

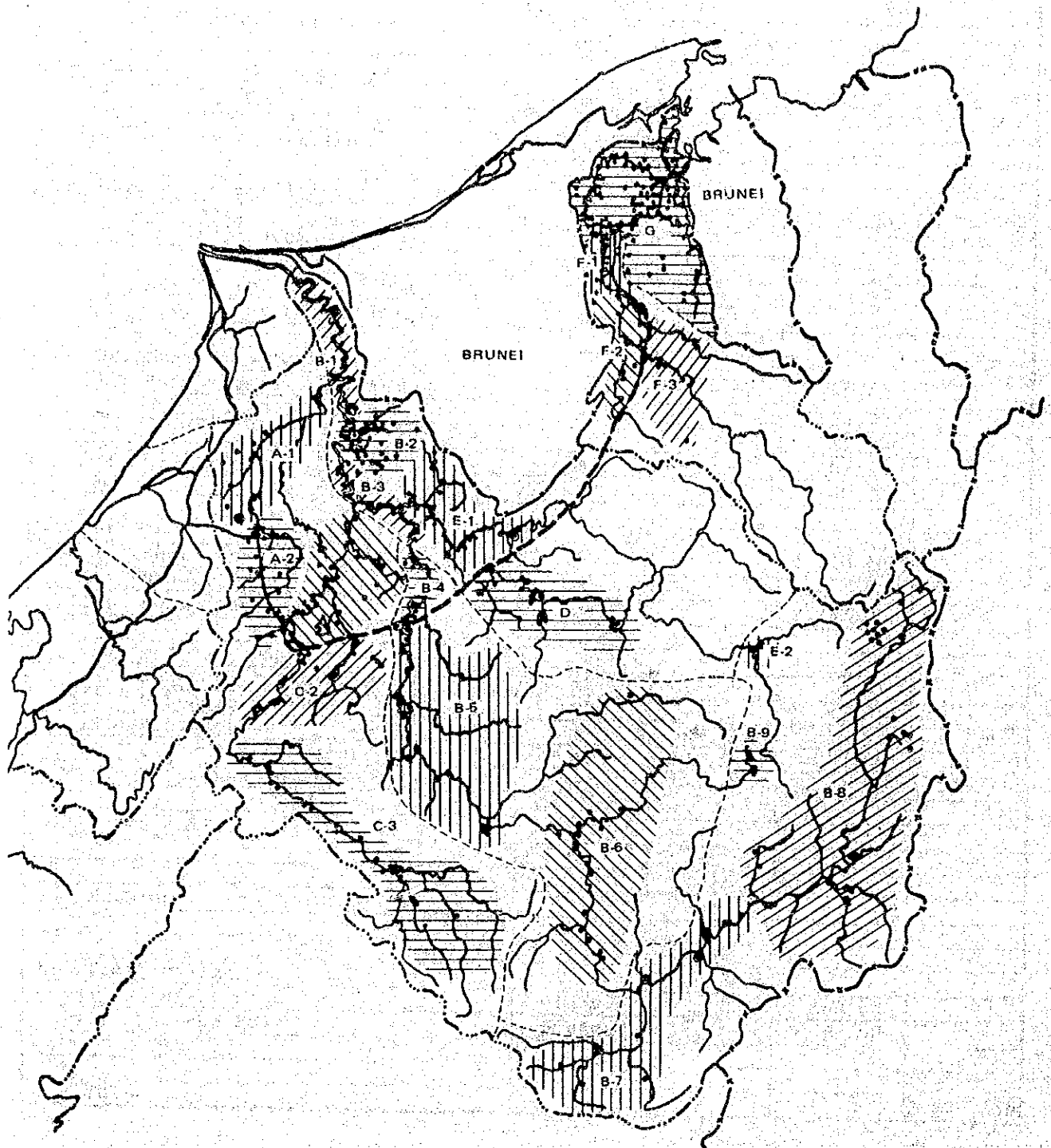
Appendix Table A-4-7 POPULATION BY MAJOR RIVER BASIN

Area Code	Traffic Zone No.	1977	River Basin
A-1	5	2,900	Sg. Bakong
A-2	5	2,500	
Beluru	5	380	
C-1	6	4,100	Sg. Tinjar
C-2	6	4,200	
C-3	6	1,920	
B-1	7	1,000	Bg. Baram
B-2	7	3,200	
B-3	7	1,700	
Marudi	7	5,000	
B-4	8	1,800	
B-5	8	3,200	
B-6	9	2,600	
B-7	9	3,300	
B-8	9	2,400	
B-9	9	300	
Long Lama	8	1,500	
D	10	3,600	Sg. Apoh
E-1	10	2,500	Sg. Tutoh
E-2	10	100	
F-1	11	3,100	Sg. Limbang
F-2	11	2,300	
F-3	11	800	
G	12	18,000	Sg. Limbang

Appendix Table A-4-8 ESTIMATED FUTURE POPULATION BY TRAFFIC ZONE

Traffic Zone Code	Name	1977	1982	1987	1992	2002
1	Miri	50,700	63,300	78,600	95,300	137,500
2	Bekenu	12,900	14,600	16,400	18,100	21,600
5	Sg. Bakong	5,780	6,750	7,800	8,800	11,100
	Beluru	380	480	580	710	1,000
	Others	5,400	6,270	7,210	8,090	10,100
6	Sg. Tinjar	10,220	11,750	13,500	15,300	19,200
7	Lower Bg. Baram	10,900	12,200	13,600	15,000	17,600
	Marudi	5,000	5,500	5,900	6,400	7,100
	Others	5,900	6,700	7,700	8,600	10,500
8	Bg. Baram Middle	6,500	7,400	8,400	9,300	11,400
	Long Lama	1,500	1,800	2,100	2,500	3,100
	Others	5,000	5,600	6,300	6,800	8,300
9	Upper Bg. Baram	8,600	9,000	9,400	9,800	10,400
10	Sg. Tutoh/Apoh	6,200	7,100	8,000	8,900	11,000
11	N. Medamit	6,200	6,700	7,200	7,600	8,300
12	Limbang	18,000	20,400	23,000	25,500	30,800
TOTAL		136,000	159,200	185,900	213,600	278,900
3	B. Niah	14,200	16,100	18,100	20,000	23,900
4	Bintulu	18,200	24,200	32,300	43,000	76,300

Appendix Fig. A-4-1 POPULATION DISTRIBUTION BY MAJAR RIVER BASIN



Appendix Table A-8-1 ESTIMATION FOR CONSTRUCTION COST

Design Section		Section 1. (Miri-Bintulu Rd ~ Beluru)			
Design Length		18.0 km			
Unit: M\$					
Construction Items		Quantities		Cost	
		Unit	Quantity	Unit Cost	Total
1. Clearing & Grubbing					
i.	Forest Area	m ²	-	4.84	-
ii.	Cultivated Area	m ²	-	0.75	-
iii.	Rubber Plantation	m ²	-	3.30	-
2. Excavation & Filling					
i. Cut Soil					
	Soft Rock	m ³	-	5.00	-
	Hard Rock	m ³	-	7.50	-
ii.	Borrow for Fill (1.0 km)	m ³	-	59.50	-
iii.	Removal of Top Soil (1.0 km)	m ³	-	7.59	-
			-	2.86	-
3. Drainage Structure					
i.	Box Culvert 2.0 x 2.0	m	-	185.00	-
"	3.0 x 2.0	m	-	235.00	-
"	3.0 x 3.0	m	-	317.00	-
ii.	Pipe Culvert ϕ 900	m	-	109.90	-
"	ϕ 1,500	m	-	200.15	-
4. Bridge					
i.	Short Span	m ²	-	1,940.00	-
ii.	Middle Span	m ²	-	2,195.00	-
iii.	Long Span	m ²	-	2,262.00	-
5. Pavement					
i. Subgrade Preparation					
ii.	Sub-base Course	m ²	-	0.41	-
iii.	Base Course	m ³	19,764	46.43	917,650
iv.	Bituminus Primcoat	m ²	131,760	0.66	87,000
v.	Bituminus Surface Course	m ²	131,760	13.85	1,824,900
6. Guard Rail					
		m	-	66.00	-
7. Marking					
		m	-	1.20	-
8. Traffic Sign					
i.	Traffic Sign	piece	-	560.00	-
ii.	Mailage Post	piece	-	91.00	-
TOTAL					
					2,829,550

Appendix Table A-8-2 ESTIMATION FOR CONSTRUCTION COST

Design Section	Section 2 (Beluru ~ Sg. Tinjar)			
Design Length	35.5 km			
Unit: M\$				
Construction Items	Quantities		Cost	
	Unit	Quantity	Unit Cost	Total
1. Clearing & Grubbing				
i. Forest Area	m ²	-	4.84	-
ii. Cultivated Area	m ²	-	0.75	-
iii. Rubber Plantation	m ²	-	3.30	-
2. Excavation & Filling				
i. Cut Soil	m ³	-	5.00	-
Soft Rock	m ³	-	7.50	-
Hard Rock	m ³	-	59.50	-
ii. Borrow for Fill (1.0 km)	m ³	-	7.59	-
iii. Removal of Top Soil (1.0 km)	m ³	-	2.86	-
3. Drainage Structure				
i. Box Culvert 2.0 x 2.0	m	-	185.00	-
" 3.0 x 2.0	m	-	235.00	-
" 3.0 x 3.0	m	-	317.00	-
ii. Pipe Culvert ϕ 900	m	-	109.90	-
" ϕ 1,500	m	-	200.15	-
4. Bridge				
i. Short Span	m ²	-	1,940.00	-
ii. Middle Span	m ²	-	2,195.00	-
iii. Long Span	m ²	-	2,262.00	-
5. Pavement				
i. Subgrade Preparation	m ²	-	0.41	-
ii. Sub-base Course	m ²	-	44.31	-
iii. Base Course	m ³	38,979	46.43	1,809,800
iv. Bituminus Primcoat	m ²	259,860	0.66	171,500
v. Bituminus Surface Course	m ²	259,860	13.85	3,599,100
6. Guard Rail				
	m	-	66.00	-
7. Marking				
	m	-	1.20	-
8. Traffic Sign				
i. Traffic Sign	piece	-	560.00	-
ii. Mailage Post	piece	-	91.00	-
TOTAL				5,580,400

Appendix Table A-8-3 ESTIMATION FOR CONSTRUCTION COST

Design Section	Section 3 (Sg. Tinjar ~ Sg. Baram/Long Lama)				
Design Length	25.0 km				
Unit: M\$					
Construction Items	Quantities		Cost		
	Unit	Quantity	Unit Cost	Total	
1. Clearing & Grubbing					
i. Forest Area	m ²	399,620	4.84	1,934,200	
ii. Cultivated Area	m ²	130,380	0.75	97,800	
iii. Rubber Plantation	m ²	-	3.30	-	
2. Excavation & Filling					
i. Cut Soil	m ³	720,500	5.00	3,602,500	
Soft Rock	m ³	-	7.50	-	
Hard Rock	m ³	-	59.50	-	
ii. Borrow for Fill (1.0 km)	m ³	156,400	7.59	1,187,100	
iii. Removal of Top Soil (1.0 km)	m ³	41,040	2.86	40,200	
3. Drainage Structure					
i. Box Culvert 2.0 x 2.0	m	54	185.00	10,000	
" 3.0 x 2.0	m	54	235.00	12,700	
" 3.0 x 3.0	m	54	317.00	17,150	
ii. Pipe Culvert ϕ 900	m	840	109.90	92,350	
" ϕ 1,500	m	588	200.15	117,700	
4. Bridge					
i. Short Span	m ²	2,529.6	1,940.00	4,907,450	
ii. Middle Span	m ²	1,488.0	2,195.00	3,266,200	
iii. Long Span	m ²	1,488.0	2,262.00	3,365,900	
5. Pavement					
i. Subgrade Preparation	m ²	183,000	0.41	75,050	
ii. Sub-base Course	m ²	54,900	44.31	2,432,650	
iii. Base Course	m ³	27,450	46.43	1,274,500	
iv. Bituminous Primcoat	m ²	183,000	0.66	120,800	
v. Bituminous Surface Course	m ²	183,000	13.85	2,534,550	
6. Guard Rail					
	m	13,600	66.00	897,600	
7. Marking					
	m	50,000	1.20	60,000	
8. Traffic Sign					
i. Traffic Sign	piece	3	560.00	1,700	
ii. Mailage Post	piece	3	91.00	300	
TOTAL				26,048,400	

Appendix Table A-8-4 ESTIMATION FOR CONSTRUCTION COST

Design Section	Section 4 (Sg. Baram/Long Lama ~ Sg. Apoh)			
Design Length	24.3 km			
Unit: M\$				
Construction Items	Quantities		Cost	
	Unit	Quantity	Unit Cost	Total
1. Clearing & Grubbing				
i. Forest Area	m ²	457,700	4.84	2,215,300
ii. Cultivated Area	m ²	101,200	0.75	75,900
iii. Rubber Plantation	m ²	--	3.30	--
2. Excavation & Filling				
i. Cut Soil	m ³	501,000	5.00	2,505,000
Soft Rock	m ³	100,150	7.50	751,150
Hard Rock	m ³	25,100	59.50	1,493,450
ii. Borrow for Fill (1.0 km)	m ³	586,560	7.59	4,452,000
iii. Removal of Top Soil (1.0 km)	m ³	--	2.86	--
3. Drainage Structure				
i. Box Culvert 2.0 x 2.0	m	54	185.00	10,000
" 3.0 x 2.0	m	54	235.00	12,700
" 3.0 x 3.0	m	54	317.00	17,150
ii. Pipe Culvert ϕ 900	m	840	109.90	92,350
" ϕ 1,500	m	588	200.15	117,700
4. Bridge				
i. Short Span	m ²	1,438.4	1,940.00	2,790,500
ii. Middle Span	m ²	1,388.8	2,195.00	3,048,450
iii. Long Span	m ²	--	2,262.00	--
5. Pavement				
i. Subgrade Preparation	m ²	177,900	0.41	72,950
ii. Sub-base Course	m ²	53,363	44.31	2,364,550
iii. Base Course	m ³	26,700	46.43	1,239,700
iv. Bituminus Primcoat	m ²	177,900	0.66	117,450
v. Bituminus Surface Course	m ²	177,900	13.85	2,463,950
6. Guard Rail				
	m	15,700	66.00	1,036,200
7. Marking				
	m	48,600	1.20	58,400
8. Traffic Sign				
i. Traffic Sign	piece	3	560.00	1,700
ii. Mailage Post	piece	3	91.00	300
TOTAL				24,936,850

Appendix Table A-8-5 ESTIMATION FOR CONSTRUCTION COST

Design Section	Section 5 (Sg. Apoh ~ Sg. Tutoh)			
Design Length	29.7 km			
Unit: M\$				
Construction Items	Quantities		Cost	
	Unit	Quantity	Unit Cost	Total
1. Clearing & Grubbing				
i. Forest Area	m ²	637,200	4.84	3,084,050
ii. Cultivated Area	m ²	4,320	0.75	3,300
iii. Rubber Plantation	m ²	-	3.30	-
2. Excavation & Filling				
i. Cut Soil	m ³	603,900	5.00	3,019,500
Soft Rock	m ³	53,700	7.50	402,750
Hard Rock	m ³	13,400	59.50	797,300
ii. Borrow for Fill (1.0 km)	m ³	407,000	7.59	3,089,150
iii. Removal of Top Soil (1.0 km)	m ³	54,120	2.86	154,800
3. Drainage Structure				
i. Box Culvert 2.0 x 2.0	m	72	185.00	13,350
" 3.0 x 2.0	m	72	235.00	16,950
" 3.0 x 3.0	m	72	317.00	22,850
ii. Pipe Culvert ϕ 900	m	1,008	109.90	110,800
" ϕ 1,500	m	714	200.15	142,900
4. Bridge				
i. Short Span	m ²	1,438.4	1,940.00	2,790,500
ii. Middle Span	m ²	-	2,195.00	-
iii. Long Span	m ²	1,091.2	2,262.00	2,468,300
5. Pavement				
i. Subgrade Preparation	m ²	217,404	0.41	89,150
ii. Sub-base Course	m ²	65,200	44.31	2,889,050
iii. Base Course	m ³	32,611	46.43	1,514,150
iv. Bituminus Primcoat	m ²	217,404	0.66	143,500
v. Bituminus Surface Course	m ²	217,404	13.85	3,011,050
6. Guard Rail				
	m	18,500	66.00	1,221,000
7. Marking				
	m	59,400	1.20	71,300
8. Traffic Sign				
i. Traffic Sign	piece	3	560.00	1,700
ii. Mailage Post	piece	3	91.00	300
TOTAL				25,057,700

Appendix Table A-8-6 ESTIMATION FOR CONSTRUCTION COST

Design Section	Section 6 (Sg. Tutoh ~ Sg. Medalam)			
Design Length	29.5 km			
Unit: M\$				
Construction Items	Quantities		Cost	
	Unit	Quantity	Unit Cost	Total
1. Clearing & Grubbing				
i. Forest Area	m ²	536,900	4.84	2,598,600
ii. Cultivated Area	m ²	-	0.75	-
iii. Rubber Plantation	m ²	-	3.30	-
2. Excavation & Filling				
i. Cut Soil	m ³	183,125	5.00	915,650
Soft Rock	m ³	-	7.50	-
Hard Rock	m ³	-	59.50	-
ii. Borrow for Fill (1.0 km)	m ³	96,690	7.59	733,900
iii. Removal of Top Soil (1.0 km)	m ³	-	2.86	-
3. Drainage Structure				
i. Box Culvert 2.0 x 2.0	m	72	185.00	13,350
" 3.0 x 2.0	m	72	235.00	16,950
" 3.0 x 3.0	m	72	317.00	22,850
ii. Pipe Culvert ϕ 900	m	1,008	109.90	110,800
" ϕ 1,500	m	714	200.15	142,900
4. Bridge				
i. Short Span	m ²	2,728	1,940.00	5,292,350
ii. Middle Span	m ²	-	2,195.00	-
iii. Long Span	m ²	-	2,262.00	-
5. Pavement				
i. Subgrade Preparation	m ²	215,940	0.41	88,550
ii. Sub-base Course	m ²	43,188	44.31	1,913,650
iii. Base Course	m ³	32,391	46.43	1,503,950
iv. Bituminus Primcoat	m ²	215,940	0.66	142,550
v. Bituminus Surface Course	m ²	215,940	13.85	2,990,800
6. Guard Rail				
	m	14,650	66.00	966,900
7. Marking				
	m	59,000	1.20	62,400
8. Traffic Sign				
i. Traffic Sign	piece	3	560.00	1,700
ii. Mailage Post	piece	3	91.00	300
TOTAL				17,419,150

Appendix Table A-8-7 ESTIMATION FOR CONSTRUCTION COST

Design Section	Section 7 (Sg. Medalam ~ Sg. Limbang/Ng. Medamit)				
Design Length	25.7 km				
Unit: M\$					
Construction Items	Quantities		Cost		
	Unit	Quantity	Unit Cost	Total	
1. Clearing & Grubbing					
i. Forest Area	m ²	247,650	4.84	1,198,650	
ii. Cultivated Area	m ²	249,600	0.75	187,200	
iii. Rubber Plantation	m ²	3,900	3.30	12,900	
2. Excavation & Filling					
i. Cut Soil	m ³	399,550	5.00	1,997,750	
Soft Rock	m ³	-	7.50	-	
Hard Rock	m ³	-	59.50	-	
ii. Borrow for Fill (1.0 km)	m ³	242,205	7.59	1,838,350	
iii. Removal of Top Soil (1.0 km)	m ³	-	2.86	-	
3. Drainage Structure					
i. Box Culvert 2.0 x 2.0	m	54	185.00	10,000	
" 3.0 x 2.0	m	54	235.00	12,700	
" 3.0 x 3.0	m	54	317.00	17,200	
ii. Pipe Culvert ϕ 900	m	882	109.90	96,950	
" ϕ 1,500	m	630	200.15	126,100	
4. Bridge					
i. Short Span	m ²	2,083.2	1,940.00	4,041,400	
ii. Middle Span	m ²	1,488	2,195.00	3,266,200	
iii. Long Span	m ²	-	2,262.00	-	
5. Pavement					
i. Subgrade Preparation	m ²	188,124	0.41	77,150	
ii. Sub-base Course	m ²	37,625	44.31	1,667,200	
iii. Base Course	m ³	28,218	46.43	1,310,200	
iv. Bituminus Primcoat	m ²	188,124	0.66	124,200	
v. Bituminus Surface Course	m ²	188,124	13.85	2,605,550	
6. Guard Rail					
	m	10,050	66.00	663,300	
7. Marking					
	m	51,400	1.20	61,700	
8. Traffic Sign					
i. Traffic Sign	piece	3	560.00	1,700	
ii. Mailage Post	piece	3	91.00	300	
TOTAL				19,316,700	

Appendix Table A-8-8 ESTIMATION FOR CONSTRUCTION COST

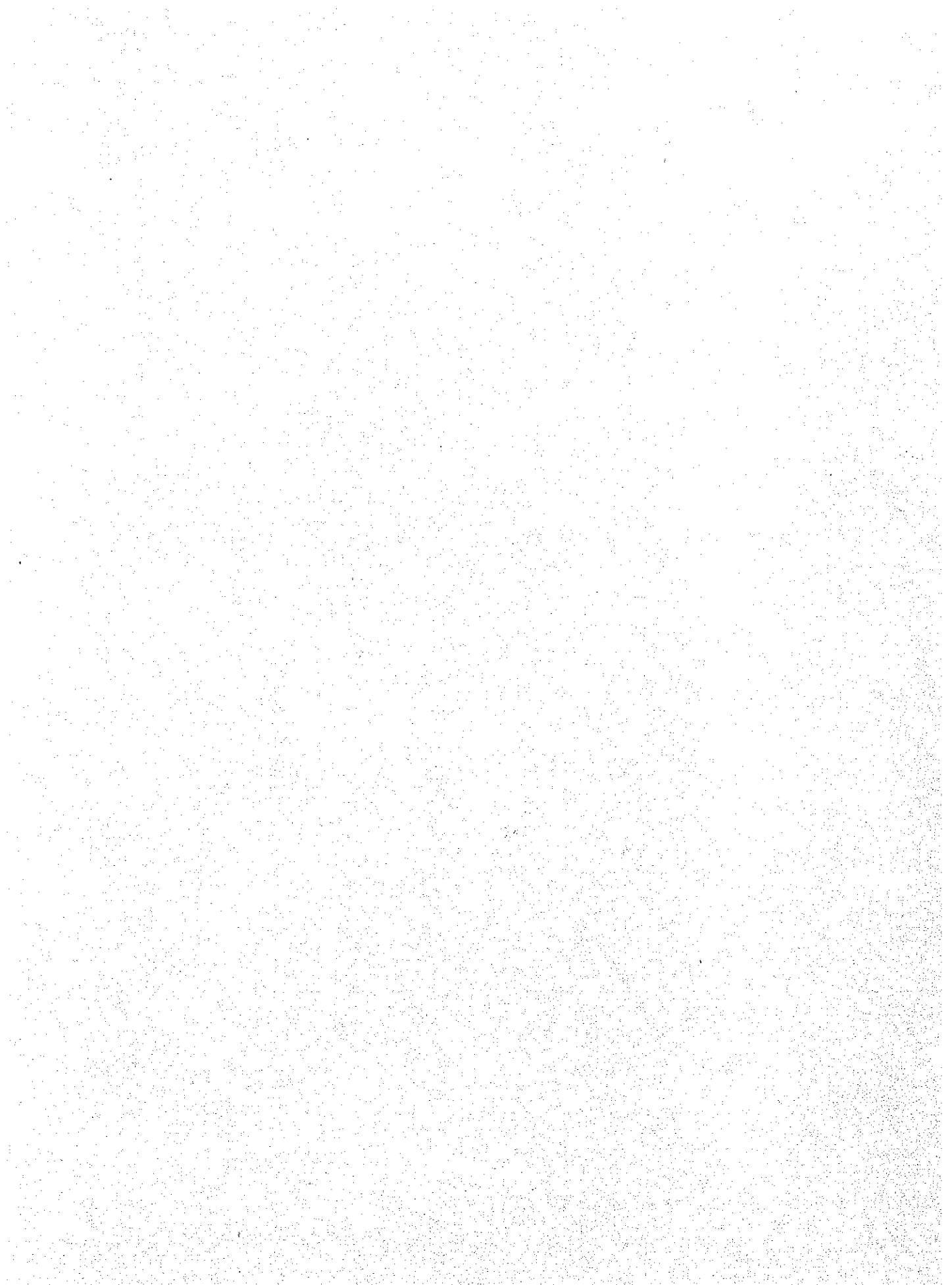
Design Section	Section 8 (Sg. Limbang/Ng. Medamit ~ Limbang)			
Design Length	41.0 km			
Unit: M\$				
Construction Items	Quantities		Cost	
	Unit	Quantity	Unit Cost	Total
1. Clearing & Grubbing				
i. Forest Area	m ²	-	4.84	-
ii. Cultivated Area	m ²	-	0.75	-
iii. Rubber Plantation	m ²	-	3.30	-
2. Excavation & Filling				
i. Cut Soil	m ³	-	5.00	-
Soft Rock	m ³	-	7.50	-
Hard Rock	m ³	-	59.50	-
ii. Borrow for Fill (1.0 km)	m ³	-	7.59	-
iii. Removal of Top Soil (1.0 km)	m ³	-	2.86	-
3. Drainage Structure				
i. Box Culvert 2.0 x 2.0	m	-	185.00	-
" 3.0 x 2.0	m	-	235.00	-
" 3.0 x 3.0	m	-	317.00	-
ii. Pipe Culvert ϕ 900	m	-	109.90	-
" ϕ 1,500	m	-	200.15	-
4. Bridge				
i. Short Span	m ²	1,934.4	1,940.00	3,752,750
ii. Middle Span	m ²	-	2,195.00	-
iii. Long Span	m ²	-	2,262.00	-
5. Pavement				
i. Subgrade Preparation	m ²	-	0.41	-
ii. Sub-base Course	m ²	-	44.31	-
iii. Base Course	m ³	45,018	46.43	2,090,200
iv. Bituminus Primcoat	m ²	300,100	0.66	198,100
v. Bituminus Surface Course	m ²	300,100	13.85	4,156,400
6. Guard Rail				
	m	-	66.00	-
7. Marking				
	m	-	1.20	-
8. Traffic Sign				
i. Traffic Sign	piece	-	560.00	-
ii. Mailage Post	piece	-	91.00	-
TOTAL			10,197,450	

Appendix Table A-8-9 ESTIMATION FOR CONSTRUCTION COST

Design Section	Section B (Alternative)			
Design Length	27.4 km			
Unit: M\$				
Construction Items	Quantities		Cost	
	Unit	Quantity	Unit Cost	Total
1. Clearing & Grubbing				
i. Forest Area	m ²	495,940	4.84	2,400,350
ii. Cultivated Area	m ²	-	0.75	-
iii. Rubber Plantation	m ²	-	3.30	-
2. Excavation & Filling				
i. Cut Soil	m ³	65,000	5.00	325,000
Soft Rock	m ³	-	7.50	-
Hard Rock	m ³	-	59.50	-
ii. Borrow for Fill (1.0 km)	m ³	45,600	7.59	346,100
iii. Removal of Top Soil (1.0 km)	m ³	-	2.86	-
3. Drainage Structure				
i. Box Culvert 2.0 x 2.0	m	72	185.00	13,350
" 3.0 x 2.0	m	72	235.00	16,950
" 3.0 x 3.0	m	72	317.00	22,850
ii. Pipe Culvert ϕ 900	m	924	109.90	101,550
" ϕ 1,500	m	672	200.15	134,500
4. Bridge				
i. Short Span	m ²	1,190.4	1,940.00	2,309,400
ii. Middle Span	m ²	992.0	2,195.00	2,177,450
iii. Long Span	m ²	-	2,262.00	-
5. Pavement				
i. Subgrade Preparation	m ²	200,600	0.41	82,250
ii. Sub-base Course	m ²	40,100	44.31	1,776,850
iii. Base Course	m ³	40,100	46.43	1,861,850
iv. Bituminus Primcoat	m ²	200,600	0.66	132,400
v. Bituminus Surface Course	m ²	200,600	13.85	2,778,350
6. Guard Rail				
	m	14,800	66.00	976,800
7. Marking				
	m	54,800	1.20	65,800
8. Traffic Sign				
i. Traffic Sign	piece	3	560.00	1,700
ii. Mailage Post	piece	3	91.00	300
TOTAL				15,523,800

Appendix Table A-8-10 ESTIMATION FOR CONSTRUCTION COST

Design Section	Section C (Alternative)			
Design Length	28.4 km			
Unit: M\$				
Construction Items	Quantities		Cost	
	Unit	Quantity	Unit Cost	Total
1. Clearing & Grubbing				
i. Forest Area	m ²	651,360	4.84	3,152,600
ii. Cultivated Area	m ²	18,880	0.75	14,200
iii. Rubber Plantation	m ²	-	3.30	-
2. Excavation & Filling				
i. Cut Soil	m ³	846,675	5.00	4,233,400
Soft Rock	m ³	225,825	7.50	1,693,700
Hard Rock	m ³	56,400	59.50	3,355,800
ii. Borrow for Fill (1.0 km)	m ³	533,030	7.59	4,045,700
iii. Removal of Top Soil (1.0 km)	m ³	-	2.86	-
3. Drainage Structure				
i. Box Culvert 2.0 x 2.0	m	72	185.00	13,350
" 3.0 x 2.0	m	72	235.00	16,950
" 3.0 x 3.0	m	72	317.00	22,850
ii. Pipe Culvert ϕ 900	m	966	109.90	106,200
" ϕ 1,500	m	672	200.15	134,500
4. Bridge				
i. Short Span	m ²	892.8	1,940.00	1,732,050
ii. Middle Span	m ²	992	2,195.00	2,177,450
iii. Long Span	m ²	-	2,262.00	-
5. Pavement				
i. Subgrade Preparation	m ²	207,900	0.41	85,250
ii. Sub-base Course	m ²	41,600	44.31	1,843,300
iii. Base Course	m ²	41,600	46.43	1,931,500
iv. Bituminus Primcoat	m ²	207,900	0.66	137,250
v. Bituminus Surface Course	m ²	207,900	13.85	2,879,450
6. Guard Rail				
	m	17,650	66.00	1,164,900
7. Marking				
	m	56,800	1.20	68,200
8. Traffic Sign				
i. Traffic Sign	piece	3	560.00	1,700
ii. Mailage Post	piece	3	91.00	300
TOTAL				28,810,600



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