer or under the following occasions or events:

1. When a portion of the work is difficult or impossible to inspect at the time of a particular operation, where a portion will be covered by backfill, or filling materials after completion and acceptance of the work by the Engineer.

2. When or where special or unusual features of the work or latent conditions on the site are present.

When taking photographs, the Contractor is required to observe that:

1. An Indicator, such as scale, pole or similar item shall be placed thereon to signify or illustrate the relative dimensions of the pictures.
2. Each picture shall be captioned and identified as to date, location, description of the work in progress or completed operation or activity or presence of unusual features.
3. Each picture shall be properly referenced, and with same angle as it was taken before, during and after construction.
4. The picture shall be clearly discernible in color having a dimension of not less than 200 mm x 150mm.

All photographs shall be submitted at intervals of not less than one (1) month or as required, taken selectively by the Engineer, which represents the progress of the works.

The photographs selected by the Engineer, with copies furnished by the Contractor, shall be compiled in albums together with the jpeg electronic files and shall be arranged in consecutive order and in accordance with the construction program submitted to and approved by the Engineer. Each album shall show the name of the Project on the cover and shall contain a location map of the construction site.

112.5 Project Signboards

Contractor to propose a drawing giving all details of size, structure, board, location, Names of parties, logos, paint type, font details etc. For approval of Engineer/Employer. After approval of drawing, the sign board has to be erected at approved location within the mobilization period. The board shall be robust, sturdy and all weather. In case of damage, contractor shall repair and re-erect it. The sign board has to be removed after successful completion of the project.

112.6 Project Plaque

The contractor shall provide and install plaque made of brass or granite or other material with messages and logos approved by the Engineer and at the designated location.

112.7 Preparation and Implementation of STI and HIV/AIDS Prevention Program

112.7.1 General Provisions

Notwithstanding General Conditions of Contract, the Contractor shall throughout the contract, in addition to the program of construction activities, include an education and prevention program for site staff and labor and their families in respect of Sexually Transmitted Infections (STI) including HIV/AIDS.

The Contractor's program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this sub-clause and the related specifications. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation.

112.7.2 Measurement and Payment

The cost of Lump Sum covering the STI and HIV/AIDS prevention program as stipulated herein will be paid under the following item.

112.8 Transfer of Technical Skills and Knowledge

112.8.1 General

The Contractor may bring in to Timor-Leste any foreign personnel who are necessary for the execution of the Works to the extent allowed by the laws of Timor-Leste. Such foreign personnel will normally be managerial or professional staff or staff possessing particular skills that are not available in Timor-Leste. The contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and

experience from sources within Timor-Leste and to facilitate the transfer of skills and knowledge to Timor-Leste citizens.

In order to promote skills transfer and to build the capacity of Timor-Leste's workforce, the Contractor shall employ Timor-Leste citizens (the trainees) in the numbers and roles described in the Bills of Quantity to receive training, work experience and mentoring from the Contractor's own managerial, professional or skilled personnel. The specified trainees are additional to any other professional or skilled Timorese national personnel that may be employed by the Contractor and who are not trainees within the scope of this Sub-Clause.

The Employer will, with the assistance of the Secretariat of State for Vocational Training and Employment Policy, will provide the contractor with candidates for each trainee position. The candidates shall be receiving formal training but the Employer does not warrant that the candidates will perform their assigned tasks without supervision or instructions. The Contractor will select from the list of candidates provided, and employ them as trainees in its workforce, either at the construction site or in its offices for the entire duration of the work (or as may otherwise be agreed by the Engineer).

The Contractor will engage each trainee under a contract of employment. The contract of employment, which will be subject to the approval of the Engineer, shall include at least the following:

(i) A rate of pay not less than the industry prevailing rate in Timor-Leste for a newly qualified employee in the respective discipline or trade;

(ii) Provision of accommodation at or near the work location of an equivalent standard to that provided to the Contractor's own employees or an adequate accommodation allowance in lieu;

(iii) A term of employment, to be not less than 12 months;

(iv) Workers compensation insurance (minimum $10,000 for death or total disability);

(v) Nomination of the Contractor's qualified and experienced persons to be responsible for training, mentoring and overseeing the work of the trainee;

(vi) A training statement, describing all formal training and on the job experience (both directly relevant and incidental) to be provided and;

(vii) Other conditions of employment, as are reasonable and customary including paid overtime and leave.

At the end of each working week, the Contractor will provide a description of the training and work experience provided to each trainee in a log book. The trainee will, in the same log book, confirm or otherwise comment against each entry made by the Contractor. At the end of each month, a copy of all logbook entries for that month shall be provided to the Engineer.

The trainee is to be regarded as a regular employee of the Contractor. The Contractor shall be entirely responsible for supervision of each trainee and

the Employer accepts no responsibility whatever for any act or omission of the trainee in the performance of his or her duty.

The Contractor shall not terminate the employment of the trainee without the consent of the Engineer.

112.8.2 Measurement and Payment

The payment for transfer of technical skills and knowledge (10 trainees) shall be in Man-Month. Where the trainee has worked for less than a full month, the quantity shall be calculated by dividing the actual number of days worked, plus public holidays, approved leave and rest days, by 30. Payment shall be subject to;

1. confirmation from the trainee that he or she has received all entitlements as described in the contract of employment and;
2. copy of the log book for that month have been provided to the supervising Engineer.

In the event that the Contractor fails without reasonable excuse (as determined by the Engineer) to employ trainees in the number and as required by this specification, by the end of the third month following the Engineers notice to commence, the Employer may deduct the sum of $500 per month in respect of each trainee not employed from sums due to the contractor as a penalty.

Pay Item No.	Description	Unit of Measurement
112.4	Provision of Progress Photographs	Month
112.5	Project Sign Board	Each
112.6	Project Plaque	Each
112.7	Preparation and Implementation of STI and HIV/AIDS Prevention Program	Lump Sum
112.8	Transfer of Technical Skills and Knowledge	Man-mon

SECTION 200 - EARTHWORKS

ITEM 202 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

202.2.2 Removal of Bridges, Culverts, and other Drainage Structures.

Delete the first paragraph in its entirety and replace with the following:

Bridges, culverts, and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic.

The removal of existing culverts within embankment areas will be required only as necessary for the installation of new structures. Abandoned culverts shall be broken down, crushed and sealed or plugged. All culvert sections removed, which are not designated for stock• piling or relaying, shall become the property of the Contractor and be removed from the project or disposed off in a manner approved by the Engineer.

Unless otherwise directed, the substructures of existing structures shall be removed down to the natural stream bottom and those parts outside of the stream shall be removed down to at least 300 mm (12 inches) below natural ground surface. Where such portions of existing structures lie wholly or in part within the limits for a new structure, they shall be removed as necessary to accommodate the construction of the proposed structure.
Steel bridges and wood bridges when specified to be salvaged shall be carefully dismantled without damage. Steel members shall be match marked unless such marking is waived by the Engineer. All salvaged material shall be stored as specified in Article 202.2.1.

Structures designated to become the property of the Contractor shall be removed from the right-of-way Blasting or other operations necessary for the removal of an existing structure or obstruction, which may damage new construction, shall be completed prior to placing the new work, unless otherwise provided in the Particular Specifications.

202.2.3 Removal of Pipes Other than Pipe Culverts,

Unless otherwise provided, all pipes shall be carefully removed and every precaution taken to avoid breakage or damaged. Pipes to be relied shall be removed and stored when necessary, so that there will be no loss or damage before re-laying. The Contractor shall replace sections lost from storage or damage by negligence, at his own expense.

202.2.4 Removal of Pavement, Sidewalks, Curbs, etc.

All concrete pavement, base course, sidewalks, curbs, gutters, etc., designated for removal shall be:

i. Broken into pieces and used for riprap on the project, or
ii. Broken into pieces, the size of which shall not exceed 300 mm (12 inches) in any dimension and stockpiled at designated locations on the project for use by the Government, or
iii. Otherwise disposed off as directed. When specified, ballast, gravel, bituminous material or other surfacing or pavement materials shall be removed and stockpiled as required in Article 202.2.1, otherwise such materials shall be disposed off as directed.

There will be no separate payment for excavating for removal of structures and obstructions or for backfilling and compacting the remaining cavity.

202.3 Method of Measurement

When the Contract stipulates that payment will be made for removal of obstructions on Jump-sum basis, the pay item will include all structures and obstructions encountered within the roadway. Where the contract stipulates that payment will be made for the removal of specific items on a unit basis, measurement will be made by the unit stipulated in the Contract.

Whenever the Bill of Quantities does not contain an item for any aforementioned removals, the work will not be paid for directly, but will be considered as a subsidiary obligation of the Contractor under other Contract Items.

202.4 Basis of Payment

The accepted quantities, measured as prescribed in Article 202.3 shall be paid for at the Contract unit price or Jump sum price bid for each of the Pay Items listed below that is included in the Bill of Quantities which price and payment shall be full compensation for removing and disposing of obstructions, including all materials, labor, equipments, tools and incidentals necessary to complete the work prescribed in this Item. The price shall also include backfilling, salvage of materials removed, their custody, preservation, storage on the right-of-way and disposal as provided herein.

ITEM 205 - EMBANKMENT

205.2 Material Requirements

Embankment shall be constructed of suitable materials, in consonance with the following definitions:

(1.) Suitable Material

The following paragraphs shall be supplemented:

All materials excavated from roadway, structures, drainage and ditches to the extent that they are suitable in the formation of embankment and backfill shall be utilized as such.

Selected material to be used for embankment shall be river run gravelly-sand as shown and specified on the drawing or as directed and approved by the Engineer.

205.3 Construction Requirements

205.3.2 Methods of Construction

This sentence is added as the second sentence of Sub-Section, 5th paragraph:

However, thicker layer maybe placed if vibratory roller with high compaction

capacity is used provided that specified density requirements are obtained throughout the layer and as approved by the Engineer.

Between paragraphs 6 and 7, add the following paragraph:

Where placing and/or compacting material under saturated or flooded conditions cannot be avoided, the Contractor shall submit to the Engineer for approval his proposed construction methods to ensure adequate compaction.

205.3.3 Compaction

Compaction Trials

Add the following at the end of the last paragraph:

If during construction the character and properties of the fill material change, the Contractor shall carry out further full scale compaction trials and submit the results to the Engineer for approval.

Filling shall not proceed if there is no adequate compaction and grading equipment available on site in operating condition, to enable the fill to be shaped and compacted to the requirements of the contract.

205.3.5 Protection of Structures

Supplement this Sub-Section to be read as follows:

Any movement or displacement of structures that may result due to improper method of backfilling and/or compacting shall be corrected by the Contractor at his own expense and he shall not be entitled to any extra time on account of the delay incurred to correct such defect.

The following Sub-Sections are added to be read as follows:

205.3.10 Formation of Embankment on Existing Pavement

Where the overlying embankment thickness is substantial as determined by the Engineer, the scarified asphalt shall be compacted to form part of the embankment.

205.4 Method of Measurement

The whole text under this Subsection is amended and shall be read as follows:

The quantity of embankment to be paid for shall be the volume of material compacted in place and shall be measured by average end area method, accepted by the Engineer and formed with materials obtained from any source.

Material from excavation per Item 203 which is used in embankment and accepted by the Engineer will be paid under embankment and such payment will be deemed to include the cost of excavating, hauling, stockpiling and all other costs incidental to the work.

The Contractor must notify the Engineer at least 24 hours in advance each time there is a change in the categorization of the source of material to enable appropriate measurements to be made.

Filler and blending materials shall be included in volume of earthwork materials compacted in place and accepted by the Engineer.

Any material coming from roadways, structures, drainage or ditches excavation which are suitable for use but are discarded and replaced by the Contractor with borrow materials shall not be considered for payment.

205.5 Basis of Payment

The whole text under this Sub-Section is amended and shall read as follows:

The accepted quantities, measured as prescribed in Sub-Section 205.4, shall be paid for at the contract unit price for each of the Pay Items listed below that is included in the Bill of Quantities. The payment shall constitute full compensation for excavation hauling, placing and compaction of all materials including all labor, equipment, tools and incidentals necessary to complete the work in this Item.

Pay Item No.	Description	Unit of Measurement
202.5(a)	Removal of Existing Box Culvert, 3 x 1.5m or below	Linear meter
202.5(b)	Removal of Existing Box Culvert, size above 3 x 1.5m	Linear meter
202.5(c)	Removal of Existing Stone Masonry Retaining Wall, 3m high or below	Linear meter
205.5	Embankment from Borrow Excavation	Cubic meter

When more than one item is specified, a means of identification shall be inserted in parenthesis immediately after the Pay Item and/or a letter suffix shall be added within the Pay Item number.

SPL 207 BREAKING/CRACKING OF EXISTING ASPHALT PAVEMENT

Technical specification for this work follows Item 202.2.4:

Where new pavement structure is to be constructed to replace an existing but deteriorated Asphalt Pavement over existing structure shall be broken, removed and disposed as directed by Engineer.

Pay Item No.	Description	Unit of Measurement
202(1)	Removal of Structures and Obstructions	Lump Sum
202(2)	Removal of structure and Obstructions (specific)	Each
202(3)	Removal of pavement, sidewalks, curbs, etc.	Square meter

ITEM 506 STRUCTURAL CONCRETE

506.1 Description

506.1.2 Classes and Uses of Concrete

Amend the whole text under this Sub-clause with the following:

Other than cement concrete pavement and except as otherwise stated in the Contract, the classes of concrete shall be designated as Class AA, Class A, Class B, Class C, Class P, Seal and Lean Concrete. Each class shall be used in that part of the Structure as called for on the Plans.

The Classes of Concrete will generally be used as follows:

Class AA (27.6 MPa or 4000 psi)	For concrete piles cast in drilled holes or bored piles and where shown on Plans.
Class A (21 MPa or 3000 psi)	All superstructures and heavily reinforced substructures. The parts of the structure included are slabs, beams, girders, diaphragms, wingwalls, backwalls, copings, columns, arc ribs, reinforced abutments, reinforced footing and other structures such as box culverts and its inlet and outlet structures, concrete lined-ditch canals, cribbing concrete, curb and gutter, and where shown on the Plans.
Class B (16.5 MPa or 2400 psi)	For concrete under footing of bridges, minor structures and where shown on plans or as directed by the Engineer
Class C (21 MPa or 3000 psi)	Thin reinforced sections i.e., railings and railpost, R.C. piles and cribbing for filler in steel grid floors.

Class P (37.9 MPa or 5500 psi)	For prestressed concrete structures and members
Seal	Concrete deposited in water
Lean Concrete (10.3 MPa or 1500 psi)	For use in thin layers underneath the footing, foundations, beddings and where shown on the Plans or as directed by the Engineer

506.2 Material Requirements

506.2.3 Coarse Aggregates

Modify Table 506.1 to read as follows:

Table 506.1
Grading Requirements for Coarse Aggregates

Sieve Designation		Mass Percent Passing					
Standard	Alternate	C L A S S					
(mm)	U.S. Std	A	B	C	P	Seal	Lean
63	2 ½"		100				
50	2"	100	95-100				
37.5	1 ½"	95-100	-			100	100
25	1"	-	35-70		100	95-100	95-100
19	¾"	35-70	-	100	95-100	-	-
12.5	½"	-	10-30	90-100	-	20-55	25-60
9.5	3/8"	10-30	-	40-70	20-55	-	-
4.75	No. 4	0-5	0-5	0-15*	0-10*	0-10*	0-10*

**The measured cement content shall be within plus (+) or minus (-) 2 mass percent of the design cement content.*

506.3 Sampling and Testing of Structural Concrete

Supplement the first paragraph to be read as follows:

However, in case of prestressed concrete structures, the number of samples shall be at least three (3), each of which consists of three (3) specimens:

The following shall be measured/ tested as work progresses:

1. Slump: as required but at least once each day of concrete pouring.
   The slump shall conform to the value specified to each class of concrete in Table 506.2

2. Air content: as required but at least once each day of concrete pouring.
   The air content shall conform to the predetermined values by mix proportion.
3. Unit Weight as required but at least once each day of pouring
   The unit weight shall conform to the predetermined values by mix proportion
4. Chloride Ion content: as required but at least one each day of pouring.
   The chloride ion content shall conform to the predetermined values as specified in sub-section 506.4.1
5. Compressive Strength: at 28 days, but in the case of prestressed concrete, at the day on which tendons are supposed to be stressed.
   The strength shall conform to the value specified to each class of concrete in Sub-section 506.4.1. As for the prestressed concrete, the strength of concrete specimen at site shall be greater than the value specified in Sub-section 506.4
6. Concrete Temperature: as required but at least once each day of concrete pouring.

The above-mentioned tests shall be conducted in accordance with ASTM Standards. All test results shall be submitted to the Engineer for evaluation and approval.

506.4 Production Requirements

506.4.1 Proportioning and Strength of Structural Concrete

Modify Sub-Section 506.4.1 to read as follows:

The measured cement content shall be within plus (+) or minus (-) 2 mass percent of the design cement content.

Chloride as $C1^{-1}$ expressed as a percent by weight of cement when added to the $C1^{-1}$ in the other components of the concrete mixture shall not exceed the following levels:

- 0.06% for Pre-stressed Concrete (AASHTO T 260)
- 0.10% for conventionally reinforced concrete in a moist environment and exposed to chloride.
- 0.15% for conventionally reinforced concrete in a moist environment but not exposed to chloride.

Mixes shall verified by performing trial mixes. The temperature specifications described in Sub-section 506.4.5 shall be taken into account.

Modify Table 506.2 as follows:

Table 506.2 : Composition and Strength of Concrete for Use in Structures

Classes of Concrete	Minimum Cement Content* (bag**) kg/m^3	Maximum Water/ Cement Ratio kg/kg	Consistency Range in Slump mm (inch)	Designated Size of Coarse Aggregate Square Opening Std. mm	Minimum Compressive Strength of 150x300 mm Concrete Cylinder Specimen @ 28 days	
					N/mm^2	psi
AA	400 (10 bags)	0.56	150-178 (6-7)	50.0-4.75 (2" – No. 4)	27.6	4000
A	360 (9 bags)	0.53	50-100 (2-4)	37.5-4.75 (1-1/2" – No. 4)	21.0	3000
B	320 (8 bags)	0.58	50-100 (2-4)	50.0–4.75 (2" – No. 4)	16.5	2400
C	380 (9.5 bags)	0.55	50-100 (2-4)	12.5–4.75 (1/2" – No. 4)	21.0	3000
P	440 (11 bags)	0.49	100 max. (4 max.)	19.0–4.75 (3/4" – No. 4)	37.9	5500
Seal	380 (9.5 bags)	0.58	100-200 (4-8)	25-4.75 (1" – No, 4)	21.0	3000
Lean	200 (5 bags)	-	-	37.5-4.75 (1-1/2" – No. 4)	10.3	1500

* The measured cement content shall be within plus or minus 2 mass percent of the design cement content.
** Based on 40 kg/bag
*** Slump can be achieved using super plasticizer

Contractors shall attain the compressive strength required for the different classes of concrete and shall not base on the water – cement ratio as fulfillment of the specification requirements. The water – cement ratios shown are just indications of the material proportions.

Add the following Sub-Sections under Section 506.4:

506.4.5 Use of Metal Decking

The contractor may use metal decking in lieu of regular formworks to serve as forms for concrete deck slab provided that it is in conformity with the requirements and approved by the Engineer.

The Contractor prior to purchase of materials for metal decking shall submit to the Engineer for review and approval the following:

a. Product manufacturer's literature/brochure
b. Product sample
c. Working/shop drawings showing details of installation
d. Appropriate design calculations
e. Test results
f. Others that may be required by the Employer

Baterial requirements:

Unless otherwise shown on the Drawings or directed by the Engineer, base metal for the metal decking shall be 0.6mm thick steel sheet with a tensile strength fy = 276 MPa (40,000psi).

Metal decking shall be galvanized and shall have a profile/shape and type as shown on the Drawings or as approved. Only one type of metal decking shall be used for the entire project. Profile/shape and type other than that of the approved, that the Contractor intends to use for whatever reason shall require written approval from the Employer.

Fasteners shall be in accordance with the manufacturer's specifications or recommendations.

Installation requirements:

Metal decking shall be installed in conformity with the lines and dimensions as shown on the Drawings or approved working/shop drawings or as directed by the Engineer.

Metal decking shall be installed water tight to prevent loss of concrete grout during concrete pouring. Side laps shall be fastened in accordance with the manufacturer's recommendations approved by the Engineer. There shall be no jointing or splicing within the clear span between the end supports.

Metal decking should be securely anchored for safety during other operations.
Metal decking may be anchored to the girder dowels by anchor rods, straps or other means acceptable to the Engineer. Welding anchors to the girder dowels may be allowed when approved and provided that the dowel bars are weldable.

If determined necessary by the Engineer, temporary supports may be required between the end supports to prevent excessive deflection of the metal decking. Design and details of the temporary support shall be prepared and submitted by the Contractor to the Engineer for review and approval.

The Contractor, during other operations, must exercise extra care to prevent damage to the metal decking. Replacement or repair to damages may be required to the satisfaction of the Engineer at the expense of the Contractor.

506.4.6 Protection of Concrete from Environmental Conditions

1) General

   Precautions shall be taken as needed to protect concrete from damage due to weather or other environmental conditions during placing and curing operations. Concrete that has been damaged by weather

conditions shall be either repaired to an acceptable condition or removed and replaced

2) Rain Protection

Under conditions of rain, the placing of concrete shall not commence or shall be stopped unless adequate protection is provided to prevent damage to the surface mortar or damaging flow or washing of the concrete surface.

3) Hot Weather Protection

When the ambient temperature is above 32°C (90°F), the forms, reinforcing steel, steel beam flanges, and other surfaces which will come in contact with the mix shall be cooled below 32°C (90°F) by means of a water spray or other approved methods.

The temperature of the concrete at the time of placement shall be maintained within the specified temperature range by any combination of the following:

a. Shading the materials storage areas or the production equipment.

b. Cooling the aggregates by sprinkling with water which conform to the requirements.

c. Cooling the aggregates or water by refrigeration or placing a portion or all of the mix water with ice that is flaked or crushed to the extent that the ice will completely melt during mixing of the concrete.

d. Liquid nitrogen injection.

506.5 Method of Measurement

The following paragraph is added:

For any structure or element of any structure defined in these Specifications as being paid for either in per unit (each) or in per linear meter measure, no additional separate payment shall be made under Item 506, “Structural Concrete” and Item 505, “Reinforcing Steel”.

Lined ditches and canals in place and accepted for payment shall be measured by linear meter along the centerline.

506.6 Basis of Payment

Modify the third paragraph of Section 506.6 to read as follows:

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
506(1)a	Structural Concrete Class AA, (Bored Piles), fc' = 27.6 MPa	Cubic Meter
506(1)b	Structural Concrete Class A, (Bridge Structures), fc' = 21.0 MPa	Cubic Meter
506(1)c	Structural Concrete Class A, (Drainage Structures), fc' = 21.0 MPa	Cubic Meter
506(2)	Structural Concrete Class B, fc' = 16.5 MPa	Cubic Meter
506(3)	Structural Concrete Class Structural Concrete Class C, fc'=21.0 MPa	Cubic Meter
506(4)	Structural Concrete Class P, fc'=37.9 MPa	Cubic Meter
506(6)	Lean Concrete	Cubic Meter

SECTION 600 DRAINAGE AND SLOPE PROTECTION STRUCTURES

ITEM 601 PIPE CULVERTS AND STORM DRAINS

601.1 Description

Under this Subsection, add the following paragraph

All reinforced concrete pipes fabricated on the project site shall conform to the requirements of the Specifications and the Drawings and shall be under the direct supervision of the Engineer or his authorized representative.

601.3 Construction Requirements

Supplement these Sub-clauses with the following:

601.3.1 Excavation

All soft unsound material underlying the proposed pipework shall be removed to the depth required by the Engineer and shall be replaced by suitable material in layers not exceeding 200 mm in depth and compacted. The width of the trench shall not be greater than two (2) times the pipe inside diameter to permit satisfactory jointing and thorough compaction of the bedding and backfilling materials under and around the pipe.

601.3.2 Bedding

Soft, spongy or other unstable material encountered that will not provide a firm foundation for the pipe shall be removed for the full width of the trench and replaced by gravel or sand bedding to a depth of not less than 30 percent of the vertical outside diameter of the pipe. The bottom of the trench shall be shaped to conform to the shape for at least 15 percent of its total height.

601.3.3 Laying Conduit

All joints unless otherwise specified, shall be filled with stiff mortar composed of one (1) part Portland cement and two (2) parts of sand. The mortar shall be placed so as to form a durable, watertight joint around the whole circumference of the pipe. Open side of the pipes at the end of each day's work shall be closed temporarily with wood blocks or bulkheads.

No pipeline shall be placed in service for which it is intended until terminal end is provided with suitable structure or outlet; and until approved and ready for service. The upper end shall be maintained plugged or blocked against entry of any water.

Add the following after Sub-clause 601.3.7

601.3.8 Existing Culverts

The existing inlets and outlets shall be investigated in conformity to the designed levels as indicated on the Drawings. The existing culverts which, in the opinion of the Engineer after investigation, determined to be still serviceable and in satisfactory conditions and consistent with the design requirements without the necessity of further modification and improvement, may be allowed to remain with the full consent of the Engineer. Culverts with deficient lengths or with elevations not in accordance with the Plans shall be augmented with the required length or adjusted to the correct levels to conform in all respects with what is specified in the Drawings. However, the Engineer may allow or order some deviations from what are shown on the Drawings if such deviations are unavoidable to suit actual site requirements. All new pipe culverts to be constructed shall all be in accordance with the plans unless adjustments are to be made with the Engineer's approval.

Where existing culverts are to be extended as indicated on the Drawings, the ends of the existing pipes shall be exposed sufficiently to facilitate jointing and the placement of the joint collars. The end of the existing pipes shall be thoroughly cleaned of dirt or any extraneous matter for effective jointing and bonding to the new pipes. The width and depth of excavation at the extended length shall be such as to provide enough working space and to accommodate the required thickness of the bedding materials.

The existing culverts, if allowed to remain and extended shall be cleaned of accumulated silt, debris or other extraneous matter which obstructs the smooth flow of water through the culvert openings. Dredging along the upstream and downstream portion of the culvert shall be sloped and extended to the highway right-of-way. At the right-of-way limits, the dredged channel shall not be less than

the length of straight or flared headwall with side slopes equal to one horizontal to one vertical or flatter or as directed by the Engineer.

601.4 Method of Measurement

Supplement this Subsection with the following:

The quantities to be measured or paid for each class and diameter, shall in the case of new culverts, be the lengths of pipe between the outside faces of the headwalls and in the case of extensions, be the length of new pipes between the existing culvert and the outside faces of headwalls, measured along the axis of the pipes as approved, installed in place, compacted, backfilled, completed and accepted.

601.5 Basis of Payment

Modify the last paragraph of Section 601.5 to read as follows:

The Contract unit price per linear meter of conduit shall include full compensation for furnishing and placing all materials, including granular bedding and backfill and all labor, equipment, tools and incidentals necessary to complete the item.

Supplement this Subsection with the following:

The removal of existing culverts or pipes which obstruct or encroach upon the excavation and other existing culverts which in the opinion of the Engineer are non-functional, and the excavation of trenches and backfilling shall be measured and paid as provided in Item 202.

Payment will be made under:

Pay Item No.	**Description**	**Unit of Measurement**
601(1)a	RCPC, 610 mm diameter, Class II	Linear Meter
601(1)b	RCPC, 910 mm diameter, Class II	Linear Meter
601(1)c-1	RCPC, 1070 mm diameter, Class II	Linear Meter
601(1)c-2	RCPC, 2-1070 mm diameter, Class II	Linear Meter
601(1)d-1	RCPC, 1220 mm diameter, Class II	Linear Meter
601(1)d-2	RCPC, 2-1220 mm diameter, Class II	Linear Meter
601(1)e-1	RCPC, 1520mm diameter, Class II	Linear Meter
601(1)e-2	RCPC, 2-1520 mm diameter, Class II	Linear Meter

ITEM 603 MANHOLES, INLETS AND CATCH BASINS

603.2 Material Requirement

Add the following:

Unless otherwise indicated on the Plans, concrete for catch basins shall be concrete Class “B” and shall be in accordance with Item 506, Structural Concrete.

603.5 Basis of Payment

Modify the 1St paragraph to be read as follows:

“The accepted quantities, determined as provided in Section 603.4, Method of Measurement, of the Pay Items in the Bill of Quantities will be paid for at the contract unit prices which shall constitute full compensation furnishing and placing all materials, including excavation and backfilling, for all labor, equipment, tools and incidental necessary to complete the items.

Second paragraph is deleted and modified as follows:

“Excavation and Backfilling will not be measured and paid for separately but cost hereof shall be deemed included in the contract unit price of the respective size of manhole or catch basin indicated in the Bill of Quantities”.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
603(3)a-1	Catch Basin for 1-610mm dia. RCPC Concrete Type	Each
603(3)b-1	Catch Basin for 1-910mm dia. RCPC Concrete Type	Each
603(3)c-1	Catch Basin for 1-1070mm dia. RCPC Concrete Type	Each
603(3)c-2	Catch Basin for 2-1070mm dia. RCPC Concrete Type	Each
603(3)d-1	Catch Basin for 1-1220mm dia. RCPC Concrete Type	Each
603(3)d-2	Catch Basin for 2-1220mm dia. RCPC Concrete Type	Each
603(3)e-1	Catch Basin for 1-1520mm dia. RCPC Concrete Type	Each
603(3)e-2	Catch Basin for 2-1520mm dia. RCPC Concrete Type	Each

ITEM 610 - GABIONS

610.2 Material Requirements

610.2.1 General

Modify this sub-clause to read as follows:

Gabions shall be made of zinc coated (galvanized) steel wire, which shall be supplied folded flat to facilitate transport and handling.

Gabion shall be furnished in accordance with the various lengths and heights as shown on the Drawings, or as directed by the Engineer. If not otherwise required, all gabions shall be one
(1) meter in width. The lengths shall be multiples of 2, 3 or 4 times the width of the gabion while the heights shall be 0.50 or 1.00 meter.

610.2.2 Wire

Supplement this Sub-Clause:

1. The minimum size of the wire used in fabrication of the gabion shall be:

Description	Diameter (mm)	
	Gabion	Mattresses
Body wire	2.7	2.2
Selvedge or perimeter wire	3.4	2.7
Tying and Connecting wire	2.2	2.2

610.3 Construction Requirements

610.3.1 Fabrication

Amend the first and second paragraphs as follows:

1. Gabions shall be in the form of rectangular basket of the required dimensions and shall be manufactured from wire as specified in sub-clause 610.2.2. Gabions shall be made of steel triple twisted forming a uniform hexagonal mesh pattern with openings 80 mm x 100 mm x 120 mm or as specified on the drawings. The edges shall be formed into securely connected selvedges adequate to prevent raveling. Individual basket ties and connections shall be made by using a quantity of wire not less than five (5%) of the weight of each basket.

2. When the gabion length exceeds its width, it shall have securely tied diaphragms connected at all edges to form individual cells of equal length and width. Diaphragms shall be of the same material and manufacture as specified above.

All the characteristics, values and figures given above are subject to the tolerance of plus or minus five percent (5%).

610.3.2 Assembly and Construction

The following paragraphs shall be added:

Beds of gabions shall be suitably level. Gabions forming elements of structures shall be securely connected along the complete length of all contact edges by means of the above specified tying and connecting wire.

Before the rockfill is placed, the gabions shall be tensioned in such a manner that will permit proper shape, alignment and compaction of fill. Rockfill for exposed face of gabion walls shall be carefully selected for uniformity of size and the pieces shall be hand placed to provide a neat appearance to the satisfaction of the Engineer. The vertical points of gabion baskets shall be staggered as in running bond brickwork.

610.4 Method of Measurement

Modify the sub-section to read as follows:

The quantities to be paid for shall be the number of cubic meter of gabions and mattresses completed in place and accepted. Excavation and Backfill are also considered as subsidiary to this Item.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
610 (1)a	Gabions, 2000mmx1000mmx1000mm	Cubic Meter
610 (1)b	Gabions, 2000mmx1000mmx500mm	Cubic Meter

SECTION 700 - MISCELLANEOUS STRUCTURES

ITEM 703 - MONUMENTS, MARKERS AND GUIDE POSTS

703.1 Description

Modify the 1st paragraph to read as follows:

This item shall consist of right-of-way monuments, maintenance marker posts, kilometer posts, and/or guide posts, furnished and installed in accordance with this Specifications at the locations and in conformity with the sizes, dimensions and design shown on the plans or as required by the Engineer. It includes the provision of delineators to be mounted on guide posts as an effective aid to delineate the roadway for driving at night.

703.3 Construction Requirements

Add another paragraph to Sub-clause 703.3 to read:

The delineators to be provided must conform to the requirements of design shown on the plans/ approved drawings. Delineators shall be placed on guideposts near the edge of the shoulder at a height such that the lower edge of the reflecting surface should not be less than 500mm above the pavement of the surface level and shall be located at intervals not exceeding 30m with closer spacing on curves. Guidepost shall be erected such that the reflective surface of the delineators would be approximately 300mm from the outer edge of the shoulder.

703.4 Method of Measurement

Modify the entire Sub-section to read as follows:

The quantities to be paid for shall be the actual number of maintenance marker posts and kilometer posts furnished, placed and accepted.

703.5 Basis of Payment

Pay Item No.	Description	Unit of Measurement
703(2)	Maintenance Marker Posts for RCPC and RCBC	Each
703(3)	Kilometer Posts	Each

ITEM 704 – GUARDRAIL

704.1 Description

Modify the 1st paragraph to read as follows:

This item consists of furnishing and constructing posts and guardrails of the types called for in the contract and in accordance with this Specification, at the locations, and in conformity with the lines and grades shown on the Plans, or as required by the Engineer. This also includes reinstallation of existing guardrails, replacement of missing elements (bolts, nuts & washers) and re-erection/ reinstallation of existing undamaged posts.

704.3 Construction Requirements

Add another paragraph after the last paragraph of Sub-clause 704.3.2 Rail Elements to read:

The surface of the guardrail facing the roadway of new and re-installed guardrail shall be painted with two coats of black and yellow stripes of hazard markings

as shown on the drawings.

704.5 Basis of Payment

Modify the entire Sub-section to read as follows:

The accepted quantities of guardrail, determined in Sub-section 704.4, method of Measurement, shall be paid for at the contract unit price per linear meter for the type specified, complete in place, which price and payment shall be full compensation for furnishing and placing all materials, including all labor, equipment, tools and incidentals necessary to complete the Item. End anchorages and terminal sections will be paid for at the contract unit price for each of the kind specified and completed in place.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
704(3) a	Metal Guardrail (Metal Beam) Including Concrete Post	Linear Meter
704(3) b	Metal Beam End Piece	Each

ITEM 706 - ROAD SIGN

706.1 Description

Modify Second paragraph of Sub-section 706.1 to read as follows

The road signs shall comply in all respect with “International Road Signs or as directed by the Engineer”. The categories of road signs are designated namely, warnings signs, regulatory signs, informatory signs, or guide signs such as Chevron Signs. Chevron Signs shall be used to guide drivers through a change in horizontal alignment of the road and to supplement any of the advanced warning signs, the Horizontal Alignment Signs (W-Types) or the standard Guide Posts and Delineators. These are referred to in the contract as Warning Signs and Informatory Signs, respectively.

Add the following to this Sub-section:

The number and exact locations of the road signs required in this project are shown and indicated on the Plans. The quantities of each kind of the different types of road signs as reflected in the Bill of Quantities may increase or decrease depending on the actual requirements as determined by the Engineer. Road signs will be provided at, but not limited to the following locations, to wit:

1. At Bends, left or right
2. At School, Church zones and other sections requiring safety signs
3. At Road Intersections
4. At Bridge Sites

5. Other locations as the Engineer may designate

The method of construction and installation of road signs shall be as outlined on the Drawings or as described in the Specifications. All signs shall be approved by the Engineer prior to incorporation of the works.

706.2 Material Requirements

706.2.1 Sign Panels

Modify the entire sub-section to read as follows:

Sign panels for warning, regulatory, informatory and chevron signs shall be manufactured from aluminum sheeting at least 3mm thick.

706.5 Basis of Payment

Modify the 2nd paragraph of this Sub-section to read as follows:

Payment will be made under

Pay Item No.	Description	Unit of Measurement
706(1)	Warning Signs	Each
706(2)a	Regulatory Signs (R1-1)	Each
706(2)b	Regulatory Signs (R1-2)	Each
706(2)c	Regulatory Signs (R2-1)	Each
706(3)	Informatory Signs	Each
706(4)	Chevron Signs (Curve Section)	Each
	Chevron Signs (Width Marker)	Each

ITEM 710 - REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS

Add the following sub-section after sub-section 710.8:

710.8 Method of Measurement

The quantity of pavement markings to be paid for shall be the area as shown on the Plans of painted traffic line of the stated width and the area as shown on the plans of symbols, lettering, hatching and the like, completed and accepted.

The quantity shown in the Bill of Quantities represents the approximate quantity in square meter of pavement markings, with width as shown applied at the centerline of the road pavements to which may be increased or decreased depending on the Engineer's decision whether to require additional markings or delete parts of it. Other markings representing symbols, lettering,

hatching and others in locations where they may be required by the Engineer shall, likewise, be implemented by the Contractor using reflectorized thermoplastic pavement markings as approved and directed.

710.9 Basis of Payment

The quantities measured as determined in Subsection 710.8, Method of Measurement, shall be paid for at the appropriate contract unit price for the Pay Items shown in the Bid Schedule which price and payment shall constitute full compensation for furnishing and placing all materials, sampling and packing, for the preparation of the surface, and for all labor, equipment, tools and incidentals necessary to complete the Item.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
710(1)a	Reflectorized Thermoplastic Pavement Markings (White)	Square Meter
710(1)b	Reflectorized Thermoplastic Pavement Markings (Yellow)	Square Meter

ITEM SPL 712 - REFLECTORIZED THERMOPLASTIC RUMBLE STRIPS

SPL 712.1 This Item shall consist of furnishing and applying reflectorized thermoplastic rumble strips on the surface of the pavement in accordance with this Specification and at the locations shown on the Plans, or as required by the Engineer.

SPL 712.1.1 Uses of Reflectorized Thermoplastic Rumble Strips

Reflectorized thermoplastic rumble strips shall be bonded to typical asphalt or concrete surfaces to provide the following traffic controls:

a. Warn/alert drivers of upcoming roadway condition such as intersections, villages, school zones, sharp horizontal curves, narrow bridges approaches.
b. Use as complementary/enhancement to advance signs such as the Stop ahead, traffic calming devices or other various Curve signs.
c. Use to prevent/lessen the effect of drowsiness during long drive, inattention and highway hypnosis.

SPL 712.2 Material Requirements

SPL 712.2.1 Reflectorized Thermoplastic Pavement Material and Glass Beads (Pre-Mix)

a. Reflectorized Thermoplastic Pavement Material shall be homogeneously composed of pigment, filler, resins and glass reflectorizing spheres.

   The thermoplastic material shall be available to both white and yellow.

b. Glass Beads (Pre-Mix) shall be uncoated and shall comply with the following requirements:

Refractive Index, min. - 1.50
Spheres, Percent, min. - 90

Gradation:

Sieve	Mass Percent Passing
mm	
0.850	100
0.600	75-95
0.425	-
0.300	15-35
0.180	-
0.150	0-5

SPL 712.3 General Requirements

SPL 712.3.1 Design

SPL712.3.1.1 General

Reflectorized thermoplastic rumble strips shall have the following dimensions:

Height : 4.0 mm to 13 mm
Width : 50 mm to 100 mm
Spacing :200 mm to 500 mm

As much as possible, placement of reflectorized thermoplastic rumble strips shall be limited to rural locations and shall not be installed near residential areas because of the noise it can generate. It should not be placed pedestrian crossings or on bicycle routes.

The recommended length of road section where reflectorized thermoplastic rumble strips are to be installed shall be from 20m to 30m depending on the advisory speed limit of the road section.

The color of reflectorized thermoplastic rumble strips shall be either white or yellow.

Reflectorized thermoplastic rumble strips placed in the travelled way should not be overused. If used at too many locations, reflectorized thermoplastic rumble strips may lose their ability to gain the motorist's attention.

SPL 712.3.1.2 Pattern

The Contractor shall lay out a reflectorized thermoplastic rumble strips test pattern prior to the start of construction for approval by the Engineer.

Pattern shall be balanced to provide adequate warning to drivers without being so severe that they startle drivers or upset motorcycles.

The pattern of reflectorized thermoplastic rumble strips shall finish within 50m of any hazard it is associated with.

SPL 712.3.2 Composition

The pigment, beads and filler shall be uniformly dispersed in the resin. The material shall be free from all skins, dirt and foreign objects and shall comply with the requirements as specified in Table 612.1.

Table 712.1 : Composition of Requirements

Component	White	Yellow
Binder, min.	18.0	18.0
Glass Beads: min. max.	30 40	30 40
Titanium Dioxide, min.	10.0	
Chrome Yellow, Medium, min.		10.0
Calcium Carbonate And Inert Fillers, Max.	42.0	42.0

SPL 712.3.3 Qualitative

The material shall conform to the qualitative requirements as specified in Table 712.2.

Property	Requirements White	Yellow
Specific Gravity, max.	2.15	
Drying Time, minutes, max.	10.0	
Bond Strength to Portland Cement Concrete after heating for four (4) hours ±5 min. @ 218°C, MPa, max.	1.24	
Cracking Resistance @ low temp. after heating for four (4) hours ±5 min. @ 218 ±2°C.	No cracks	
Impact Resistance after heating for four (4) hours ±5 min. @ 218 ±2°C and forming test specimens, mm/kg, min.	115	
Softening Point after heating for four (4) hours ±5 min. @ 218 ±2°C.	102.5 ± 9.5°C	
Daylight reflectant @ 45 Degrees – 0 degrees, % min.	75	45

SPL 712.3.4 Application Properties

The material shall readily extrude at a temperature of 211 ± 7°C, from approved equipment to produce a line 3.2 to 4.8 mm thick which shall be continuous and uniform in shape having clear and sharp dimensions.

The material shall not exude fumes which are toxic, obnoxious or injurious to persons or property when heated during applications.

The application of additional glass beads by drop-in methods shall be at a rate of not less than 350 g/L of glass beads having a size range for drop-in type. The typical size range of spheres of drop-in type paints is.

Passing 850 um (#20) sieve and retained on 250 um (#60) sieve, %
80 – 100

a) Preparation of Road Surface – the materials should be applied only on the surface which is clean and dry. It shall not be laid into loose detritus, mud or similar extraneous matter, or over an old paint marking, or over an old thermoplastic marking which is faulty. In the case of smooth, polished surface stones such as smooth concrete, old asphalt surfacing with smooth polished surface stones and/or where the method of application of the manufacturer of the thermoplastic materials shall be recommended, and with the approval of the Engineer.

b) Preparation of Thermoplastic Materials – The materials shall be melted in accordance with the manufacturer's instruction in a heater fitted with a mechanical stirrer to give a smooth consistency to the thermoplastic and such the local overheating shall be avoided. The temperature of the mass shall be within the range specified by the manufacturer and shall on no account be allowed to exceed the maximum temperature stated by the manufacturer. The molten material shall be used as expeditiously as possible and for thermoplastics which have natural resin binders or otherwise sensitive to prolong heating the materials shall not be maintained in a molden condition for more than 4 hours.

c) Laying – Center lines, lane lines and edges lines shall be applied by approved mechanical means and shall be laid in regular alignment. Other markings may be applied by hand – screed, hand propelled machine or by self-propelled machine approved or directed by the Engineer. After transfer to the laying apparatus the materials shall be maintained within the temperature range specified by the manufacturer and stirred to maintain the right consistency for laying.

In the case of screen application, the material shall be laid to a thickness of not less than 3 mm or more than 6 mm unless authorized by the Engineer when laid over existing markings. In the case of sprayed application the material shall be laid to thickness of not less than 1.5 mm unless authorized by the Engineer. In all cases the surface produced shall be uniform and appreciably

free from bubbles and steaks. Where the Contractor Documents require or the Engineer direct that ballotini shall be applied to the surface of the markings, these shall be applied uniformly to the surface of hot thermoplastic immediately after laying such that the quality of ballotini firmly embedded and retained in the surface after completion complies with the following Material Requirements.

The paint shall consist of pigments, vehicles and glass beads so combined as to produce a paint that will conform to the following requirements.

a. Condition in container – The packaged material shall be free from lumps and mixed readily to a smooth homogenous state.
b. Skinning – The packaged material shall not skin within 48 hours in a ¾ filled, tightly closed container.
c. Appearance of Dried Film – The paint film shall dry to a smooth uniform finish.
d. Flexibility – The dried paint film shall not show cracking or flaking after being bent about 180 degrees over a 12.7 mm mandrel.
e. Resistance to Water – The dried paint film shall not show blistering, peeling, wrinkling and discoloration when immersed in water for 18 hours.
f. The paint shall also conform to the physical properties specified in Table 1.

Table 1 – Physical Properties

Properties	Type I and Type II	
	Minimum	Maximum
Specific Gravity	1.5	-
Drying Time, No Pick Up,		
Minutes	-	40
Consistency (Kreb Units) at 20 C	65	95

g. Premixed reflectorized traffic paint composition shall conform to the requirements given in Table 2.

Table 2 – Composition Requirements

Paint Composition	Requirements			
	Type I		Type II	
	Minimum	Maximum	Minimum	Maximum
Total Dry Solids, percent by weight	60	-	60	-

Titanium Dioxide, Rutile Percent by weight	16.0	-	16.0	-
Medium Chrome Yellow, Percent by weight	12.0	-	12.0	-
Extenders, percent by wt., White Yellow	-	13.0 17.0	- -	13.0 17.0
Non-volatile Content (based on the vehicle) percent by weight	40	-	41	-
Glass Beads, percent by Weight	31.0	35.0	31.0	35.0

h. Glass Spheres or Beads Requirements:

Quantity: The amount of glass beads to be mixed with the paint shall be 500 grams per liter of paint.

Beads Diameter: The percentage of beads that will pass through the US Standard Sieves shall be as follows:

Sieve No. (um)	Mass Percent Passing
70 (212 – um) – 0.850	100
80 (186 – um) – 0.600	85-100
140 (106 – um) – 0.300	15-55
230 (63 – um) – 0.150	0-10

Index of Refraction: The index of refraction of the beads shall be within the range of 1.50 to 1.60 when tested by the liquid immersion method at 29°C.

Appearance: The glass beads shall be transparent, colorless and the sum of particles that are fused, plane, angular and colored and contains bubble shall not exceed 20 percent

Road markings of a repetitive nature, other center lines, lane lines, etc., shall unless otherwise directed by the Engineer be set out with stencils which comply with the size and spacing requirements shown on the Plans.

d) Re-use of Thermoplastic Materials – At the end of day's as much as possible the material remaining in the heater and/or laying apparatus shall be removed. This may be broken and used again provided that the maximum heating temperature has not been exceeded and that the total time during which it is a molden condition does not exceed the requirements of Sub-section 606.2.3, Construction Requirements.

Reflectorized thermoplastic rumble strips shall be placed transverse to motor vehicle traffic movement. It shall not adversely affect overall pavement skid resistance under wet or dry conditions and shall not be placed on sharp horizontal or vertical curves. It shall not be applied over deteriorating existing reflectorized thermoplastic rumble strips or pavement surface.

A sign warning the drivers of the onset of reflectorized thermoplastic rumble strips may be placed in advanced of rumble strips installation.

SPL 712.3.5 Sampling

A minimum weight of 10 kg. of Reflectorized Thermoplastic paint shall be taken for every 100 bags or fraction thereof.

SPL 712.3.6 Testing

The material shall be tested in accordance with AASHTO T 250 or with the appropriate method in ASTM designation.

SPL 712.3.7 Packing and Marking

The material shall be packaged in suitable containers to which it will not adhere during shipment and storage. The blocks of cast thermoplastic material shall be approximately 300 x 915 by 51 mm and shall weigh approximately 23 kg. Each container label shall designate the color, manufacturer's name, batch number and date of manufacture. Each batch manufactured shall have its own separate number. The label shall warn the user that the material shall be heated to 211 ± 7^{o}C during application.

SPL 712.3.8 Method of Measurement

The area to be paid for under this item shall be the number of square meters (m^2) of reflectorized thermoplastic rumble strips applied and accepted.

SPL 712.3.9 Basis of Payment

Payment shall constitute full compensation for furnishing and application of reflectorized thermoplastic rumble strips including all labor, equipment, tools and incidentals necessary to complete the Item.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
SPL 712	Reflectorized Thermoplastic Rumble Strips	Square meter

SECTION 800 BIO - ENGINEERING WORKS

Supplement this paragraph:

This section is a method of construction using living plants in combination with dead or organic materials with or without engineering structures. The practice brings together biological, ecological and engineering concepts to produce living, functioning systems for slope stabilization to prevent erosion, to control sedimentation, or to offset habitat destroyed by tree removal in difficult settings.

SPL 803 SLOPE PREPARATION

SPL 803.1 DESCRIPTIONS

The Contractor shall prepare slopes for planting operations as required by the Engineer. This shall be done according to the specifications described hereunder as and when required. The contractor shall supply all necessary expertise, resources and facilities to ensure that these requirements are met.

It is essential that no damage to existing vegetation is done during slope preparation works.

SPL 803.2 CUT SLOPE PREPARATION

The objective of final cut slope preparation is to produce a surface adequately prepared for grass planting, grass lines are used to provide a strong surface cover but need a well prepared surface in which to be planted. If the grass is to be an effective form of slope protection it must be allowed to establish properly on a slope which does not subject it to undue stress from erosion and mass movement in its initial stages.

The Contractor must ensure that the slope is trimmed to a straight angle according to Engineer's instruction. Cut slopes to be planted with grass will normally be instructed as 3 vertical 2 horizontal but may be varied per instruction. In any event, a straight profile must be obtained. Cavities must be filled with well-compacted materials, convexities must be removed and it is essential that the general profile does not have a shape giving over steep segment.

All loose materials must be removed from the slope and tipped elsewhere in a approved location.

SPL 803.3 FILL SLOPE PREPARATION

The objective of final preparation of fill slopes is t produce a surface adequately prepared for shrubs or tree planting of brush-layering of grass sowing/planting or a combination of these. Vegetation is used to provide a strong surface cover but needs a well prepared surface in which to be planted, if it is to be a effective form of slope protection it must be allowed to establish properly on a slope which does not subject it to undue stress in its initial stages.

The Contractor must ensure that the slope under instruction is trimmed to a straight angle according to the Engineer's instruction. In an event a straight profile must be obtained, all loose debris must be removed. Cavities must be filled with wellcompacted material. Convexities must be removed and it is essential that the general profile does not have a shape giving over steep segments.

SPL 803.4 MEASUREMENT FOR PAYMENT

Measurement shall be made in square meters of completed and accepted prepared slopes limited to the dimensions shown on the Drawings.

SPL 803.4 BASIS OF PAYMENT

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
SPL 803(1)	Slope Trimming/Preparation	Square meter

SPL 804(4) STONE SOLING

SPL 804(4).2 MATERIAL REQUIREMENTS

Stone for soling work shall be block stone of good quality (hard and unweathered) of specified size.

SPL 804(4).3 CONSTRUCTION REQUIREMENTS

Area receiving soling will be excavated and trimmed to the required levels, profile and gradient as per Drawings.

The soling shall be laid and hand-packed true to grade and section. Unless otherwise specified, soling thickness shall be 20 cm.

SPL 804(4).4 **MEASUREMENT FOR PAYMENT**

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
SPL 804(4)	Stone Soling	Square meter

SPL 804(5) **SUB-SOIL DRAIN**

SPL 804(5).1 **DESCRIPTION**

Sub-soil drains shall be installed on the consolidated or semi-consolidated debris mass where soil drainage is generally poor. The main function of the sub-soil is to draw up sub-surface water up to the depth of 2 meters and discharge it to the safe location, to protect the slope from liquefaction and debris slide.

SPL 804(5).2 **MATERIAL REQUIREMENTS**

SPL 804(5).2.1 **POLYTHENE SHEET**

Shall be 500 gauge polythene sheet

SPL 804(5).2.2 **GEOTEXTILE**

Shall conform to the requirements of Item 612.

SPL 804(5).2.3 **AGGREGATES**

Clean and unweathered 40 – 60 mm river aggregates.

SPL 804(5).2.4 **STONE**

Shall consist of hard, unweathered and generally uniformly graded ranging 100 mm to 300 mm.

SPL 804(5).3 **TYPE OF DRAIN**

Main Drain: depth 1 m to 1.5 m; width 0.50 m; length depends on site condition

Herringbone Drain: depth 0.75 m to 1.25 m; width 0.50 m; length depends on site condition

SPL 804(5).4 **CONSTRUCTION REQUIREMENT**

The site should be given final preparation immediately before the installation of subsoil drains.

Starting at the base of slope to be treated and using appropriate measuring equipment, lines should be marked out across the slope. A line should run straight up to the top of the slope. From the base of main drain, mark out lines

on both sides of main drain at 35 – 45 degrees. These will form the herringbones.

Starting at the bottom, trench with rectangular base should be dug along the lines.

The size of the trench should be 1000 mm to 1500 mm in depth and 500 mm width.

In the main drain, polythene sheet should be laid at the bottom of the trenches.

Geotextile should then be laid filled with 40 mm to 60 mm aggregates. The filled shape of the filter portion of the drain should be 500 mm x 500 mm.

In the case of herringbones, polythene sheet should be laid at the bottom of trenches. The polythene sheet should be raised 100 mm on the upper side then down on the floor and all the way to the top of the lower side.

The geotextile should be gradually closed together and secured, working up from the bottom of the slope while aggregates are passed in from above to fill them.

As the trench is filled with filler material for a certain length, remaining part should be filled with boulder. The boulders must be carefully placed to give a good structural integrity.

Once all of the lines are in place, all surplus debris should be cleaned off the slope.

SPL 804(5).5 MEASUREMENT FOR PAYMENT

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
SPL 804(5)a	Sub-soil Drain (Main Drain)	Meter
SPL 804(5)b	Sub-soil Drain (Herringbone Drain)	Meter

SPL 809 BRUSHLAYERING

SPL 809.1 DESCRIPTIONS

This work shall include furnishing and laying of live hardwood cutting or brush layers in the slopes of embankment and other locations shown on the drawings or directed by the Engineer

SPL809.2 MATERIAL REQUIREMENTS

SPL 809.2.1 HARDWOOD CUTTING

450mm long with 20mm-50mm diameter hardwood cuttings which are known to propagate easily by vegetative means. The Contractor shall be responsible to supply the hardwood cutting as instructed by Engineer.

SPL 809.2.2 COLLECTION OF HARDWOOD CUTTING

Hardwood cuttings must be taken from shrubs and trees of species which are known to propagate easily by vegetative means.

Cuttings must be made from as many healthy individual plants as possible. The plants from which the cuttings are taken must show vigorous growth and good form. Misshaped and stunted plants should not be considered as sources.

Apart from the branches from which cuttings are taken the Contractor must under no circumstances damage plants while taking cuttings. The Contractor is responsible for taking safety precautions and for making all necessary arrangements with landowners, farmers and local district forest office, as applicable before the making of cuttings.

Hardwood cuttings must be made from stem which are between 6 and 18 months old. Materials outside range are normally vigorous or strong enough to survive as cuttings. The Contractor may be held liable if the success rate of cuttings is seriously lower than the normally expected percentage.

Hardwood cuttings must be made using sharp secateurs or sharp knife. The top cut should be made at right angles to the stem and the bottom cut should be made at 45° to identify the top from the bottom of the cutting and show orientation of planting. Under no circumstances must there be any damage to the bark of cuttings.

Hardwood cuttings are 300 mm to 450 mm in length and 20mm to 50mm in diameter. The size should not be exceeded for the majority of species unless specified by the Enginee.

Once cuttings have been made they must be wrapped in wet hessian jute immediately or other suitable fabric to keep them moist. At all times, cuttings are to be kept moist and as cool as possible and should be wrapped in wet hessian between all operations such as taking from the parent plants, trimming and planting. Under all circumstances, all cuttings must be planted the same day that they are made.

SPL 809.3 CONSTRUCTION METHODS

a. Under certain conditions, the Contractor will be required to construct brushlayer using hardwood cuttings. Where specified, the Contractor is required to carry out the necessary preparation and planting works as required in the Engineer's instructions.

b. It is assumed that the site will already have been prepared for planting under a separate instruction, but it is nevertheless the responsibility of the Contractor to ensure that the condition of the site is good enough for the successful establishment of delicate plants.

c. The Contractor will be responsible for collection and transportation of cuttings. Engineer will specify the species and expected / target sources and the Contractor must then obtain the cuttings required. This will be done in the manner described in provision of hardwood cutting, except that the size of the cuttings will be a length of 450mm and diameter of 20mm to 50mm for brush layer. At all times, cuttings are to be kept moist and as cool as possible and should be wrapped in wet hessian between all operations such as cutting from parent plant, trimming and planting. Under any circumstances all plants supplied must be planted the same day that they are collected from the source.

d. The Contractor is required to supervise all field operations very closely. The planting of trees and shrub cuttings is a delicate business and should be approached in the same way as the planting of horticulture cuttings. The Contractor should employ experienced agricultural or forestry labourers for this work

e. Brush layer should be constructed as given below, unless specified differently.

   I. Starting at the bottom of the slope area to be treated and using appropriate measuring equipment exact lines should be marked out. From 0.5 meter above the bottom of the slope a precise contour line should be marked out every 1.5 to 2.0 meter up the slope.

   II. Starting at the bottom, trenches depths approximately 350mm on slope should be excavated along the lines.

   III. Cuttings should then be placed into trench at 100mm centres the correct way up and angle so that they are right angles to the maximum slope angle. All cuttings should be inserted to depth such that two-thirds of their length is buried.

   IV. The trench should then be partially backfill and another line of cuttings placed along the trench at 100mm centres and 100mm behind the first line and with the individual cuttings offset to coincide with gaps between the cuttings in the first line. This results in cuttings at 50mm centres in each brush layer (21 cuttings per meter). The trench is then completely backfilled with soil and gently compacted. Any loose or excess material is cleared down the slope.

SPL 809.3.1 WATERING AND MAINTENANCE

All trees shall be watered during the planting operations, subject to direction and approval by the Engineer

The Contractor shall, during the life of the Contract; properly care for all brush-layer furnished, planted or stored, performing such watering, weeding, cultivating or other ordinary maintenance work as shall be necessary to keep the stock in a live and healthy condition. Brush-layers that have died shall be replaced by the Contractor at no additional expense to the Employer.

SPL 809.4 METHOD OF MEASUREMENT

The quantity to be paid for shall be the linear meter of constructed brush layer as directed by the Engineer furnished, planted and accepted.

SPL 809.5 BASIS OF PAYMENT

The quantities as determined in Subsection SPL 809 Method of Measurement shall be paid for at the contract unit. Payment shall constitute full compensation for furnishing all labor, tools and incidentals necessary to complete the item.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
SPL 809	Brush-layering Work with Hardwood Cuttings	Linear Meter

ITEM SPL 810 TURFING WITH SODS

SPL 810.1 DESCRIPTIONS

This work shall include furnishing and laying of live sod of perennial turf which forms grass on the slopes of embankment, shoulders and other locations shown on the drawings or directed by the Engineer.

Unless otherwise specified, such works shall be carried out immediately after the completion of relevant construction items provided that the season is favourable and for turfing.

SPL 810.2 MATERIAL REQUIREMENTS

SPL 810.2.1 SODS

The sod shall be dense and have well-rooted growth of permanent and desirable grasses which are indigenous to the locality where it is supposed to be used. It shall be practically free from weeds or other undesirable matters.

When the sod is cut for re-use, the thickness of the grass layer on sod should be approximately 50 mm and free from debris. The overall thickness of the sod should be as uniform as possible with 5-8 cm thick cover of soil containing grass roots. Practically, the entire root system of the grasses shall remain intact in the sod strip as the sod is cut.

The sods shall be cut in rectangular strips having dimensions of not less than 20 cm x 30 cm. However, the sods shall not be in excessively large size which may cause inconvenience in handling and transportation.

During wet weather, the sod shall be allowed to dry sufficiently in order to avoid any tearing during handling. During dry weather, the sod shall be watered in order to prevent the separation of soil during handling. Furthermore, watering keeps the grass alive.

The contractor shall be responsible to supply the sods for turfing within 24hrs of the work as instructed by Engineer.

SPL 810.3 CONSTRUCTION METHODS

SPL 810.3.1 PREPARATION OF ERTHEN BED FOR TURFING

The area to be turfed shall be constructed in advance to the required slope and cross-section. Soil on the area shall be loosened and made free from all stones larger than 50 mm diameter, sticks, stumps and undesirable hostile matters. Soil on the area shall be prepared to a reasonably fine granular texture up to a depth of not less than 25 mm.

If the sod bed is not sufficiently wet, then the prepared sod bed shall be moistened to the loosened depth prior to turfing. The sod shall, however, be placed within 24 hours of its detachment from the original ground.

Each sod strip shall be laid edge to edge. Each strip, when placed tightly against the other, shall be tamped with wooden or metal tampers in order to eliminate air pockets and to press it into the underlying soil layer.

On side slopes steeper than 2:1, the laying of sods shall be carried out from the bottom to the top. At places where water may flow over the turfed area, the top edge of the lower strip shall always be inserted into the down edge of the higher strip and a layer of soil shall be placed over the joint followed by its compaction.

SPL 810.3.2 STAKING THE SODS

Where the slope is 2:1 or steeper and the distance along the slope is more than 2 m, the sods shall be staked with pegs or nails spaced approximately 50 to 100 cm along the longitudinal axis of the sod strips. The stakes shall be driven approximately perpendicular to the sod surface.

SPL 810.3.3 TOP DRESSING

After the sods have been laid in position, the surface shall be cleared of loose sods, excess soil and other hostile materials. A thin layer of top soil shall be spread over the turf and the turfed area shall be moistened by sprinkling water.

SPL 810.3.4 WATERING AND MAINTENANCE

The turf shall be watered regularly by the Contractor for a period of at least four weeks after its laying. Watering shall be carried out without damaging the turf by erosion or flooding. The turfed areas shall be protected by barriers from any damage that could be caused by wheels of water browsers or by people walking over it. To this effect, the Contractor shall erect necessary warning signs and barriers.

The Contractor shall repair or replace damaged or dead turfed areas by new sods if any area fails to show uniform growth of grass. If such situation occurs as a result of the Contractor's negligence then it shall be rectified at no cost to the Employer.

SPL 810.3.5 METHOD OF MEASUREMENT

The quantity to be paid for shall be the square metres of constructed turfing as directed by the Engineer installed, planted, alive and accepted.

SPL 810.5 BASIS OF PAYMENT

The quantities as determined in Subsection SPL 810 Method of Measurement shall be paid for at the contract unit. Payment shall constitute full compensation for furnishing all labor, tools and incidentals necessary to complete the item.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
SPL 810	Turfing of Sods	Square Meter

SPL 811 GRASS PLANTING

SPL 811.1 DESCRIPTIONS

This work shall include planting of grass slips or rhizomes in the slopes of embankment and other locations shown on the drawings or directed by the Engineer

SPL 811.2 MATERIAL REQUIREMENTS

SPL 811.2.1 GRASS SLIPS OR RHIZOMES

Slips or rhizomes of various types must be taken from grass species which are known to propagate easily by vegetative means.

The Contractor shall be responsible to supply the grass slips/rhizome as instructed by Engineer.

SPL 811.2.2 COLLECTION OF GRASS SLIP AND RHIZOME

Cutting slips and rhysomes must be made from as many healthy individual plants as possible. The plants from which the cuttings are taken must show vigorous growth and good form. Grass clumps showing slow growth should not be considered as sources. The cuttings should be taken over several small locations in a wider area so as not to expose the source area to erosion.

Apart from the clumps which are dug to make cuttings, the Contractor must under no circumstances damage other plants. The Contractor is responsible for making all necessary arrangements with landowners, farmers and district forest offices as applicable, before making of cuttings.

Where roots are required for cuttings, grass clumps should be carefully dug up. They must not be pulled hard as this can damage the material. They must be separated carefully by hand using a sharp knife when necessary. There must be no tearing of the plant roots, stems and leaves.

Slips and rhysome stem cuttings must be made using sharp secateurs or knife. The top cut should be made at right angles to the stem and the bottom cut should be made at 45°to the stem; this is to show the orientation of the planting.

Once cuttings have been made they must be wrapped in wet hessian jute immediately. At all times cuttings are to be kept moist and as cool as possible and should be wrapped in wet hessian between all operations such as digging out of the planting drills, splitting out, trimming and planting. Under any circumstances all cutting must be planted the same day that they are made.

SPL 811.3 CONSTRUCTION METHODS

a. The planting of grass slips and cuttings is intended to create a strengthened slope surface which is resistant to erosion. The Contractor is required to carry out the planting of grass seedlings or rooted cuttings, according to the Engineer's specific instructions. The configuration of plant will be determined according to individual site conditions. It will be contoured, down slope or diagonal.

b. It is assumed that the site will already have been prepared for planting under a slope preparation, but it is nevertheless the responsibility of the Contractor to ensure that the conditions of site is good enough for the successful establishment of grasses and accords with the specifications given in collection and preparation of grass slips and cuttings

c. The Contractor will be responsible for supplying of grass. The Engineer will specify the species and expected sources and the Contractor must then obtain the required quantity of grass.

d. Using appropriate tools (such as tape measures, sprit level and line string) planting lines must be marked out as per ngineer's specific instruction,

e. The contractor is required to supervise all field operations very closely. The planting of grass slips is a delicate business and should be approached in the same way as the transplanting of millet seedling. The Contractor should employ experienced agriculture labourers for this work.

f. The plants supplied to the Contractor should be prepared for planting by the Contractor as given below; the Contractor is to transport them from the source wrapped in hessian jute. At all times plants to be kept moist and as cool as possible and should be wrapped in wet hessian jute between all operations such as extraction from the source, pruning and planting. Under any circumstances all plants supplied must be planted the same day that they are lifted from the source.

    g. Grass slips or cuttings should be carefully separated from the clumps to give the maximum viable planting material. Any roots in excess of 35 mm should be cut off using knife. Shoots and stems should be lopped off 100mm to 150 mm above the ground level.

    h. Planting should be started at the top of the slope under no circumstances should new plants be walked on or otherwise be disturbed. Using a small dibber bar (usually made of mild steel and with flatten end) a hole should be made in cylindrical shape that is just big enough for the roots. The slips or cutting is inserted and care must be taken that the roots are not tangled or bent back to the surface. Soil is then replaced around the roots and firmed with fingers. The spacing of the plant within the rows should be 100mm unless otherwise specified.

i. If the soil is dry and there is no rain within 16 to 24 hours of planting, the site should be watered carefully with fine spray. The Contractor will be required to water the plants for the 1st two weeks after planting in the event of inadequate rainfall.

j. Engineer will specify the species and expected source of grass plants. It is important to minimize disruption to neighboring land in the event that species are collected from surrounding area. It is the Contractor's responsibilities to collect the stock required from an area and not to give rise to any soil erosion through the excessive removal of plants in one locality.

SPL 811.4 METHOD OF MEASUREMENT

The quantity to be paid for shall be the liner meter of planted grass in contour lines and square meter of planted grass in random as directed by the Engineer furnished, planted and accepted.

SPL 811.5 BASIS OF PAYMENT

The quantities as determined in Subsection SPL 811.4 Method of Measurement shall be paid for at the contract unit. Payment shall constitute full compensation for furnishing all labor, tools and incidentals necessary to complete the item.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
SPL 811(a)	Grass Planting in Contour Lines	Linear Meter
SPL 811(b)	Grass Planting in Randomly	Square Meter

ITEM SPL 812 COIR NET

SPL 812.1 SUPPLY OF COIR NET

a) The Contractor shall provide and install coir netting as required by the Engineer. T his shall be done according to specifications described hereunder, as and when re quired. The Contractor shall supply all necessary expertise, resources and facilities to ensure that these requirements are met.

b) The Engineer may instruct that coir netting applications be used in conjunction wit h other techniques, particularly the sowing or planting of grasses. In this event, the netting should be applied before the plants are introduced. When planting, the labo urers must take care only to hold or stand on the pegs and not disturb the netting e xcept when carefully placing grass seed underneath on the soil surface.

c) The Contractor will obtain a supply of coir netting to the Engineer's specification.

d) The detailed specifications for standard coir netting are as follows: "Standard" coir netting is used for placing on bare slope and is normally planted with grasses. [Note: warp ends are the length-ways threads and weft strands are the cross-way s threads]

i)	Material	:	High quality (special grained), 100% natural coconut fiber from the latest harvest, properly treated and dried.
ii)	Yarn	:	Handspun 4 to 6 mm
iii)	Strip size	:	Minimum 1.0 x 10.0 meter Maximum 1.5 x 11.5 meter
iv)	Warp ends	:	27 ends per 1000 mm
v)	Weft strands	:	20 to 24 strands per 1000 mm.
vi)	Mesh size		40 mm square mesh holes.
vii)	Weight	:	1 to 1.1 kg per square meter (dry).

SPL 812.2 PLACEMENT OF NET

a. The Engineer will normally instruct the placement of standard coir netting on slop es in excess of 40 degrees. It is therefore a difficult task to place the netting in an effective manner which fulfils the Engineer's purpose. Carelessly placed netting i s often useless and can actually detrimental slope surface.

b. It is assumed that the site will already have been prepared for the application of c oir netting under a separate instruction; but it is nevertheless the responsibility of the Contractor to ensure that the condition of the site is good enough for the opti mum effect to be attained. In any event, a smooth profile must be obtained. All lo ose debris must be removed. Concavities must be filled with well compacted mat erial or in some cases, with dry stone dentition. Convexities must also be remove d and it is essential that the general profile does not have a shape giving over-ste ep segments.

c. Starting one end of the site to be treated, a roll of netting should be pegged 300 mm above the slope to be covered.

d. The netting should be rolled slowly down the slope. Hardwood cuttings or split bamboo pegs should be hammered through the netting at centre of 500-1000mm; they should protrude about 8mm. labourers must stand on these cuttings or pegs and not to hang on to the netting. As the full length of coir netting is unrolled dow n the slope, a second round of the pegs should be added in between. This will m ake total allowable spacing not more than 500mm intervals. Another strip of coir net is then unrolled from the top. This should overlap by 100mm and under no cir cumstances the pegging should be done through the both layer of coir net, instea d it should be pegged separately. Therefore each net is pegged down individually

e. The tension of the netting must now be reduced so that it hugs the slope surface precisely. This is done by pulling up about 200mm at the bottom of the netting an d hooking it on the pegs a little higher up. This process is repeated up and acros s the slope until the netting rests snugly against the surface and is nowhere tight or pulled away from the surface in minor concavities. Additional pegs should be u sed to hold netting closely against the surface of concave slope segment if neces sary.

f. This process should be repeated until the entire slope surface is covered. There must be no lacing of any coir netting.

g. Finally the bottom of netting is trimmed to give neat and tidy finish.

SPL812.3 MEASUREMENTS FOR PAYMENT

The quantity to be paid for shall be the square meter of netted area as directed by the Engineer installed and accepted.

Pay Item No.	Description	Unit of Measurement
SPL 812	Coir netting	Square Meter

ITEM SPL 813 TREE PLANTING

SPL 813.1 DESCRIPTIONS

The planting of trees and shrubs is intended to replace or restore something of the natural vegetation on the slope to be treated. The Contractor is required to carry out the planting of seedlings to the Engineer's specific instruction.

SPL 813.2 MATERIAL REQUIREMENTS

SPL 813.2.1 MULCHING

Mulching material shall consist of approved wood chips, leaves, rice bran shavings, rice stalks, or saw dust. Bracing stakes for plants shall be 50 mm x 50 mm of rough wood free from unsound loose knots, rot, sapwood or other defects that may impair its strength.

SPL 813.2.2 TREES

All trees furnished under this item shall be 150 mm or less in diameter and shall be the
Casuarina junghana and *Swietenia mahagoni* tree or other local specie approved by the Engineer. Trees furnished by the Contractor shall be healthy, shapely and well rooted and roots shall show no evidence of having been restricted or deformed at any time.
Trees shall be free from insect pest and disease.

SPL 813.3 CONSTRUCTION METHODS

a. The Contractor to ensure that the condition of the site is good enough for the successful establishment of delicate young plants.

b. The spacing of the plants will be determined according to the individual site conditions and nature of plants. However, it will normally be at 2.5 meter centres unless otherwise specified.

c. The Contractor is required to supervise all field operations very closely. The planting of trees and shrubs is a delicate business and should be approached in the same way as the planting of horticulture seedlings. The Contractor should employ experienced agricultural or forestry labourers for this work.

d. The Contractor will be responsible for supplying of plants. Engineer will specify the species and the Contractor must then obtain the required quantity of plants. The plant should be at least 300mm in height above the soil surface and hardened off in the normal way. The Contractor is to collect the plants from the nursery and transport them to site with all due care. The plants will normally be supplied in polypots never by the stem or leaves. At all times they are to be kept as cool as possible. The Contractor is responsible for ensuring that the soil around the roots does not dry out. Under any circumstances all plants supplied must be planted within three days of removal from the nursery.

e. Planting should be started at the top of the slope and under no circumstances should new plants be walked on or otherwise disturbed.

f. A planting pit 30 cm wide and 30 cm deep enough for the main root to be buried in without bending it and wide enough for all the roots and surrounding soil ball should be made at the time of planting. Some compost, if available, should be mixed with soil from the silt prior to backfilling around the roots. The protective plastic polypots must be removed from the seedling by cutting it away with a razor blade. The plant should then be carefully placed into the hole with the compost at the bottom and soil packed in. All surrounding soil firmed up taking care not to cause any damage to the plant and its roots. The surface over and around the pit should then be mulched using any appropriate locally available material such as manure compost dead leaves or cut herbage.

SPL 813.3.1 WATERING AND MAINTENANCE

All trees shall be watered during the planting operations, subject to direction and approval by the Engineer

The Contractor shall, during the life of the Contract; properly care for all trees furnished, planted or stored, performing such watering, weeding, cultivating or other ordinary maintenance work as shall be necessary to keep the stock in a live and healthy condition. Trees that have died shall be replaced by the Contractor at no additional expense to the Employer.

SPL 813.4 METHOD OF MEASUREMENT

The quantity to be paid for shall be the number of trees planted as directed by the Engineer furnished, planted and accepted.

SPL 813.5 BASIS OF PAYMENT

The quantities as determined in Subsection SPL 813.4 Method of Measurement, shall be paid for at the contract unit price for each specified specie of tree furnished, planted and accepted which price and payment shall constitute full compensation for furnishing all labor, tools and incidentals necessary to complete the item.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
SPL 813	Tree Planting	Each

ITEM SPL 814 BAMBOO TREE GUARDS

SPL 814.1 FABBRICATION OF BAMBOO TREE GUARDS

a) The Contractor shall provide bamboo tree guards as required by the Engineer. This shall be done according to the specifications described hereunder, as and when required. The Contractors' shall supply all necessary supervision, resources and facilities to ensure that these requirements are met.

b) The bamboo strips used to make bamboo tree guards are to be made from mal bans (Bambusa nutans subsp cupulata) whilst the uprights are to be made from tharu or dhanu bas (Bambusa nutans subsp nutans or Bambusa balcooa). Bamboo tree guards shall be a minimum of 450 mm in diameter by 1300 mm in height so that they are able to provide sufficient protection from grazing and from the elements for the first 18 months after planting the seedling.

c) The guard is made by cutting 5 bamboo posts which are a minimum of 50 mm wide by 10 mm thick and at least 1600 mm long. The posts should be cut so that they have a strong spear-like point at the bottom that can be driven into the ground when placing out on site. The bamboo poles used to make the uprights should be a minimum of 3 years old.

d) Bamboo strips, a minimum of 5 mm thick and 50 mm wide are cut from poles that are at least 2 years old. The bamboo used must be split so that the outer wall remains intact. Only lengths with the outer wall intact are to be used. The split bamboo should be the length of the whole bamboo pole that it is cut from, or as long as possible. The split bamboo must be woven in and out of the bamboo uprights and pulled tight, so that it is firm and strong. The end of each of the strips must be woven back into the basket and tied with binding wire to keep it in place. End pieces must not be left sticking out and unbound, because they quickly get broken and the basket starts to unravel from this point. The split bamboo should be woven round the poles so that when they are tightly pressed down there are no gaps in the guard.

SPL 814.2 PLACEMENT OF BAMBOO TREE GUARDS

a) Tree guards are to be installed on site at the time of planting and must be placed carefully around the planted seedlings.

b) The tree guards should be placed over the seedling immediately after planting. The upright posts must be firmly driven at least 300 mm into the ground so that the guard is able to resist bashing and rubbing from cows, buffalo, goats and people. The woven slats should be pushed down firmly from the bottom upwards so that they touch one another and are free from large gaps.

c) Tree guards alone are not adequate protection for small plants. The Contractor must provide a site watchman in addition, for the time specified, to maintain the tree guards and planted trees at site.

SPL 814.3 MEASUREMENTS FOR PAYMENT

The quantity to be paid for shall be the number of tree guards placed in the site as directed by the Engineer, furnished and accepted.

Pay Item No.	Description	Unit of Measurement
SPL 814	Bamboo tree guards	Each

ITEM SPL 815 SITE PROTECTION

SPL 815.1 GENERAL

a) The Contractor is to protect a planted site for the period specified. Protection is to include the prevention of damage to all manner of site works and plants by local people and domestic or wild animals. It also includes an active role in tending the plants and improving their growth, as specified below.

b) Because of the long time required for plants to become robust, the period of maintenance by the Contractor will normally be for twelve months. However, in the case of small contracts, a period of only six months may be specified.

SPL 815.2 PROVISION AND ROLE OF WATCHMAN

a) The Contractor is required to provide an adequate number of site watchmen to fulfill the specified requirements.

b) Watchmen must be mature and reliable characters who need little supervision for the adequate fulfillment of their duties. They must be active and physically fit. Old people who are losing their strength should not be employed. They must be experienced agricultural workers familiar with caring for plants. They must be prepared to remain on site through all hours of daylight and through all adverse weather conditions. They must eat their meals on site and at no time leave the site untended for any reason whatsoever.

c) The role of the watchman is primarily to tend the plants. He must take the initiative in weeding, mulching, replanting failed plants, pruning and protecting plants against all pests. This is an active role requiring individuals with considerable energy and initiative. The watchman must work constantly to maintain and improve the site and its bio-engineering plants.

d) The watchman is also required to protect plants on the site from damage by local people, domestic and wild animals. In doing this he should use a friendly approach to the people as far as possible. The Contractor must educate the watchman fully in the reasons for his/her job, so that he/she can explain to others the importance of safeguarding the plants on the site. He/she should be an

effective communicator with others since he/she also fulfils and inevitable function as the ambassador between the MPWTC and local road neighbors.

SPL 815.3 MEASUREMENTS FOR PAYMENT

Site protection shall not be paid separately, the cost of complying with this requirement shall be deemed included in the rates and prices of the pay items in the Bill of Quantities.

C1. DAYWORK SCHEDULE, SECTION 1: LAUTEM-COM SECTION

General

1. Reference should be made to Clause 13.6 of the Conditions of Contract. Work shall not be executed on a Daywork basis except by written order of the Engineer. Contractor shall enter rates for Daywork items in schedules, which rates shall apply to any quantity of Daywork ordered by the Engineer.

2. The Contractors shall price all items in the Daywork schedule for Labour, Equipment/Plant and Material.

3. The Quantities reflected in the BOQ for Dayworks are intended as common basis for comparison of bids. The quantities to be paid as a result of executing work through Dayworks shall be actual quantities of materials, labour and equipment regardless if it exceeds the quantities reflected in the BOQ provided the total Dayworks cost does not exceed the total contract amount for Dayworks.

Daywork for Labour

4. In calculating payments due to the Contractor for the execution of dayworks, the hours for labour will be reckoned from the time of arrival of the labour at the jobsite to execute the particular item of emergency work to the time of departure from the job site, but excluding meal breaks and rest periods. Only the time of classes of labour directly doing work ordered by the Engineer and are competent to perform such work will be measured.

5. The Contractor shall be entitled to payment in respect of the total time that labour is employed, calculated at the basic rates entered by it in the SCHEDULE OF DAYWORKS RATES: 1. “LABOUR”. The rates for labour shall be deemed to cover all costs to the Contractor including (but not limited to) the amount of wages paid to such labour, transportation time, overtime, subsistence allowances, and any sums paid to or on behalf of such labour social benefits in accordance with The Democratic Republic of Timor Leste law, as well as Contractor’s profit, overheads, superintendence, liabilities and insurance and allowance to labour, time keeping and clerical and office work, the use of consumable

stores, water, lighting and power; the use and repair of staging, scaffolding, workshops and sores, portable power tools, manual plant and tools; supervision by the Contractor's staff, foremen and other supervisory personnel; and charges incidental to the foregoing.

SCHEDULE OF DAYWORK RATES: 1. LABOUR

SPL 1001(1)

Item No.	Description	Quantity (hr.)	Hourly Rate (US $/hr.)	Amount (US$)
DW 101	Foreman	496		
DW 102	Skilled Labour	1,920		
DW 103	Unskilled Labour	1,120		
DW 104	Operator for Heavy Equipment	800		
DW 105	Operator for Light Equipment	720		
DW 106	Driver for Heavy Duty Vehicle	960		
DW 107	Driver for Light Duty Vehicle	496		
DW 108	Electrician	480		
TOTAL FOR DAYWORK: LABOUR Carried forward to Daywork Summary				

Daywork for Contractor's Equipment:

6. The Contractor shall be entitled to payments in respect of Constructional plant already on Site and employed on emergency at the basic rental rates entered by him in the SCHEDULE OF DAYWORKS RATES: 2. "CONTRACTOR'S EQUIPMENT". The said rates shall be deemed to include due and complete allowance for depreciation, interest, indemnity and insurance, repairs, maintenance, supplies, fuel, lubricants and other consumable and all overhead profit and administrative costs related to the use of such equipment. The cost of driver, operators and assistants will be paid for separately as described under the section on Daywork Labour.

7. In calculating the payment due to the Contractor for Construction Plant employed on daywork, only the actual number of working hours will be eligible for payment, except that where applicable and agreed with the Engineer, the travelling time from the part of the Site where the Construction Plant was located when ordered by the Engineer to be employed on emergency work and the time for return journey shall be included for payment.

SCHEDULE OF DAYWORKS RATES: 2. CONTRACTOR'S EQUIPMENT

SPL 1001(2)

Item No.	Description	Quantity (hr)	Rental Rate (US$ /hr.)	Amount (US$)
DW201	Wheel Loader, 1.8 cu.m. bucket capacity, 160hp	240		
DW202	Motor Grader, 160 hp	80		
DW203	Backhoe/Excavator 100 hp	240		
DW204	Low Bed Trailer and Truck, 45 t capacity	240		
DW205	Vibrating Roller Single Smooth Drum, 10t, 150ph	240		
DW206	Portable air compressor	240		
DW207	Plate Compactor, vibrating, 15hp	240		
DW208	Water Pump, 100 mm diameter	240		
DW209	Water Truck with pump. 4500liters with spray	240		
DW210	Dump Truck 6-7 cu. m capacity	480		
DW211	Generator Set, 50 KVA	480		
TOTAL FOR DAYWORK: CONTRACTOR'S EQUIPMENT Carried forward to Daywork Summary				

Daywork for Materials

8. The Contractor shall be entitled to payment in respect of materials used for Daywork at the rates entered by him in the SCHEDULE OF DAYWORK RATES: 3. "MATERIALS" and shall be deemed to include overhead charges and profit as follows;

   (a) the rates for materials shall be deemed to include freight, insurance, handling expenses, damage, losses, etc., and shall provide for delivery to store for stockpiling at the Site.
   (b) the cost of hauling materials for use on work ordered to be carried out as Daywork from the store or stockpile on the Site to the place where it is to be used will be paid in accordance with the terms for Labour and Constructional Plant in this Schedule.

SCHEDULE OF DAYWORK RATES: 3. MATERIALS

SPL 1001(3)

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE (US$)	TOTAL AMOUNT

					(US$)
DW301	Aggregate Subbase Course	m^3	300		
DW302	Fine Aggregates for Masonry Works	m^3	288		
DW303	Boulders	m^3	720		
DW304	Portland Cement,40kg	bag	5,184		
DW305	Diesel	liter	19,560		
DW306	Gasoline (Petrol)	liter	360		
TOTAL FOR DAYWORK: MATERIALS Carried forward Daywork Summary					

TS - 2b: SPECIAL SPECIFICATIONS

Performance Based Maintenance Works

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SPECIFICATIONS FOR PERFORMANCE BASED MAINTENANCE WORKS

PBM. 1 Description of Works to be provided

PBM.1.1 General Specifications

PBM.1.1.1 Scope of Works to be provided

Maintenance works are those activities necessary for keeping the road in compliance with the Performance Standards which shall include all activities required to achieve and keep the Road Performance Standards and Service Levels.

In particular, they include management tasks and physical works associated with the following outputs:

Output: Carriageway Maintenance

Pavement Maintenance
Bridge and Structure Maintenance

Output: Roadside Maintenance

Shoulder Maintenance
Drainage Maintenance
Traffic Services Maintenance
Health and Safety Management
Vegetation Control, Roadside slope and Slope protection
Slides Removal

The Contractor shall carry out the Performance-Based Maintenance (PBM) of the entire length of the road after the expiry of the 365 days Defects Notification Period (DNP).

Maintenance Works shall be billed in fixed monthly amount per Bill of Quantities. Payments shall be made with reductions for non-compliance with the performance standards in accordance with the methodology of these Specifications.

All works required for remedying any defect or damage on the pavement and other permanent works attributable to the Contractor shall be executed at the risk and cost of the Contractor during the Defects Notification Period. However, in the evaluation of PBM payment for non-compliance with the performance standards and service levels, any defect or damage on the pavement and other permanent works attributable to the Contractor shall be included for PBM payment reduction as defined in these specifications.

The Contractor is encouraged to subcontract the routine maintenance works to local communities where sufficient population density exists to allow for labor based maintenance to occur; and to small local contractors where sufficient population density does not support labor based community contracting.

PBM.1.1.2 Quality and Extraction of Materials

The materials used by the Contractor shall comply with or exceed the quality criteria as detailed in the Technical Specifications. The Contractor shall determine by his own preference the sites where suitable materials are known to exist and may be
extracted that meet quality requirements and to what permits may be needed and payments to be made, if any.

Prior to the extraction of materials for use on the roads included in the contract, the contractor shall ensure that;

(i) The laboratory test necessary to determine the quality of materials has been conducted
(ii) The quality of the materials is sufficient for the purpose intended.

The Contractor may also utilize materials from other sources, provided that the following criteria in the extraction is fully complied and satisfied:

(i) The extraction is in conformity with the legislation
(ii) The contractor has informed the Employer of his intention to utilize the material
(iii) The contractor has reviewed the result of the test as to the sufficiency of the technical characteristics

PBM.1.1.3 Performance-Based Management Unit (PBMU) of the Contractor

a. The Contractor shall establish, within his own organizational structure, a specific Unit staffed with qualified personnel, whose task is to verify continuously the degree of compliance by the Contractor with the required Service Levels.

b. In general terms, the PBMU will be responsible for maintaining a detailed and complete knowledge of the condition of the road and to provide to the management of the Contractor all the information needed in order to efficiently manage and maintain the road. The PBMU shall also carry out, in close collaboration with the Engineer, the verifications on the Service Levels.

c. The cost of establishing, operating and maintaining the PBMU shall be borne by the Contractor, and all such costs are deemed to be included in the Contractor's lump sum amount for a month in his bid.

PBM.1.1.4 Functions of Key Personnel

The Contractor shall submit a Performance Based Maintenance Organization Chart giving the functions/duties of his key personnel 28 days prior to the expiry date of the Defects Notification Period.

PBM.1.2 Specifications of Service Quality Criteria

The Service Levels measure the condition of the roads to assure their durability as well as to satisfy road user services and comfort. They comprise the usability of the road in terms of the outputs: pavement, bridge and structure, shoulder, drainage, vegetation control, traffic services and health and safety management.

There are three overall service level criteria or areas of performance requirements as follows.

1. Road Usability
2. Road User Service and Comfort Measures
3. Durability Performance Measures

PBM.1.3 Output Carriageway Maintenance

PBM.1.3.1 Pavement Maintenance 50%

The Operational Service Level for Asphalt Concrete Pavement (ACP) is defined as follows:

Item	Operational Service Level	Measurement/ Detection	Response Time (RT) in Days	Weight Factor
Lane Closure	There shall be no lane closure more than 4 hours in any section of the road	Visual Inspection	1	10
Potholes	No potholes allowed	Visual inspection.	2	15
Patches including delaminations	Patches shall be square or rectangular, parallel to the centerline of the road, level with surrounding pavement including seals, made of materials equal or better than those used for the surrounding pavement.	Visual Inspection Measurement with ruler with scale in mm	3	
Depression, rutting, corrugation and shoving	There shall be no depression, rut, corrugation, and shoving	Measurement with ruler with scale in mm	3	

Linear cracks	All cracks shall be sealed. Sealant height shall be within ± 2 mm of adjacent pavement surface.	Measurement with a tape measure and ruler with a scale of mm.	7	9
Multiple cracks (alligator cracking)	Cracked areas shall be less than 1.0 m^2 and sealed in any continuous 100 m of road section.	For multiple cracks and cracks crossing each other, the "cracked area" is measured enclosing the cracks.	7	
Edge Breaks	There shall be no loose or broken off portion of the edge of the pavement more than 200 mm of a total of 50 m of lanes of any continuous road section of one kilometer.	Measurement with a straight edge of 1.2 m length and a ruler with a scale in mm	3	8
Pavement Surface Drain Defects	There shall be no water ponding on the pavement	Visual Inspection/measurement by tape	5	5
Pavement Cleanliness	There shall be no debris , soil, trash or any waste material on the pavement and shoulder	Visual Inspection	2	3

PBM.1.3.2 Bridges and Other Structures Maintenance 10%

The operational service levels for bridges and other structures are defined as follows:

Approach to bridges	The level of the bridge deck shall not be more than ± 15 mm than the approaches.	Measurement with ruler with scale in mm, a measuring tape, and 3 m straight edge	20	2
Structures	Guardrails and parapets, must be present and not deformed or damaged. All metal parts shall be painted or otherwise protected and free of corrosion.	Visual inspection and measurement tape	20	2
Bridge deck	The bridge deck shall be clean and deck material shall be fully intact properly functioning as intended. Drainage system in good condition and fully functional.	Visual inspection	20	2

Retaining walls, bridge abutments and wing walls	Retaining walls, bridge abutments and wing walls must be clean and free of grass/vegetation and minor cracks and adequate drainage, Weep holes shall be clean and fully functional.	Visual inspection and measuring tape	20	2
Waterway	Cross-sectional area of the waterway shall not be obstructed by debris or inappropriate vegetation up to 50 m upstream and downstream.	Visual inspection and measuring tape	5 days / 1 day during emergency	2

PBM.1.4 Roadside Maintenance

PBM.1.4.1 Shoulder Maintenance 8%

The operational service levels for sealed and unsealed shoulders are defined as follows:

Item	Operational Service Level	Measurement/ Detection	Response Time (RT) in Days	Weight Factor
Width	Width shall be in accordance with the requirements of the Design Guidelines with a range of 0.5 m to 1 m. min.	Measurement tape	30	1
Potholes, Patches	There shall be no potholes on the shoulder.	Visual Inspection Measurement with a straight edge of 1.2m length and a ruler with a scale in mm.	5	4
Depressions and corrugation	There shall be no corrugation or depressions more in any continuous road section of one kilometer.	Measurement with a straight edge of 1.2m length and a ruler with a scale in mm.	5	1

Edge drop , inverted shoulder	The pavement shall not be lower or higher than the adjacent edge of the shoulder by 20mm at any point.	Visual Inspection Measurement with a tape measure and a ruler with a scale in mm.	10	1
Crossfall/ Surface drainage defects	There shall be no water ponding . Crossfall shall be in accordance with the design drawings.	Visual Inspection Measurement with a tape measure and a ruler with a scale in mm.	10	1

PBM.1.4.2 Drainage Maintenance 10%

The operational service levels for drainage system and slope protection are defined as follows:

Item	Operational Service Level	Measurement/ Detection	Response Time (RT) in Days	Weight Factor
Slopes of drainage system	There shall be no negative slope.	Visual Inspection Measurement with tape measure, waterlevel straight edge.	7	2
Ditches and drains with and without lining	Ditches and drains must be clean and free of silted materials, debris or obstacles and without erosion	Visual Inspection Measurement with a tape measure and a ruler with a scale of mm	7	5
Culverts (Pipes and Box) including inlets, outlets and headwalls	Culverts including inlets, outlets and headwalls must be clean and free of silted material and obstacles, and without structural damage. Must be firmly contained by surrounding soil or material.	Visual Inspection, Measurement with a tape measure and visual inspection	7	3

PBM.1.4.3 Traffic Services Maintenance 5%

The operational service levels for traffic services and other safety devices are defined as follows:

Item	Service Level	Measurement/ Detection	Response Time in Days	Weight Factor

Road Signs	All signs have to be present, complete, clean, properly erected, legible and clearly visible.	Visual inspection	1 day for missing signs and 10 days for all other defects	1
Pavement markings	Pavement markings shall be present, legible, painted to pavement, and visible at night.	Visual inspection	2 days for missing markers and 10 days for all other defects	2
Kilometer Post	Kilometer Post Have to be present, complete, clean, legible, properly erected and surface painted	Visual inspection	20	1
Guard rails and road safety barriers	Guardrails and road safety barriers have to be present in steep slopes.	Visual inspection and measurement with a 6 m long string, a ruler, a straight edge and measurement tape.	10	1

PBM.1.4.4 Health and Safety Management 2%

The operational service levels for health and safety management are defined as follows:

Item	Service Level	Measurement/ Detection	Response Time in Days	Weight Factor
Personal protective equipment	All workers must wear reflectorized vest, hard hat and safety shoes.	Visual inspection	1/2	2
Cone Barrier/ Lighting	Barriers shall be installed in road repair works. Light shall be provided during night time in areas where repair works are conducted.		1	

PBM.1.4.5 Vegetation, Road Slope and Slope Protection 7%

The operational service levels for vegetation control are defined as follows:

Item	Service Level	Measurement/ Detection	Response Time in Days	Weight Factor
Vegetation (grass, weeds, plants)	Vegetation on shoulders shall not be more than 10mm high and shall not obstruct the flow of water. Height of grass/vegetation (except trees) must be: □ Less than 150 mm to toe of slope or utmost side of lateral ditches.	Measurement with a ruler and a measuring tape	15	1
Trees and shrubs	Trees and bush branches within clearway must have branches cut back to be no closer than 4.75 meters vertically from the pavement surface and 2.50 meters horizontally from the outer edge of shoulder	Visual inspection and measuring pole of 4.5m	2 days if a road sign is obscured 15 days for all other cases	1
Roadside Slope and slope protection	Embankment slopes and slopes in cuts must be without deformation and erosion.	Visual Inspection	2	5

PBM.1.4.6 Slides Removal 8%

The operational service levels for Slides and Erosion are defined as follows:

Item	Service Level	Measurement/ Detection	Response Time (RT) in Days	Weight Factor
Slides (quantity of material is below 10.0 m3)	There shall be no slide of slope material on the road blocking any lane The carriageway must be free from landslides/ rockslides.	Visual Inspection /Measuring Tape.	1	8

PBM.1.5 ROAD ROUGHNESS

The Contractor is responsible for ensuring that the road roughness is below the threshold values given in the table below:

Item	Service Level	Measurement/ Detection	Response Time (RT) in Days
Road Roughness	The average value for any one (1) km road section must be less than the threshold value in IRI average 3.00	Measured with calibrated Bump Integrator	As instructed by the Engineer

PBM.1.6 Methods for Inspection of Service Quality Levels

PBM.1.6.1 Formal Inspections of Service Quality Levels

Formal inspections are those scheduled in advance by the Engineer, and carried out by the Contractor (through his PBMU) under the supervision of the Engineer. The main purpose of the formal inspections is to enable the Engineer to verify the information presented in the Contractor's Monthly Statement for PBM Works and to issue the Interim Payment Certificate for PBM. The Engineer must inform the Contractor of his intention to carry out a formal inspection at least 48 hours in advance, indicating the exact date, hour and location where the formal inspection is to begin. The Contractor is obliged to be present at the date, hour and location specified by the Engineer, providing the physical means needed for the inspection including transport.
The formal inspections allow the comparison of the information on compliance provided by the Contractor in the standard tables, which are part of his Monthly Statement for PBM Works, with actual measurements taken in locations to be determined by the Engineer. During the formal inspections, the Engineer will prepare a brief Memorandum describing:

(i) The general circumstances of the site visit, including date, road sections visited, persons present, etc.,
(ii) The description and location of any non-compliance which may have been detected, and
(iii) The response times to remedy the detected defects.

Based on the outcome of the formal inspection, the Engineer will immediately correct any possible errors or misrepresentations in the Contractor's statement, countersign it and present it to the Employer for payment, and to the Contractor for information. All Service Levels that do not meet the requirements will be taken into account when calculating the monthly compliance with Service Levels, even if they have been granted a response time. For all non-complying Operational Service Levels recorded during the formal inspection the response time will start on the day the non-compliance has been recorded.

For the formal inspections of compliance with Service Levels, the Contractor's PBMU will work together with the Engineer. The Contractor will provide the physical means needed for the inspections; they are the same that are normally used by the PBMU for the continuous self-evaluation of the Contractor's compliance.

The Engineer will also schedule formal inspections for the follow-up site visits, whose purpose is to verify if the Contractor has remedied the causes of earlier non-compliance within the time frames specified by the respective response times. The Contractor shall participate in the follow-up site visits. Penalties will be applied if Service Levels are not complied with within the respective response times. The penalties will be deducted from the amounts due to the Contractor at the end of each month.

PBM.1.6.2 Informal Inspections of Service Levels

The Engineer may carry out informal inspections of Service Levels. If he detects any road sections where the Service Level criteria are not met, he will inform the Contractor within 24 hours in writing, in order to enable the Contractor to take remedial action within the response times defined in the contract. The results of informal inspections may be used by the Engineer for evaluating the performance of the contractor.

PBM.1.6.3

Verification of Test Results Ordered by the Engineer

If the Engineer disputes testing results submitted by the Contractor, he can order the Contractor to retest under his supervision or can order a third party to verify the testing results. If the testing results of the verification of test results ordered by the Engineer are in compliance with the specifications, the Engineer will have to pay for the retesting, otherwise the Contractor has bear the cost of the verification of test results.

Form 01: Contractor's Monthly Service Level Inspection Report

Form 01: Contractor's Monthly Service Level Inspection Report														
Contract Number:		**Month/Year:**												
Road/Road Section:		**Length at required service levels:**												
Category	Item													
Output: Carriageway Maintenance		1	2	3	4	5	6	7	8	9	10			Total km complying
Road usability	Lane closure													
Pavement	Potholes & Patches , Depression, rutting, corrugations, raveling and shoving													
	Cracks													
	Edge Breaks													
	Pavement surface drains													
	Cleanliness													
Bridges and other structures	Bridge Approaches													
	Structures													
	Bridge Decks													
	Retaining walls, bridge abutments and wing walls													
	waterway													
Output: Roadside Maintenance														
Shoulders	Width, obstructions, vegetation													
	Potholes, depressions, rutting, corrugation, raveling & shoving													
	Edge drop off, inverted shoulder													
	Surface drainage/crossfall													
Drainage system	Drainage slope													
	Ditches and drains													
	Culverts and inlets and outlets													
Traffic Services	Road signs													
	Pavement markings													
	Kilometer posts, parapets & concrete barriers													
Health and safety management	Personal Protective Equipment (PPE)/cone barrier and lighting													
	Grass, weeds and plants													

Vegetation, Roadside slope and slope protection	Trees and shrubs													
	Roadside slope and Slope protection													
Slides removal	Slides removal on the carriageway													

Date of inspection:_____

---------- (signature)

For the Contractor

Form 02: Monthly Memorandum of Non-Compliance with Service Levels

Form 02: Monthly Memorandum of Non-Compliance with Service Levels		
Contract No.:	Road:	Month/year:

Location	Non-Compliance				
	Item No.	Description	Date of detection	Response time	Date Due

----------(signature) ----------(signature)

Engineer Contractor

Date:_____

Form 03: Memorandum of Non-Compliance with Service Levels Based on Informal Inspections

Form 03: Memorandum of Non-Compliance with Service Levels Based on Informal Inspections

Contract No.:	Road:

Location	Non-Compliance				
	Item No.	Description	Date of detection	Response time	Date due

----------(signature) ----------(signature)

Engineer Received by Contractor

Date:_____ Date and time:_____

Form 04: Contractor's Operational Service Level Inspection and Remedial Works Report

Contract No:	Road:

Item	Non-compliance				Nature and extent of remedial works
	Date of detection	**location**	**extent and nature**	**probable cause**	

_____(signature) Date:
Contractor

PBM.1.7 Procedures for Inspection and Evaluation of Service Levels

The inspection of service quality levels on the road will be carried out in accordance with the following procedures:

General aspects of the road may be evaluated by visual inspections and measurements which do not require sophisticated equipment. The two outputs, carriageway and roadside shall be evaluated. Under carriageway, pavement and bridge structures shall be evaluated per work activity as presented in the evaluation form. Likewise, for roadside, shoulders, drainage vegetation control, traffic services and health and safety management shall be similarly evaluated per work activity as contained in the evaluation form.

The formal monthly inspection of general aspects for each road section included in the contract shall be carried out based on tests sections of 100m per one kilometer road. The location of the test sections will be determined by the Engineer, with selected sections varying month to month at the sole discretion of the Engineer.

Each 100 m shall represent one kilometer road. The inspection process shall determine, for each segment of 100 meters, if non-compliance exists for any of the aspects to be verified (pavement, bridge and structures, shoulder, drainage, vegetation, traffic services and health and safety management), it will mean noncompliance to the whole kilometer. Each type of non-compliance will receive a weight factor and any payment deductions will be calculated.

ASPECT	WEIGHT FACTOR
Carriageway	60
Pavement	50
Bridge and Structures	10
Roadside	40
Shoulder	8
Drainage	10
Traffic Services	5
Health and Safety Management	2
Vegetation, Roadside Slope and Slope Protection	7
Slides Removal	8
TOTAL	100

Form 05: Evaluation of Service Level Inspection for a 1 Km Test Section

Form 05: Contractor's Monthly Service Level Inspection Report																		
Contract Number:														Month/Year:				
Road/Road Section:																		
														Length at required service levels: km				
Category	Item																	
	Output: Carriageway Maintenance 60%	1	2	3	4	5	6	7	8	9	10			No. of complying segments	Ave. of complying segments	Weight factor	Total Compliance Factor
		A													B= A/12	C	D= B x C	
Pavement 50%																**50**		
	Lane closure															10		
	Potholes & Patches , Depression, rutting, corrugations, raveling and shoving															15		
	Cracks															9		
	Edge Breaks															8		
	Pavement surface drains															5		
	Cleanliness															3		
Bridge and Structures 10%																**10**		
	Bridge Approaches															2		
	Structures															2		
	Bridge Decks															2		
	Retaining walls, bridge abutments and wing walls															2		
	Waterway															2		
	Output: Roadside Maintenance 40%																	
Shoulders 8%																**8**		
	Width															1		
	Potholes, Patches															4		
	Depressions and corrugation															1		
	Edge drop off, inverted shoulder															1		
	Crossfall/Surface drainage defects															1		

Drainage 10%																**10**	
	Drainage slope															2	
	Ditches and drains															5	
	Culverts and inlets and outlets															3	
Traffic Services 5%																**5**	
	Road signs															1	
	Pavement markings															2	
	Kilometer post, parapets, concrete barrier															1	
	Guardrails & safety barriers															1	
Health & Safety 2%																**2**	
	Personal Protective Equipment (PPE)/ cone barrier															2	
Vegetation, Roadside slope and Slope Protection 7%																**7**	
	Grass , weeds and Plants															1	
	Trees and shrubs															1	
	Roadside slope and slope Protection															5	
Slides Removal 8%																8	
	Slides removal from carriageway and shoulders.															8	
															Total	100	
Total Monthly Compliance Factor (TMCF)																	

In addition to the above criteria, IRI survey shall be taken starting on the 4th month from the issue of the Taking Over certificate and every 4 months thereafter to ensure that the IRI measured prior to the issue of the Taking Over Certificate is maintained throughout the duration of the PBM. Measurement and payment are discussed in Section 1.9.1 (Methodology for evaluation of conditions of pavement).

Determination of Payment Reductions

The results of each formal inspection of the service quality levels and other performance criteria will be recorded by the Engineer in the form of a Memorandum. The Memorandum will state the type and location of any non-compliance detected, in particular those non-compliances already

shown in the standard tables provided by the Contractor as part of his monthly statement. A format for Monthly Statements shall be proposed by the Contractor to the Engineer for approval. For each individual case of non-compliance, the Engineer will determine a date by which the Contractor must have completed the necessary measures in order to remedy the cause of the noncompliance. A follow-up site visit is therefore necessary at the date fixed by the Engineer, or soon thereafter, in order to verify that the Contractor has indeed remedied the cause of non-compliance.

If at the date indicated in the Memorandum, the Contractor has not remedied the cause for non-compliance, independent of the reason given by him for his failure to do so, the Contractor is subject to Payment Reductions in accordance with the
Specifications.

Penalties will be imposed to the Contractor if he has not remedied the cause for noncompliance on the Service Level criteria; independent of the reason given by him for his failure to do so on the specified response time, the contractor is subject to Payment reduction as shown below.

Table of Penalties for Non-compliance to Response Time

OUTPUT	CATEGORY	Penalty per day of delay (in %) of monthly payment per kilometer
Carriageway Maintenance	**Pavement Maintenance**	
	1. Lane Closure	2
	2. Potholes	5
	3. Patches including delaminations	3
	4. Depression, rutting, corrugation and shoving	3
	5. Linear Cracks	1
	6. Multiple Cracks (alligator cracking)	2
	7. Edge Breaks	2
	8. Pavement Surface Drain Defects	1
	9. Pavement Cleanliness	1
	Bridge Maintenance	
	1. Approach to bridges	1
	2. Structures	1
	3. Bridge deck	1
	4. Retaining walls, bridge abutments and wingwalls	1
	5. Waterways	1
Roadside Maintenance	**Shoulder Maintenance**	
	1. Width	1
	2. Potholes, patches	2
	3. Depressions and Corrugation	2
	4. Edge drop, inverted shoulder	1
	5. Crossfall/ Surface Drainage Defects	1
	Drainage Maintenance	
	1. Slopes of drainage system	1

	2. Ditches and drains with and without lining	1
	3. Culverts (pipes and box) including inlets, outlets and headwalls	1
	Traffic Services Maintenance	
	1. Road signs	1
	2. Pavement markings	1
	3. Kilometer post	1
	4. Guardrails and road safety barrier	1
	Health & Safety Management	
	1. Personal protective equipment	1
	2. Cone barrier/lighting	1
	Vegetation Control, roadside Slope and slope protection	
	1. Vegetation (grass, weeds, plants)	1
	2. Trees and shrubs	1
	3. Roadside slope and slope protection	1
	Slides Removal	
	1. Slides (quantity of material is below 10.0 m^3)	3

Every 4 months, the road roughness will be measured and if the measurement reveals that the road roughness is above the threshold established, the Engineer will establish a timeframe for the contractor to take the measures necessary to correct the defect. That timeframe should normally ensure that the corresponding works are completed within 4 months and before the next measurement is due to be carried out.

The payment reduction for non-compliance with service quality level on road roughness beyond the time limit determined by the Engineer is set at US$10.00 per day for every 100m section of each non-complying lane.

FORM 6A: COMPUTATION OF PENALTIES FOR NON-COMPLIANCE TO RESPONSE TIME

Contract No:	**Road:**
Monthly Rate: US$ _____ A	

		Non-compliance	Penalty	

Defect	Location	Date of detection	Response Time	Due Date	Date Rectified	No of Days Overdue B	Penalty per calendar day in % of the Total monthly payment C	Penalty in US$ D = A X C	Total Penalty E=B XD

_____(signature) Date:
Engineer

_____(signature) Date:
Contractor

FORM 06.B – MONTHLY PAYMENT FORM FOR PERFORMANCE BASED WORKS

	Contract No.:	Month and year:
	Road Name	
A.	Total Number of Kilometers (TNK)	
B.	Scheduled Monthly Payment per Kilometer (SMPK)	
C.	Scheduled Total Monthly Payment (STMP) = (TNK) x (SMPK)	
D.	Total Monthly Compliance Factor (TMCF)	
E.	Kilometer for Payment (KFP) = (TNK) x (TMCF)	
	LESS:	
F.	Non Compliance to Response Time (NCRT)	
G.	Non Compliance to Road Roughness (NCRR)	
H.	Recoupment of Advance Payment	

I.	Net Amount Due (I= E-F-G-H)	
	----------(signature) Date:___ Contractor Approved: ----------(signature) Date:___ Engineer	_____ _____

PBM.1.8 Means Used for Inspection

For the formal inspections of compliance with service quality levels, the Contractor's Performance-based Unit will work in close collaboration with and under supervision of the Engineer. The physical means needed for the inspections will be provided by the Contractor; they are the same which are normally used by the Performance-based Unit for the continuous self-evaluation of the Contractor's compliance, in particular:

(i) The chief of the Performance-based Unit plus two helpers.
(ii) All equipment, tools and instruments needed as indicated in the paragraphs describing the methodologies for inspection.
(iii) Vehicles in good condition.

PBM.1.9 Methodologies to be used for inspections of Service Quality Levels

PBM.1.9.1 Methodology for evaluation of conditions of pavement

Lane Closure

Lane closure is defined as the lane blocked or obstructed by trees or earth material and not passable to traffic. Lane closure can be full road closure or partial closure.
Partial road closure involves the closure of one side of the road. Traffic is shifted to the other side of the road, rather than detoured, which distinguishes this type of closure from full closure. The method of determining compliance is by simple observation. A 20 lm of lane not passable to traffic is considered as lane closure.

Potholes

A pothole is defined as any defect, degradation or deficiency in the asphalt or other surfacing material that allows the base course material to be visible, even if that base course material is intact at that time. In other words, any loss of

surfacing material constitutes a pothole. The method for determination of the existence of a pothole is by simple visual observation by walking or driving at less than 5kph along the edge of pavement viewing outward to the centerline. Any potholes detected as defined above will then be confirmed by walking to the location and standing directly over the location to determine that the base course is indeed exposed. This process shall be duplicated on the opposite side of the road so that all lanes have been inspected. For pavements were paved shoulders have been constructed contiguously with the main carriageway, the shoulders are to be included as part of the pavement in this inspection process as well and the intactness of the edge of the pavement or paved shoulder.

Patching

Patching is defined the well prepared, filled and compacted repair of a surface distresses such as a pothole or similar with bituminous materials similar to the surrounding pavement which has been approved for use by the Engineer. The method of determination of compliance with the patching service quality criterion is similar to that for pothole criterion compliance and may be performed simultaneously. Any patch suspected of being non-compliant on the walk through or drive over inspection shall be closely inspected and measured for compliance as detailed for this criterion in the service level table above.

Depression

Depressions and settlement are defined as any pavement defect that has caused there to be more than a 20mm gap when measured under a 3m straight edge when laid parallel or perpendicular to the direction of travel. The method of correction must be approved by the Engineer. The method of determination of the existence of depressions or settlement is the same as for potholes and should be done at the same time. When a suspected depression or settlement is detected, a 3m straight edge will be laid across the location in the direction that caused the greatest gap under the straight edge and then the gap will be measured with a millimeter ruler or preferably with an indexed wedge.

Rutting

Rutting is defined as settlement caused by the wheels of the vehicle. When a suspected rutting is detected, a 3m straight edge will be laid across the location in the direction that caused the greatest gap under the straight edge and then the gap will be measured with a millimeter ruler or preferably with an indexed wedge. The method of determination of the existence of rutting is the same as for potholes and should be done at the same time.

Shoving

Shoving is defined as the bulging of the pavement caused by the rut or depression.

When a suspected shove is detected, a 3m straight edge will be laid across the location in the direction that caused the greatest gap under the straight edge and then the gap will be measured with a millimeter ruler or preferably with an indexed wedge. The method of determination of the existence of shoving is the same as for potholes and should be done at the same time.

Cracks in Pavement

Cracks in the pavement are defined as linear fissures, openings, openings in the pavement surfacing materials that have not been filled level full with an appropriate bituminous material and method approved by the Engineer that may allow water to penetrate or seep through to the base course material and thus lead to potholing and other pavement distresses. The method of determination of compliance for this service level criterion is similar to that for pothole criterion compliance and may be performed simultaneously.

Edge Breaks

Edge Break is a broken or irregular edge of a road wearing surface. Edge breaks generally occur when the road shoulder is worn, there is inadequate strength of the pavement at the edge if the roadway or water enters the pavement through the shoulders. Significant edge breaks coupled with edge drops can result in tire damage. The method of determination of compliance with the edge break is similar to that for pothole criterion compliance and may be performed simultaneously.

Surface Drain

Standing water (ponding) from poor surface drainage or poor camber can cause significant harm to the road. Poor surface drainage also creates situations where excess water penetrates to the base causing defects on the road. The method of determination of compliance with the surface drain is by visual inspection possibly after the rain.

Cleanliness

Pavement cleanliness is defined as the absence of traffic hazards such as loose gravel, rocks, tree branches, dry mud, tire fragments, vehicle wreckage or any other debris, rubble, etc.; that is not an engineered part of the pavement surface. Material washed onto the road or shoulder from slopes in a cut section of roadway or earth or mud slides are included in this criterion. Businesses and road side vendors, such as petrol barrels, fruit stands and the like that have encroached onto the pavement or close enough to pose a hazard in the opinion of the Engineer are included in this criterion. Mud tracked onto the pavement, tree branches, and foreign materials found on the pavement surface shall be removed.. The method of determining that the pavement is clean and free of

foreign materials such as described above is by visual observation. Presence of any traffic hazards or waste materials is considered noncompliance.

International Roughness Index (IRI)

To ensure that the IRI acceptance value is maintained during the 2 year PBM period, roughness measurement shall be taken prior to the issue of the Taking Over Certificate (TOC). The values taken shall be the basis of the compliance level for IRI measurements and in no case shall be higher than 3.00 to be taken at 4 months interval starting on the 4th month from the issue of the Taking Over Certificate. Roughness measurement equipment may be rented by the Contractor from the PMU at a rate of US$1,000.00 per day. Fuel, labor and other operational costs shall be borne by the Contractor.

PBM.1.9.2 Methodology for evaluation of conditions of bridges and structures

Bridge Approaches

The bridge approaches is defined as the embankment or road before the superstructure. There are two bridge approaches; abutment A and abutment B. The method of determining compliance is by visual observation and measurement of elevation between the approach and the superstructure. No bump shall be felt in the pavement at the bridge ends.

Super Structure

The super structure is defined as those parts of members of a bridge or similar structure on above the deck across which vehicles or pedestrians travel. This includes barriers, railing and curbs, the main bridge side rails or parapets. All super structure components shall be in place and properly attached and tightened. All metal handrails and barriers shall be fully coated with paint or zinc and any corrosion properly treated or repaired. The method of determining compliance is by visual observation. No corrosion shall be visually present. If anyone of the preceding items is not fully compliant, this criterion shall be recorded as non-compliant.

Bridge Deck

A bridge deck is defined as the surface across which vehicles and pedestrians travel including separated or non-separated walkways. The method of determining compliance is by visual observation. The deck surfacing material must be fully intact. Deck plates must be fully bolted down and immovable under traffic. The expansion joints shall be firmly attached and clean, intact properly functioning. The bridge drainage system must be in good condition and fully functional. Any violation of the preceding items and the bridge deck shall be recorded as non-compliant with this criterion.

Retaining Walls and Bridge Substructures

Retaining walls may be vertical, near vertical or stepped walls constructed of concrete, pre-cast or placed blocks, gabions, stone masonry, reinforced earth or other materials. Retaining walls also include mortared rip rap, interlocking paving blocks, sand bags or similar materials, including gabion blankets. The bridge substructure comprises all those components below the deck including supporting girders, beams, bearing shelves and all pier components. The method of determining compliance is by visual observation. Any damage or defects involving retaining walls and bridge substructures shall be recorded as non-compliant for this criterion

Waterways

A waterway is any navigable body of water. Waterways can include rivers, lakes, and canals which are usually span by a bridge. The method of determining compliance is by visual observation. Any obstruction or debris 100 m upstream and downstream shall be recorded as non-compliant for this criterion.

PBM.1.9.3 Methodology for evaluation of conditions of Shoulders

Width of Shoulder

The width of the shoulder is the distance from the end of the carriageway to the ditch or slope. The design criteria provides for a 0.5 m. minimum width of shoulder. The method of determining compliance is to conduct visual inspection and measure by tape. Shoulders with width less than the min are recorded as non-compliant to this criterion.

Potholes, Rutting, Depression

The method of determining compliance for these is the same as in pavement.

Edge Drop Off

The shoulders lower than the carriageway surface criterion is defined as follows: The difference in height at edge of carriageway surface and shoulder surface must be kept not exceeding the specified heights and so as to facilitate smooth flow of rain water from the carriageway to the road side drain over the shoulder. The method of determining compliance is first by visual observation for suspect violations of this criterion while conducting the inspection for the pavement and embankment and then confirming a violation with the use of ruler, marked in mm.

Inverted Shoulder

The shoulders higher than the carriageway surface criterion is defined as follows: The difference in height at edge of carriageway surface and shoulder surface must be kept not exceeding the specified heights and so as to facilitate smooth flow of rain water from the carriageway to the road side drain over the shoulder. The method of determining compliance is first by visual observation for suspect violations of this criterion while conducting the inspection for the pavement and embankment and then confirming a violation with the use of ruler, marked in mm.

Surface Drain/Crossfall

The method of determining compliance for these is the same as in pavement.

PBM.1.9.4 Methodology for evaluation of conditions of Drainage

Drainage Slope

The drainage slope is grading an area so that water collects and flows to a lower elevation up to the outfall. Because slope is so important for drainage, a transit or level is good to have on hand to determine slope. The method of determining compliances is by visual observation. Minimum slope is 0.5% and no negative slope in any section of the drainage. Any deviation from the minimum slope given is recorded as non-compliant to this criterion.

Ditches (lined and unlined)

Ditches are defined as engineered waterways constructed as part of the permanent works or contributing to the road drainage system. Ditches maybe earthen grassed or lined with pre-cast or cast in place concrete or stone masonry. The method of determining compliances is by visual observation. Ditch lining, if present, must be clean and free from mud, grass clumps, rocks or other obstructions not purposely engineered to be there. Ditches must have less than 10% of the cross-sectional area un-obstructed, or be found non-compliant. Any damage to the ditch lining which may cause water to not remain contained within the lining shall be deemed as noncompliant. An unlined ditch will be surveyed similarly, however grass and other vegetation is allowable, but must meet the criterion for allowable grass/vegetation height.

Culverts (pipe, box and others)

Culverts are defined as any type of pipe of any diameter, single or multi-cell, box-type culverts constructed of any type of materials and any other type construction which takes water from one side of the road (or driveway entrance) to the other side. The method of determining compliance is by visual observation. The condition of culvert headwalls must also be observed. The full culvert cells or any single cell of a multi- cell culvert shall not exceed the 10% obstruction tolerance, and headwalls shall be intact or this criterion shall be recorded as non-compliant.

PBM.1.9.5 Methodology for Evaluation of Conditions of Traffic Services

Road signs

Road signs are defined as any sign, instruction, warning and speed limit posting within the road section. The method of determining compliance is by visual observation and comparing sign positions along the road way to those shown on the drawings. The sign face shall be retro-reflective and visible after dark under normal low beam head lamp lights of any vehicle. The symbols, numbers or lettering shall have the same legibility at the same distance as during daylight at a distance of not less than 50m. To be in compliance with this criterion, the signs in the test section must all be in place, undamaged and meet the MPWTC standards in all respects. Otherwise, the test section will be recorded as non-compliant for this criterion. All signs shall be maintained and replaced as necessary.

Road Markings

Traffic signs are defined as any markings, lines, edge lines, center line, pedestrian lines and arrow markings within the road section. The method of determining compliance is by visual observation. The markings shall be reflective or thermoplastic and visible after dark under normal low beam head lamp lights of any vehicle. To be in compliance with this criterion, the markers must all be seen on the road, and meet the MPWTC standards in all respects

Kilometer Posts and Guide Posts and Parapets

Kilometer and guide posts shall be present undamaged with lettering and numbering clearly visible from 50 meters and in their proper position according to drawings. Parapets shall be visible. They shall meet the MPWTC standards for placement, dimensions, colors and markings. The method of determining compliance is by visual observation. If any of the above described conditions are not met, this test section shall be recorded as non-compliant for this criterion.

Guardrails

Guardrails are defined as metal, concrete, wood or cable safety devices along the road side. Guardrails shall be in place, located and dimensionally and materially detailed as indicated on the drawings and meet any applicable MPWTC standards. They shall not be significantly damaged, loose or corroded. Any required paint or zinc coating shall be intact. Any reflective disks or the like shown on the details or required by the MPWTC standards must be in place. The method of determining compliance is by visual observations while walking or driving along a test section to determine it from serving its intended purpose. No less than 90% of reflectors shall in place and the surface coating intact and no significant

corrosion shall be present. If any of these conditions are not met, this tests section shall be recorded as non-compliant for this criterion.

PBM.1.9.6 Methodology for evaluation of conditions of Health and Management services

Personal Protective Equipment (PPE)

Personal Protective Equipment is defined as clothing and safety equipment to be used by all staff and labor engaged on the Works to the satisfaction of the Engineer. Such clothing and equipment shall include, at a minimum, high visibility vests for workers directing traffic, protective footwear and gloves for any workmen performing bituminous paving works, protective footwear, protective footwear and hard hats for workmen engaged on bridge repair, landslide prevention piling work and in all locations subject to rockfall, safety ropes and harness for workmen engaged on slope protection, and otherwise as appropriate to the job in hand and to the Engineer's satisfaction. The method of determining compliance is by visual observation and field inspection. Any worker not wearing PPE shall be recorded as non-compliant to this criterion.

Cone Barriers

Cone barriers are defined as plastic cones constructed of high-visibility day glow red/orange commonly used as a temporary traffic barrier or warning sign. Cone barriers shall be place at all road works prior to the start of the work. The method of determining compliance is by visual observation and field inspection. Any road works without cone barrier shall be recorded as non-compliant to this criterion.

PBM.1.9.7 Methodology for evaluation of conditions of Vegetation, Roadside Slope and Slope Protection

Grass/Weeds/Plants Vegetation

The grass/vegetation criterion is defined as follows: Grass, weeds and plants or vegetation of any kind (except for trees), alive or dead, must be kept cut so that it does not exceed the specified heights and so that standard lines of sight for road users are preserved, as well as maintaining general neatness. The method of determining compliance is first by visual observation for suspect violations of this criterion while conducting the inspection for the pavement and embankment and then confirming a violation with the use of one meter ruler.

Tree and Shrubs

Tree and shrub branches must not infringe on the user space of the roadway. The method of determining compliance is first by visual observation for suspect violations of this criterion while conducting the inspection for the

pavement and embankment items and then confirming a violation with the use of a 4.75 meter pole marked at point 2.50 meters from one end of the pole. Confirm vertical violations by holding the pole vertically plumb with one end against the surfaces of the pavement or shoulder to see if branches or bush clear the top end of the pole. The process is similar for confirming horizontal clearance violations. Hold the pole at the marked point, keeping 2.50 meter length towards the trees or bushes and sight it over the edge of pavement or shoulder holding the pole perpendicular to the direction of travel and waist high and then over your head A second person will sight across the end of the pole and determine if any branches or bush violates the 2.50 meter horizontal clearance from ground level to 4.75 meter above the pavement surface.

Roadside Slope and Slope Protection

Roadside slope erosion is defined as any gully or furrow that has formed from surface water runoff, or otherwise, and is wider than 0.25 meters or deeper than 0.15 meters. Such erosion at any point on the roadside slopes of either cut or fill sections of roadway from the top to toe of the slope for fill (embankment) sections or from side ditch inverts to the limits of the right of way would form non-compliance. The method of determining compliance is first by visual observation for suspect violations of this criterion while conducting the inspection for the pavement items and then confirming a violation with the use of two regular office-type rulers. One ruler can be used if the eroded gully is not wider than 0.25m and the two together to measure depth, one used as a straight edge held perpendicularly across the gully and the other to measure the depth of the gully.

PBM.1.9.8 Methodology for evaluation of conditions of Slide Removal

A Slide is defined as the perceptible downward sliding or falling of a mass of earth, rock, or a combination of the two under the influence of gravity. Slides may cause blockage of the road, drainage paths, and damage of road furniture and road structures. It may contain trees, bushes, other objects depending on the location; those are also to be removed along with the removal of mass of earth, rock or combination of the two. Repairs (if any) caused by the slide to the road furniture and structures are not included in this criterion. The method of determining that the slide material is removed is by visual observation and to see that the road platform, drains, road furniture and structures are clean and free of debris and other objects. If the above-described condition is not met fully, the removal of slide shall be recorded as non-compliant for this criterion.