

ANNEX
BILL OF QUANTITIES

CHAPTER 7
CONSTRUCTION PLAN AND COST ESTIMATE

ANNEX

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ITEM NO.	MVC. NO.							LOCATION	BQ ITEMS	UNIT	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7				QUANTITY	UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)		
A	1	1	1	1	1	1	1	GENERAL								
A1	1	1	1	1	1	1	1	MODIFICATION AND DEMOBILIZATION	L.S.							GS.6.03
A2	1	1	1	1	1	1	1	ESTABLISHMENT	L.S.							GS.7.05
A3	1	1	1	1	1	1	1	RELOCATION OF EXISTING FACILITIES	L.S.							GS.14.04
A4	1	1	1	1	1	1	1	GEOLOGICAL INVESTIGATION	L.S.							GS.9.05
A4.1	1	1	1	1	1	1	1	Hand Auger	m							GS.9.06
A4.2	1	1	1	1	1	1	1	Mechanical Boring	m							GS.9.06
A4.3	1	1	1	1	1	1	1	Exploratory Excavation	m³							GS.9.06
B	1	1	1	1	1	1	1	CHANNEL AND DIKE WORKS								
B1	1	1	1	1	1	1	1	PREPARATION WORKS								
B1.1	1	1	1	1	1	1	1	Conferring and Dewatering	L.S.							TS.1.04
B1.2	1	1	1	1	1	1	1	Cleaning and Grubbing	m²							TS.2.10
B2	1	1	1	1	1	1	1	CHANNEL EXCAVATION								
B2.1	1	1	1	1	1	1	1	Dredging (Rivermouth - PE 14)	m³							TS.2.10
B2.2	1	1	1	1	1	1	1	Excavation (River Channel)	m³							TS.2.10
B2.3	1	1	1	1	1	1	1	Excavation (Common)	m³							TS.2.10
B2.4	1	1	1	1	1	1	1	Excavation (Floodway Channel)	m³							TS.2.10
B3	1	1	1	1	1	1	1	EARTH DIKE WORKS								
B3.1	1	1	1	1	1	1	1	Stripping of Top Soil	m³							TS.2.10
B3.2	1	1	1	1	1	1	1	Embankment	m³							TS.2.10
B3.3	1	1	1	1	1	1	1	Gravel Pavement, 200 mm thick	m³							TS.7.09
B3.4	1	1	1	1	1	1	1	Maintenance Marker Post	nos						TS.12.10	
B3.5	1	1	1	1	1	1	1	Base Course (Class A)	m³							TS.7.09
B3.6	1	1	1	1	1	1	1	Asphalt Treatment Base (A.T.B)	ton							TS.7.09
B3.7	1	1	1	1	1	1	1	Sub-Base Course (Class C)	m³							TS.7.09
B4	1	1	1	1	1	1	1	PARAPET WALL ON DIKE (PE14) (10m to PE15)								
B4.1	1	1	1	1	1	1	1	Excavation (Common)	m³							TS.2.10
B4.2	1	1	1	1	1	1	1	Wet Stone Masonry (1:3) for Revetment	m³							TS.4.14
B4.3	1	1	1	1	1	1	1	Crusher Run Bedding	m³							TS.4.14
B4.4	1	1	1	1	1	1	1	Elastic Joint Filler, 10 mm thick	m²							TS.3.24
B4.5	1	1	1	1	1	1	1	Water Stop, 30 cm wide	m							TS.3.24
B4.6	1	1	1	1	1	1	1	Backfill with Selected Soil	m³							TS.2.10
B5	1	1	1	1	1	1	1	FLOOD RETAINING WALL (PE17) (L=6.5m to PE18=20m)								
B5.1	1	1	1	1	1	1	1	Prevention (Common)	m³							TS.2.10
B5.2	1	1	1	1	1	1	1	Concrete, Type C1	m³							TS.3.24
B5.3	1	1	1	1	1	1	1	Concrete, Type E	m³							TS.3.24
B5.4	1	1	1	1	1	1	1	Formwork FW1	m²							TS.3.24
B5.5	1	1	1	1	1	1	1	Supply and Driving of PG Sheet Piles, L=5.0 m	m							TS.5.07
B5.6	1	1	1	1	1	1	1	Log Pile, Dia. 150mm, L=4.0m	m							TS.5.07
B5.7	1	1	1	1	1	1	1	Elastic Joint Filler, 10 mm thick	m²							TS.3.24
B5.8	1	1	1	1	1	1	1	Water Stop, 30 cm wide	m							TS.3.24
B5.9	1	1	1	1	1	1	1	Backfill with Selected Soil	m³							TS.2.10
B6	1	1	1	1	1	1	1	FILLING ON RIVER BANK								
B6.1	1	1	1	1	1	1	1	Soil Filling	m³							TS.2.10
C	1	1	1	1	1	1	1	SLOPE AND RIVERBED PROTECTION WORKS								
C1	1	1	1	1	1	1	1	PREPARATION WORKS								
C1.1	1	1	1	1	1	1	1	Conferring and Dewatering	L.S.							TS.1.04
C2	1	1	1	1	1	1	1	SODDING AND DIKE								
C2.1	1	1	1	1	1	1	1	Solid Sodding	m²							TS.4.14

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)		
C2.2									Check Sodding for Retarding Channel and Diversion Weirs	m ²							TS. 4.14
C2.3									Springing	m ²							TS. 4.14
C3	1	1	1	1	1	1	1		REVETMENT - WET STONE MASONRY TYPE								
C3.1	1	1	1	1	1	1	1		Excavation (Common)	m ³							TS. 2.10
C3.2	1	1	1	1	1	1	1		Backfill with Selected Soil	m ³							TS. 2.10
C3.3	1	1	1	1	1	1	1		Crusher Run Bedding	m ³							TS. 4.14
C3.4	1	1	1	1	1	1	1		Wet Stone Masonry (1:4) for Revetment	m ³							TS. 4.14
C3.5	1	1	1	1	1	1	1		Cement Mortar Plastering	m ²							TS. 4.14
C3.6	1	1	1	1	1	1	1		Concrete, Type C1	m ³							TS. 3.24
C3.7	1	1	1	1	1	1	1		Reinforcing Steel Bar	kg							TS. 3.24
C3.8	1	1	1	1	1	1	1		Formwork FW1	m ²							TS. 3.24
C3.9	1	1	1	1	1	1	1		Weep Hole, Dia. 50 mm	nos.							TS. 4.14
C3.10	1	1	1	1	1	1	1		Log Pile, Dia. 150 mm, L=3.0m	m							TS. 5.07
C3.11	1	1	1	1	1	1	1		Log Pile, Dia. 150 mm, L=2.0m	m							TS. 5.07
C3.12	1	1	1	1	1	1	1		Plastic Joint Filler, 10 mm thick	m ²							TS. 3.24
C3.13	1	1	1	1	1	1	1		Gabion Mattress	m ³							TS. 4.14
C3.14	1	1	1	1	1	1	1		Gabion Cylinder	m ³							TS. 4.14
C3.15	1	1	1	1	1	1	1		Cobble Stone Filling	m ³							TS. 4.14
C3.16	1	1	1	1	1	1	1		Palm Fiber Filter	m ²							TS. 4.14
C4	1	1	1	1	1	1	1		GABION TYPE FOOT PROTECTION								
C4.1	1	1	1	1	1	1	1		Cobble Stone Filling	m ³							TS. 4.14
C4.2	1	1	1	1	1	1	1		Gabion Mattress	m ³							TS. 4.14
C5	1	1	1	1	1	1	1		REVETMENT - GABION CYLINDER TYPE								
C5.1	1	1	1	1	1	1	1		Excavation (Common)	m ³							TS. 2.10
C5.2	1	1	1	1	1	1	1		Gabion Cylinder	m ³							TS. 4.14
C5.3	1	1	1	1	1	1	1		Cobble Stone Filling	m ³							TS. 4.14
C5.4	1	1	1	1	1	1	1		Log Pile, Dia. 150 mm, L=2.0m	m							TS. 5.07
C5.5	1	1	1	1	1	1	1		Palm Fiber Filter	m ²							TS. 4.14
C6	1	1	1	1	1	1	1		REVETMENT - GABION AND RIPRAP / RIPRAP TYPE								
C6.1	1	1	1	1	1	1	1		Gabion Cylinder	m ³							TS. 4.14
C6.2	1	1	1	1	1	1	1		Boulder Riprap, (300mm - 500mm)	m ³							TS. 4.14
C6.3	1	1	1	1	1	1	1		Boulder Riprap, (200mm - 300mm)	m ³							TS. 4.14
C7	1	1	1	1	1	1	1		GROIN (PILE TYPE)								
C7.1	1	1	1	1	1	1	1		RC Piles, 200mm x 200mm, including Driving	m							TS. 12.10
C7.2	1	1	1	1	1	1	1		Concrete, Type C1	m ³							TS. 3.24
C7.3	1	1	1	1	1	1	1		Reinforcing Steel Bar	kg							TS. 3.24
C7.4	1	1	1	1	1	1	1		Formwork FW1	m ²							TS. 3.24
C7.5	1	1	1	1	1	1	1		Boulder Riprap, (300mm - 500mm)	m ³							TS. 4.14
C8	1	1	1	1	1	1	1		PROTECTION WORKS FOR ITJI RUNTUX BRIDGE (PE129-43m)								
C8.1	1	1	1	1	1	1	1		Excavation (Common)	m ³							TS. 2.10
C8.2	1	1	1	1	1	1	1		Backfill with Selected Soil	m ³							TS. 2.10
C8.3	1	1	1	1	1	1	1		Crusher Run Bedding	m ³							TS. 4.14
C8.4	1	1	1	1	1	1	1		Log Pile, Dia. 150 mm, L=3.0m	m							TS. 5.07
C8.5	1	1	1	1	1	1	1		Wet Stone Masonry (1:4) for Revetment	m ³							TS. 4.14
C8.6	1	1	1	1	1	1	1		Cement Mortar Plastering	m ²							TS. 4.14
C8.7	1	1	1	1	1	1	1		Concrete, Type C1	m ³							TS. 3.24
C8.8	1	1	1	1	1	1	1		Concrete, Type D	m ³							TS. 3.24
C8.9	1	1	1	1	1	1	1		Reinforcing Steel Bar	kg							TS. 3.24
C8.10	1	1	1	1	1	1	1		Formwork FW1	m ²							TS. 3.24

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
C8.11										m ²						TS. 3.24	
C8.12										m ³						TS. 3.24	
C8.13										nos.						TS. 4.14	
C8.14										m ³						TS. 4.14	
C8.15										m ³						TS. 4.14	
C8.16										m ³						TS. 4.14	
C9								PE17/6-66	PROTECTION WORKS FOR RAILWAY BRIDGE								
C9.1									Preservation (Common)	m ³						TS. 2.10	
C9.2									Backfill with Selected Soil	m ³						TS. 2.10	
C9.3									Backfill with Gravel	m ³						TS. 4.14	
C9.4									Log Pile, Dia. 150 mm, L=3.0m	m						TS. 5.07	
C9.5									Cement Mortar Plastering	m ²						TS. 4.14	
C9.6									Concrete, Type C1	m ³						TS. 3.24	
C9.7									Concrete, Type D	m ³						TS. 3.24	
C9.8									Concrete, Type E	m ³						TS. 3.24	
C9.9									Reinforcing Steel Bar	kg						TS. 3.24	
C9.10									Formwork FW1	m ²						TS. 3.24	
C9.11									Formwork FW2	m ²						TS. 3.24	
C9.12									Plastic Joint Filter, 10 mm thick	m ²						TS. 3.24	
C9.13									Weep Hole, Dia. 50 mm	nos.						TS. 4.14	
C9.14									Cobble Stone Filling	m ³						TS. 4.14	
C9.15									Gabion Mattress	m ³						TS. 4.14	
C9.16									Gabion Cylinder	m ³						TS. 4.14	
C9.17									Crusher Run Bedding	m ³						TS. 4.14	
C9.18									Wet Stone Masonry (1:4) for Revement	m ³						TS. 4.14	
C10								PE2/69-75	PROTECTION WORKS FOR NATIONAL ROAD BRIDGE								
C10.1									Excavation (Common)	m ³						TS. 2.10	
C10.2									Crusher Run Bedding	m ³						TS. 4.14	
C10.3									Backfill with Gravel	m ³						TS. 4.14	
C10.4									Log Pile, Dia. 150 mm, L=3.0m	m						TS. 5.07	
C10.5									Wet Stone Masonry (1:4) for Revement	m ³						TS. 4.14	
C10.6									Cement Mortar Plastering	m ²						TS. 4.14	
C10.7									Concrete Block, 980mm x 980mm x 400mm	nos.						TS. 4.14	
C10.8									Concrete, Type C1	m ³						TS. 3.24	
C10.9									Reinforcing Steel Bar	kg						TS. 5.24	
C10.10									Formwork FW1	m ²						TS. 3.24	
C10.11									Formwork FW2	m ²						TS. 3.24	
C10.12									Elastic Joint Filter, 10 mm thick	m ²						TS. 3.24	
C10.13									Weep Hole, Dia. 50 mm	nos.						TS. 4.14	
C10.14									Gabion Mattress	m ³						TS. 4.14	
C10.15									Gabion Cylinder	m ³						TS. 4.14	
C10.16									Cobble Stone Filling	m ³						TS. 4.14	
C11									LEANING WALL FOR FLOODWAY								
C11.1									Excavation (Common)	m ³						TS. 2.10	
C11.2									Backfill with Selected Soil	m ³						TS. 2.10	
C11.3									Backfill with Gravel	m ³						TS. 4.14	
C11.4									Rubble Stone Bedding	m ³						TS. 4.14	
C11.5									Concrete, Type E	m ³						TS. 3.24	
C11.6									Concrete, Type D	m ³						TS. 3.24	

ITEM NO.	MFC. NO.							LOCATION	BQ ITEMS	UNIT	QUANTITY	F.C.		I.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
C11.7									kg								TS. 3.24
C11.8									m ²								TS. 3.24
C11.9									m ²								TS. 3.24
C11.10									m ²								TS. 3.24
C11.11									nos.								TS. 4.14
C11.12									m ³								TS. 7.09
C12									m ³								TS. 2.10
C12.1									m ³								TS. 4.14
C12.2									m ³								TS. 3.24
C12.3									m ²								TS. 3.24
C12.4									nos.								TS. 4.14
C12.5									m ³								TS. 2.10
C13									m ³								TS. 4.14
C13.1									m ³								TS. 4.14
C13.2									m ³								TS. 4.14
C13.3									m ³								TS. 4.14
D																	
D1									L.S.								TS. 1.04
D1.1									m ²								TS. 2.10
D1.2									m ²								TS. 2.10
D2									m ³								TS. 2.10
D2.1									m ³								TS. 2.10
D2.2									m ²								TS. 5.07
D2.3									m ²								TS. 5.07
D2.4									m ³								TS. 3.24
D2.5									m ³								TS. 3.24
D2.6									m ³								TS. 3.24
D2.7									kg								TS. 3.24
D2.8									m ³								TS. 4.14
D2.9									m ³								TS. 2.10
D3									m ³								TS. 2.10
D3.1									m ³								TS. 2.10
D3.2									m ²								TS. 5.07
D3.3									m ²								TS. 5.07
D3.4									m ³								TS. 3.24
D3.5									m ³								TS. 3.24
D3.6									m ²								TS. 3.24
D3.7									m ²								TS. 3.24
D4									m ³								TS. 2.10
D4.1									m ³								TS. 2.10
D4.2									m ³								TS. 2.10
D4.3									m ³								TS. 5.07
D4.4									m ³								TS. 3.24
D4.5									m ³								TS. 3.24
D4.6									m ³								TS. 3.24
D4.7									kg								TS. 3.24
D4.8									m ²								TS. 3.24
D4.9									m ³								TS. 4.14
D4.10									m ³								TS. 4.14

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	P.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7				QUANTITY	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
D4.11	5	26						Plastering	m ²							TS. 4.14
D4.12	5	24						Gabion Mattress	m ³							TS. 4.14
D4.13	5	24						Gabion Cylinder	m ³							TS. 4.14
D4.14	5	24						Cobble Stone Filling	m ³							TS. 4.14
D5	6	26						APPROACH STEPS, TYPE PB (places)								
D5.1	6	26						Excavation (Common)	m ³							TS. 2.10
D5.2	6	26						Backfill with Selected Soil	m ³							TS. 2.10
D5.3	6	26						Concrete, Type C1	m ³							TS. 3.24
D5.4	6	26						Concrete, Type D	m ³							TS. 3.24
D5.5	6	26						Formwork FW1	m ²							TS. 3.24
D5.6	6	26						Crusher Run Bedding	m ³							TS. 4.14
D6	4							APPROACH STEPS, TYPE PC (place)								
D6.1	4							Excavation (Common)	m ³							TS. 2.10
D6.2	4							Log Pile, Dia. 150mm, L=3.0m	m							TS. 5.07
D6.3	4							Concrete, Type D	m ³							TS. 3.24
D6.4	4							Formwork FW1	m ²							TS. 3.24
D6.5	4							Wet Stone Masonry (1:3) for Retement	m ³							TS. 4.14
D6.6	4							Crusher Run Bedding	m ³							TS. 4.14
D6.7	4							Elastic Joint Filler, 10 mm thick	m ²							TS. 3.24
D7	28	26						APPROACH STEPS, TYPE PD (place)								
D7.1	28	26						Excavation (Common)	m ³							TS. 2.10
D7.2	28	26						Backfill with Selected Soil	m ³							TS. 2.10
D7.3	28	26						Log Pile, Dia. 150mm, L=3.0m	m							TS. 5.07
D7.4	28	26						Concrete, Type C1	m ³							TS. 3.24
D7.5	28	26						Concrete, Type D	m ³							TS. 3.24
D7.6	28	26						Reinforcing Steel Bar	kg							TS. 3.24
D7.7	28	26						Formwork FW1	m ²							TS. 3.24
D7.8	28	26						Crusher Run Bedding	m ³							TS. 4.14
D7.9	28	26						Elastic Joint Filler, 10 mm thick	m ²							TS. 3.24
D7.10	28	26						Gabion Mattress	m ³							TS. 4.14
D7.11	28	26						Gabion Cylinder	m ³							TS. 4.14
D7.12	28	26						Cobble Stone Filling	m ³							TS. 4.14
D8	3	1						MAINTENANCE STEPS (places)								
D8.1	3	1						Excavation (Common)	m ³							TS. 2.10
D8.2	3	1						Backfill with Selected Soil	m ³							TS. 2.10
D8.3	3	1						Concrete, Type C2	m ³							TS. 3.24
D8.4	3	1						Formwork FW1	m ²							TS. 3.24
D8.5	3	1						Crusher Run Bedding	m ³							TS. 4.14
D8.6	3	1						Elastic Joint Filler, 10 mm thick	m ²							TS. 3.24
D9	6							APPROACH STEPS, TYPE DA (places)								
D9.1	6							Excavation (Common)	m ³							TS. 2.10
D9.2	6							Backfill with Selected Soil	m ³							TS. 2.10
D9.3	6							Log Pile, Dia. 150mm, L=2.0m	m							TS. 5.07
D9.4	6							Concrete, Type C2	m ³							TS. 3.24
D9.5	6							Concrete, Type D	m ³							TS. 3.24
D9.6	6							Reinforcing Steel Bar	kg							TS. 3.24
D9.7	6							Formwork FW1	m ²							TS. 3.24
D9.8	6							Crusher Run Bedding	m ³							TS. 4.14

ITEM NO.	MFC. NO.							LOCATION	BO-ITEMS	UNIT	QUANTITY	P.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
D9-9						6		Elastic Joint Filler, 10 mm thick	m ²							TS. 3.24	
D9-10						6		Gabion Mattress	m ³							TS. 4.14	
D9-11						6		Cobble Stone Filling	m ³							TS. 4.14	
D10						10		APPROACH STEPS, TYPE DB (places)									
D10.1						10		Excavation (Common)	m ³							TS. 2.10	
D10.2						10		Backfill with Selected Soil	m ³							TS. 2.10	
D10.3						10		Concrete, Type C2	m ³							TS. 3.24	
D10.4						10		Formwork FW1	m ²							TS. 3.24	
D10.5						10		Crusher Run Bedding	m ³							TS. 4.14	
D10.6						10		Elastic Joint Filler, 10 mm thick	m ²							TS. 3.24	
D11						1		JETTY - LANDING STAGE AND MOORING FACILITIES (PE14+57m)									
D11.1						1		Excavation (Common)	m ³							TS. 2.10	
D11.2						1		Backfill with Selected Soil	m ³							TS. 2.10	
D11.3						1		Supply and Driving of PC Sheet Piles, L=4.0 m and 4.75 m	m							TS. 5.07	
D11.4						1		Log Pile, Dia. 150mm, L=4.0m	m							TS. 5.07	
D11.5						1		Concrete, Type C1 for Base Concrete and Top Concrete	m ³							TS. 3.24	
D11.6						1		Concrete, Type C2 for Step	m ³							TS. 3.24	
D11.7						1		Concrete, Type E	m ³							TS. 3.24	
D11.8						1		Wet Stone Masonry (1:3) for Gravity Type Wall and Steps	m ³							TS. 4.14	
D11.9						1		Crusher Run Bedding	m ³							TS. 4.14	
D11.10						1		Reinforcing Steel Bar	kg							TS. 3.24	
D11.11						1		Formwork FW1	m ²							TS. 3.24	
D11.12						1		Concrete Block Pavement for Landing Stage	m ³							TS. 2.09	
D11.13						1		Gabion Mattress	m ³							TS. 4.14	
D11.14						1		Gabion Cylinder	m ³							TS. 4.14	
D11.15						1		Mooring Post, Block Type	L.S							TS. 12.10	
D11.16						1		Mooring Post, Pile Type	L.S							TS. 12.10	

ITEM NO.	MFC. NO.						LOCATION	REQ. ITEMS	UNIT	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6				7	QUANTITY	AMOUNT (RP.)	UNIT COST (RP.)		
E1	1	1	1	1	1	1	DRAINAGE CHANNEL AND OUTLET WORKS PREPARATION WORKS FOR DRAINAGE WORKS								
E1.1	1	1	1	1	1	1		Coffering and Dewatering	L.S.						TS. 1.04
E1.2	1	1	1	1	1	1	Cleaning and Grubbing	m ²						TS. 2.10	
E2	1	1	1	1	1	1	DRAINAGE OUTLET SL1, PIPE CULVERT WITH FLAP GATE								
E2.1	1	1	1	1	1	1		Excavation (Common)	m ³						TS. 2.10
E2.2	1	1	1	1	1	1	Backfill with Selected Soil	m ³						TS. 2.10	
E2.3	1	1	1	1	1	1	Log Pile, Dia. 150mm, L=3.0m	m						TS. 5.07	
E2.4	1	1	1	1	1	1	Crusher Run Bedding	m ³						TS. 4.14	
E2.5	1	1	1	1	1	1	Wet Stone Masonry (1:4) for Revetment	m ³						TS. 4.14	
E2.6	1	1	1	1	1	1	Cement Mortar Plastering	m ²						TS. 4.14	
E2.7	1	1	1	1	1	1	Weep Hole, Dia. 50 mm	nos.						TS. 4.14	
E2.8	1	1	1	1	1	1	Dowel Bars, Dia. 19 mm, L=600mm	kg						TS. 3.24	
E2.9	1	1	1	1	1	1	Water Stop, 30 cm wide	m						TS. 3.24	
E2.10	1	1	1	1	1	1	Concrete, Type C2	m ³						TS. 3.24	
E2.11	1	1	1	1	1	1	Concrete, Type E	m ³						TS. 3.24	
E2.12	1	1	1	1	1	1	Reinforcing Steel Bar	kg						TS. 3.24	
E2.13	1	1	1	1	1	1	Formwork FW1	m ²						TS. 3.24	
E2.14	1	1	1	1	1	1	Formwork FW2	m ²						TS. 3.24	
E2.15	1	1	1	1	1	1	Elastic Joint Filler, 10 mm thick	m ²						TS. 3.24	
E2.16	1	1	1	1	1	1	RC Pipe, D=600mm	m						TS. 12.10	
E2.17	1	1	1	1	1	1	Supply and Installation of Flap Gate, Dia. 600 mm	L.S.						TS. 4.09	
E3	1	1	1	1	1	1	DRAINAGE OUTLET SL2, BOX CULVERT WITH SLUICE GATE								
E3.1	1	1	1	1	1	1		Excavation (Common)	m ³						TS. 2.10
E3.2	1	1	1	1	1	1	Backfill with Selected Soil	m ³						TS. 2.10	
E3.3	1	1	1	1	1	1	Crusher Run Bedding	m ³						TS. 4.14	
E3.4	1	1	1	1	1	1	Wet Stone Masonry (1:4) for Revetment	m ³						TS. 4.14	
E3.5	1	1	1	1	1	1	Cement Mortar Plastering	m ²						TS. 4.14	
E3.6	1	1	1	1	1	1	Supply and Driving of Steel Sheet Piles, Type II	m ²						TS. 5.07	
E3.7	1	1	1	1	1	1	Log Pile, Dia. 150mm, L=3.0m	m						TS. 5.07	
E3.8	1	1	1	1	1	1	Concrete, Type C1	m ³						TS. 3.24	
E3.9	1	1	1	1	1	1	Concrete, Type C2	m ³						TS. 3.24	
E3.10	1	1	1	1	1	1	Concrete, Type E	m ³						TS. 3.24	
E3.11	1	1	1	1	1	1	Reinforcing Steel Bar	kg						TS. 3.24	
E3.12	1	1	1	1	1	1	Formwork FW1	m ²						TS. 3.24	
E3.13	1	1	1	1	1	1	Formwork FW2	m ²						TS. 3.24	
E3.14	1	1	1	1	1	1	Dowel Bars, Dia. 19 mm, 1.0 m long	kg						TS. 3.24	
E3.15	1	1	1	1	1	1	Elastic Joint Filler, 10 mm thick	m ²						TS. 3.24	
E3.16	1	1	1	1	1	1	Water Stop, 30 cm wide	m						TS. 3.24	
E3.17	1	1	1	1	1	1	Handrail, Galvanized Steel Pipe	kg						TS. 6.09	
E3.18	1	1	1	1	1	1	Galvanized Steel Ladder	kg						TS. 6.09	
E3.19	1	1	1	1	1	1	Supply and Installation of Steel Slide Gates (H=1.5m, B=2.0m x 2)	L.S.						TS. 9.09	
E4	1	1	1	1	1	1	DRAINAGE OUTLET SL3, BOX CULVERT WITH SLUICE GATE								
E4.1	1	1	1	1	1	1		Excavation (Common)	m ³						TS. 2.10
E4.2	1	1	1	1	1	1	Backfill with Selected Soil	m ³						TS. 2.10	
E4.3	1	1	1	1	1	1	Crusher Run Bedding	m ³						TS. 4.14	
E4.4	1	1	1	1	1	1	Wet Stone Masonry (1:4) for Revetment	m ³						TS. 4.14	
E4.5	1	1	1	1	1	1	Cement Mortar Plastering	m ²						TS. 4.14	
E4.6	1	1	1	1	1	1	Supply and Driving of Steel Sheet Piles, Type II	m ²						TS. 5.07	
E4.7	1	1	1	1	1	1	Concrete, Type C1	m ³						TS. 3.24	

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7				QUANTITY	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
E4.8				1				Concrete, Type C2	m ³						TS. 3.24	
E4.9				1				Concrete, Type B	m ³						TS. 3.24	
E4.10				1				Reinforcing Steel Bar	kg						TS. 3.24	
E4.11				1				Formwork FW1	m ²						TS. 3.24	
E4.12				1				Formwork FW2	m ²						TS. 3.24	
E4.13				1				Elastic Joint Filler, 10 mm thick	m						TS. 3.24	
E4.14				1				Water Stop, 30 cm wide	m						TS. 3.24	
E4.15				1				Dowel Bar	kg						TS. 3.24	
E4.16				1				Handrail, Galvanized Steel Pipe	kg						TS. 6.09	
E4.17				1				Galvanized Steel Ladder	kg						TS. 6.09	
E4.18				1				Supply and Installation of Steel Sluice Gates (H=1.5m, D=1.5m x 1)	L.S.					TS. 9.09		
E5				1			PE155+90	DRAINAGE OUTLET SL4, BOX CULVERT WITH SLUICE GATE								
E5.1				1				Excavation (Common)	m ³						TS. 2.10	
E5.2				1				Backfill with Selected Soil	m ³						TS. 2.10	
E5.3				1				Crusher Run Bedding	m ³						TS. 4.14	
E5.4				1				Wet Stone Masonry (1:4) for Revetment	m ³						TS. 4.14	
E5.5				1				Cement Mortar Plastering	m ²						TS. 3.07	
E5.6				1				Supply and Driving of Steel Sheet Piles, Type II	m						TS. 3.24	
E5.7				1				Concrete, Type C1	m ³						TS. 3.24	
E5.8				1				Concrete, Type C2	m ³						TS. 3.24	
E5.9				1				Concrete, Type E	m ³						TS. 3.24	
E5.10				1				Reinforcing Steel Bar	kg						TS. 3.24	
E5.11				1				Formwork FW1	m ²						TS. 3.24	
E5.12				1				Formwork FW2	m ²						TS. 3.24	
E5.13				1				Elastic Joint Filler, 10 mm thick	m						TS. 3.24	
E5.14				1				Water Stop, 30 cm wide	m						TS. 3.24	
E5.15				1				Dowel Bar	kg						TS. 3.24	
E5.16				1				Handrail, Galvanized Steel Pipe	kg						TS. 6.09	
E5.17				1				Galvanized Steel Ladder	kg						TS. 6.09	
E5.18				1			PE176+55	Supply and Installation of Steel Sluice Gate (H=1.5m, D=2.0m x 1)	L.S.					TS. 9.09		
E6				1				DRAINAGE OUTLET SL5, BOX CULVERT								
E6.1				1				Excavation (Common)	m ³						TS. 2.10	
E6.2				1				Backfill with Selected Soil	m ³						TS. 2.10	
E6.3				1				Crusher Run Bedding	m ³						TS. 4.14	
E6.4				1				Wet Stone Masonry (1:4) for Revetment	m ³						TS. 4.14	
E6.5				1				Cement Mortar Plastering	m ²						TS. 4.14	
E6.6				1				Concrete, Type C1	m ³						TS. 3.24	
E6.7				1				Concrete, Type C2	m ³						TS. 3.24	
E6.8				1				Concrete, Type E	m ³						TS. 3.24	
E6.9				1				Reinforcing Steel Bar	kg						TS. 3.24	
E6.10				1				Formwork FW1	m ²						TS. 3.24	
E6.11				1				Formwork FW2	m ²						TS. 3.24	
E7				1			PE176+85	DRAINAGE OUTLET SL6, BOX CULVERT								
E7.1				1				Excavation (Common)	m ³						TS. 2.10	
E7.2				1				Backfill with Selected Soil	m ³						TS. 2.10	
E7.3				1				Crusher Run Bedding	m ³						TS. 4.14	
E7.4				1				Wet Stone Masonry (1:4) for Revetment	m ³						TS. 4.14	
E7.5				1				Cement Mortar Plastering	m ²						TS. 4.14	
E7.6				1				Concrete, Type C1	m ³						TS. 3.24	

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT QUANTITY	P.C.		I.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7				UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
E7.7									m ³						TS. 3.24	
E7.8									m ³						TS. 3.24	
E7.9									kg						TS. 3.24	
E7.10									m ²						TS. 3.24	
E7.11									m ²						TS. 3.24	
E8								PE212+00	Concrete, Type C2							
E8.1									Excavation (Common)	m ³					TS. 2.10	
E8.2									Backfill with Selected Soil	m ³					TS. 2.10	
E8.3									Crusher Run Bedding	m ³					TS. 4.14	
E8.4									Wet Stone Masonry (1:4) for Revetment	m ³					TS. 4.14	
E8.5									Cement Mortar Plastering	m ²					TS. 4.14	
E8.6									Concrete, Type C1	m ³					TS. 3.24	
E8.7									Concrete, Type C2	m ³					TS. 3.24	
E8.8									Concrete, Type E	m ³					TS. 3.24	
E8.9									Reinforcing Steel Bar	kg					TS. 3.24	
E8.10									Formwork FW1	m ²					TS. 3.24	
E8.11									Formwork FW2	m ²					TS. 3.24	
E9								PE222+00	Concrete, Type C1							
E9.1									Excavation (Common)	m ³					TS. 2.10	
E9.2									Backfill with Selected Soil	m ³					TS. 2.10	
E9.3									Concrete, Type C1	m ³					TS. 3.24	
E9.4									Concrete, Type E	m ³					TS. 3.24	
E9.5									Reinforcing Steel Bar	kg					TS. 3.24	
E9.6									Formwork FW1	m ²					TS. 3.24	
E9.7									Formwork FW2	m ²					TS. 3.24	
E9.8									Demolition & Removal Gabion	m ³					TS. 3.24	
E9.9									Demolition & Removal Stone Massart	m ³					TS. 3.24	
E10								PE246+00	Concrete, Type C1							
E10.1									Excavation (Common)	m ³					TS. 2.10	
E10.2									Backfill with Selected Soil	m ³					TS. 2.10	
E10.3									Crusher Run Bedding	m ³					TS. 4.14	
E10.4									Wet Stone Masonry (1:4) for Revetment	m ³					TS. 4.14	
E10.5									Cement Mortar Plastering	m ²					TS. 4.14	
E10.6									Concrete, Type C1	m ³					TS. 3.24	
E10.7									Concrete, Type E	m ³					TS. 3.24	
E10.8									Reinforcing Steel Bar	kg					TS. 3.24	
E10.9									Formwork FW1	m ²					TS. 3.24	
E10.10									Formwork FW2	m ²					TS. 3.24	
E11								PE259+00	Concrete, Type C1							
E11.1									Excavation (Common)	m ³					TS. 2.10	
E11.2									Backfill with Selected Soil	m ³					TS. 2.10	
E11.3									Crusher Run Bedding	m ³					TS. 4.14	
E11.4									Wet Stone Masonry (1:4) for Revetment	m ³					TS. 4.14	
E11.5									Cement Mortar Plastering	m ²					TS. 4.14	
E11.6									Concrete, Type C1	m ³					TS. 3.24	
E11.7									Concrete, Type C2	m ³					TS. 3.24	
E11.8									Concrete, Type E	m ³					TS. 3.24	
E11.9									Reinforcing Steel Bar	kg					TS. 3.24	

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT QUANTITY	K.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7				UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
E11.10				1					Formwork FW1	m ²					TS. 3.24	
E11.11				1					Formwork FW2	m ²					TS. 3.24	
E12				1			FW9+81	DRAINAGE OUTLET SPZ, FALLING WORKS								
E12.1				1				Excavation (Common)	m ³						TS. 2.10	
E12.2				1				Backfill with Selected Soil	m ³						TS. 2.10	
E12.3				1				Concrete, Type C1	m ³						TS. 3.24	
E12.4				1				Concrete, Type E	m ³						TS. 3.24	
E12.5				1				Reinforcing Steel Bar	kg						TS. 3.24	
E12.6				1				Formwork FW1	m ²						TS. 3.24	
E12.7				1				Formwork FW2	m ²						TS. 3.24	
E13				1			FW25+24	DRAINAGE OUTLET (SPS), BOX CULVERT (BATUAN RIVER)								
E13.1				1				Excavation (Common)	m ³						TS. 2.10	
E13.2				1				Backfill with Selected Soil	m ³						TS. 2.10	
E13.3				1				Concrete, Type C1	m ³						TS. 3.24	
E13.4				1				Concrete, Type C2	m ³						TS. 3.24	
E13.5				1				Concrete, Type E	m ³						TS. 3.24	
E13.6				1				Reinforcing Steel Bar	kg						TS. 3.24	
E13.7				1				Formwork FW1	m ²						TS. 3.24	
E13.8				1				Formwork FW2	m ²						TS. 3.24	
E14				3	6			DRAINAGE OUTLET, PIPE CULVERT D=600 x 1 (places)								
E14.1				3	6			Excavation (Common)	m ³						TS. 2.10	
E14.2				3	6			Backfill with Selected Soil	m ³						TS. 2.10	
E14.3				3	6			Concrete, Type C1	m ³						TS. 3.24	
E14.4				3	6			Concrete, Type E	m ³						TS. 3.24	
E14.5				3	6			Reinforcing Steel Bar	kg						TS. 3.24	
E14.6				3	6			Formwork FW1	m ²						TS. 3.24	
E14.7				6				Formwork FW2	m ²						TS. 3.24	
E14.8				3	6			RC Pipe, D=600mm	m						TS. 12.10	
E15				1	4	1		DRAINAGE OUTLET(SLS), PIPE CULVERT D=800 x 1 (places)								
E15.1				1	4	1		Excavation (Common)	m ³						TS. 2.10	
E15.2				1	4	1		Backfill with Selected Soil	m ³						TS. 2.10	
E15.3				1	4	1		Concrete, Type C1	m ³						TS. 3.24	
E15.4				1	4	1		Concrete, Type E	m ³						TS. 3.24	
E15.5				1	4	1		Reinforcing Steel Bar	kg						TS. 3.24	
E15.6				1	4	1		Formwork FW1	m ²						TS. 3.24	
E15.7				4	1			Formwork FW2	m ²						TS. 3.24	
E15.8				1	4	1		RC Pipe, D=800mm	m						TS. 12.10	
E16				1	2			DRAINAGE OUTLET, PIPE CULVERT D=1000 x 1 (places)								
E16.1				1	2			Excavation (Common)	m ³						TS. 2.10	
E16.2				1	2			Backfill with Selected Soil	m ³						TS. 2.10	
E16.3				1	2			Concrete, Type C1	m ³						TS. 3.24	
E16.4				1	2			Concrete, Type E	m ³						TS. 3.24	
E16.5				1	2			Reinforcing Steel Bar	kg						TS. 3.24	
E16.6				1	2			Formwork FW1	m ²						TS. 3.24	
E16.7				2				Formwork FW2	m ²						TS. 3.24	
E16.8				1	2			RC Pipe, D=1000mm	m						TS. 12.10	
E17				2				DRAINAGE OUTLET, PIPE CULVERT D=800 x 2 (places)								
E17.1				2				Excavation (Common)	m ³						TS. 2.10	
E17.2				2				Backfill with Selected Soil	m ³						TS. 2.10	

ITEM NO.	MFC. NO.							LOCATION	EQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)		
E17.3									Concrete, Type C1	m ³							TS. 3.24
E17.4									Concrete, Type E	m ³							TS. 3.24
E17.5									Reinforcing Steel Bar	kg							TS. 3.24
E17.6									Formwork FW1	m ²							TS. 3.24
E17.7									Formwork FW2	m ²							TS. 3.24
E17.8									RC Pipe, D=800mm	m							TS. 12.10
E18									DRAINAGE OUTLET, PIPE CULVERT D=1000 x 2 (places)								
E18.1									Excavation (Common)	m ³							TS. 2.10
E18.2									Backfill with Selected Soil	m ³							TS. 2.10
E18.3									Wet Stone Masonry (1:4) for Retement	m ³							TS. 4.14
E18.4									Concrete, Type C1	m ³							TS. 3.24
E18.5									Concrete, Type E	m ³							TS. 3.24
E18.6									Reinforcing Steel Bar	kg							TS. 3.24
E18.7									Formwork FW1	m ²							TS. 3.24
E18.8									Formwork FW2	m ²							TS. 3.24
E18.9									RC Pipe, D=1000mm	m							TS. 12.10
E19									DRAINAGE OUTLET, PIPE CULVERT D=1000 x 1 (places)								
E19.1									Excavation (Common)	m ³							TS. 2.10
E19.2									Backfill with Selected Soil	m ³							TS. 2.10
E19.3									Concrete, Type C1	m ³							TS. 3.24
E19.4									Concrete, Type E	m ³							TS. 3.24
E19.5									Reinforcing Steel Bar	kg							TS. 3.24
E19.6									Formwork FW1	m ²							TS. 3.24
E19.7									Formwork FW2	m ²							TS. 3.24
E19.8									RC Pipe D=1000mm	m							TS. 12.10
E20									DRAINAGE OUTLET, OPEN DITCH TYPE (places)								
E20.1									Excavation (Common)	m ³							TS. 2.10
E20.2									Backfill with Selected Soil	m ³							TS. 2.10
E20.3									Concrete, Type C1	m ³							TS. 3.24
E20.4									Concrete, Type E	m ³							TS. 3.24
E20.5									Reinforcing Steel Bar	kg							TS. 3.24
E20.6									Formwork FW1	m ²							TS. 3.24
E21									DRAINAGE DITCH CONNECTING TO DRAINAGE OUTLETS								
E21.1									Excavation (Common)	m ³							TS. 2.10
E21.2									Backfill with Gravel	m ³							TS. 4.14
E21.3									Crusher Run Bedding	m ³							TS. 4.14
E21.4									Wet Stone Masonry (1:4) for Retement	m ³							TS. 4.14
E21.5									Concrete Mortar Plastering	m ²							TS. 4.14
E21.6									Concrete, Type C2	m ³							TS. 3.24
E21.7									Concrete, Type E	m ³							TS. 3.24
E21.8									Reinforcing Steel Bar	kg							TS. 3.24
E21.9									Formwork FW1	m ²							TS. 3.24
E22									EARTH DRAINAGE CHANNEL (PIER+90m to PIE32)								
E22.1									Excavation (Common)	m ³							TS. 2.10
E22.2									Shipping of Top Soil	m ³							TS. 2.10
E22.3									Embankment	m ³							TS. 2.10
E23									DRAINAGE SIDE DITCH ALONG EARTH DINE								
E23.1									Cleaning and Grubbing	m ²							TS. 2.10
E23.2									Excavation (Common)	m ³							TS. 2.10

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		I.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
E23.3				1	1	1			Sand Bedding	m ³							TS-4.14
E23.4				1					Backfill with Selected Soil	m ³							TS-2.10
E23.5				1	1	1			Backfill with Gravel	m ³							TS-4.14
E23.6				1	1	1			Wet Stone Masonry (1:4) for Revetment	m ³							TS-4.14
E23.7				1	1	1			Cement Mortar Plastering	m ²							TS-4.14
E23.8				1	1	1			Crusher Run Bedding	m ³							TS-4.14
E23.9				1	1	1			Concrete, Type C2	m ³							TS-3.24
E23.10				1	1	1			Reinforcing Steel Bar	kg							TS-3.24
E23.11				1	1	1			Formwork FW1	m ²							TS-3.24
E23.12				1	1	1			Wet Stone Masonry (1:3) for Revetment	m ³							TS-4.14
E24				1	1	1			DRAINAGE SIDE DITCH (CONCRETE U-TYPE)								
E24.1				1	1	1			Excavation (Common)	m ³							TS-2.10
E24.2				1	1	1			Backfill with Selected Soil	m ³							TS-2.10
E24.3				1	1	1			Concrete, Type C2	m ³							TS-3.24
E24.4				1	1	1			Reinforcing Steel Bar	kg							TS-3.24
E24.5				1	1	1			Formwork FW1	m ²							TS-3.24
E24.6				1	1	1			Crusher Run Bedding	m ³							TS-4.14

ITEM NO.	MFC. NO.				LOCATION	IQ-ITEMS	UNIT QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4				5	6	7	UNIT COST (RP.)		
F1	1				PE 71-00	BANDAR SIDORAS INTAKE WEIR AND IRRIGATION FACILITIES							
						PREPARATION WORKS							
F1.1	1					Clearing and Grubbing	m ²						TS. 2.10
F1.2	1					Coffering and Dewatering	L.S.						TS. 1.04
F1.3	1					Demolition and Removal of Existing Structure	L.S.						TS. 2.10
F2	1					INFLATABLE RUBBER-MADE DAM							
						EARTH WORKS							
F2.1	1					Excavation (Common)	m ³						TS. 2.10
F2.2	1					Backfill with Selected Soil	m ³						TS. 2.10
						CONCRETE WORKS							
F2.3	1					Concrete, Type C1 for Main Structure	m ³						TS. 3.24
F2.4	1					Concrete, Type E	m ³						TS. 3.24
F2.5	1					Formwork FW1	m ²						TS. 3.24
F2.6	1					Formwork FW2	m ²						TS. 3.24
F2.7	1					Reinforcing Steel Bar	kg						TS. 3.24
F2.8	1					Elastic Joint Filler, 10 mm thick	m ³						TS. 3.24
F2.9	1					Water Stop, 30 cm wide	m						TS. 3.24
F2.10	1					Dowel Bars, Dia. 19mm, 1.0 m long	kg						TS. 3.24
						PILE WORKS							
F2.11	1					PC Pile for Test Pile, Dia 400 mm, Type AB	m						TS. 5.07
F2.12	1					Supply and Driving of PC Piles, Dia. 400 mm, Type AB	m						TS. 5.07
F2.13	1					PC Pile for Test Pile, Dia 600 mm, Type AB	m						TS. 5.07
F2.14	1					Supply and Driving of PC Piles, Dia. 600 mm, Type AB	m						TS. 5.07
F2.15	1					Supply and Driving of Steel Sheet Piles, Type II	m ²						TS. 5.07
						INFLATABLE RUBBER-MADE DAM							
F2.16	1					Inflatable Rubber-made Dam including Anchoring materials, Operating and electric equipment	set						TS.10.15
F3	1					IRRIGATION INTAKE FACILITIES							
						EARTH WORKS							
F3.1	1					Excavation (Common)	m ³						TS. 2.10
F3.2	1					Backfill with Selected Soil	m ³						TS. 2.10
						CONCRETE WORKS							
F3.3	1					Concrete, Type C1 for Irrigation Intake Facilities and Bridge Pier	m ³						TS. 3.24
F3.4	1					Concrete, Type C2 for Block-out Concrete for Gate Post	m ³						TS. 3.24
F3.5	1					Concrete, Type E	m ³						TS. 3.24
F3.6	1					Formwork FW1	m ²						TS. 3.24
F3.7	1					Formwork FW2	m ²						TS. 3.24
F3.8	1					Reinforcing Steel Bar	kg						TS. 3.24
F3.9	1					Elastic Joint Filler, 10 mm thick	m ³						TS. 3.24
F3.10	1					Water Stop, 30 cm wide	m						TS. 3.24
F3.11	1					Dowel Bars, Dia. 19mm, 1.0 m long	kg						TS. 3.24
						PILE WORKS							
F3.12	1					Supply and Driving of PC Piles, Dia. 600 mm, Type AB	m						TS. 5.07
F3.13	1					Supply and Driving of Steel Sheet Piles, Type II	m ²						TS. 5.07
F3.14	1					Log Pile	m						TS. 5.07
						CONTROL GATES							
F3.15	1					Supply and Installation of Steel Slide Gate (H=1.0m, B=1.25m x 2)	L.S.						TS. 9.09
F3.16	1					Supply and Installation of Steel Slide Gate (H=1.0m, B=1.0m x 2)	L.S.						TS. 9.09
						IRRIGATION CHANNEL LINING							
F3.17	1					Wet Stone Masonry (1:4) for Revetment	m ³						TS. 4.14
F3.18	1					Crusher Run Bedding	m ³						TS. 4.14
F3.19	1					Concrete, Type C1 for Base Concrete	m ³						TS. 3.24

ITEM NO.	MFC. NO.	LOCATION	BC ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
						UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
F3.20	1		Concrete, Type C2 for top Concrete and Channel Bed Lining	m ³							TS. 3.24
F3.21	1		Cement Mortar Plastering	m ²							TS. 4.14
F3.22	1		Formwork FW1	m ²							TS. 3.24
F3.23	1		Reinforcing Steel Bar	kg							TS. 3.24
F3.24	1		PVC Pipe Drain, Dia. 50 mm	m							TS. 3.24
F3.25	1		Elastic Joint Filler, 10mm thick	m ²							TS. 3.24
F4	1		CHANNEL PROTECTION WORKS								
F4.1	1		Excavation (Common)	m ³							TS. 2.10
F4.2	1		Concrete Block, Crib Type, 1x200 mm	nos.							TS. 4.14
F4.3	1		Cusher Run Bedding	m ³							TS. 4.14
F5	1		MAINTENANCE FACILITIES								
F5.1	1		INSPECTION BRIDGE (SUPER STRUCTURE)								
F5.2	1		Concrete, Type C2 for Substructures	m ³							TS. 3.24
F5.3	1		Concrete, Type E	m ³							TS. 3.24
F5.4	1		Formwork FW1	m ²							TS. 3.24
F5.5	1		Formwork FW2	m ²							TS. 3.24
F5.6	1		Reinforcing Steel Bar	kg							TS. 3.24
F5.7	1		Steel Girder	L.S.							TS. 8.07
F5.8	1		Supply and Driving of RC Piles, 400mm x 400mm, L=15m	m							TS. 5.07
F5.9	1		CONTROL HOUSE								
F5.10	1		Control House	L.S.							TS. 10.13
G1	1	DUI2+22	DIVERSION WEIRS								
G1.1	1		PREPARATION WORKS FOR DIVERSION WEIRS								
G1.2	1		Cleaning and Grubbing	m ²							TS. 2.10
G1.3	1		Coffering and Dewatering	L.S.							TS. 1.04
G2	1	DUI2+22	DELI RIVER WEIR								
G2.1	1		EARTH WORKS								
G2.2	1		Excavation (Common)	m ³							TS. 2.10
G2.3	1		Backfill with Selected Soil	m ³							TS. 2.10
G2.4	1		Backfill with Impervious Soil	m ³							TS. 2.10
G2.5	1		CONCRETE WORKS								
G2.6	1		Concrete, Type C1	m ³							TS. 3.24
G2.7	1		Concrete, Type D for Learning Wall	m ³							TS. 3.24
G2.8	1		Concrete, Type E	m ³							TS. 3.24
G2.9	1		Reinforcing Steel Bar	kg							TS. 3.24
G2.10	1		Formwork FW1	m ²							TS. 3.24
G2.11	1		Formwork FW2	m ²							TS. 3.24
G2.12	1		Water Stop, 30 cm wide	m							TS. 3.24
G2.13	1		Dowel Bars, Dia. 19mm, 1.0 m long	kg							TS. 3.24
G2.14	1		Elastic Joint Filler, 10 mm thick	m ²							TS. 3.24
G2.15	1		Surface Caulking	m							TS. 3.24
G2.16	1		DRAIN WORKS								
G2.17	1		Concrete Drainage Ditch (U= 300mm x 300mm) with Gravel	m							TS. 12.10
G2.18	1		Foundation								
G2.19	1		Backfill with Gravel	m ³							TS. 4.14
G2.20	1		Weep Hole, Dia 100mm	nos.							TS. 4.14
G2.21	1		Weep Hole, Dia. 50 mm	nos.							TS. 4.14
G2.22	1		RIVER BED PROTECTION WORKS								
G2.23	1		Concrete Block, 980mm x 980mm x 400mm	nos.							TS. 4.14
G2.24	1		Concrete Block, Crib Type, 1=400 mm	nos.							TS. 4.14
G2.25	1		Cobble Stone Filling for Crib type Concrete Block	m ³							TS. 4.14

ITEM NO.	MFC. NO.						LOCATION	REQ-ITEMS	UNIT QUANTITY	F.C.		I.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6				UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
G2.21					1		Crusher Run Bedding	m ³						TS. 4.14	
					1		MISCELLANEOUS WORKS								
G2.22					1		Handrail, Galvanized Steel Pipe	kg						TS. 6.09	
G2.23					1		Gabion Mattress	m ³						TS. 4.14	
G3					1		FW39-50.5 FLOODWAY WEIR								
					1		EARTH WORKS								
G3.1					1		Excavation (Common)	m ³						TS. 2.10	
G3.2					1		Backfill with Selected Soil	m ³						TS. 2.10	
G3.3					1		Backfill with Impervious Soil	m ³						TS. 2.10	
G3.4					1		Foundation Improvement with Cement	m ³						TS. 12.10	
					1		CONCRETE WORKS								
G3.5					1		Concrete, Type C1	m ³						TS. 3.24	
G3.6					1		Concrete, Type D for Leaning Wall	m ³						TS. 3.24	
G3.7					1		Concrete, Type E	m ³						TS. 3.24	
G3.8					1		Reinforcing Steel Bar	kg						TS. 3.24	
G3.9					1		Formwork FW1	m ²						TS. 3.24	
G3.10					1		Formwork FW2	m ²						TS. 3.24	
G3.11					1		Water Stop, 30 cm wide	m						TS. 3.24	
G3.12					1		Dowel Bars, Dia. 19mm, 1.0 m long	kg						TS. 3.24	
G3.13					1		Elastic Joint Filler, 10 mm thick	m ²						TS. 3.24	
G3.14					1		Surface Caulking	m						TS. 3.24	
					1		DRAIN WORKS								
G3.15					1		Concrete Drainage Ditch (U=300mm x 300mm) with Gravel	m						TS. 12.10	
					1		Foundation								
G3.16					1		Backfill with Gravel	m ³						TS. 4.14	
G3.17					1		Weep Hole, Dia 100mm, including Filter Cloth and Counterflow	nos.						TS. 4.14	
					1		Prevention Valve								
G3.18					1		Weep Hole, Dia. 50 mm	nos.						TS. 4.14	
					1		RIVER BED PROTECTION WORKS								
G3.19					1		Concrete Block, 980mm x 980mm x 400mm	nos.						TS. 4.14	
G3.20					1		Concrete Block, Cob Type, 1=400 mm	nos.						TS. 4.14	
G3.21					1		Cobble Stone Filling for Crb type Concrete Block	m ³						TS. 4.14	
G3.22					1		Crusher Run Bedding	m ³						TS. 4.14	
					1		MISCELLANEOUS WORKS								
G3.23					1		Handrail, Galvanized Steel Pipe	kg						TS. 6.09	
G3.24					1		Galvanized Steel Ladder	kg						TS. 6.09	
G3.25					1		Water Level Staff Gauge, Type A	L-S						TS. 12.10	

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		I.C.		TOTAL	SPEC. NO.		
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)				
H1	1	1	1	1	1	1	1	BRIDGE WORK											
H1-1	1	1	1	1	1	1	1	PREPARATION WORKS											
H1-2	1	1	1	1	1	1	1	Coffering and Dewatering	L.S.								TS-1.04		
H2	1	1	1	1	1	1	1	Clearing and Grubbing	m ²								TS-2.10		
H2-1	1	1	1	1	1	1	1	TFTL BESI BRIDGE (P1)											
H2-1.1	1	1	1	1	1	1	1	EARTH WORKS											
H2-1.2	1	1	1	1	1	1	1	Excavation (Common)	m ³								TS-2.10		
H2-1.3	1	1	1	1	1	1	1	Embankment	m ³								TS-2.10		
H2-1.4	1	1	1	1	1	1	1	Backfill with Selected Soil	m ³								TS-2.10		
H2-1.5	1	1	1	1	1	1	1	Solid Sodding	m ²								TS-4.14		
H2-2	1	1	1	1	1	1	1	Demolition and Removal of Existing Structure	L.S.								TS-2.10		
H2-2.1	1	1	1	1	1	1	1	PILE FOUNDATION WORKS FOR PIER AND ABUTMENT											
H2-2.2	1	1	1	1	1	1	1	SP Pile for Test Pile, Dia.400 mm	m								TS-5.07		
H2-2.3	1	1	1	1	1	1	1	PC Pile for Test Pile, Dia.400 mm, Type B	m								TS-5.07		
H2-2.4	1	1	1	1	1	1	1	Static Load Test for SP and PC Pile	nos								TS-5.07		
H2-2.5	1	1	1	1	1	1	1	Supply and Driving of SP Piles, Dia. 400 mm	m								TS-5.07		
H2-2.6	1	1	1	1	1	1	1	Supply and Driving of PC Piles, Dia. 400 mm, Type B	m								TS-5.07		
H2-2.7	1	1	1	1	1	1	1	Reinforcing Steel Bar	kg								TS-3.24		
H2-3	1	1	1	1	1	1	1	Concrete, Type C1	m ³								TS-3.24		
H2-3.1	1	1	1	1	1	1	1	CONCRETE WORKS FOR PIER, ABUTMENT AND APPROACH SLAB											
H2-3.2	1	1	1	1	1	1	1	Concrete, Type C1	m ³									TS-3.24	
H2-3.3	1	1	1	1	1	1	1	Concrete, Type E	m ³									TS-3.24	
H2-3.4	1	1	1	1	1	1	1	Reinforcing Steel Bar	kg									TS-3.24	
H2-3.5	1	1	1	1	1	1	1	Formwork FW1	m ²									TS-3.24	
H2-3.6	1	1	1	1	1	1	1	Formwork FW2	m ²									TS-3.24	
H2-4	1	1	1	1	1	1	1	Rubble Stone Bedding	m ³									TS-4.14	
H2-4.1	1	1	1	1	1	1	1	CONCRETE WORKS FOR SUPER STRUCTURE											
H2-4.2	1	1	1	1	1	1	1	Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.									TS-8.07	
H2-4.3	1	1	1	1	1	1	1	Precast Prestressed Concrete Diaphragm	L.S.									TS-8.07	
H2-4.4	1	1	1	1	1	1	1	Prestressed Concrete Panel for Slab	L.S.									TS-8.07	
H2-4.5	1	1	1	1	1	1	1	Concrete, Type B for Slab	m ³									TS-3.24	
H2-4.6	1	1	1	1	1	1	1	Reinforcing Steel Bar	kg									TS-3.24	
H2-5	1	1	1	1	1	1	1	Formwork FW2	m ²									TS-3.24	
H2-5.1	1	1	1	1	1	1	1	MISCELLANEOUS WORKS											
H2-5.2	1	1	1	1	1	1	1	Expansion Joint, Steel Profile (75 x 75 x 6mm)	m									TS-6.99	
H2-5.3	1	1	1	1	1	1	1	Elastomeric Bearing Pad for Abutment, 406 x 280 x 67 mm	nos									TS-8.07	
H2-5.4	1	1	1	1	1	1	1	Elastomeric Bearing Pad for Pier, 406 x 280 x 67 mm	nos									TS-8.07	
H2-5.5	1	1	1	1	1	1	1	PVC Pipe Drain, Dia.100 mm	m									TS-8.07	
H2-5.6	1	1	1	1	1	1	1	Handrail, Galvanized Steel Pipe	kg									TS-6.99	
H2-5.7	1	1	1	1	1	1	1	Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³									TS-3.24	
H2-5.8	1	1	1	1	1	1	1	Formwork FW1	m ²									TS-3.24	
H2-6	1	1	1	1	1	1	1	Name Plate	nos									TS-8.07	
H2-6.1	1	1	1	1	1	1	1	DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD											
H2-6.2	1	1	1	1	1	1	1	Backfill with Gravel	m ³										TS-4.14
H2-6.3	1	1	1	1	1	1	1	Wet Stone Masonry (1:4) for Retement	m ³									TS-4.14	
H2-6.4	1	1	1	1	1	1	1	Cement Mortar Plastering	m ²									TS-4.14	
H2-6.5	1	1	1	1	1	1	1	Concrete, Type C1	m ³									TS-3.24	
H2-6.6	1	1	1	1	1	1	1	Concrete, Type E	m ³									TS-3.24	
H2-6.7	1	1	1	1	1	1	1	Reinforcing Steel Bar	kg									TS-3.24	
H2-6.8	1	1	1	1	1	1	1	Formwork FW1	m ²									TS-3.24	

ITEM NO.	MPC. NO.		LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2					3	4	5	6		
H2-6.8	1			Weep Hole, Dia. 50 mm	nos.							TS. 4.14
H2-7	1			PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD) CLASS II								
H2-7.1	1			Sub-Base Course (Class B)	m ³							TS. 7.09
H2-7.2	1			Base Course (Class A)	m ³							TS. 7.09
H2-7.3	1			Asphalt Treatment Base (A.T.B)	ton							TS. 7.09
H2-7.4	1			Bituminous Prime Coat	liter							TS. 7.09
H2-7.5	1			Bituminous Surface Course, 50 mm thick	ton							TS. 7.09
H3												
H3-1	1		PE84-28	PERKUBUNAN BRIDGE (P2)								
H3-1.1	1			EARTH WORKS								
H3-1.2	1			Excavation (Common)	m ³							TS. 2.10
H3-1.3	1			Embankment	m ³							TS. 2.10
H3-1.4	1			Backfill with Selected Soil	m ³							TS. 2.10
H3-1.5	1			Solid Sodding	m ²							TS. 4.14
H3-2	1			Demolition and Removal of Existing Structure	L.S.							TS. 2.10
H3-2.1	1			PILE FOUNDATION WORKS FOR PIER AND ABUTMENT								
H3-2.2	1			SP Test Pile, Dia. 400 mm	m							TS. 5.07
H3-2.3	1			PC Test Pile, Dia. 400 mm, Type B	m							TS. 5.07
H3-2.4	1			Static Load Test for SP and PC Pile	nos							TS. 5.07
H3-2.5	1			Supply and Driving of SP Piles, Dia. 400 mm	m							TS. 5.07
H3-2.6	1			Supply and Driving of PC Piles, Dia. 400 mm, Type B	m							TS. 5.07
H3-2.7	1			Reinforcing Steel Bar	kg							TS. 3.24
H3-3	1			Concrete, Type C1	m ³							TS. 3.24
H3-3.1	1			CONCRETE WORKS FOR PIER, ABUTMENT AND APPROACH SLAB								
H3-3.2	1			Concrete, Type C1	m ³							TS. 3.24
H3-3.3	1			Concrete, Type E	m ³							TS. 3.24
H3-3.4	1			Reinforcing Steel Bar	kg							TS. 3.24
H3-3.5	1			Formwork FW1	m ²							TS. 3.24
H3-3.6	1			Formwork FW2	m ²							TS. 3.24
H3-4	1			Rubble Stone Bedding	m ³							TS. 4.14
H3-4.1	1			CONCRETE WORKS FOR SUPER STRUCTURE								
H3-4.2	1			Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.							TS. 8.07
H3-4.3	1			Precast Prestressed Concrete Diaphragm	L.S.							TS. 8.07
H3-4.4	1			Prestressed Concrete Panel for Slab	L.S.							TS. 8.07
H3-4.5	1			Concrete, Type B for Slab	m ³							TS. 3.24
H3-4.6	1			Reinforcing Steel Bar	kg							TS. 3.24
H3-5	1			Formwork FW2	m ²							TS. 3.24
H3-5.1	1			MISCELLANEOUS WORKS								
H3-5.2	1			Expansion Joint, Steel Profile (75 x 75 x 6mm)	m							TS. 6.09
H3-5.3	1			Elastic Bearing Pad for Abutment, 406 x 280 x 67 mm	nos							TS. 8.07
H3-5.4	1			Elastic Bearing Pad for Pier, 480 x 300 x 67 mm	nos							TS. 8.07
H3-5.5	1			PVC Pipe Drain, Dia. 100 mm	m							TS. 8.07
H3-5.6	1			Handrail, Galvanized Steel Pipe	kg							TS. 6.09
H3-5.7	1			Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³							TS. 3.24
H3-5.8	1			Formwork FW1	m ²							TS. 3.24
H3-6	1			Name Plate	nos							TS. 8.07
H3-6.1	1			DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD								
H3-6.2	1			Backfill with Gravel	m ³							TS. 4.14
H3-6.3	2			Wet Stone Masonry (1:4) for Retement	m ³							TS. 4.14
				Cement Mortar Plastering	m ²							TS. 4.14

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)		
H3-6.4	1							Concrete, Type C1	m ³							TS. 3.24	
H3-6.5	1							Concrete, Type E	m ³							TS. 3.24	
H3-6.6	1							Reinforcing Steel Bar	kg							TS. 3.24	
H3-6.7	1							Formwork FW1	m ²							TS. 3.24	
H3-6.8	1							Weep Hole, Dia. 50 mm, including Filter Cloth	nos.							TS. 4.14	
H3-7	1							PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD : CLASS II)									
H3-7.1	1							Sub-Base Course (Class B)	m ³								TS. 7.09
H3-7.2	1							Base Course (Class A)	m ³								TS. 7.09
H3-7.3	1							Asphalt Treatment Base (A.T.B)	ton								TS. 7.09
H3-7.4	1							Bituminous Prime Coat	liter								TS. 7.09
H3-7.5	1							Bituminous Surface Course, 50 mm thick	ton								TS. 7.09
H4	1						PEB15+06	TITI CANTUNG BRIDGE (P3)									
H4-1	1							EARTH WORKS									
H4-1.1	1							Excavation (Common)	m ³								TS. 2.10
H4-1.2	1							Embankment	m ³								TS. 2.10
H4-1.3	1							Backfill with Selected Soil	m ³								TS. 2.10
H4-1.4	1							Solid Sodding	m ²								TS. 4.14
H4-1.5	1							Demolition and Removal of Existing Structure	L.S.								TS. 2.10
H4-2	1							PILE FOUNDATION WORKS FOR PIER AND ABUTMENT									
H4-2.1	1							SP Pile for Test Pile, Dia.400 mm	m								TS. 5.07
H4-2.2	1							Static Load Test for SP and PC Pile	nos								TS. 5.07
H4-2.3	1							Supply and Driving of SP Piles, Dia. 400 mm	m								TS. 5.07
H4-2.4	1							Reinforcing Steel Bar	kg								TS. 3.24
H4-2.5	1							Concrete, Type C1	m ³								TS. 3.24
H4-3	1							CONCRETE WORKS FOR PIER, ABUTMENT AND APPROACH SLAB									
H4-3.1	1							Concrete, Type C1	m ³								TS. 3.24
H4-3.2	1							Concrete, Type B	m ³								TS. 3.24
H4-3.3	1							Reinforcing Steel Bar	kg								TS. 3.24
H4-3.4	1							Formwork FW1	m ²								TS. 3.24
H4-3.5	1							Formwork FW2	m ²								TS. 3.24
H4-3.6	1							Rubble Stone Bedding	m ³								TS. 4.14
H4-4	1							CONCRETE WORKS FOR SUPER STRUCTURE									
H4-4.1	1							Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.								TS. 8.07
H4-4.2	1							Precast Prestressed Concrete Diaphragm	L.S.								TS. 8.07
H4-4.3	1							Prestressed Concrete Panel for Slab	L.S.								TS. 8.07
H4-4.4	1							Concrete, Type B for Slab	m ³								TS. 3.24
H4-4.5	1							Reinforcing Steel Bar	kg								TS. 3.24
H4-4.6	1							Formwork FW2	m ²								TS. 3.24
H4-5	1							MISCELLANEOUS WORKS									
H4-5.1	1							Expansion Joint, Steel Profile (75 x 75 x 6mm)	m								TS. 6.09
H4-5.2	1							Elastomeric Bearing Pad for Abutment, 406 x 280 x 67 mm	nos.								TS. 8.07
H4-5.3	1							Elastomeric Bearing Pad for Pier, 460 x 300 x 67 mm	nos.								TS. 8.07
H4-5.4	1							PVC Pipe Drain, Dia.100 mm	m								TS. 6.09
H4-5.5	1							Handrail, Galvanized Steel Pipe	kg								TS. 6.09
H4-5.6	1							Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³								TS. 3.24
H4-5.7	1							Formwork FW1	m ²								TS. 3.24
H4-5.8	1							Name Plate	nos.								TS. 8.07
H4-6	1							DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD									
H4-6.1	1							Backfill with Gravel	m ³								TS. 4.14
H4-6.2	1							Wet Stone Masonry (1:4) for Retevment	m ³								TS. 4.14

ITEM NO.	MRC. NO.						LOCATION	BQ. ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6					7	UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)		
H4-6.3	1						Cement Mortar Plastering	m ²							TS. 4.14	
H4-6.4	1						Concrete, Type C1	m ³							TS. 3.24	
H4-6.5	1						Concrete, Type E	m ³							TS. 3.24	
H4-6.6	1						Reinforcing Steel Bar	kg							TS. 3.24	
H4-6.7	1						Formwork FW1	m ²							TS. 3.24	
H4-6.8	1						Wash Hole, Dia. 50 mm, including Filter Cloth	nos.							TS. 4.14	
H4-7	1						PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD - CLASS II)									
H4-7.1	1						Sub-Base Course (Class B)	m ³							TS. 7.09	
H4-7.2	1						Base Course (Class A)	m ³							TS. 7.09	
H4-7.3	1						Asphalt Treatment Base (A.T.B)	ton							TS. 7.09	
H4-7.4	1						Bituminous Prime Coat	liter							TS. 7.09	
H4-7.5	1						Bituminous Surface Course, 50 mm thick	ton							TS. 7.09	
HS							PAYUNG BRIDGE (PS)									
HS-1							EARTH WORKS									
HS-1.1	1						Excavation (Common)	m ³							TS. 2.10	
HS-1.2	1						Embankment	m ³							TS. 2.10	
HS-1.3	1						Backfill with Selected Soil	m ³							TS. 2.10	
HS-1.4	1						Solid Sodding	m ²							TS. 4.14	
HS-1.5	1						Demolition and Removal of Existing Structure	L.S.							TS. 2.10	
HS-2							PILE FOUNDATION WORKS FOR ABUTMENT									
HS-2.1	1						SP Pile for Test Pile, Dia. 400 mm	m							TS. 5.07	
HS-2.2	1						Static Load Test for SP and PC Pile	nos							TS. 5.07	
HS-2.3	1						Supply and Driving of SP Piles, Dia. 400 mm	m							TS. 5.07	
HS-2.4	1						Reinforcing Steel Bar	kg							TS. 3.24	
HS-2.5	1						Concrete, Type C1	m ³							TS. 3.24	
HS-3							CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB									
HS-3.1	1						Concrete, Type C1	m ³							TS. 3.24	
HS-3.2	1						Concrete, Type E	m ³							TS. 3.24	
HS-3.3	1						Reinforcing Steel Bar	kg							TS. 3.24	
HS-3.4	1						Formwork FW1	m ²							TS. 3.24	
HS-3.5	1						Formwork FW2	m ²							TS. 3.24	
HS-3.6	1						Rubble Stone Bedding	m ³							TS. 4.14	
HS-4							CONCRETE WORKS FOR SUPER STRUCTURE									
HS-4.1	1						Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.							TS. 8.07	
HS-4.2	1						Precast Prestressed Concrete Diaphragm	L.S.							TS. 8.07	
HS-4.3	1						Prestressed Concrete Panel for Slab	L.S.							TS. 8.07	
HS-4.4	1						Concrete, Type B for Slab	m ³							TS. 3.24	
HS-4.5	1						Reinforcing Steel Bar	kg							TS. 3.24	
HS-4.6	1						Formwork FW2	m ²							TS. 3.24	
HS-5							MISCELLANEOUS WORKS									
HS-5.1	1						Expansion Joint, Steel Profile (75 x 75 x 6mm)	m							TS. 6.09	
HS-5.2	1						Elastomeric Bearing Pad for Abutment, 480 x 300 x 67 mm	nos.							TS. 8.07	
HS-5.3	1						PVC Pipe Drain, Dia. 100 mm	m							TS. 8.07	
HS-5.4	1						Handrail, Galvanized Steel Pipe	kg							TS. 6.09	
HS-5.5	1						Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³							TS. 3.24	
HS-5.6	1						Formwork FW1	m ²							TS. 3.24	
HS-5.7	1						Name Plate	nos							TS. 8.07	
HS-6							DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD									
HS-6.1	1						Backfill with Gravel	m ³							TS. 4.14	
HS-6.2	1						Wet Stone Masonry (1:4) for Retention	m ³							TS. 4.14	

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H5-6.3	1							Cement Mortar Plastering	m ²							TS. 4.14	
H5-6.4	1							Concrete, Type C1	m ³							TS. 3.24	
H5-6.5	1							Concrete, Type E	m ³							TS. 3.24	
H5-6.6	1							Reinforcing Steel Bar	kg							TS. 3.24	
H5-6.7	1							Formwork FW1	m ²							TS. 3.24	
H5-6.8	1							Woop Hole, Dia. 50 mm, including Filter Cloth	nos.							TS. 4.14	
H5-7	1							PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD: CLASS II)									
H5-7.1	1							Sub-Base Course (Class B)	m ³							TS. 7.09	
H5-7.2	1							Base Course (Class A)	m ³							TS. 7.09	
H5-7.3	1							Asphalt Treatment Base (A-T.B)	ton							TS. 7.09	
H5-7.4	1							Bituminous Prime Coat	liter							TS. 7.09	
H5-7.5	1							Bituminous Surface Course, 50 mm thick	ton							TS. 7.09	
H6	1						PE147-58	PEDESTRIAN BRIDGE (P6)									
H6-1	1							EARTH WORKS									
H6-1.1	1							Excavation (Common)	m ³							TS. 2.10	
H6-1.2	1							Embankment	m ³							TS. 2.10	
H6-1.3	1							Backfill with Selected Soil	m ³							TS. 2.10	
H6-1.4	1							Solid Sodding	m ²							TS. 4.14	
H6-1.5	1							Demolition and Removal of Existing Structure	L.S.							TS. 2.10	
H6-2	1							PILE FOUNDATION WORKS FOR ABUTMENT									
H6-2.1	1							SP Pile for Test Pile, Dia. 400 mm	m							TS. 5.07	
H6-2.2	1							Static Load Test for SP and PC Pile	nos							TS. 5.07	
H6-2.3	1							Supply and Driving of SP Piles, Dia. 400 mm	m							TS. 5.07	
H6-2.4	1							Reinforcing Steel Bar	kg							TS. 3.24	
H6-2.5	1							Concrete, Type C1	m ³							TS. 3.24	
H6-3	1							CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB									
H6-3.1	1							Concrete, Type C1	m ³							TS. 3.24	
H6-3.2	1							Concrete, Type E	m ³							TS. 3.24	
H6-3.3	1							Reinforcing Steel Bar	kg							TS. 3.24	
H6-3.4	1							Formwork FW1	m ²							TS. 3.24	
H6-3.5	1							Formwork FW2	m ²							TS. 3.24	
H6-3.6	1							Rubble Stone Bedding	m ³							TS. 4.14	
H6-4	1							CONCRETE WORKS FOR SUPER STRUCTURE									
H6-4.1	1							Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.							TS. 8.07	
H6-4.2	1							Concrete, Type B for Slab	m ³							TS. 3.24	
H6-4.3	1							Reinforcing Steel Bar	kg							TS. 3.24	
H6-4.4	1							Formwork FW2	m ²							TS. 3.24	
H6-5	1							MISCELLANEOUS WORKS									
H6-5.1	1							Expansion Joint, Steel Profile (75 x 75 x 6mm)	m							TS. 6.09	
H6-5.2	1							Elastomeric Bearing Pad for Abutment, 480 x 300 x 67 mm	nos.							TS. 8.07	
H6-5.3	1							PVC Pipe Drain, Dia. 100 mm	m							TS. 8.07	
H6-5.4	1							Handrail, Galvanized Steel Pipe	kg							TS. 6.09	
H6-5.5	1							Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³							TS. 3.24	
H6-5.6	1							Formwork FW1	m ²							TS. 3.24	
H6-5.7	1							Name Plate	nos.							TS. 8.07	
H6-6	1							DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD									
H6-6.1	1							Backfill with Gravel	m ³							TS. 4.14	
H6-6.2	1							Wet Stone Masonry (1:4) for Revetment	m ³							TS. 4.14	
H6-6.3	1							Cement Mortar Plastering	m ²							TS. 4.14	
H6-6.4	1							Concrete, Type C1	m ³							TS. 3.24	

ITEM NO.	MFC. NO.	LOCATION	BQ-ITEMS	UNIT	QUANTITY	P.C.		L.C.		TOTAL	SPEC. NO.
						UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H6-6.5	1		Concrete, Type E	m ³							TS. 3.24
H6-6.6	1		Reinforcing Steel Bar	kg							TS. 3.24
H6-6.7	1		Formwork FW1	m ²							TS. 3.24
H6-6.8	1		Weep Hole, Dia. 50 mm, including Filter Cloth	nos.							TS. 4.14
H6-7	1		PAVEMENT (APPROACH ROAD)								
H6-7.1	1		Gravel Pavement, 200 mm thick	m ³							TS. 7.09
H7			MEDAN TEMBUNG BRIDGE WITH WATER PIPE (P7)								
H7.1	1		EARTH WORKS								
H7-1.1	1		Excavation (Common)	m ³							TS. 2.10
H7-1.2	1		Embankment	m ³							TS. 2.10
H7-1.3	1		Backfill with Selected Soil	m ³							TS. 2.10
H7-1.4	1		Solid Sodding	m ²							TS. 4.14
H7-1.5	1		Demolition and Removal of Existing Structure	L.S.							TS. 2.10
H7-2	1		PILE FOUNDATION WORKS FOR ABUTMENT								
H7-2.1	1		SP Pile for Test Pile, Dia. 400 mm	m							TS. 3.07
H7-2.2	1		Static Load Test for SP and PC Pile	nos							TS. 3.07
H7-2.3	1		Supply and Driving of SP Piles, Dia. 400 mm	m							TS. 3.07
H7-2.4	1		Reinforcing Steel Bar	kg							TS. 3.24
H7-2.5	1		Concrete, Type C1	m ³							TS. 3.24
H7-3	1		CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB								
H7-3.1	1		Concrete, Type C1	m ³							TS. 3.24
H7-3.2	1		Concrete, Type E	m ³							TS. 3.24
H7-3.3	1		Reinforcing Steel Bar	kg							TS. 3.24
H7-3.4	1		Formwork FW1	m ²							TS. 3.24
H7-3.5	1		Formwork FW2	m ²							TS. 3.24
H7-3.6	1		Rubble Stone Bedding	m ³							TS. 4.14
H7-4	1		CONCRETE WORKS FOR SUPER STRUCTURE								
H7-4.1	1		Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.							TS. 8.07
H7-4.2	1		Precast Prestressed Concrete Diaphragm	L.S.							TS. 8.07
H7-4.3	1		Prestressed Concrete Panel for Slab	L.S.							TS. 8.07
H7-4.4	1		Concrete, Type B for Slab	m ³							TS. 3.24
H7-4.5	1		Reinforcing Steel Bar	kg							TS. 3.24
H7-4.6	1		Formwork FW2	m ²							TS. 3.24
H7-5	1		MISCELLANEOUS WORKS								
H7-5.1	1		Expansion Joint, Steel Profile (75 x 75 x 6mm)	m							TS. 6.09
H7-5.2	1		Elastomeric Bearing Pad for Abutment, 480 x 300 x 67 mm	nos.							TS. 8.07
H7-5.3	1		PVC Pipe Drain, Dia. 100 mm	m							TS. 8.07
H7-5.4	1		Handrail, Galvanized Steel Pipe	kg							TS. 6.09
H7-5.5	1		Concrete, Type C1 for Handrail Post, Carb and Footpass	m ³							TS. 3.24
H7-5.6	1		Formwork FW1	m ²							TS. 3.24
H7-5.7	1		Name Plate	nos.							TS. 8.07
H7-6	1		DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD								
H7-6.1	1		Backfill with Gravel	m ³							TS. 4.14
H7-6.2	1		Wet Stone Masonry (1:4) for Retement	m ³							TS. 4.14
H7-6.3	1		Cement Mortar Plastering	m ²							TS. 4.14
H7-6.4	1		Concrete, Type C1	m ³							TS. 3.24
H7-6.5	1		Concrete, Type E	m ³							TS. 3.24
H7-6.6	1		Reinforcing Steel Bar	kg							TS. 3.24
H7-6.7	1		Formwork FW1	m ²							TS. 3.24
H7-6.8	1		Weep Hole, Dia. 50 mm, including Filter Cloth	nos.							TS. 4.14

ITEM NO.	MFC. NO. 1 2 3 4 5 6 7	LOCATION	BQ ITEMS	UNIT	F.C.		L.C.		TOTAL	SPEC. NO.
					QUANTITY	UNIT COST (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H7-7	1		PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD - CLASS II)	m ²						
H7-7.1	1		Sub-Base Course (Class B)	m ³						TS. 7.09
H7-7.2	1		Base Course (Class A)	m ³						TS. 7.09
H7-7.3	1		Asphalt Treatment Base (A.T.B)	ton						TS. 7.09
H7-7.4	1		Bituminous Prime Coat	liter						TS. 7.09
H7-7.5	1		Bituminous Surface Course, 50 mm thick	ton						TS. 7.09
H7-8	1		PIPE WORKS							
H7-8.1	1		Supply and Installation of Water Pipe, Dia. 114 mm, including Joints and Pipe Supports	L.S.						TS. 11.06
H8	1	PE200-25	MEDAN DENAI BRIDGE WITH WATER PIPES AND CABLE PIPES (P9)							
H8-1	1		EARTH WORKS							
H8-1.1	1		Excavation (Common)	m ³						TS. 2.10
H8-1.2	1		Embankment	m ³						TS. 2.10
H8-1.3	1		Backfill with Selected Soil	m ³						TS. 2.10
H8-1.4	1		Solid Sodding	m ²						TS. 4.14
H8-1.5	1		Demolition and Removal of Existing Structure	L.S.						TS. 2.10
H8-2	1		PILE FOUNDATION WORKS ABUTMENT							
H8-2.1	1		SP Pile for Test Pile, Dia. 400 mm	m						TS. 5.07
H8-2.2	1		Static Load Test for SP and PC Pile	nos						TS. 5.07
H8-2.3	1		Supply and Driving of SP Piles, Dia. 400 mm	m						TS. 5.07
H8-2.4	1		Reinforcing Steel Bar	kg						TS. 3.24
H8-2.5	1		Concrete, Type C1	m ³						TS. 3.24
H8-3	1		CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB							
H8-3.1	1		Concrete, Type C1	m ³						TS. 3.24
H8-3.2	1		Concrete, Type E	m ³						TS. 3.24
H8-3.3	1		Reinforcing Steel Bar	kg						TS. 3.24
H8-3.4	1		Formwork FW1	m ²						TS. 3.24
H8-3.5	1		Formwork FW2	m ²						TS. 3.24
H8-3.6	1		Rubble Stone Bedding	m ³						TS. 4.14
H8-4	1		CONCRETE WORKS FOR SUPER STRUCTURE							
H8-4.1	1		Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.						TS. 8.07
H8-4.2	1		Precast Prestressed Concrete Diaphragm	L.S.						TS. 8.07
H8-4.3	1		Prestressed Concrete Panel for Slab	L.S.						TS. 8.07
H8-4.4	1		Concrete, Type B for Slab	m ³						TS. 3.24
H8-4.5	1		Reinforcing Steel Bar	kg						TS. 3.24
H8-4.6	1		Formwork FW2	m ²						TS. 3.24
H8-5	1		MISCELLANEOUS WORKS							
H8-5.1	1		Expansion Joint, Steel Profile (75 x 75 x 6mm)	m						TS. 6.09
H8-5.2	1		Elastic Bearing Pad for Abutment, 480 x 300 x 67 mm	nos						TS. 8.07
H8-5.3	1		PVC Pipe Drain, Dia. 100 mm	m						TS. 8.07
H8-5.4	1		Handrail, Galvanized Steel Pipe	kg						TS. 6.09
H8-5.5	1		Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³						TS. 3.24
H8-5.6	1		Formwork FW1	m ²						TS. 3.24
H8-5.7	1		Name Plate	nos						TS. 8.07
H8-6	1		DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD							
H8-6.1	1		Backfill with Gravel	m ³						TS. 4.14
H8-6.2	1		Wet Stone Masonry (1:4) for Retainment	m ³						TS. 4.14
H8-6.3	1		Cement Mortar Plastering	m ²						TS. 4.14
H8-6.4	1		Concrete, Type C1	m ³						TS. 3.24
H8-6.5	1		Concrete, Type E	m ³						TS. 3.24

ITEM NO.	MFC. NO.	LOCATION	BQ-ITEMS	UNIT	F.C.		L.C.		TOTAL	SPEC. NO.
					QUANTITY	UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)		
H8-6.6	1		Reinforcing Steel Bar	kg						TS-3.24
H8-6.7	1		Formwork FW1	m ²						TS-3.24
H8-6.8	1		Weep Hole, Dia. 50 mm, including Filter Cloth	nos.						TS-4.14
H8-7	1		PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD: CLASS II)							
H8-7.1	1		Sub-Base Course (Class B)	m ³						TS-7.09
H8-7.2	1		Base Course (Class A)	m ³						TS-7.09
H8-7.3	1		Asphalt Treatment Base (A-T.B)	ton						TS-7.09
H8-7.4	1		Bituminous Prime Coat	liter						TS-7.09
H8-7.5	1		Bituminous Surface Course, 50 mm thick	ton						TS-7.09
H8-8	1		PIPE WORKS							
H8-8.1	1		Supply and Installation of Water Pipe, Dia.100 mm, including Joints and Pipe Supports	L.S.						TS-11.06
H8-8.2	1		Supply and Installation of Water Pipe, Dia.150 mm, including Joints and Pipe Supports	L.S.						TS-11.06
H9			BINJAI BRIDGE WITH WATER PIPES (PII)							
H9-1	1	PE22+00	EARTH WORKS							
H9-1.1	1		Excavation (Common)	m ³						TS-2.10
H9-1.2	1		Embankment	m ³						TS-2.10
H9-1.3	1		Backfill with Selected Soil	m ³						TS-2.10
H9-1.4	1		Solid Sodding	m ²						TS-4.14
H9-1.5	1		Demolition and Removal of Existing Structure	L.S.						TS-2.10
H9-2	1		PILE FOUNDATION WORKS FOR ABUTMENT							
H9-2.1	1		SP Pile for Test Pile, Dia.400 mm	m						TS-3.07
H9-2.2	1		Static Load Test for SP and PC Pile	nos.						TS-3.07
H9-2.3	1		Supply and Driving of SP Piles, Dia. 400 mm	m						TS-3.07
H9-2.4	1		Reinforcing Steel Bar	kg						TS-3.24
H9-2.5	1		Concrete, Type C1	m ³						TS-3.24
H9-3	1		CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB							
H9-3.1	1		Concrete, Type C1	m ³						TS-3.24
H9-3.2	1		Concrete, Type E	m ³						TS-3.24
H9-3.3	1		Reinforcing Steel Bar	kg						TS-3.24
H9-3.4	1		Formwork FW1	m ²						TS-3.24
H9-3.5	1		Formwork FW2	m ²						TS-3.24
H9-3.6	1		Rubble Stone Bedding	m ³						TS-4.14
H9-4	1		CONCRETE WORKS FOR SUPER STRUCTURE							
H9-4.1	1		Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.						TS-8.07
H9-4.2	1		Precast Prestressed Concrete Diaphragm	L.S.						TS-8.07
H9-4.3	1		Precast Prestressed Concrete Panel for Slab	L.S.						TS-8.07
H9-4.4	1		Concrete, Type B for Slab	m ³						TS-3.24
H9-4.5	1		Reinforcing Steel Bar	kg						TS-3.24
H9-4.6	1		Formwork FW2	m ²						TS-3.24
H9-5	1		MISCELLANEOUS WORKS							
H9-5.1	1		Expansion Joint, Steel Profile (75 x 75 x 6mm)	m						TS-6.09
H9-5.2	1		Elastic Bearing Pad for Abutment, 480 x 300 x 67 mm	nos.						TS-8.07
H9-5.3	1		PVC Pipe Drain, Dia.100 mm	m						TS-8.07
H9-5.4	1		Handrail, Galvanized Steel Pipe	kg						TS-6.09
H9-5.5	1		Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³						TS-3.24
H9-5.6	1		Formwork FW1	m ²						TS-3.24
H9-5.7	1		Name Plate	nos.						TS-8.07
H9-6	1		DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD							

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	P.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H9-6.1				1				Backfill with Gravel	m ³							TS. 4.14	
H9-6.2			1					Wet Stone Masonry (1/4) for Revetment	m ³							TS. 4.14	
H9-6.3			1					Cement Mortar Plastering	m ²							TS. 4.14	
H9-6.4			1					Concrete, Type C1	m ³							TS. 3.24	
H9-6.5			1					Concrete, Type E	m ³							TS. 3.24	
H9-6.6			1					Reinforcing Steel Bar	kg							TS. 3.24	
H9-6.7			1					Formwork FW1	m ²							TS. 3.24	
H9-6.8			1					Wesp Hole, Dia. 50 mm	nos							TS. 4.14	
H9-7			1					PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD - CLASS II)	m ³								
H9-7.1			1					Sub-Base Course (Class B)	m ³							TS. 7.09	
H9-7.2			1					Base Course (Class A)	m ³							TS. 7.09	
H9-7.3			1					Asphalt Treatment Base (A.T.B)	ton							TS. 7.09	
H9-7.4			1					Bituminous Prime Coat	liter							TS. 7.09	
H9-7.5			1					Bituminous Surface Course, 50 mm thick	ton							TS. 7.09	
H9-8			1					PIPE WORKS								TS. 11.06	
H9-8.1			1					Supply and Installation of Water Pipe, Dia. 400 mm, including Air Valve, Joints and Pipe Supports	L.S.								
H9-8.2			1					Supply and Installation of Water Pipe, Dia. 150 mm, including, Joints and Pipe Supports	L.S.							TS. 11.06	
H10			1					AMPLAS BRIDGE WITH WATER PIPES AND CABLE PIPES (PI3)									
H10-1			1					EARTH WORKS									
H10-1.1			1					Excavation (Common)	m ³							TS. 2.10	
H10-1.2			1					Embankment	m ³							TS. 2.10	
H10-1.3			1					Backfill with Selected Soil	m ³							TS. 2.10	
H10-1.4			1					Solid Sodding	m ²							TS. 4.14	
H10-1.5			1					Demolition and Removal of Existing Structure	L.S.							TS. 2.10	
H10-2			1					PILE FOUNDATION WORKS ABUTMENT									
H10-2.1			1					SP Pile for Test Pile, Dia. 400 mm	m							TS. 5.07	
H10-2.2			1					Static Load Test for SP and PC Pile	nos							TS. 5.07	
H10-2.3			1					Supply and Driving of SP Piles, Dia. 400 mm	m							TS. 5.07	
H10-2.4			1					Reinforcing Steel Bar	kg							TS. 3.24	
H10-2.5			1					Concrete, Type C1	m ³							TS. 3.24	
H10-3			1					CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB									
H10-3.1			1					Concrete, Type C1	m ³							TS. 3.24	
H10-3.2			1					Concrete, Type E	m ³							TS. 3.24	
H10-3.3			1					Reinforcing Steel Bar	kg							TS. 3.24	
H10-3.4			1					Formwork FW1	m ²							TS. 3.24	
H10-3.5			1					Formwork FW2	m ²							TS. 3.24	
H10-3.6			1					Rubble Stone Bedding	m ³							TS. 4.14	
H10-4			1					CONCRETE WORKS FOR SUPER STRUCTURE									
H10-4.1			1					Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.							TS. 8.07	
H10-4.2			1					Precast Prestressed Concrete Diaphragm	L.S.							TS. 8.07	
H10-4.3			1					Prestressed Concrete Panel for Slab	L.S.							TS. 8.07	
H10-4.4			1					Concrete, Type B for Slab	m ³							TS. 3.24	
H10-4.5			1					Reinforcing Steel Bar	kg							TS. 3.24	
H10-4.6			1					Formwork FW2	m ²							TS. 3.24	
H10-5			1					MISCELLANEOUS WORKS									
H10-5.1			1					Expansion Joint, Steel Profile (75 x 75 x 6mm)	m							TS. 6.09	
H10-5.2			1					Elastomeric Bearing Pad for Abutment, 480 x 300 x 67 mm	nos							TS. 8.07	
H10-5.3			1					PVC Pipe Drain, Dia. 100 mm	m							TS. 8.07	

ITEM NO.	MFC. NO.							LOCATION	REQ. ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H10-5.4									kg								TS. 6.09
H10-5.5									m ³								TS. 3.24
H10-5.6									m ²								TS. 3.24
H10-5.7									nos.								TS. 8.07
H10-6																	
H10-6.1									m ³								TS. 4.14
H10-6.2									m ³								TS. 4.14
H10-6.3									m ²								TS. 4.14
H10-6.4									m ³								TS. 3.24
H10-6.5									m ³								TS. 3.24
H10-6.6									kg								TS. 3.24
H10-6.7									m ²								TS. 3.24
H10-6.8									nos.								TS. 4.14
H10-7																	
H10-7.1									m ²								TS. 7.09
H10-7.2									m ³								TS. 7.09
H10-7.3									ton								TS. 7.09
H10-7.4									liter								TS. 7.09
H10-7.5									ton								TS. 7.09
H10-8																	
H10-8.1									L.S.								TS. 11.06
H10-8.2									L.S.								TS. 11.06
H10-8.3									L.S.								TS. 11.06
H11																	
H11-1									m ³								TS. 2.10
H11-1.1									m ³								TS. 4.14
H11-1.2									m ³								TS. 2.10
H11-1.3									m								TS. 5.07
H11-1.4									m ³								TS. 3.24
H11-1.5									m ³								TS. 3.24
H11-1.6									kg								TS. 3.24
H11-1.7									m ²								TS. 3.24
H11-1.8																	TS. 3.24
H11-2																	
H11-2.1									L.S.								TS. 11.06
H11-2.2									L.S.								TS. 8.07

ITEM NO.	MFC. NO.					LOCATION	BQ-ITEMS	UNIT	QUANTITY	P.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5					6	7	UNIT COST (RP.)	AMOUNT (RP.)		
H12						FW6+90	JALAN BAJAK BRIDGE (F1)								
H12-1	1						EARTH WORKS								
H12-1.1	1						Excavation (Common)	m ³							TS. 2.10
H12-1.2	1						Embankment	m ³							TS. 2.10
H12-1.3	1						Backfill with Selected Soil	m ³							TS. 2.10
H12-1.4	1						Solid Sodding	m ²							TS. 4.14
H12-2	2						PILE FOUNDATION WORKS FOR ABUTMENT								
H12-2.1	1						SP Pile for Test Pile, Dia. 400 mm	m							TS. 5.07
H12-2.2	1						Static Load Test for SP and PC Pile	nos							TS. 5.07
H12-2.3	1						Supply and Driving of SP Piles, Dia. 400 mm	m							TS. 5.07
H12-2.4	1						Reinforcing Steel Bar	kg							TS. 3.24
H12-2.5	1						Concrete, Type C1	m ³							TS. 3.24
H12-3	1						CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB								
H12-3.1	1						Concrete, Type C1	m ³							TS. 3.24
H12-3.2	1						Concrete, Type E	m ³							TS. 3.24
H12-3.3	1						Reinforcing Steel Bar	kg							TS. 3.24
H12-3.4	1						Formwork FW1	m ²							TS. 3.24
H12-3.5	1						Formwork FW2	m ²							TS. 3.24
H12-3.6	1						Rubble Stone Bedding	m ³							TS. 4.14
H12-4	1						CONCRETE WORKS FOR SUPER STRUCTURE								
H12-4.1	1						Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.							TS. 8.07
H12-4.2	1						Precast Prestressed Concrete Diaphragm	L.S.							TS. 8.07
H12-4.3	1						Prestressed Concrete Panel for Slab	L.S.							TS. 8.07
H12-4.4	1						Concrete, Type B for Slab	m ³							TS. 3.24
H12-4.5	1						Reinforcing Steel Bar	kg							TS. 3.24
H12-4.6	1						Formwork FW2	m ²							TS. 3.24
H12-5	1						MISCELLANEOUS WORKS								
H12-5.1	1						Expansion Joint, Steel Profile (75 x 75 x 6mm)	m							TS. 6.09
H12-5.2	1						Elastomeric Bearing Pad for Abutment, 406 x 280 x 67 mm	nos							TS. 8.07
H12-5.3	1						Galvanized Pipe Drain, Dia. 100 mm	m							TS. 8.07
H12-5.4	1						Handrail, Galvanized Steel Pipe	kg							TS. 6.09
H12-5.5	1						Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³							TS. 3.24
H12-5.6	1						Formwork FW1	m ²							TS. 3.24
H12-5.7	1						Name Plate	nos							TS. 8.07
H12-6	1						DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD								
H12-6.1	1						Backfill with Gravel	m ³							TS. 4.14
H12-6.2	1						Wet Stone Masonry (1:4) for Revetment	m ³							TS. 4.14
H12-6.3	1						Cement Mortar Plastering	m ²							TS. 4.14
H12-6.4	1						Concrete, Type C1	m ³							TS. 3.24
H12-6.5	1						Concrete, Type E	m ³							TS. 3.24
H12-6.6	1						Reinforcing Steel Bar	kg							TS. 3.24
H12-6.7	1						Formwork FW1	m ²							TS. 3.24
H12-6.8	1						Weep Hole, Dia. 50 mm, including Filter Cloth	nos							TS. 4.14
H12-7	1						PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD : CLASS II)								
H12-7.1	1						Sub-Base Course (Class B)	m ³							TS. 7.09
H12-7.2	1						Base Course (Class A)	m ³							TS. 7.09
H12-7.3	1						Asphalt Treatment Base (A.T.B)	ton							TS. 7.09
H12-7.4	1						Bituminous Prime Coat	liter							TS. 7.09
H12-7.5	1						Bituminous Surface Course, 50 mm thick	ton							TS. 7.09
H13						FW20+45	JALAN PTP-IX BRIDGE (F2)								

ITEM NO.	MFC NO.							LOCATION	BQ-ITEMS	UNIT	F.C.		I.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7				QUANTITY	UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)		
H13-1								EARTH WORKS								
								Excavation (Common)	m ³							TS. 210
H13-1.1								Excavation (Common)	m ³							TS. 210
H13-1.2								Embarkment	m ³							TS. 210
H13-1.3								Backfill with Selected Soil	m ³							TS. 210
H13-1.4								Solid Sidding	m ³							TS. 414
H13-2								PILE FOUNDATION WORKS FOR ABUTMENT								
H13-2.1								SP Pile for Test Pile, Dia. 400 mm	m							TS. 507
H13-2.2								Static Load Test for SP and PC Pile	nos							TS. 507
H13-2.3								Supply and Driving of SP Piles, Dia. 400 mm	m							TS. 507
H13-2.4								Reinforcing Steel Bar	kg							TS. 324
H13-2.5								Concrete, Type C1	m ³							TS. 324
H13-3								CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB								
H13-3.1								Concrete, Type C1	m ³							TS. 324
H13-3.2								Concrete, Type E	m ³							TS. 324
H13-3.3								Reinforcing Steel Bar	kg							TS. 324
H13-3.4								Formwork FW1	m ²							TS. 324
H13-3.5								Formwork FW2	m ²							TS. 324
H13-3.6								Rubble Stone Bedding	m ³							TS. 414
H13-4								CONCRETE WORKS FOR SUPER STRUCTURE								
H13-4.1								Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.							TS. 807
H13-4.2								Precast Prestressed Concrete Diaphragm	L.S.							TS. 807
H13-4.3								Prestressed Concrete Panel for Slab	L.S.							TS. 807
H13-4.4								Concrete, Type B for Slab	m ³							TS. 324
H13-4.5								Reinforcing Steel Bar	kg							TS. 324
H13-4.6								Formwork FW2	m ²							TS. 324
H13-5								MISCELLANEOUS WORKS								
H13-5.1								Expansion Joint, Steel Profile (75 x 75 x 6mm)	m							TS. 609
H13-5.2								Elastomeric Bearing Pad, 406 x 280 x 67 mm	nos							TS. 807
H13-5.3								Galvanized Pipe Drain, Dia. 100 mm	m							TS. 807
H13-5.4								Handrail, Galvanized Steel Pipe	kg							TS. 609
H13-5.5								Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³							TS. 324
H13-5.6								Formwork FW1	m ²							TS. 324
H13-5.7								Name Plate	nos							TS. 807
H13-6								DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD								
H13-6.1								Backfill with Gravel	m ³							TS. 414
H13-6.2								Wet Stone Masonry (1:4) for Retewment	m ³							TS. 414
H13-6.3								Cement Mortar Plastering	m ²							TS. 414
H13-6.4								Concrete, Type C1	m ³							TS. 324
H13-6.5								Concrete, Type E	m ³							TS. 324
H13-6.6								Reinforcing Steel Bar	kg							TS. 324
H13-6.7								Formwork FW1	m ²							TS. 324
H13-6.8								Wesp Hole, Dia. 50 mm, including Filter Cloth	nos							TS. 414
H13-7								PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD : CLASS I)								
H13-7.1								Sub-Base Course (Class B)	m ³							TS. 709
H13-7.2								Base Course (Class A)	m ³							TS. 709
H13-7.3								Asphalt Treatment Base (A.T.B)	ton							TS. 709
H13-7.4								Bituminous Prime Coat	liter							TS. 709
H13-7.5								Bituminous Surface Course, 50 mm thick	ton							TS. 709
H14								WATER PIPE BRIDGE (WBE)								
								FW20+SS								
H14-1								ABUTMENT, PIER AND CONNECTING CHANNEL WORKS								

ITEM NO.	MFC. NO.							LOCATION	BO-ITEMS	UNIT	QUANTITY	P.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H14-1.1				1					Excavation (Common)	m ³						TS. 2.10	
H14-1.2				3					Backfill with Gravel	m ³						TS. 4.14	
H14-1.3				1					Backfill with Selected Soil	m ³						TS. 2.10	
H14-1.4				1					Supply and Driving of RC Piles, 400 mm x 400 mm	m						TS. 5.07	
H14-1.5				1					Concrete Type B	m ³						TS. 5.07	
H14-1.6				1					Concrete, Type C1	m ³						TS. 3.24	
H14-1.7				1					Reinforcing Steel Bar	kg						TS. 3.24	
H14-1.8				1					Formwork FW1	m ²						TS. 3.24	
H14-2				1					METAL WORKS								
H14-2.1				1					Supply and Installation of Water Pipe, Dia. 300 mm, including Air Valve, Joints and Pipe Supports	L.S.						TS. 11.06	
H14-2.2				1					Steel Truss Girder	L.S.						TS. 8.07	
H15				1				JW24+70	PIPE BRIDGE FOR IRRIGATION CHANNEL (WRS)								
H15-1				1					ABUTMENT, PIER AND CONNECTING CHANNEL WORKS								
H15-1.1				1					Excavation (Common)	m ³						TS. 2.10	
H15-1.2				1					Backfill with Gravel	m ³						TS. 4.14	
H15-1.3				1					Backfill with Selected Soil	m ³						TS. 2.10	
H15-1.4				1					Supply and Driving of PC Piles, Dia. 300 mm, Type AB	m						TS. 5.07	
H15-1.5				1					Log Pile, Dia. 150mm, L=4.0m	m						TS. 5.07	
H15-1.6				1					Concrete, Type C1	m ³						TS. 3.24	
H15-1.7				1					Sand Bedding	m ³						TS. 4.14	
H15-1.8				1					Concrete, Type E	m ³						TS. 3.24	
H15-1.9				1					Reinforcing Steel Bar	kg						TS. 3.24	
H15-1.10				1					Formwork FW1	m ²						TS. 3.24	
H15-1.11				1					Formwork FW2	m ²						TS. 3.24	
H15-2				1					METAL WORKS								
H15-2.1				1					Supply and Installation of Water Pipe, Dia. 300 mm, including Air Valve, Joints and Pipe Supports	L.S.						TS. 11.06	
H16				1				JW28+22	JALAN STM UJUNG BRIDGE (P3)								
H16-1				1					EARTH WORKS								
H16-1.1				1					Excavation (Common)	m ³						TS. 2.10	
H16-1.2				1					Embankment	m ³						TS. 2.10	
H16-1.3				1					Backfill with Selected Soil	m ³						TS. 2.10	
H16-1.4				1					Solid Sodding	m ²						TS. 4.14	
H16-2				1					PILE FOUNDATION WORKS FOR ABUTMENT								
H16-2.1				1					SP Pile for Test Pile, Dia. 400 mm	m						TS. 5.07	
H16-2.2				1					Static Load Test	nos						TS. 5.07	
H16-2.3				1					Supply and Driving of SP Piles, Dia. 400 mm	m						TS. 5.07	
H16-2.4				1					Reinforcing Steel Bar	kg						TS. 3.24	
H16-2.5				1					Concrete, Type C1	m ³						TS. 3.24	
H16-3				1					CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB								
H16-3.1				1					Concrete, Type C1	m ³						TS. 3.24	
H16-3.2				1					Concrete, Type E	m ³						TS. 3.24	
H16-3.3				1					Reinforcing Steel Bar	kg						TS. 3.24	
H16-3.4				1					Formwork FW1	m ²						TS. 3.24	
H16-3.5				1					Formwork FW2	m ²						TS. 3.24	
H16-3.6				1					Rubble Stone Including	m ³						TS. 4.14	
H16-4				1					CONCRETE WORKS FOR SUPER STRUCTURE								
H16-4.1				1					Precast Prestressed Concrete Beam Including Tensioning and Erection	L.S.						TS. 8.07	
H16-4.2				1					Precast Prestressed Concrete Diaphragm	L.S.						TS. 8.07	

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H16-4.3					1			1	Prestressed Concrete Panel for Slab	L.S.						TS. 8.07	
H16-4.4					1			1	Concrete, Type B for Slab	m ³						TS. 3.24	
H16-4.5					1			1	Reinforcing Steel Bar	kg						TS. 3.24	
H16-4.6					1			1	Formwork FW2	m ²						TS. 3.24	
H16-5					1			1	MISCELLANEOUS WORKS								
H16-5.1					1			1	Expansion Joint, Steel Profile (75 x 75 x 6mm)	m						TS. 6.09	
H16-5.2					1			1	Elastomeric Bearing Pad for Abutment, 406 x 280 x 67 mm	nos						TS. 8.07	
H16-5.3					1			1	PVC Pipe Drain, Dia. 100 mm	m						TS. 8.07	
H16-5.4					1			1	Handrail, Galvanized Steel Pipe	kg						TS. 6.09	
H16-5.5					1			1	Concrete, Type C1 for Handrail Post, Curb and Footpaths	m ³						TS. 3.24	
H16-5.6					1			1	Formwork FW3	m ²						TS. 3.24	
H16-5.7					1			1	Name Plate	nos						TS. 8.07	
H16-6					1			1	DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD								
H16-6.1					1			1	Backfill with Gravel	m ³							TS. 4.14
H16-6.2					1			1	Wet Stone Masonry (1st) for Retention	m ³							TS. 4.14
H16-6.3					1			1	Cement Mortar Plastering	m ²							TS. 4.14
H16-6.4					1			1	Concrete, Type C1	m ³							TS. 3.24
H16-6.5					1			1	Concrete, Type E	kg							TS. 3.24
H16-6.6					1			1	Reinforcing Steel Bar	m ²							TS. 3.24
H16-6.7					1			1	Formwork FW1	nos						TS. 3.24	
H16-6.8					1			1	Weep Hole, Dia. 50 mm, including Filter Cloth	m ³							TS. 4.14
H16-7					1			1	PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD - CLASS II)								
H16-7.1					1			1	Sub-Base Course (Class B)	m ³							TS. 7.09
H16-7.2					1			1	Base Course (Class A)	m ³							TS. 7.09
H16-7.3					1			1	Asphalt Treatment Base (A.T.B)	ton							TS. 7.09
H16-7.4					1			1	Bituminous Prime Coat	liter							TS. 7.09
H16-7.5					1			1	Bituminous Surface Course, 50 mm thick	ton							TS. 7.09
H17					1			1	RAILWAY BRIDGE (R)								
H17-1					1			1	EARTH WORKS								
H17-1.1					1			1	Excavation (Common)	m ³							TS. 2.10
H17-1.2					1			1	Embankment	m ³							TS. 2.10
H17-1.3					1			1	Backfill with Selected Soil	m ³							TS. 2.10
H17-1.4					1			1	Solid Sodding	m ²							TS. 4.14
H17-1.5					1			1	Demolishment and Removal of Existing Structure	m ³							TS. 4.14
H17-2					1			1	PILE FOUNDATION WORKS FOR ABUTMENT								
H17-2.1					1			1	SP Pile for Test Pile, Dia. 400 mm	m							TS. 5.07
H17-2.2					1			1	Static Load Test for SP and PC Pile	nos							TS. 5.07
H17-2.3					1			1	Supply and Driving of SP Piles, Dia. 400 mm	m							TS. 5.07
H17-2.4					1			1	Reinforcing Steel Bar	kg							TS. 3.24
H17-2.5					1			1	Concrete, Type C1	m ³							TS. 3.24
H17-3					1			1	CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB								
H17-3.1					1			1	Concrete, Type C1	m ³							TS. 3.24
H17-3.2					1			1	Concrete, Type E	m ³							TS. 3.24
H17-3.3					1			1	Reinforcing Steel Bar	kg							TS. 3.24
H17-3.4					1			1	Formwork FW1	m ²							TS. 3.24
H17-3.5					1			1	Formwork FW2	m ²							TS. 3.24
H17-3.6					1			1	Rubble Stone Bedding	m ³							TS. 4.14
H17-4					1			1	CONCRETE WORKS FOR SUPER STRUCTURE								
H17-4.1					1			1	Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.							TS. 8.07
H17-4.2					1			1	Precast Prestressed Concrete Diaphragm	L.S.							TS. 8.07

ITEM NO.	MFC. NO.							LOCATION	BQ ITEMS	UNIT	QUANTITY	P.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H17-4.3									L.S.							TS. 8.07	
H17-4.4								Prestressed Concrete Panel for Slab	m ²							TS. 3.24	
H17-4.5								Concrete, Type B for Slab	kg							TS. 3.24	
H17-4.6								Reinforcing Steel Bar	m ²							TS. 3.24	
H17-5								Formwork FW2	m ²							TS. 3.24	
H17-5.1								MISCELLANEOUS WORKS	m							TS. 6.09	
H17-5.2								Expansion Joint, Steel Profile (75 x 75 x 6mm)	nos.							TS. 8.07	
H17-5.3								Elastic Bearing Pad for Abutment, 400 x 280 x 67 mm	m							TS. 8.07	
H17-5.4								PVC Pipe Drain, Dia. 100 mm	nos.							TS. 8.07	
H17-6								Name Plate	nos.							TS. 8.07	
H17-6.1								DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD	m ³							TS. 4.14	
H17-6.2								Backfill with Gravel	m ³							TS. 4.14	
H17-6.3								Wet Stone Masonry (1.4) for Revetment	m ³							TS. 4.14	
H17-6.4								Wet Stone Masonry (1.3) for Revetment	m ²							TS. 4.14	
H17-6.5								Cement Mortar Plastering	m ²							TS. 3.24	
H17-6.6								Concrete, Type C1	m ³							TS. 3.24	
H17-6.7								Concrete, Type E	kg							TS. 3.24	
H17-6.8								Reinforcing Steel Bar	m ²							TS. 3.24	
H17-6.9								Formwork FW1	nos.							TS. 4.14	
H17-7								Weep Hole, Dia. 50 mm, including Filter Cloth	m ³							TS. 4.14	
H17-7.1								REMOVAL AND REINSTALLATION OF RAILWAY	m ³							TS. 4.14	
H17-7.2								Crusher Run Bedding	m ³							TS. 4.14	
H17-7.3								Sand Bedding	ton							TS. 1.09	
H17-7.4								Asphalt Treatment Base (A.T.B)	m ³							TS. 3.24	
H17-7.5								Ball Concrete, Type C1	L.S.							TS. 3.24	
H18								Removal and Installation									
H18-1								WATER PIPE BRIDGE (W14)	m ³							TS. 2.10	
H18-1.1								ABATMENT, PIER AND CONNECTING CHANNEL WORKS	m ³							TS. 4.14	
H18-1.2								Excavation (Common)	m ³							TS. 2.10	
H18-1.3								Backfill with Gravel	m ³							TS. 2.10	
H18-1.4								Backfill with Selected Soil	m ³							TS. 5.07	
H18-1.5								Supply and Driving of RC Piles, 400 mm x 400 mm	m ³							TS. 3.24	
H18-1.6								Concrete, Type C1	m ³							TS. 3.24	
H18-1.7								Concrete, Type E	kg							TS. 3.24	
H18-1.8								Reinforcing Steel Bar	m ²							TS. 3.24	
H18-2								Formwork FW1	m ²							TS. 3.24	
H18-2.1								METAL WORKS	L.S.							TS. 11.06	
H18-2.2								Supply and Installation of Water Pipe, Dia. 300 mm, including Air Valve, Joints and Pipe Supports	L.S.							TS. 11.06	
H18-2.3								Supply and Installation of Water Pipe, Dia. 600 mm, including Air Valve, Joints and Pipe Supports	L.S.							TS. 8.07	
H19								Steel Truss Girder									
H19-1								JALAN DELI TUA BRIDGE WITH WATER PIPE (5)									
H19-1.1								EARTH WORKS	m ³							TS. 2.10	
H19-1.2								Excavation (Common)	m ³							TS. 2.10	
H19-1.3								Embankment	m ³							TS. 2.10	
H19-1.4								Backfill with Selected Soil	m ³							TS. 4.14	
H19-2								Solid Sodding	m ²							TS. 5.07	
H19-2.1								PILE FOUNDATION WORKS FOR ABUTMENT	m							TS. 5.07	
H19-2.2								SP Pile for Test Pile, Dia. 400 mm	nos							TS. 5.07	
								Static Load Test									

ITEM NO.	MFC. NO.						LOCATION	BQ-ITEMS	UNIT	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6				7	QUANTITY	AMOUNT (RP.)	UNIT COST (RP.)		
H19-2.3						1		Supply and Driving of SP Piles, Dia. 400 mm	m						TS. 507
H19-2.4						1		Reinforcing Steel Bar	kg						TS. 324
H19-2.5						1		Concrete, Type C1	m ³						TS. 324
H19-3						1		CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB							
H19-3.1						1		Concrete, Type C1	m ³						TS. 324
H19-3.2						1		Concrete, Type E	m ³						TS. 324
H19-3.3						1		Reinforcing Steel Bar	kg						TS. 324
H19-3.4						1		Formwork FW1	m ²						TS. 324
H19-3.5						1		Formwork FW2	m ²						TS. 324
H19-3.6						1		Rubble Stone Bedding	m ³						TS. 414
H19-4						1		CONCRETE WORKS FOR SUPER STRUCTURE							
H19-4.1						1		Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.						TS. 807
H19-4.2						1		Precast Prestressed Concrete Diaphragm	L.S.						TS. 807
H19-4.3						1		Prestressed Concrete Panel for Slab	L.S.						TS. 807
H19-4.4						1		Concrete, Type B for Slab	m ³						TS. 324
H19-4.5						1		Reinforcing Steel Bar	kg						TS. 324
H19-4.6						1		Formwork FW2	m ²						TS. 324
H19-5						1		MISCELLANEOUS WORKS							
H19-5.1						1		Expansion Joint, Steel Profile (75 x 75 x 6mm)	m						TS. 609
H19-5.2						1		Elastomeric Bearing Pad for Abutment, 406 x 280 x 67 mm	nos						TS. 807
H19-5.3						1		PVC Pipe Drain, Dia. 100 mm	m						TS. 807
H19-5.4						1		Handrail, Galvanized Steel Pipe	kg						TS. 609
H19-5.5						1		Concrete, Type C1 for Handrail Post, Curb and Footpass	m ³						TS. 324
H19-5.6						1		Formwork FW1	m ²						TS. 324
H19-5.7						1		Name Plate	nos						TS. 807
H19-6						1		DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD							
H19-6.1						1		Backfill with Gravel	m ³						TS. 414
H19-6.2						1		Wet Stone Masonry (1:4) for Retention	m ³						TS. 414
H19-6.3						1		Cement Mortar Plastering	m ²						TS. 414
H19-6.4						1		Concrete, Type C1	m ³						TS. 324
H19-6.5						1		Concrete, Type E	m ³						TS. 324
H19-6.6						1		Reinforcing Steel Bar	kg						TS. 324
H19-6.7						1		Formwork FW1	m ²						TS. 324
H19-6.8						1		Weep Hole, Dia. 50 mm, including Filter Cloth	nos						TS. 414
H19-7						1		PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD - CLASS II)							
H19-7.1						1		Sub-Base Course (Class B)	m ³						TS. 709
H19-7.2						1		Base Course (Class A)	m ³						TS. 709
H19-7.3						1		Asphalt Treatment Base (A.T.B)	ton						TS. 709
H19-7.4						1		Bituminous Prime Coat	liter						TS. 709
H19-7.5						1		Bituminous Surface Course, 50 mm thick	ton						TS. 709
H19-8						1		METAL WORKS							
H19-8.1						1		Supply and Installation of Water Pipe, Dia. 350 mm, including Air Valve, Joints and Pipe Supports	L.S.						TS. 1106
H20						1		PIPE AND PEDESTRIAN BRIDGE FOR PAPER FACTORY (N-6)							
H20-1						1		EARTH WORKS							
H20-1.1						1		Excavation (Common)	m ³						TS. 210
H20-1.2						1		Embankment	m ³						TS. 210
H20-1.3						1		Backfill with Selected Soil	m ³						TS. 210
H20-1.4						1		Solid Siding	m ²						TS. 414
H20-2						1		PILE FOUNDATION WORKS FOR ABUTMENT							

ITEM NO.	MPC NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H20-2.1									m								TS. 5.07
H20-2.2								SP Pile for Test Pile, Dia-400 mm	nos								TS. 5.07
H20-2.3								Static Load Test	m								TS. 5.07
H20-2.4								Supply and Driving of SP Piles, Dia. 400 mm	kg								TS. 3.24
H20-2.5								Reinforcing Steel Bar	m ³								TS. 3.24
H20-3								Concrete, Type C1	m ³								TS. 3.24
H20-3.1								CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB	m ³								TS. 3.24
H20-3.2								Concrete, Type C1	m ³								TS. 3.24
H20-3.3								Concrete, Type E	kg								TS. 3.24
H20-3.4								Reinforcing Steel Bar	m ²								TS. 3.24
H20-3.5								Formwork FW1	m ²								TS. 3.24
H20-3.6								Formwork FW2	m ²								TS. 3.24
H20-4								Rubble Stone Bedding	m ³								TS. 4.14
H20-4.1								CONCRETE WORKS FOR SUPER STRUCTURE	L.S.								TS. 8.07
H20-4.2								Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.								TS. 8.07
H20-4.3								Precast Prestressed Concrete Diaphragm	L.S.								TS. 8.07
H20-4.4								Prestressed Concrete Panel for Slab	m ³								TS. 3.24
H20-4.5								Concrete, Type B for Slab	kg								TS. 3.24
H20-4.6								Reinforcing Steel Bar	m ²								TS. 3.24
H20-5								Formwork FW2	m ²								TS. 3.24
H20-5.1								MISCELLANEOUS WORKS	m								TS. 6.09
H20-5.2								Expansion Joint, Steel Profile (75 x 75 x 6mm)	nos								TS. 8.07
H20-5.3								Elastomeric Bearing Pad for Abutment, 406 x 280 x 67 mm	m								TS. 8.07
H20-5.4								PVC Pipe Drain, Dia.100 mm	kg								TS. 6.09
H20-5.5								Handrail, Galvanized Steel Pipe	m ³								TS. 3.24
H20-5.6								Concrete, Type C1 for Handrail Post, Curb and Footpass	m ²								TS. 3.24
H20-5.7								Formwork FW1	nos								TS. 8.07
H20-6								Name Plate	m ³								TS. 4.14
H20-6.1								DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD	m ³								TS. 4.14
H20-6.2								Backfill with Gravel	m ³								TS. 4.14
H20-6.3								Wet Stone Masonry (1:4) for Retement	m ³								TS. 4.14
H20-6.4								Cement Mortar, Plastering	m ³								TS. 3.24
H20-6.5								Concrete, Type C1	m ³								TS. 3.24
H20-6.6								Concrete, Type E	kg								TS. 3.24
H20-6.7								Reinforcing Steel Bar	m ²								TS. 3.24
H20-6.8								Formwork FW1	nos								TS. 4.14
H20-7								Weep Hole, Dia. 50 mm, including Filter Cloth	m ³								TS. 7.09
H20-7.1								PAVEMENT (APPROACH ROAD)	m ³								TS. 7.09
H21								Gravel Pavement, 200 mm thick	m ³								TS. 7.09
H21-1								JALAN SMA BRIDGE (F7)	m ³								TS. 2.10
H21-1.1								EARTH WORKS	m ³								TS. 2.10
H21-1.2								Excavation (Common)	m ³								TS. 2.10
H21-2								Backfill with Selected Soil	m ³								TS. 3.24
H21-2.1								CONCRETE WORKS FOR ABUTMENT AND APPROACH SLAB	m ³								TS. 3.24
H21-2.2								Concrete, Type C1	m ³								TS. 3.24
H21-2.3								Concrete, Type E	kg								TS. 3.24
H21-2.4								Reinforcing Steel Bar	m ²								TS. 3.24
H21-2.5								Formwork FW1	m ²								TS. 3.24
H21-2.6								Formwork FW2	m ²								TS. 3.24
H21-3								Rubble Stone Bedding	m ³								TS. 4.14
								CONCRETE WORKS FOR SUPER STRUCTURE	m ³								TS. 4.14

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H21-5.1									L.S.							TS. 8.07	
H21-5.2									L.S.							TS. 8.07	
H21-5.3									L.S.							TS. 8.07	
H21-5.4									m ³							TS. 3.24	
H21-5.5									kg							TS. 3.24	
H21-5.6									m ²							TS. 3.24	
H21-4																	
H21-4.1									m							TS. 6.09	
H21-4.2									nos.							TS. 8.07	
H21-4.3									m							TS. 8.07	
H21-4.4									kg							TS. 6.09	
H21-4.5									m ³							TS. 3.24	
H21-4.6									m ²							TS. 3.24	
H21-4.7									nos.							TS. 8.07	
H21-5																	
H21-5.1									liter							TS. 7.09	
H21-5.2									ton							TS. 7.09	
H22																	
H22-1																	
H22-1.1									m ³							TS. 2.10	
H22-1.2									m ³							TS. 2.10	
H22-1.3									m ³							TS. 2.10	
H22-1.4									m ²							TS. 4.14	
H22-1.5									L.S.							TS. 2.10	
H22-2																	
H22-2.1									m							TS. 5.07	
H22-2.2									nos							TS. 5.07	
H22-2.3									m							TS. 5.07	
H22-2.4									kg							TS. 3.24	
H22-2.5									m ³							TS. 3.24	
H22-3																	
H22-3.1									m ³							TS. 3.24	
H22-3.2									m ³							TS. 3.24	
H22-3.3									kg							TS. 3.24	
H22-3.4									m ²							TS. 3.24	
H22-3.5									m ²							TS. 3.24	
H22-3.6									m ³							TS. 4.14	
H22-4																	
H22-4.1									L.S.							TS. 8.07	
H22-4.2									L.S.							TS. 8.07	
H22-4.3									L.S.							TS. 8.07	
H22-4.4									m ³							TS. 3.24	
H22-4.5									kg							TS. 3.24	
H22-4.6									m ²							TS. 3.24	
H22-5																	
H22-5.1									m							TS. 6.09	
H22-5.2									nos.							TS. 6.09	
H22-5.3									m							TS. 6.07	
H22-5.4									kg							TS. 6.09	
H22-5.5									m ³							TS. 3.24	

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
H22-5.6									Formwork, FW1	m ²							TS. 324
H22-5.7									Name Plate	nos.							TS. 807
H22-6									DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD								
									Backfill with Gravel	m ³							TS. 414
									Wet Stone Masonry (1:4) for Revetment	m ³							TS. 414
									Cement Mortar Plastering	m ²							TS. 414
									Concrete, Type C1	m ³							TS. 324
									Concrete, Type E	m ³							TS. 324
									Reinforcing Steel Bar	kg							TS. 324
									Formwork, FW1	m ²							TS. 324
									Weep Hole, Dia. 50 mm, including Filter Cloth	nos.							TS. 414
H22-7									PAVEMENT (APPROACH ROAD)								
									Gravel Pavement, 200 mm thick	m ³							TS. 709

ITEM NO.	MFC. NO.							LOCATION	BO. ITEMS	UNIT	K.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7				UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
1	1	1	1	1	1	1	1	OTHER WORKS								
11							PE8-60	CHANNEL EXCAVATION FOR SUNGAJ LATANG (PE8-60m to PE8-80m)	m ³							TS. 2.10
11.1								Cleaning and Grubbing	m ³							TS. 2.10
11.2								Excavation (River Channel)	m ³							TS. 2.10
11.3								Stripping of Top Soil	m ³							TS. 2.10
11.4								Embankment	m ³							TS. 2.10
11.5								Solid Sodding	m ²							TS. 4.14
12							PE105-30	DRAINAGE CHANNEL EXCAVATION (PE95L-35m to PE103+10m)	m ²							TS. 2.10
12.1								Cleaning and Grubbing	m ³							TS. 2.10
12.2								Excavation (River Channel)	m ³							TS. 2.10
12.3								Stripping of Top Soil	m ³							TS. 2.10
12.4								Embankment	m ³							TS. 2.10
13							PE33+10	RELOCATION OF KABUPATEN ROAD. (PE14L-70 to PE133+100)	L.S.							TS. 2.10
13.1								Demolition and Removal of Existing Structure	m ³							TS. 2.10
13.2								Stripping of Top Soil	m ³							TS. 2.10
13.3								Solid Sodding	m ²							TS. 4.14
13.4								Embankment	m ³							TS. 2.10
13.5								Sub-Base Course (Class C)	m ³							TS. 7.09
13.6								Base Course (Class B)	m ³							TS. 7.09
13.7								Asphalt Treatment Base (A.T.B)	ton							TS. 7.09
14							PE97	RELOCATION OF EXISTING FARM ROAD (BETWEEN PE97 to PE92) CLASS IV	m ²							TS. 2.10
14.1								Cleaning and Grubbing	m ³							TS. 2.10
14.2								Stripping of Top Soil	m ³							TS. 2.10
14.3								Embankment	m ³							TS. 2.10
14.4								Gravel Pavement, 200 mm thick	m ²							TS. 7.09
14.5								Solid Sodding	m ²							TS. 4.14
15								ENVIRONMENTAL IMPROVEMENT WORKS FOR INSPECTION ROAD OF UPPER PERCUT RIVER								
15.1								WALKWAY ON FLOOD CHANNEL	m ³							TS. 7.09
15.2								Gravel Pavement, 200 mm thick	m ³							TS. 4.14
15.3								Solid Sodding	m ³							TS. 4.14
15.4								Boulder Pitching, (300mm - 500mm)	m ²							TS. 2.10
15.5								Cleaning and Grubbing	tree							TS. 12.10
15.6								Palem Hijau	tree							TS. 12.10
15.7								Fillisium	tree							TS. 12.10
15.8								Acasia Petandra	tree							TS. 12.10
15.9								Tanjung	tree							TS. 12.10
15.10								DRAINAGE SIDE DITCH	m ³							TS. 2.10
15.11								Excavation (Common)	m ³							TS. 4.14
15.12								Backfill with Gravel	m ³							TS. 4.14
15.13								Wet Stone Masonry (1:4) for Revetment	m ²							TS. 4.14
15.14								Cement Mortar Plastering	m ³							TS. 4.14
								Sand Bedding	m ³							TS. 4.14
								DRAINAGE OUTLET	m ³							TS. 2.10
								Excavation (Common)	m ³							TS. 2.10

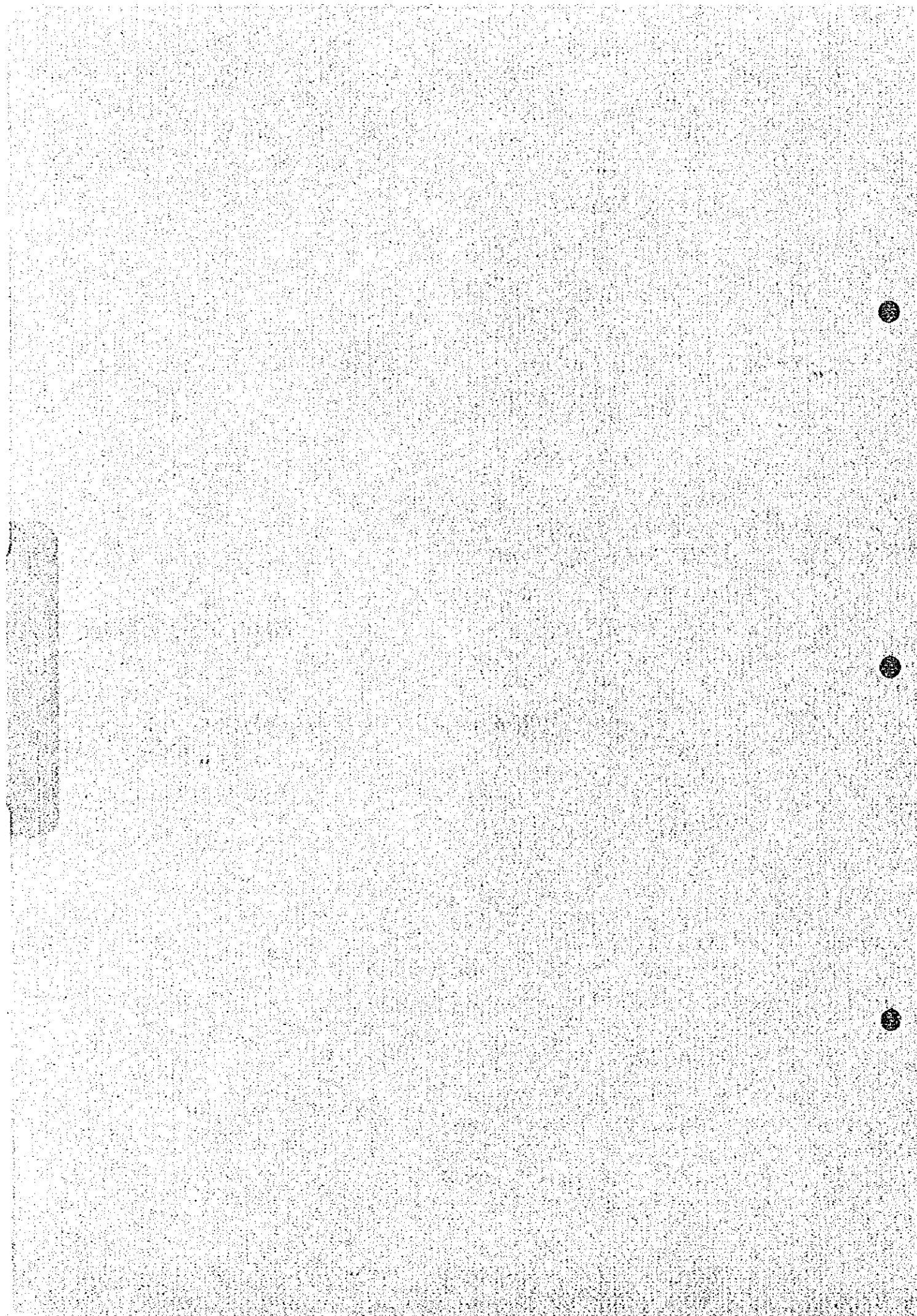
ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
15.15									m ³							TS. 4.14	
								Crusher Run Bedding									
15.16								Concrete, Type C2	m ³							TS. 3.24	
15.17								Formwork FW1	m ²							TS. 3.24	
15.18								Reinforcing Steel Bar	kg							TS. 3.24	
15.19								Wet Stone Masonry (1:3) for Retention	m ³							TS. 4.14	
15.20								Cement Mortar Plastering	m ²							TS. 4.14	
15.21								Backfill with Selected Soil	m ³							TS. 2.10	
								PLANTING ALONGSIDE INSPECTION ROAD									
15.22								Cleaning and Grubbing	m ²							TS. 2.10	
15.23								Palem Hijau	tree							TS. 12.10	
15.24								Filiatum	tree							TS. 12.10	
15.25								Acacia Petandra	tree							TS. 12.10	
15.26								Tanjung	tree							TS. 12.10	
16								ENVIRONMENTAL IMPROVEMENT WORKS FOR INSPECTION ROAD OF FLOODWAY									
								INSPECTION ROAD									
16.1								Excavation (Common)	m ³							TS. 2.10	
16.2								Gravel Pavement, 200 mm thick	m ³							TS. 7.09	
16.3								Maintenance Marker Post	nos.							TS. 12.10	
								KABUPATEN ROAD (CLASS III)									
16.4								Excavation (Common)	m ³							TS. 2.10	
16.5								Sub-Base Course (Class C)	m ³							TS. 7.09	
16.6								Base Course (Class B)	m ³							TS. 7.09	
16.7								Asphalt Treatment Base (A.T.B)	ton							TS. 7.09	
								PLANTING ALONGSIDE INSPECTION ROAD									
16.8								Excavation (Common)	m ³							TS. 2.10	
16.9								Sand Bedding	m ³							TS. 4.14	
16.10								Concrete, Type D	m ³							TS. 3.24	
16.11								Formwork FW1	m ²							TS. 3.24	
16.12								Boulder Paving, (200mm - 300mm)	m ²							TS. 4.14	
16.13								Palem Hijau	tree							TS. 12.10	
16.14								Filiatum	tree							TS. 12.10	
16.15								Acacia Petandra	tree							TS. 12.10	
16.16								Tanjung	tree							TS. 12.10	
16.17								Cemara Kipras	tree							TS. 12.10	
16.18								Cemara Lilin	tree							TS. 12.10	
16.19								Soka	tree							TS. 12.10	
16.20								Bougainvillea	tree							TS. 12.10	
								FENCE									
16.21								Excavation (Common)	m ³							TS. 2.10	
16.22								Backfill with Selected Soil	m ³							TS. 2.10	
16.23								Crusher Run Bedding	m ²							TS. 4.14	
16.24								Concrete, Type D	m ³							TS. 3.24	
16.25								Formwork FW1	m ²							TS. 3.24	
16.26								Galvanized Steel Fence, H=1.20 m	m							TS. 6.09	
16.27								Steel Gate (2 places)	L.S.							TS. 9.09	
17								ENVIRONMENTAL IMPROVEMENT WORKS FOR RETARDING CHANNEL PREPARATION WORKS									

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		TOTAL	SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)		
17.1							1	Clearing and Grubbing	m ²								TS. 2.10
							1	WALKWAY									
17.2							1	Excavation (Common)	m ³								TS. 2.10
17.3							1	Gravel Pavement, 200 mm thick for Walkway	m ²								TS. 7.09
							1	APPROACH ROAD TO RETARDING CHANNEL (CLASS III)									
17.4							1	Excavation (Common)	m ³								TS. 2.10
17.5							1	Stripping of Top Soil	m ³								TS. 2.10
17.6							1	Embankment	m ³								TS. 2.10
17.7							1	Sub-Base Course (Class C)	m ³								TS. 7.09
17.8							1	Base Course (Class B)	m ³								TS. 7.09
17.9							1	Asphalt Treatment Base (A.T.B)	ton								TS. 7.09
							1	DRAINAGE DITCH (WET MASONRY TYPE) AND OUTLET									
17.10							1	Excavation (Common)	m ³								TS. 2.10
17.11							1	Backfill with Selected Soil	m ³								TS. 2.10
17.12							1	Crusher Run Bedding	m ³								TS. 4.14
17.13							1	Wet Stone Masonry (1:4) for Revetment	m ³								TS. 4.14
17.14							1	Wet Stone Masonry (1:3) for Revetment	m ³								TS. 4.14
17.15							1	Cement Mortar Plastering	m ²								TS. 4.14
17.16							1	Concrete, Type C2	m ³								TS. 3.24
17.17							1	Reinforcing Steel Bar	kg								TS. 3.24
17.18							1	Formwork FW1	m ²								TS. 3.24
							1	BOULDER PITCHING FOR SLOPE BETWEEN ZONE A AND B									
17.19							1	Excavation (Common)	m ³								TS. 2.10
17.20							1	Boulder Pitching, (300mm - 500mm)	m ²								TS. 4.14
17.21							1	Backfill with Selected Soil	m ³								TS. 2.10
							1	FENCE									
17.22							1	Excavation (Common)	m ³								TS. 2.10
17.23							1	Backfill with Selected Soil	m ³								TS. 2.10
17.24							1	Crusher Run Bedding	m ³								TS. 4.14
17.25							1	Concrete, Type D	m ³								TS. 3.24
17.26							1	Galvanized Steel Fence, H=1.20 m	m								TS. 6.09
							1	PLANTING ALONGSIDE WALKWAY ON ZONE D									
17.27							1	Excavation (Common)	m ³								TS. 2.10
17.28							1	Backfill with Selected Soil	m ³								TS. 2.10
17.29							1	Solid Sodding	m ²								TS. 4.14
17.30							1	Sand Bedding	m ³								TS. 4.14
17.31							1	Formwork FW1	m ²								TS. 3.24
17.32							1	Concrete, Type D	m ³								TS. 3.24
17.33							1	Palem Hujan	tree								TS. 12.10
17.34							1	Fillisium	tree								TS. 12.10
17.35							1	Acacia Penanda	tree								TS. 12.10
17.36							1	Tanjung	tree								TS. 12.10
							1	MISCELLANEOUS									
17.37							1	Information Board	L.S.								TS. 12.10
17.38							1	Roofed Bench	nos.								TS. 12.10
17.39							1	Water Level Staff Gauge	nos.								TS. 12.10

ITEM NO.	MFC. NO.							LOCATION	BQ-ITEMS	UNIT	QUANTITY	F.C.		L.C.		SPEC. NO.
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)	
17.40								Entrance Gate	nos.							TS. 6.09
								RELOCATION OF WATER LEVEL GAUGING STATION								
18								Excavation (Common)	m ³							TS. 2.10
18.1								Backfill By Selected Soil	m ³							TS. 2.10
18.2								Steel Pipe Pile	m							TS. 5.07
18.3								Concrete, Type C1	m ³							TS. 3.24
18.4								Wet Stone Masonry for Step	m ³							TS. 4.14
18.5								Steel Pipe for Intel Pipe, Dia. 200 mm	m							TS. 5.07
18.6								Observation House	L.S.							TS. 12.10
18.7								INTAKE FOR FISHPOND (PE6R-00, PE6-125)								
19								Excavation (Common)	m ³							TS. 2.10
19.1								Backfill with Selected Soil	m ³							TS. 2.10
19.2								Log Pile, Dia. 150 mm, L=4.0m	m							TS. 5.07
19.3								Concrete, Type C1	m ³							TS. 3.24
19.4								Concrete, Type E	m ³							TS. 3.24
19.5								Reinforcing Steel Bar	kg							TS. 3.24
19.6								Formwork FW1	m ²							TS. 3.24
19.7								Gabion Mattress	m ³							TS. 4.14
19.8								Gabion Cylinder	m ³							TS. 4.14
19.9								Steel Slide Gate (1m x 1m)	nos.							TS. 9.09
19.10								APPROACH ROAD FOR MAINTENANCE								
110								Excavation (Common)	m ³							TS. 2.10
110.1								Base Course (Class A)	m ³							TS. 7.09
110.2								Sub-Base Course (Class C)	m ³							TS. 7.09
110.3								Asphalt Treatment Base (A.T.B)	ton							TS. 7.09
110.4								Entrance Gate	nos.							TS. 6.09
110.5																

CHAPTER 8

OPERATION AND MAINTENANCE



CHAPTER 8. OPERATION AND MAINTENANCE

8.1 Institutional Setup

8.1.1 Basic Concept

Legal Aspect

Several laws, presidential decrees and government/ministerial regulations have been executed for the proper operation and maintenance (O&M) of rivers, as shown in Table 8.1.1 (refer to the report entitled "An Integrated Programme for the Development of Operation and Maintenance for Rivers in Indonesia", July 1993; CIDA). Among them, the following regulations are particularly relevant to the formulation of an O&M organization:

- (1) Government Regulation No. 22 (1982)
 - (a) Direct beneficiaries are to pay their share;
 - (b) Works for general welfare are to be covered by the Local Government; and
 - (c) The Central Government may assist local entities.
- (2) Government Regulation No. 35 (1991)
 - (a) River administration may be delegated to local government or state-owned companies; and
 - (b) Rivers may be administered by a system of co-administration, which implies that the financing will be provided by the Central Government but the implementation will be undertaken by the Provincial Government.

The Government of Indonesia has been striving to establish an effective organization to administer, operate and maintain rivers and water resources by employing local governments and people which would derived benefit therefrom in accordance with the national policy of diversification and sustainable development.

Current Practice on O&M

In the administration and development of rivers, including flood control works, the legal position favors new construction works. In accordance with Government Regulation No. 39 (1991), rivers may be administered by a system of co-administration, which implies that financing is provided by the Central Government but the implementation is undertaken by the Provincial Government. Since financing during and after completion of a project remains as a

responsibility of the Central Government, there is no clear distinction between a project work undertaken by the Central Government (Ministry of Public Works) and routine maintenance undertaken by the Provincial Government. In actual practice, no river administration has been transferred to provincial governments and the Central Government continues to be responsible for funding as well as implementation of O&M.

The present budgeting procedure is not geared towards O&M. The Ministry of Public Works prepares its project budget as part of the Proposed Development Budget, under seven headings; namely, Salaries, Land, Materials, Equipment and Machinery, Official Travel, Construction, and Others.

Construction accounts for a major portion of the budget. Since there is no separate heading for O&M, the allocation for O&M is made under the construction heading which implies that an O&M project must be justified as a construction project. The amounts reflected as O&M expenses were, essentially, amounts spent on rehabilitation and other construction works.

Most major river improvement and flood control works including operation and maintenance are presently funded by the Central Government through the PPS offices. Accordingly, allocations for O&M are often diverted to new construction and other purposes.

A Provincial Government exercises jurisdiction over most river basins lying totally within the province, while the Ministry of Public Works has the authority over interprovincial and a few important river basins. Government Regulation No. 22 (1982) calls for the formulation of comprehensive water resources plans and classify the country's rivers into two categories under the jurisdiction of the Ministry of Public Works; namely, important and interprovincial, and any river within one province under the jurisdiction of the province. As shown in Table 8.1.2, Ministerial Regulation No. 39 (1989) also defines 90 river basins, and Ministerial Regulation No. 48 (1990) specifies the responsibility over these rivers/basins (73 provincial, 15 national, and 2 managed by public corporations).

In North Sumatra Province, there are six classifications of river territories; namely, Wampu-Besitang, Belawan-Belumai-Ular, Bahbolon, Asahan, Barumon-Kualuh, and Batang Gadis/Batang Toru, although they are not limited to one river basin. All the six river territories are under the jurisdiction of North Sumatra Province; however, the funding and construction of projects and hence, the implementation of O&M, are undertaken by the Central Government and its appointed project offices. Usually, studies and projects for the above-said rivers have been carried out with foreign assistance, as tabulated below.

Name of Project	Works Undertaken	Name of Country/Institution
Ular River Flood Control	Study, Design and Construction	Japan/JICA and OECF
Bahbolon River Improvement	Study, Design and Construction	Australia
Belawan-Padang Development	Study and Design	Japan/JICA
Deli River Improvement (MUDP)	Design and Construction	Asian Development Bank

Area Coverage of O&M

Administratively, the project area is covered by Medan City (Kotamadya) and Deli-Serdang District (Kabupaten) of North Sumatra Province. The administrative boundary with respect to the project area is presented in Fig. 8.1.1.

In formulating the O&M plan for the Medan Flood Control Project, it is necessary to firstly consider the implication of the improvement works of Deli River which are executed under the Second Medan Urban Development Project (MUDP II). The works consist of the improvement works of the Deli River main stream for 24.367 km and the improvement works on its tributaries (Sikambing, 16.8 km and Putih, 6.8 km) with the design flood discharge corresponding to a 10-year return period. On the other hand, some upstream portions of the Deli River main stream until the Deli River Weir and the biggest tributary, Babura River, will be improved to the flood control scale under the proposed Third Medan Urban Development Project (MUDP III).

Completion of the Medan Flood Control Project itself should bring changes in the area, as described below.

- (1) With the completion of the Percut River Improvement Works and the construction of Medan Floodway as expected in the year 2000, hydrological conditions especially flood flows will change drastically. Deli River will be connected to Percut River by Medan Floodway, forming one river system. Flood flows with a scale of less than 25-year return period will be completely confined in the river channel without any damage over Medan City and suburbs.
- (2) The urban drainage system connected to either Deli or Percut River will also be improved as much as stormwater of less than 2 to 5-year return period will bring no inundation therearound.
- (3) Confining floods in river and drainage channels and reconstruction of bridges will relieve the traffic condition from frequent stagnation and congestion. The reconstruction of Bandar Sidoras Intake Weir with less O&M works will ease the irrigation practice and further promote its expansion.

- (4) Some environmental improvement works such as the construction of waterfront facilities will not only improve sanitary conditions to be brought by flood mitigation effects but also introduce more pleasant living conditions.

In accordance with the current practice of O&M for rivers in North Sumatra Province, especially Deli River and Percut River, the Project Office of Proyek Pengelolaan Sumber Air dan Pengendalian Banjir Sumatera Utara (PPSAPB-SU, Project of Water Resources Development and Flood Control in North Sumatra) implements the operation and maintenance works for flood control works of the Deli River. Accordingly, the flood control works under the Medan Flood Control Project will be under the responsibility of PPSAPB-SU.

8.1.2 O&M Organization and Functions

Existing Organizations

Although no definite organization is assigned to O&M works, there are two organizations which are related to rivers as to water resources development and flood control; namely, Dinas Pengairan Sumatera Utara (DPSU, North Sumatra Provincial Office for Water Resources Development) and PPSAPB-SU (refer to the organization charts in Figs. 8.1.2. and 8.1.3). The two organizations are under the Directorate General of Water Resources Development (DGWRD), Ministry of Public Works, and they are in charge of development, improvement and O&M of rivers in North Sumatra.

As shown in the charts, Sub-Dinas Sungai dan Rawa (Subdivision of Rivers and Swamps) under DPSU and Pengendalian Banjir Kota Medan dan Sekitarnya (PBKMS, Flood Control Project in Medan City and Suburbs) should specifically carry out the O&M for the Project and the Deli River Improvement Works. However, the two offices financially rely on the national budget in their implementation of any work for flood control and water resources development. PBKMS is now actually in charge of construction, rehabilitation and O&M.

Manpower and Financial Status

On account of actual undertaking of work for rivers, the existing condition of manpower and financial capacity were studied only for the PPSAPB-SU.

(1) Manpower

The manpower in PPSAPB-SU as of April 1995 is summarized below (details are presented in Table 8.1.3.):

Classification	Number
Senior Engineer (Insinyur)	23
Junior Engineer	20
Technician	162
Administrative Officer	24
Administrative Staff	60
Total	289

(2) Financial

For the last five years from 1991 to 1995, PPSAPB-SU had engaged in six projects in North Sumatra Province with the total cost of about 82 billion rupiah. Out of the project cost, about 23 billion rupiah, which corresponds to 28%, was provided by foreign funding institutions as foreign loan. As to financial capability, PPSAPB-SU may be able to allocate about 12 billion rupiah per annum for the construction and rehabilitation of rivers, as shown below:

(Unit: Million Rp.)

Name of Project	Fiscal Year					Total
	1991/92	1992/93	1993/94	1994/95	1995/96	
North Sumatra Rivers	2,715	3,224	4,446	10,704	6,750	27,839
Wampu River Rehabilitation	2,954	2,664	2,864	0	0	8,483
Binjai City Flood Control	151	966	1,619	0	0	2,736
Ular River Rehabilitation	0	551	775	0	0	1,326
Bahbolon River Rehabilitation	0	0	0	2,174	1,273	3,447
Medan City Flood Control	0	0	0	25,091	12,765	37,856
Total	5,820	7,405	9,704	37,969	20,788	81,687
(Foreign Assisted Portion)	0	0	0	15,950	6,888	22,838

The actual cost for O&M is not clear from the budgeting schedule presented in Table 8.1.4, because no work item for operation and maintenance is shown in the schedule. The projects under North Sumatra Rivers were mostly rehabilitation works of rivers other than those specified therein. Since the rehabilitation works could be considered as part of operation and maintenance for the rivers, the possible allocation for O&M works is estimated at 2.5 billion rupiah or about 50% of the average annual budget of North Sumatra Rivers. The possible amount will be further allocated to 10 to 15 rivers under the jurisdiction of North Sumatra Province.

Functions

O&M activities for rivers are also undertaken by PPSAPB-SU, although the Sub-Project Office for Rivers and Swamps is deemed to be responsible from the existing organizational setup. Two major activities have been identified; namely, (1) the sub-project offices under

PPSAPB-SU conduct all O&M works for a certain period after completion of construction, and (2) PPSAPB-SU prepares funds and manpower for necessary rehabilitation works which are identified by the branch offices of Dinas Pengairan of North Sumatra Province, since a branch office is established in each Kabupaten of North Sumatra Province and mostly carrying out the O&M works for irrigation.

Due to the budgeting system, the actual works such as survey/design, equipment purchase and civil works for deteriorated structures/facilities are controlled and undertaken with project funds by the project staff of PPSAPB-SU. Moreover, the PPSAPB-SU prepares rehabilitation projects for contracting with local consulting engineers and/or construction contractors.

8.1.3 Organizational Setup

Overall O&M Organization

In accordance with the current practice of O&M for rivers in North Sumatra, the O&M organization for Percut River and Medan Floodway will be incorporated in an overall river O&M system for the Deli and Percut rivers. This concept may be advantageous from the viewpoint of not only engineering soundness but also financial through the avoidance of duplication of functions or immobility of the organization if it is established independently from other systems.

Proposed O&M Organization

An organization for O&M is proposed for the Project in view of the required operation and maintenance plan described in the succeeding section, although the organization is set up for all rivers in North Sumatra Province. O&M works and responsibility for flood control projects will be transferred to the province under the North Sumatra Provincial Public Works because the project is located within the province. Under the Sub-Project Office for Rivers and Swamps, on the presumption of the existing organization and regulation, an O&M unit can be created to exclusively carry out the operation and maintenance work for all flood control and water resources works in North Sumatra Province after their construction.

O&M work is considered to cover (1) the integrated operation of all major river structures and river improvement, and (2) river monitoring and comprehensive flood management for river structures, flood control works such as river dike and channel, flood plain management such as flood warning/fighting and zoning, low flow discharge, water quality, sand mining, river mouth condition of sedimentation, and environmental matters.

(1) Required Activities of O&M

The project works are composed of river improvement works together with river structures such as diversion weirs, intake weir, ground sill, etc. There are also the road, railway and pedestrian bridges, as well as the urban drainage facilities which are included in the Project.

When the activities are classified into two categories, operation and maintenance, the project works related to operation will be limited to the new Bandar Sidoras Intake Weir, the retarding channel and the drainage sluice, while maintenance shall be required for all project works.

(a) Operation

A proper gate operation is required for the new Bandar Sidoras Intake Weir and drainage sluices while inflation of the rubber body is also made in accordance with the operation guideline. An operational management plan is necessary for the retarding channel to be located upstream of the proposed Deli River Weir. No facility or equipment will be installed for the area; however, the guideline or regulation for utilization is to be publicized.

(b) Maintenance

Periodical and routine inspection over project works shall be carried out to promptly undertake effective and economical countermeasures for deteriorated portions or the whole works. The frequency of inspection is varied depending on material, type and surrounding condition of the works; however, such inspection work shall be conducted at least before and after flood seasons. Items of inspection, as well as some effective preventive works, are prepared.

(2) Structure and Manpower for O&M Organization

The operation of road, railway and pedestrian bridges, as well as drainage facilities will be transferred to the local government entity to which they belong. The operation of road and pedestrian bridges will be transferred to Medan City or Kab. Deli Serdang and the railway bridge to PJKA. O&M of drainage outlets shall be under the Public Works Office of Medan City or Kab. Deli Serdang. Therefore, the organizational structure for O&M is proposed to cover river and river structures not only of the Project but also of the Deli River Improvement Works when completed under MUDP, as presented in Fig. 8.1.4.

Manpower for the O&M organization is proposed only for the river and river structures under PPSAPB-SU. The required manpower for the Percut River improvement and relevant river structures is estimated as follows:

Designation	Number	Job Description
Senior Civil Engineer	1	Direction and supervision of O&M work
Asst. Civil Engineer	2	Inspection and preparation of countermeasures
Surveyor	6	Assistance for inspection and measurement
Adm. Staff incl. Driver	4	Day to day administration

8.2 Operation Plan

8.2.1 Intake Structure

The new weir is a kind of rising weir made of rubber with bag shaped to be inflated by air. When overflow depth exceeds a certain level at flood time, the dam body shrinks and falls down automatically by water pressure. Therefore, floods bigger than a certain discharge may flow down safely without obstruction. After flood, the dam body will be inflated and raised by the air compressor in short time, and the function as intake weir is recovered.

Present Water Use

Present condition of water use related to the Bandar Sidoras Intake Weir is as shown in Fig. 8.2.1. In accordance with the data and plan of the Irrigation Section, Branch Office of Kab. Deli-Serdang North Sumatra Provincial Office of Water Resources Development, the existing irrigation area on the right bank side is estimated at 2,090 ha and that of the left bank side is 1,360 ha. In the future irrigation plan, the irrigation area of the left bank side will increase by 320 ha to 1,680 ha. Accordingly, the water requirement of the right intake is estimated at 2.09 m³/s, and that of the left intake is 1.36 m³/s at present, 1.68 m³/s in future.

The cropping yield is currently performed at 130%. As a standard cropping pattern, puddling is carried out in April and October, planting in May and November, and harvesting in August and February. However, this cropping pattern is not uniformly practiced; some farmers shift their activities by one or two months.

Inflatable Rubber-Made Dam**(1) Main Features**

The main features of the inflatable rubber-made dam to be newly constructed are given below. The rubber body itself is supposed to be set in the condition of rising or falling down completely without intermediate condition.

Height of Rubber Body	3.14 m
Length of Bottom	13.00 m
Datum Level of Rubber Body	EL 0.920 m
Reservoir Water Level (Dam Crest)	EL 4.06 m
Auto-Deflation Water Level	EL 4.87 m
Medium of Inflation	Air
Rubber Sheet Size	6.315 m x 32.330 m
Thickness of Rubber Body	15.8 mm
Internal Air Volume of Rubber Body	198.7 m ³

(2) Deflating Rubber Body

Manual operation to deflate the rubber body is not needed as a rule. When water level in the river rises higher than 1.2 times the dam height (i.e., EL 4.870 m), the air inside the rubber body will be automatically exhausted by water pressure and the dam shrinks and falls down. The rubber body appears flat when deflated. The time needed for deflating the rubber body is estimated to be 22 min.

The overflow discharge when the rubber body starts to deflate is estimated to be about 20 m³/s which corresponds to a 20% discharge in annual flow regime. The frequency of dam deflation is presumed to be some 10 times a year. Therefore, the siltation immediately upstream of the dam will not be serious due to the high frequency of dam deflation.

(3) Inflating Rubber Body

As required for irrigation water after flood, the rubber body shall be inflated to raise the river water level. The inflation could be started by pressing a switch on a control board which is installed in a control house at the right bank. The time needed to inflate the rubber body is estimated to be 35 minutes.

Intake Gate**(1) Main Features**

The main features of intake sluices, which are installed at both right and left bank sides immediately upstream of the inflatable rubber-made dam, are as follows.

Left Intake Sluice	
- Orifice Size	B1.0 m × H1.0 m × 2 sets
- Sill Elevation	EL 2.900 m
- Gate Type	steel slide gate
- Hoisting System	manually driven spindle
Right Intake Sluice	
- Orifice Size	B1.25m × H1.0 m × 2 sets
- Sill Elevation	EL 2.900 m
- Gate Type	steel slide gate
- Hoisting System	manually driven spindle

(2) Rating Curve of Intake Gate

The discharge from an intake sluice is controlled by the gate opening and water level in the river. In the design of sluice, the flow condition becomes a submerged flow due to the high elevation of the irrigated paddy as well as the water level of the connecting canal. The rating curves of the canal immediately downstream of the right and left intakes are estimated by non-uniform flow, as shown in Fig. 8.2.2. Based on the aforementioned conditions, the intake discharges at the right and left banks are estimated, as shown in Tables 8.2.1 to 8.2.2 and in Figs. 8.2.3 to 8.2.4, where the gate openings are given as parameters.

Since all intake gates are 1.0 m high, the gate opening "a=0.2 m" means 20% open condition and the gate opening "a=1.0 m" means fully open. Two gates will be installed at each bank and it is assumed in the calculation that the two gates are simultaneously operated.

The crest elevation of the inflatable rubber-made dam as inflated is EL 4.060 m. The deflation water level is at EL 4.87 m. Therefore, the water level in the river for irrigation water intake fluctuates between EL 4.060 m and EL 4.87 m.

(3) Operation Rule

The problem on actual operation of intake gates is how to adjust the gate opening to allow intake of irrigation water at a given water level in the river while water requirements vary seasonally. Maximum water requirements are estimated at 1.68 m³/s for the left irrigation area in the future, and 2.09 m³/s for the right.

For a given water level, the gate openings for intake of required water are as shown in Table 8.2.3 and Figs. 8.2.5 to 8.2.6. Water level (H1) in the river is observed directly on the control board in the control house, or gauged by staff gauge at the inlet as water depth (h1) from sill elevation. In the said procedure, in order to intake the maximum water requirement of 1.68 m³/s at the left bank at the river water level of H1=4.20 m

($h_1=1.30$ m), the gate opening should be set at $a=0.65$ m using Table 8.2.3. Similarly, for the intake water of 2.09 m³/s at the right bank at the same water level, the gate opening should be set $a=0.66$ m.

The operation of intake gates and conditions of water balance in dry season (95% discharge in annual flow regime) and usual time (50% discharge) are shown in Fig. 8.2.7. At 95% discharge time, the gate opening should be 74% at the right bank and 73% at the left bank. At 50% discharge time, the gate opening should be 45% at both banks. Since the gate opening in usual time at present is set at 50% with the existing structure, almost the same operation will be required for the new gate with the inflatable rubber-made dam. The proposed operation scheme is illustrated in the form of a flow diagram in Fig. 8.2.8.

(4) Function and Manpower for Operation

The operation of intake gates will almost be similar as the existing ones except the small work of inflating the rubber body, because the sizes of new inlets will be almost the same as the existing ones. Conversely, the operation of spillway slide gates on head works, which used to be operated in flood time, will be not necessary.

At present, the operation and maintenance for Bandar Sidoras Intake Weir and intake gates are being carried out by three personnel from the Irrigation Section, Project Office of Water Resources Development. The operation for new facilities could also be performed by a similar organization although initial training will be required.

8.2.2 Retarding Channel

The upstream section of the Dcll River Weir will become a retarding channel to be inundated in flood time by the diversion weirs; while, in usual time, the retarding channel area can be utilized as a wide open space for multipurpose uses such as park and sports facility.

The left side slope of the retarding channel will be reclaimed into staged terraces and divided into four zones, as presented below, on account of the frequency of inundation. Among them, three zones, Zone A to Zone C, will be multipurpose utilization zones and Zone D will be a residential area after raising work of the ground.

Zone	Area (m ²)	Ground Elevation (EL m)	Inundation Occurrence Probability	Utilization Plan
Zone A	18,400	32.6	1 time/year	Park Area and Sports
Zone B	27,140	31.5	10 times/year	Free Open Park Space
Zone C	9,040	28.0~29.0	20 times/year	Waterfront and Walking
Zone D	33,760	35.0	No inundation	Residential

The frequency of inundation at Zone A is once a year, ten times a year at Zone B, and 20 times a year at Zone C. Zone A is recommended for use as sports ground, tennis court, recreation park or parking lot; Zone B for cycling road, walkway, picnic spot, or free open space for sports; and Zone C for waterfront activities, fishing space or walkway.

Safety for Users

The basic conditions for the multipurpose utilization of the retarding channel are to assure the safety of facility users and to facilitate restoration after inundation by flood, because the rising speed of water level is high. With the design flood hydrograph of a 25-year return period, it takes only 54 min for water level to rise 3.5 m from Zone C (EL 28.000 m) to Zone B (EL 31.500 m), and 40 min from Zone B to Zone A (EL 32.600 m).

People in the retarding channel shall evacuate promptly when flood occurs. An evacuation route is provided sequentially from Zone C to Zone B to Zone A and to the outside. The slope between one zone and another zone is designed with a gentle gradient (1 : 5) to facilitate the smooth evacuation.

It is necessary to set up warning signboards at appropriate places in each zone in order to disseminate information and warning to people in and around the retarding channel in flood time and lead them for prompt evacuation. On the warning signboard, information on precise standing location, zones, facilities, inundation area and frequency, rising speed of water level, evacuation route, etc., shall be indicated. These signboards should be made of durable material and the painting on the board should be preserved.

Reminder on Facilities

The park facilities to be constructed in the retarding channel shall not be obstacles to sanitation or maintenance. Facilities such as lavatory or stall which may cause sanitary problems, or such management office that may cause maintenance problems in flood time shall not be built in the retarding channel.