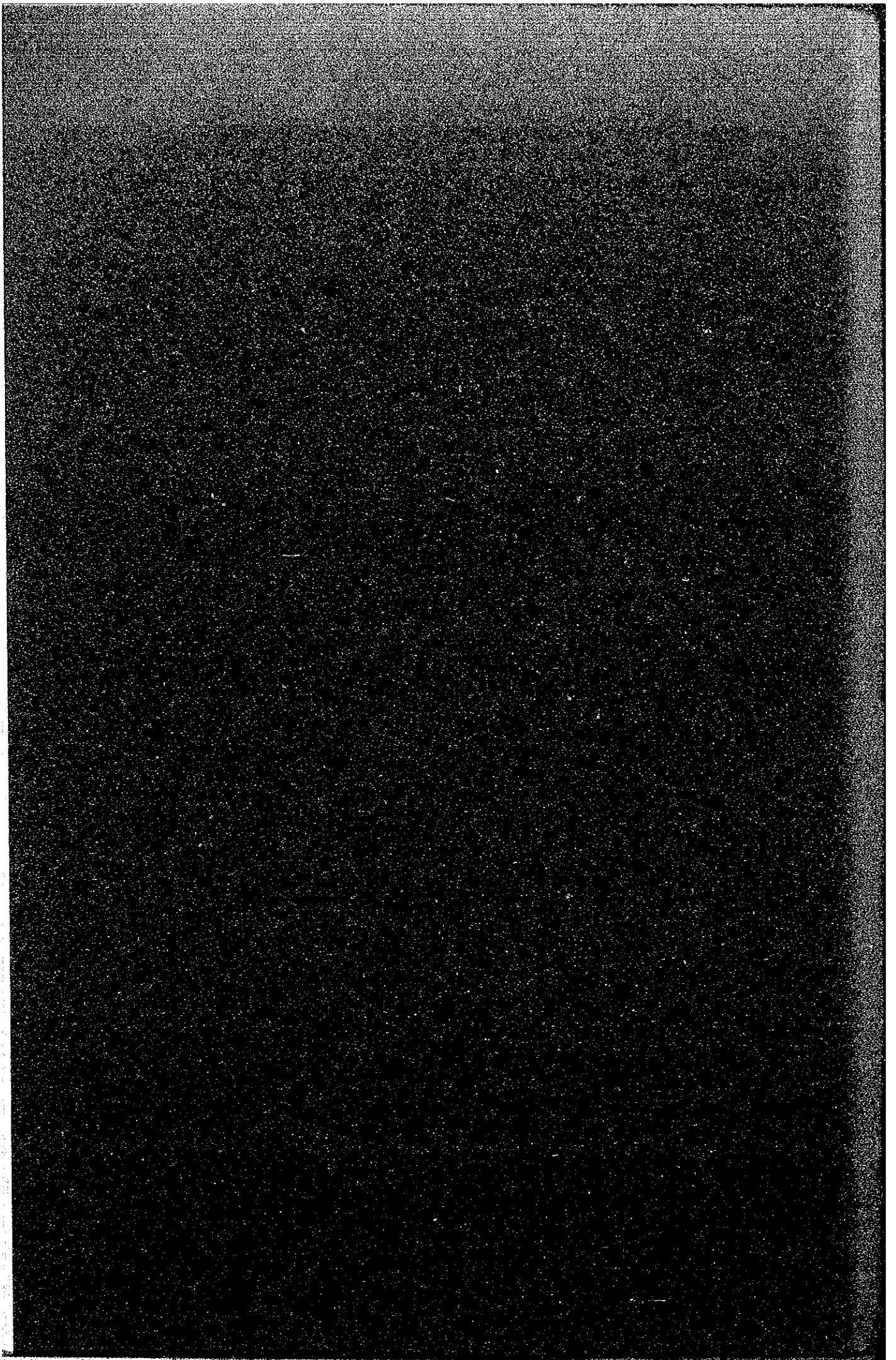


APPENDIXES FOR CHAPTER 10



APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS

ITEM NO.	DESCRIPTION	PRICE COMPONENT	P/UNIT	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)			SUB-TOTAL	TAXES	UNIT PRICE:	
				FOREIGN CURRENCY	LOCAL CURRENCY	FOREIGN CURRENCY			LOCAL CURRENCY	TAXES
A)	Equipment:									41.41 P/m ³
	3	Excavator Crowler	P/h	804.00	240.00	1200.00	156.00			
	40	Dump Truck, 10t	"	3000.00	1000.00	5000.00	1000.00			
	1	Motograder 125 HP	"	151.80	46.00	230.00	32.20			
	1	Crawler Tractor	"	92.40	28.00	140.00	19.60			
	1	Vibratory Sheepfoot Roller 6 ton	"	59.40	18.00	90.00	12.60			
	1/2	Pneumatic Roller (Self-propelled up to 15 tgn)	"	46.20	14.00	70.00	9.80			
	1	Water Trucks 8 m ³	"	177.00	63.00	300.00	60.00			
	1/2	Water Pump 3" Ø	"	5.02	1.43	7.50	1.05			
		Minor Tools (10% Unskilled Laborers)	"	0.77	0.23	1.16	0.16			
		Total A	P/h	4336.59	1410.66	7038.66	1291.41			
B)	Labor:									
	1	Foreman	P/h		6.27	6.27				
	5	1/2 Heavy Equipment Operator	"		31.19	31.19				
	1	1/2 Light Equipment Operator	"		6.57	6.57				
	1/2	Skilled Laborers	"		2.50	2.50				
	4	Drivers	"		179.58	179.58				
	3	Unskilled Laborers	"		11.55	11.55				
		Total B	P/h		237.66	237.66				
		Total A + B	P/h	4336.59	1648.32	7276.32	1291.41			
		Total A + B Carried Forward	P/h	4336.59	1648.32	7276.32	1291.41			

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO. DESCRIPTION: BORROW	PRICE COMPONENT	P/UNIT	FOREIGN CURRENCY		LOCAL CURRENCY		SUB-TOTAL	FOREIGN CURRENCY		LOCAL CURRENCY		TAXES	TOTAL
PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)													
	Total A + B Brought Forward	P/h	4336.59		1648.32		7276.32						
	C) Output: 200 m ³ /h	P/m ³						21.68		8.24		6.46	36.41
	<u>7276.32 P/h</u>												
	200 m ³ /h												
D) Materials:													
	Royalty	P/m ³								5.00			5.00
	Total Cost	P/m ³						21.68		13.24		6.46	41.41
%													
								52		32		16	100

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	108	PROJECT:	FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)	UNIT PRICE:					
DESCRIPTION:	AGGREGATE SUBBASE	FOREIGN CURRENCY	LOCAL CURRENCY	92.58 P/m ³					
PRICE COMPONENT	P/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL
A) Equipment:									
3 Motorgraders 125 HP	P/h	376.20	114.00	79.80	570.00				
1 Vibratory Smooth Roller	"	72.60	22.00	15.40	110.00				
1/4 Pneumatic Roller (Self-propelled up to 15t)	"	23.10	7.00	4.90	35.00				
2 Water Trucks	"	354.00	126.00	120.00	600.00				
1/2 Water Pump 3" Ø	"	5.02	1.43	1.05	7.50				
Minor Tools (10% Unskilled Laborers)	"	1.27	0.39	0.27	1.93				
Total A	P/h	832.19	270.82	221.62	1324.43				
B) Labor:									
1 Foreman	P/h		6.27		6.27				
3 Heavy Equipment Operators	"		17.01		17.01				
1 1/4 Light Equipment Operators	"		5.47		5.47				
2 Drivers	"		8.76		8.76				
1/2 Skilled Laborer	"		2.50		2.50				
5 Unskilled Laborer	"		19.25		19.25				
Total B	P/h		59.26		59.26				
Total A & B	P/h	832.19	330.08	221.62	1383.69				
C) Output:									
80 m ³ /h	P/m ³					10.40	4.13	2.77	17.30
1,383.69 P/h									
80 m ³ /h	P/m ³								
Carried Forward	P/m³					10.40	4.13	2.77	17.30

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION: AGGREGATE SUBBASE	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)												
		PRICE COMPONENT	\$/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL			
	Brought Forward	₱/m ³						10.40	4.13	2.77	17.30			
	D) Materials on Site:													
	Coarse Aggregate:													
	1.1 t/m ³ x 45.00 ₱/t	₱/m ³	25.74	15.84	7.92	49.50								
	Fine Aggregate:													
	0.5 t/m ³ x 22.00 ₱/t	"	5.50	3.96	1.54	11.00								
	Soil:													
	0.4 t/m ³ x 36.98 ₱/m ³	"	7.60	4.84	2.31	14.78								
	Total D	₱/m ³	38.84	24.67	11.77	75.28	38.84	24.67	11.79	75.28				
	Total Cost	₱/m ³					49.24	28.80	14.54	92.58				
		%					53	31	16	100				

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION	PRICE COMPONENT	P/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL	UNIT PRICE
316	PORTLAND CEMENT CONCRETE PAVEMENT 25 CM THICK OUTER MAJOR ROADS (SOUTHERN PACKAGE)											152.47 P/m ²
	Output:	10,000 m ²										
A) Equipment:												
	33 Concrete Spreader		P/h	5346.00	1782.00	1782.00	8910.00					
	33 Concrete Finisher		"	544.00	1848.00	1848.00	9240.00					
	Total A		P/h	10890.00	3630.00	3630.00	18150.00					
B) Labor:												
	33 Foreman		P/h		206.91		206.91					
	33 Assistant Foreman		"		187.11		187.11					
	66 Equipment Operators		"		374.22		374.22					
	165 Skilled Laborers		"		825.00		825.00					
	264 Unskilled Laborers		"		1016.40		1016.40					
	Total B		P/h		2609.64		2609.64					
	Total A & B		P/h	10890.00	6239.64	3630.00	20759.64					
	Carried Forward		P/h	10890.00	6239.64	3630.00	20759.64					

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION	PRICE COMPONENT	\$/UNIT	FOREIGN CURRENCY		LOCAL CURRENCY		SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL
				\$/UNIT	\$/UNIT	\$/UNIT	\$/UNIT					
	PROJECT: FEASIBILITY STUDY FOR METRO MANILA											
	DESCRIPTION: PORTLAND CEMENT CONCRETE PAVEMENT 250 MM THICK OUTER MAJOR ROADS (SOUTHERN PACKAGE)											
	Total A & B Brought Forward	\$/h		10890.00	6239.64	3630.00	20759.64					
C) Materials:												
	Concrete delivered on site											
	2500 m ³ x 534.68 \$/m ³	\$		696800.00	433175.00	206725.00	1336700.00					
	Formwork											
	460 m ² x 90 \$/m ²	"		20700.00	14490.00	6210.00	41400.00					
	Steel Bars and Mesh											
	10.34 t x 5240.00 \$/t	"		27632.62	22214.46	4334.52	54181.60					
	Incidentals Primer											
	Joint Filler											
	(5% above)			37256.63	23493.97	10863.48	71614.08					
	Total D			782389.25	493373.43	228133.00	1503895.68					
	Total Cost			793279.25	499613.07	231763.00	1524655.32					
	D) Output: 10,000 m ²											
	1,524,655.32 \$	\$/m ²							79.33	49.96	23.18	152.47
	10,000 m ²											
		%							52	33	15	100

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	402	DESCRIPTION: PRESTRESSED CONCRETE PILES (0.40 x 0.40 m) (FURNISHING AND DRIVING)	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)				UNIT PRICE:				
			\$/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL
A) Equipment:											
1	1/2	Crawler Crane, 30T	₱/h	271.35	81.00	52.65	405.00				
1		Pile Driver Delmag 30T	"	195.00	60.00	45.00	300.00				
		Ancillary Equipment (5% above)	"	23.32	7.05	4.88	35.25				
		Total A	₱/h	489.67	148.05	102.53	740.25				
B) Labor:											
1		Foreman	₱/h		6.27		6.27				
1	1/2	Heavy Equipment Operator	"		8.51		8.51				
1		Light Equipment Operator	"		4.38		4.38				
2		Skilled Laborers	"		10.00		10.00				
8		Unskilled Laborers	"		30.80		30.80				
		Total B	₱/h		59.96		59.96				
		Total A & B	₱/h	489.67	208.01	102.53	800.21				
C) Output: 8 m/h											
		800.21 ₱/h	₱/ft					61.21	26.00	12.82	100.03
		8 m/h									
		Carried Forward	₱/ft					61.21	26.00	12.82	100.03

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

PRICE COMPONENT	P/UNIT	FOREIGN CURRENCY		LOCAL CURRENCY		TAXES	SUB-TOTAL	FOREIGN CURRENCY		LOCAL CURRENCY		TAXES	TOTAL
PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)													
DESCRIPTION: PRESTRESSED CONCRETE PILES (0.40 x 0.40 m) (FURNISHING AND DRIVING)													
Brought Forward	P/m			61.21	26.00	12.82							100.03
D) Materials:													
Prestressed Concrete Pile delivered at Site	P/m			252.00	148.50	49.50							450.00
Incidentals (Including shoes: 5% above)	"			12.60	7.43	2.47							22.50
Total D				264.60	155.93	51.97							472.50
Total Cost	P/m			325.81	181.93	64.79							572.53
	%			57	32	11							100

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION: CONCRETE (PLAIN) CLASS "A"	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)	UNIT PRICE: 534.68 P/m ³						
PRICE COMPONENT	P/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL	
A) Equipment:									
1 Concrete Batching Plant: 15 m ³ /h	P/h	138.00	46.00	46.00		230.00		230.00	
1 Water Tank Truck, 8m ³ /h	"	177.00	63.00	60.00		300.00		300.00	
2 Truck Mixers 5m ³ /h	"	198.02	66.66	55.32		320.00		320.00	
1 Wheel Loader 1-3/4 yd ³	"	113.52	34.40	24.08		172.00		172.00	
1 Generator, Diesel 50KVA	"	28.50	9.50	9.50		47.50		47.50	
6 Belt Conveyors, Portable	"	57.78	16.39	12.07		86.24		86.24	
Ancillary Equipment (15% of the above)	"	106.92	35.39	31.05		173.36		173.36	
Total A	P/h	819.74	271.34	238.02		1329.10		1329.10	
B) Labor:									
1 Foreman	P/h		6.27			6.27		6.27	
1 Batching Plant Operator	"		5.67			5.67		5.67	
3 Drivers	"		13.14			13.14		13.14	
1 Heavy Equipment Operator	"		5.67			5.67		5.67	
2 Skilled Laborers	"		10.00			10.00		10.00	
10 Unskilled Laborers	"		38.50			38.50		38.50	
Total B	P/h		79.25			79.25		79.25	
Total A & B	P/h	819.74	350.59	238.02		1408.35		1408.35	
C) Output:									
13 m ³ /h					63.06	26.97	18.30	108.33	
1408.35 P/h									
13 m ³ /h									
Carried Forward	P/h				63.06	26.97	18.30	108.33	

10-9

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION: CONCRETE (PLAIN) CLASS "A"	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)													
		PRICE COMPONENT	Q/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL				
	Brought Forward							63.06	26.97	18.30	108.33				
D)	<u>Materials:</u>														
	Cement														
	0.363 t/m ³ x 800.00 P/t	P/m ³	145.20	101.64	43.56	290.40									
	Coarse Aggregate														
	1.24 t/m ³ x 50.00 P/t	"	33.48	18.60	9.92	62.00									
	Fine Aggregate														
	0.655 t/m ³ x 28.00 P/t	"	9.17	6.60	2.57	18.34									
	Incidentals (15% of the above)	"	27.81	19.46	8.34	55.61									
	Total D	P/m ³	215.66	146.30	64.39	426.35	215.66	146.30	64.39	426.35					
	Total Cost	P/m ³					278.72	173.27	82.69	534.68					
	%						52	32	16	100					

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

LINE NO.	DESCRIPTION: LEAN CONCRETE (Material only)	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)						UNIT PRICE:	
PRICE COMPONENT	P/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL
A) <u>Equipment:</u>									
1 Concrete Mixer	₱/h	20.59	6.81	6.97	34.37				
1 Pick-up	"	42.00	14.00	14.00	70.00				
1 Dump Truck	"	75.00	25.00	25.00	125.00				
Minor Tools (10% for the above)	"	13.76	4.58	4.60	22.94				
Total A	₱/h	151.35	50.39	50.57	252.31				
B) <u>Labor:</u>									
1 Foreman	₱/h		6.27		6.27				
2 Drivers	"		8.76		8.76				
3 Skilled Laborer	"		15.00		15.00				
10 Unskilled Laborer	"		38.50		38.50				
Total B	₱/h		68.53		68.53				
Total A & B	₱/h	151.35	118.92	50.57	320.84				
C) Output: 2 m ³ /h									
320.84 ₱/h									
2 m ³ /h						75.67	59.46	25.29	160.42
Carried Forward						75.67	59.46	25.29	160.42

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION: LEAN CONCRETE (Material only)	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)	2/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL
	Brought Forward							75.67	59.46	25.29	160.42
D) Materials:											
	Cement										
	0.15 t/m ³ x 800.00 P/t			60.00	42.00	18.00	120.00				
	Coarse Aggregate:										
	1.35 t/m ³ x 50.00 P/t			36.45	20.25	10.80	67.50				
	Fine Aggregate:										
	0.67 t/m ³ x 28.00 P/t			9.38	6.75	2.63	18.76				
	Incidentals (10% of the above)										
	Total D			10.58	6.90	3.14	20.62	116.41	75.90	34.57	226.88
	Total Cost			116.41	75.90	34.57	226.88	192.08	135.36	59.86	387.30
	%							50	35	15	100

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO. 406 DESCRIPTION: REINFORCING STEEL	PRICE COMPONENT	P/UNIT	FOREIGN CURRENCY		LOCAL CURRENCY		TAXES	SUB-TOTAL	FOREIGN CURRENCY		LOCAL CURRENCY		TAXES	TOTAL
PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE) UNIT PRICE: 5.24 P/kg.														
A) <u>Equipment:</u>														
Bending Machine														
15 h/t x 19.90 P/h		P/t	185.07	65.67	47.76	298.50								
Shearing Machine		"	62.50	22.18	16.12	100.80								
8 h/t x 12.60 P/h		"	7.42	2.63	1.91	11.96								
Minor Tools (3% of machine)		P/t	254.99	90.48	65.79	411.26								
Total A														
B) <u>Labor:</u>														
Foreman		P/t		50.16		50.16								
8 h/t x 6.27 P/h		"		90.72		90.72								
Assistant Foreman		"		202.40		202.40								
16 h/t x 5.67 P/h		"		385.00		385.00								
Steelmen 5.06 P/h		P/t		728.28		728.28								
40 h/t x 5.06 P/h		P/t	254.99	818.76	65.79	1139.54								
Unskilled Laborer														
100 h/t x 3.85 P/h														
Total B														
Total A & B		P/t	254.99	818.76	65.79	1139.54				254.99	818.76	65.79	1139.54	
Carried Forward		P/t												

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION: REINFORCING STEEL	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)													
		PRICE COMPONENT	\$/UNIT	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	SUB-TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL				
	Total A & B Brought Forward							254.99	818.76	65.79					1139.54
C) <u>Materials:</u>															
	Reinforcement Steel on Site	P/t	2204.00	1254.00	342.00	3800.00									
	Wastage (5% of the above)	"	110.20	62.70	17.10	190.00									
	Wire and Others (3% of Steel)	"	66.12	37.62	10.26	114.00									
	Total C	P/t	2380.32	1354.32	369.36	4104.00	2380.32	1354.32	369.36						4104.00
	Total A & B & C	P/t					2635.31	2173.08	435.15						5243.54
	D) Price per kilogram	P/kg					2.64	2.17	0.43						5.24
	%						51	41	8						100

APPENDIX TABLE 10.3-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION	PRICE COMPONENT	P/UNIT	PROJECT: FEASIBILITY STUDY FOR METRO MANILA OUTER MAJOR ROADS (SOUTHERN PACKAGE)			UNIT PRICE:						
				FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL			
A) <u>Equipment:</u>													
1	Explosion Rammer (Frog)		P/h	15.84	4.43	3.03	23.30						
1	Dump Truck		"	75.00	25.00	25.00	125.00						
	Minor Tools (10% Unskilled Laborers)		"	0.88	0.25	0.17	1.30						
	Total A		P/h	91.72	29.68	28.20	149.60						
B) <u>Output:</u>													
	2 m/h		P/m					45.86	14.84	14.10			74.80
	149.60 P/h												
C) <u>Labor:</u>													
	Unskilled Laborer	3.39 h/m	P/m		13.05		13.05						
	Driver	0.50 h/m	"		2.19		2.19						
	Skilled Laborer	2.50 h/m	"		12.50		12.50						
	Assistant Foreman (10% Unskilled Laborers)		"		1.30		1.30						
	Total C		P/m		29.04		29.04			29.04			29.04
	Total B & C		P/m					45.86	43.88	14.10			103.84
	Total B + C		P/m					45.86	43.88	14.10			103.84
	Carried Forward												

APPENDIX TABLE 103-1 EXAMPLES OF UNIT PRICE ANALYSIS (cont'd)

ITEM NO.	DESCRIPTION	PRICE COMPONENT	P/UNIT	FOREIGN CURRENCY		LOCAL CURRENCY		TAXES	SUB-TOTAL	FOREIGN CURRENCY		LOCAL CURRENCY		TAXES	TOTAL
				3	0	3	0			3	0	3	0		
		Total B + C Brought Forward	P/m							45.86		43.88		14.10	103.84
D) Materials:															
		Pipes Delivered on Site	P/m	73.15		68.75		18.10	160.00						
		Scraps (10% above)	"	7.31		6.88		1.81	16.00						
		Sealing Joints													
		0.011 m ³ /m x 600.00 P/m ³	"	3.03		2.70		0.87	5.60						
		Total D	P/m	83.49		78.33		20.78	182.60		83.49		78.33		182.60
		Total Cost	P/m								129.35		122.21		286.44
		%								45		43		12	100

APPENDIX TABLE 10.5-1 ESTIMATED CONSTRUCTION COST FOR PLAN 1 BY STAGE
(UNIT: Pesos in thousand)

STAGE	DESCRIPTION	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL
1 Open- ing 1987	Earthwork	31897	20600	9028	61525
	Pavement Structures	46816	29251	13694	89761
	Bridge & Other Structures	25132	16002	5240	46374
	Drainage Structures	11856	10570	3079	25505
	Miscellaneous	15219	15259	3789	34267
	Construction Cost (Sub T.)	130920	91682	34830	257432
	Detailed Design	10661	7143	2779	20583
	Supervision	9164	6418	3438	19020
	Physical Contingencies	15075	10524	4105	29704
	Total	165820	115767	45152	326739
	R.O.W. Cost	-	273709	-	273709
	Grand Total	165820	389476	45152	600448
2 Open- ing 1991	Earthwork	20569	11771	5601	37941
	Pavement Structures	33889	21170	9913	64972
	Bridge & Other Structures	17746	8639	3036	29421
	Drainage Structures	6101	5437	1583	13121
	Miscellaneous	9286	9882	2296	21464
	Construction Cost (Sub T.)	87591	56899	22429	166919
	Detailed Design	-	-	-	-
	Supervision	6131	3983	1570	11684
	Physical Contingencies	9372	6088	2400	17860
	Total	103094	66970	26399	196463
	R.O.W. Cost	-	-	-	-
	Grand Total	103094	66970	26399	196463
3 Open- ing 1995	Earthwork	8483	4457	2191	15131
	Pavement Structures	21735	13578	6358	41671
	Bridges & Other Structures	9341	3885	1450	14676
	Drainage Structures	3519	3136	913	7568
	Miscellaneous	4938	4936	1317	11191
	Construction Cost (Sub T.)	48016	29992	12229	90237
	Detailed Design	-	-	-	-
	Supervision	3361	2100	856	6317
	Physical Contingencies	5138	3209	1309	9656
	Total	56515	35301	14394	106210
	R.O.W. Cost	-	-	-	-
	Grand Total	56515	35301	14394	106210
Total	Earthwork	60949	36828	16820	114598
	Pavement Structures	102440	63999	29965	196404
	Bridge & Other Structures	52219	28526	9726	90471
	Drainage Structures	21476	19143	5575	46194
	Miscellaneous	29443	30077	7402	66922
	Construction Cost (Sub T.)	266527	178573	69488	51458
	Detailed Design	10661	7143	2779	20583
	Supervision	18656	12501	5864	37021
	Physical Contingencies	29585	19821	7814	57220
	Total	325429	218038	85945	629412
	R.O.W. Cost	-	273709	-	273709
	Grand Total	325429	491747	85945	903121

NOTES: The cost of detailed design is 3 - 4% of the construction cost,
The cost of supervision is 3 - 7% of the construction cost.
The cost of physical contingencies is 10% for each item.
The cost of land acquisition includes the cost of 10% physical contingencies.

Prices are as of October 1981.

R.O.W. is assumed to be acquired in the first stage regardless of the staged implementation.

APPENDIX TABLE 10.5-2 ESTIMATED CONSTRUCTION COST FOR PLAN 2 BY STAGE

(UNIT: Pesos in thousand)

STAGE	DESCRIPTION	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL
1 Opening 1987	Earthwork	27686	17587	7859	53132
	Pavement Structures	33036	20639	9663	63338
	Bridge & Other Structures	21496	12728	4348	38572
	Drainage Structures	7464	6652	1937	16053
	Miscellaneous	11715	11465	2836	26016
	Construction Cost (Sug T.)	101397	69071	26643	197111
	Detailed Design	10661	7143	2779	20583
	Supervision	7098	4835	1865	13798
	Physical Contingencies	11916	8105	3128	23149
	Total	131072	89154	34415	254641
	R.O.W. Cost	-	273709	-	273709
	Grand Total	131072	362863	34415	528350
2 Opening 1995	Earthwork	25492	15212	6966	47670
	Pavement Structures	50312	31434	14716	96462
	Bridge & Other Structures	21378	11909	3928	37215
	Drainage Structures	10492	9355	2725	22572
	Miscellaneous	13272	14133	3396	30801
	Construction Cost (Sub T.)	120946	82043	31731	234720
	Detailed Design	-	-	-	-
	Supervision	8466	5743	2221	16430
	Physical Contingencies	12941	8779	3395	25115
	Total	142353	96565	37347	276265
	R.O.W. Cost	-	-	-	-
	Grand Total	142353	96565	37347	276265
Total	Earthwork	53178	32799	14825	100802
	Pavement Structures	83348	52073	24379	159800
	Bridge & Other Structures	42874	24637	8276	75787
	Drainage Structures	17956	16007	4662	38625
	Miscellaneous	24987	25598	6232	56817
	Construction Cost (Sub T.)	222343	151114	58374	431831
	Detailed Design	10661	7143	2779	20583
	Supervision	15564	10578	4086	30228
	Physical Contingencies	24857	16884	6523	48264
	Total	273425	185719	71762	530906
	R.O.W. Cost	-	273709	-	273709
	Grand Total	273425	459428	71762	804615

NOTES: The cost of detailed design is 3 - 4% of the construction cost.
 The cost of supervision is 3 - 7% of the construction cost.
 The cost of physical contingency is 10% for each item.
 The cost of land acquisition includes the cost of 10% physical contingencies.
 Prices are as of October 1981.
 The cost of detailed design covers that for the widening of the southern section of Route C which is assumed to be implemented beyond 1995.
 R.O.W. is assumed to be acquired in the first stage regardless of the staged implementation.

APPENDIX TABLE 10.5-3 ESTIMATED CONSTRUCTION COST FOR PLAN 3 BY STAGE

(UNIT: Pesos in thousand)

STAGE	DESCRIPTION	FOREIGN CURRENCY	LOCAL CURRENCY	TAXES	TOTAL
1 Opening 1987	Earthwork	40892	26224	11584	78700
	Pavement Structures	58762	36714	17188	112664
	Bridge & Other Structures	33268	20748	6841	60857
	Drainage Structures	14058	12533	3651	30242
	Miscellaneous	18398	18688	4595	41681
	Construction Cost (Sub T.)	165378	114907	43859	324144
	Detailed Design	10661	7143	2779	20583
	Supervision	11577	8044	3070	22691
	Physical Contingencies	18762	13009	4971	36742
	Total	206378	143103	54679	404160
	R.O.W. Cost	-	273709	-	273709
	Grand Total	206378	416812	54679	677869
2 Opening 1995	Earthwork	12285	6575	3241	22101
	Pavement Structures	24585	15359	7191	47135
	Bridge & Other Structures	9606	3889	1435	14930
	Drainage Structures	3898	3474	1011	8383
	Miscellaneous	6589	6910	1637	15136
	Construction Cost (Sub T.)	56963	36207	14515	107685
	Detailed Design	-	-	-	-
	Supervision	3987	2534	1016	7537
	Physical Contingencies	6095	3874	1555	11524
	Total	67045	42615	1708	126746
	R.O.W. Cost	-	-	-	-
	Grand Total	67045	42615	1708	126746
Total	Earthwork	53178	32799	14825	100802
	Pavement Structures	83348	52073	24379	159800
	Bridge & Other Structures	42874	24637	8276	75787
	Drainage Structures	17956	16007	4662	38625
	Miscellaneous	24987	25598	6232	56817
	Construction Cost (Sub T.)	222343	151114	58374	431831
	Detailed Design	10661	7143	2779	20583
	Supervision	15564	10578	4086	30228
	Physical Contingencies	24857	16884	6523	48264
	Total	273425	185719	71762	530906
	R.O.W. Cost	-	273709	-	273709
	Grand Total	273425	459428	71762	804615

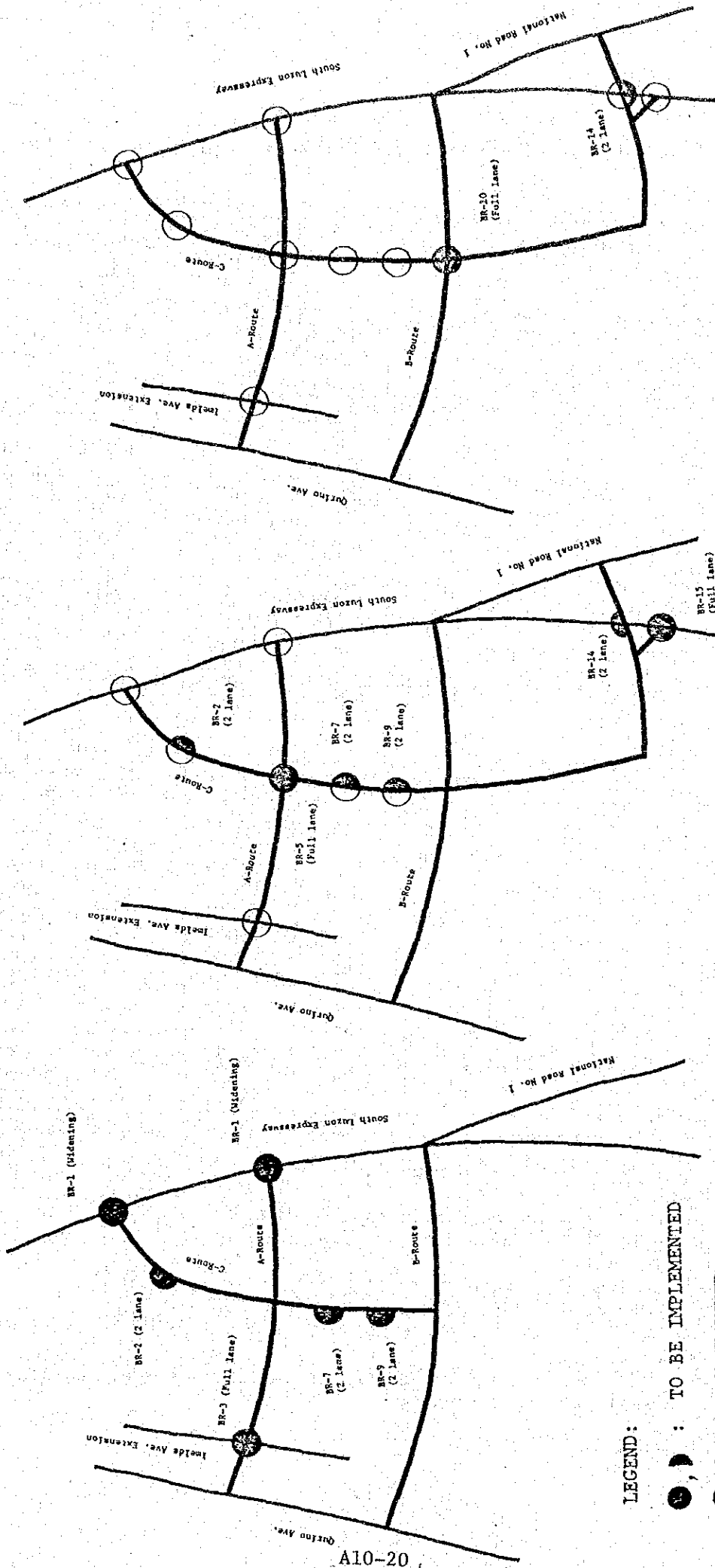
NOTES: The cost of detailed design is 3 - 4% of the construction cost.
The cost of supervision is 3 - 7% of the construction cost.
The cost of physical contingency is 10% for each item.
The cost of land acquisition includes the cost of 10% physical contingencies.
Prices are as of October 1981.
The cost of detailed design covers that for the widening of the southern section of Route C which is assumed to be implemented beyond 1995.
R.O.W. is assumed to be acquired in the first stage regardless of the staged implementation.

APPENDIX FIG. 10.5-1 GRADE SEPARATION SCHEDULE BY ALTERNATIVE: PLAN 1

BY 1987

BY 1991

BY 1995



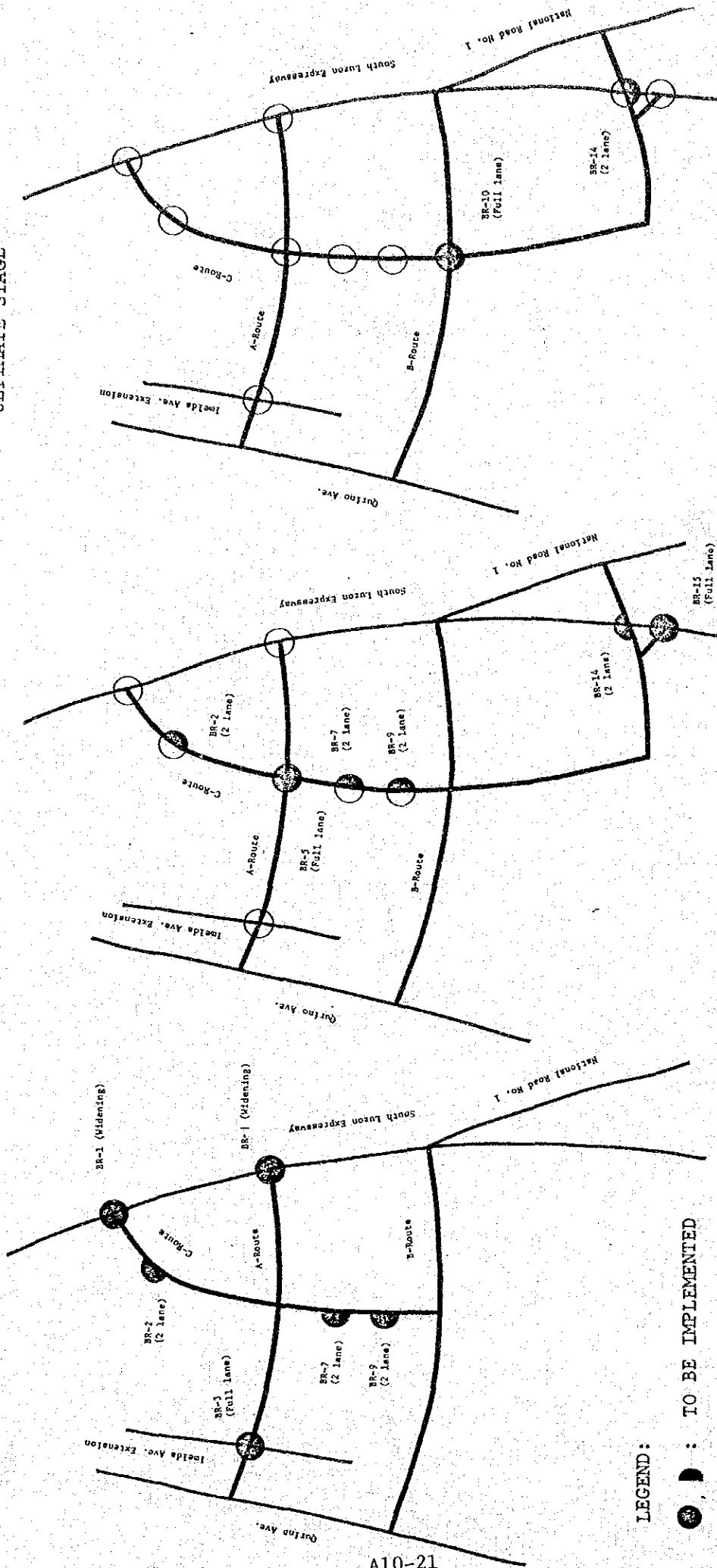
- LEGEND:
- : TO BE IMPLEMENTED
 - : IMPLEMENTED
 - ⊙ : FULL CONSTRUCTION
 - ◐ : STAGE CONSTRUCTION

APPENDIX FIG. 10.5-2 GRADE SEPARATION SCHEDULE BY ALTERNATIVE: PLAN 2

BY 1987

BY 1995

ULTIMATE STAGE



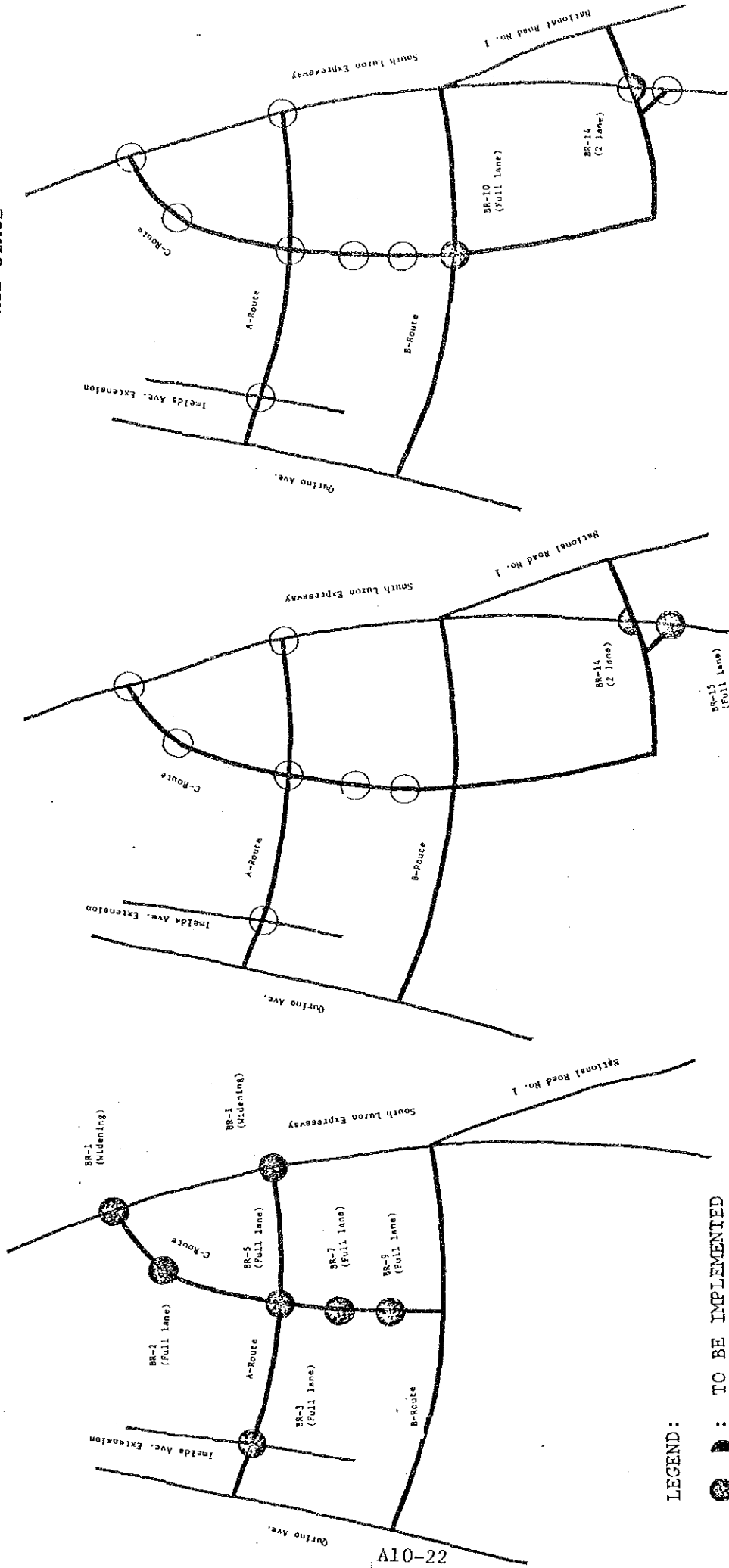
- LEGEND:
- : TO BE IMPLEMENTED
 - : IMPLEMENTED
 - ⊙ : FULL CONSTRUCTION
 - ◕ : STAGE CONSTRUCTION

APPENDIX FIG. 10.5-3 GRADE SEPARATION SCHEDULE BY ALTERNATIVE: PLAN 3

BY 1987

BY 1995

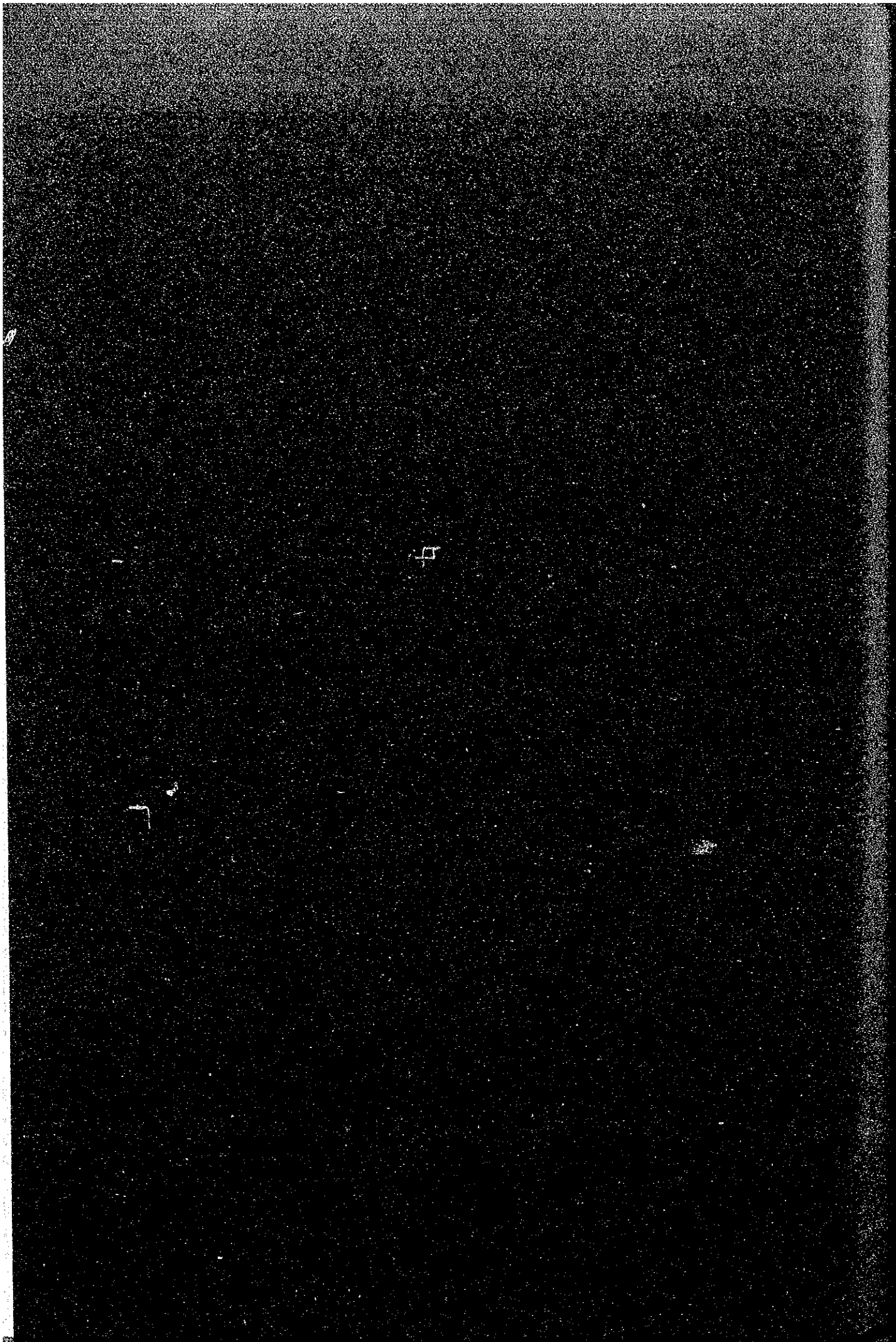
ULTIMATE STAGE



LEGEND:

- : TO BE IMPLEMENTED
- : IMPLEMENTED
- : FULL CONSTRUCTION
- : STAGE CONSTRUCTION

APPENDIXES FOR CHAPTER 11



APPENDIX NOTE 11.1 BASIC ROAD TRAFFIC COST

11.1.1 General

Studies on the vehicle operating cost were conducted on the following four vehicle types, each having different operating characteristics:

1. Small vehicles including cars and vans
2. Jeepneys
3. Buses
4. Medium Trucks

The vehicle operating cost is composed of distance-related (running costs) and time-related cost (fixed hourly cost). Running costs are defined as part of vehicle operating costs which vary in proportion to the operating distance run by vehicles, while fixed costs are defined as part of vehicle operating costs which vary directly with operating hours, i.e. running hours plus idling hours. The Manual on Basic Traffic Cost Calculation Procedures,^{1/} prepared by the MPWH was the main reference for the study with some minor modifications to be consistent with findings of the Study Team.

11.1.2 Representative Vehicles

The following representative vehicles were selected in this Study:

APPENDIX TABLE 11.2-1 PRICE OF REPRESENTATIVE VEHICLES,
JUNE 1981

	Weighted Retail Price	
	Including Tax (IT) (₱)	Excluding Tax (ET) (₱)
1. Bantam RG	57,480	45,930
2. Jeepney Mac-Arthur RG	50,860	44,250
3. Bus D 1)	248,580	214,505
4. Truck D 2)	216,430	182,410

R = Regular, P = Premium, RG = Gasoline Regular
D = Diesel

^{1/} PPDO of MPWH, The Manual on Basic Traffic Cost Calculation Procedures,
(Vol. 4, July 1979 with prices updated to June 1981).

Source: Manual on Basic Road Traffic Cost Calculation Procedures, Vol. 4 PPDO, MPH in July 1979 with prices updated to June 1981.

- 1) The average price of a small and a large bus. The 50% share each on large buses and small buses was determined by reviewing the traffic count data at the cordon screen AA' in the DIZ of the Project Study.
- 2) Medium Truck of net cargo weight approximately 6 tons.

11.1.3 Basic Running Costs

The basic running cost comprises of fuel, lubricant, tire, maintenance and repair costs. A part of depreciation cost to be included was estimated as in the latter subsection 4).

1) Fuel Cost

Fuel cost was estimated by multiplying fuel consumption (liter/Km.) for each representative vehicle by fuel price (pesos/liter). They are shown in the following Tables 4). 11.2-2 and 11.2-3.

APPENDIX TABLE 11.2-2 PRICE OF FUEL AND OIL AS OF JUNE 1981

	Unit: Pesos/Liter				
	Diesel	Fuel		Engine Oil 1)	
		Regular Gasoline	Premium Gasoline :	Cars, Vans & Jeepneys	Buses & Trucks
Price excluding tax	2.660	3.392	3.507	8.687	10.087
Customs duty	0.160	0.160	0.160	0.160	0.160
Specific Tax & Special Funds	0.290	1.308	1.393	1.263	1.263
Energy Tax	-	0.190	0.190	0.190	0.190
Price including tax	3.110	5.050	5.250	10.300	11.700

Source: Oil Industry Commission through the Manual of PPDO.

- 1) ESSO Motor Oil 10^W for cars and jeepneys, and model HD 90 for buses and trucks.

APPENDIX TABLE 11.2-3 FUEL AND OIL CONSUMPTION

Vehicle Type	Fuel Consumption		Oil Consumption
	Fuel Type	Liters/Km.	(Liters/1,000 Kms.)
Bantam Car	Regular Gas	0.10	0.7
Jeepney MacArthur 2)	Diesel	0.15	1.0
Bus 1)	-do-	0.20	2.75
Medium Truck	-do-	0.26	3.0

Source: Manual of PPDO

- 1) The averaged fuel and oil consumption of a small and a large bus.
- 2) According to the survey in 1979 for Manila-Bataan Road Study, the majority was using diesel.

2) Tire Cost

Tire cost was estimated by dividing the price of a set of tires by tire life expressed in kilometers. However, considering the fact that recapped tires were commonly used by commercial vehicles, the following assumptions were made:

1. The tire life will be extended by 50% of the original life at 85% use.
2. The cost of recapping will be 30% of the brand new price.
3. Recapping will be done once per tire on average for commercial vehicles.

APPENDIX TABLE 11.2-4 PRICES AND LIFE OF TIRES, JUNE 1981

Vehicle Type	No. of Tires	Tire Size	Tire Set Price (₱)		Tire Life (000 Kms.)	
			IT	ET	New	Recapped
Car	4	5.60-13 4-PR	1120	986	35	-
Jeepney	4	6.00-16 6 PR	1819	1601	40	54.00
Bus	6	8.25-20 10 PR	8831	7770	55	74.25
Truck (Medium)	6	8.25-20 10 PR	8257	7266	50	67.50

Source: Manual of PPDO

3) Maintenance and Repair Cost

Maintenance and repair cost was divided into two components; one in the distance-related running cost and the other in

the time-related cost. The former was determined as follows:

- a. The spare part component was estimated in terms of percent of the adjusted vehicle retail price (vehicle price less tire set price).
- b. The labor component was calculated as the required number of labor hours per vehicle per annum. Appendix Table 11.2-5 shows the maintenance and repair requirement.

APPENDIX TABLE 11.2-5 REQUIREMENT FOR MAINTENANCE AND REPAIR

Vehicle Type	Spare Parts Requirements (%)	No. of Labour Hours Required Per Year	Unit Cost of Labour (₱/hr.)	
			Including Tax	Excluding Tax
Car	2.5	60		
Jeepney	10.0	200	14.30	13.90
Bus 1)	9.0	275		
Medium Truck	7.0	250		

Source: Manual of PPDO

- 1) The average of a small and a large bus.

4) Distance-Related Depreciation Cost

The distance-related depreciation cost per kilometer was calculated as the distance-related portion of the vehicle retail price less the price of a set of tires, divided by the life kilometerage of the representative vehicle. The split of the depreciation cost between the distance-related portion and the time-related one is assumed as shown in Appendix Table 11.2-6.

APPENDIX TABLE 11.2-6 OPERATING CHARACTERISTICS

Vehicle Type	Vehicle Life		Annual Operating Distance (1000 Kms.)	Split Ratio of Depreciation Cost	
	Years	1000 Kms.		Distance-Related	Time-Related
Car	10	150	15	50%	50%
Jeepney	7	420	60	85%	15%
Bus 1)	7	530	75	85%	15%
Medium Truck	12	540	45	65%	35%

Source: Manual of PPDO

- 1) The average of a small and a large bus.

5) Summary of the Running Cost per Kilometer

Appendix Table 11.2-7 shows the summary of the financial and the economic running cost by vehicle type, respectively.

APPENDIX TABLE 11.2-7 RUNNING COST, JUNE 1981

Cost Item	(Pesos/Vehicle/Km.)			
	Bantam Car	MacArthur Jeepney	Bus 1) Diesel	Medium Truck Deisel
<u>Cost Including Tax</u>				
Fuel	0.5050	0.4666	0.6220	0.8086
Lubricant Oil	0.0072	0.0103	0.0322	0.0351
Tire	0.0381	0.0438	0.1484	0.1817
Maintenance:				
Spare parts	0.0936	0.0817	0.2672	0.3220
Labor	0.0572	0.0477	0.0524	0.0794
Depreciation (Distance)	0.1872	0.0992	0.3630	0.2492
Total:	0.8883	0.7493	1.4852	1.6760
<u>Cost Excluding Tax</u>				
Fuel	0.3392	0.3989	0.5320	0.6916
Lubricant Oil	0.0061	0.0087	0.0278	0.0303
Tire	0.0335	0.0385	0.1305	0.1599
Maintenance:				
Spare Parts	0.0746	0.0711	0.2314	0.2708
Labor	0.0556	0.0463	0.0509	0.0772
Depreciation (Distance)	0.1492	0.0863	0.3145	0.2105
Total:	0.6582	0.6498	1.2871	1.4403

Source: Manual of PPDO

- 1) The average of small and a large bus.

11.1.4 Time Related Costs (Fixed Costs)

- 1) General

Time related cost is part of vehicle operating cost, which is considered suitable to associate it with the operating hours regardless of actual running time. It was estimated as in the following subsections.

- 2) Annual Operating Hours

Average annual operating hours were assumed as follows:

APPENDIX TABLE 11.2-8 ANNUAL OPERATING HOURS

Vehicle Type	Operating Hours	
	Per Day	Per Year
Car	6.5	2,000
Jeepney	10.0	3,000
Bus	10.0	3,000
Medium Truck	9.0	2,700

Source: Manual of PPDO

3) Time-Related Depreciation Cost

The time-related depreciation cost was calculated as the time dependent share in percent of the vehicle retail price less the cost of a tire set. The percent share is shown in Appendix Table 11.2-6. The cost was divided by the product of vehicle life in years and annual operating hours. Thus, calculation method was based on the straight line depreciation and no salvage value was assumed.

4) Capital Opportunity Cost

The capital opportunity cost (the interest rate) was estimated at 15% p.a. for the country. Therefore, the average capital employed over a vehicle's lifetime could be considered to be half the initial purchasing cost with zero salvage value. The capital cost (the interest charge) was calculated with the following equation:

$$\text{Capital Cost} = \frac{\text{Vehicle Price (Without Tires)} \times 0.15 \times 0.5}{\text{Annual Operating Hours}}$$

5) Crew Cost

The crew cost per hour comprising salary allowance, social benefit and commission is shown in the following table with the required number of crew per vehicle.

APPENDIX TABLE 11.2-9 CREW COST

Vehicle Type	Driver	Conductor	Helper
Car			
Jeepney	1 @ ₱3.50		
Bus	1 @ ₱4.25	1 @ ₱3.95	
Truck	1 @ ₱3.40		2 @ ₱2.15 = 4.30

Source: Manual of PPDO

6) Overhead and Vehicle Fee

Overhead and vehicle fee per hour is quoted from the updated Basic Traffic Cost Manual and are shown in Appendix Table 11.2-12.

7) Insurance Cost

The insurance cost per vehicle per hour could be calculated as the annual premiums over the annual operating hours. In this case the premium was for the all-risk coverage.

APPENDIX TABLE 11.2-10 INSURANCE COST

Vehicle Type	Pesos/Hour) Insurance Cost 1)
Bantam Car	0.53
Jeepney	0.94
Bus 2)	1.04
Medium Truck	1.02

Source: Manual of PPDO

- 1) Insurance cost was considered same for both cases with and without tax.
- 2) The average of a small and a large bus.

8) Basic Fixed Cost Reduction Factors

Based on the research made by the PPDO of the MPWH only 30% of bantam cars were considered to be in commercial use. The total fixed cost of this commercial use has been taken into the operating cost. The cost for private use was deleted.

Fleet reduction factors will vary with the type of vehicle, type of operation and area. The factors are supposed to express the degree at which time saving due to road improvements can lead to productivity gain in the form of fleet reduction.

It was further assumed that the utilization of saved time would probably be higher on vehicles with characteristics of short and frequent trips, such as jeepney and commercial cars, while large vehicles would not be utilized effectively because they were subject to extensive repair and rescheduling trips over longer distances.

Basic fixed cost reduction factors, comprising commercial use and fleet reduction factors were assumed as shown in Appendix Table 11.2-11.

APPENDIX TABLE 11.2-11 REDUCTION FACTOR

Vehicle Type	Reduction Factor	
	Commercial Use	Fleet Red.
Bantam Car	0.30	1.0
Jeepney	1.00	0.9
Bus 1)	1.00	0.75
Truck	1.00	0.60

Source: Manual of PPDO

1) The average of a small and a large bus.

9) Summary of Fixed Cost

APPENDIX TABLE 11.2-12 FIXED COST

Cost Item	(Pesos/Vehicle/Hour)			
	Bantam Car	Jeepney	Bus 4)	Truck
<u>Cost Including Tax</u>				
Depreciation (Time)	1.40	0.35	1.64	2.24
Capital Cost at 15% p.a.	2.16	1.27	6.22	6.01
Crew Cost	-	3.50	8.20	7.70
Overhead & Motor Vehicle Fee	0.10 ¹⁾ 1.48 ²⁾	2.18	8.62	7.33
Insurance	0.53	0.94	1.04	1.02
Total	4.19¹⁾ 5.57²⁾	8.24	25.72	24.30
Reduction Commercial Use Factor	0.30	1.00	1.00	1.00
Fleet Use	1.00	0.90	0.75	0.60
Basic Fixed Cost³⁾	1.51	6.57	18.21	13.97
<u>Cost Excluding Tax</u>				
Depreciation (Time)	1.12	0.30	1.42	1.88
Capital Cost	1.72	1.11	5.36	5.07
Crew Cost	-	3.50	8.20	7.70
Overhead & Motor Vehicle Fee	- ¹⁾ 1.39 ²⁾	2.11	8.38	6.95
Insurance	0.53	0.94	1.04	1.02
Total	3.37¹⁾ 4.76²⁾	7.96	24.40	22.62
Reduction Commercial Use Factor	0.30	1.00	1.00	1.00
Fleet Use	1.00	0.90	0.75	0.60
Basic Fixed Cost³⁾	1.27	6.32	17.25	12.96

Source: Manual of PPDO

- 1) Private Car Only
- 2) Commercial Car Only
- 3) Excluding Insurance
- 4) The average of a small and a large bus.

11.1.5 Time Cost of Passengers

In general, time cost is defined as a possible benefit which drivers and passengers could produce had they allocated their in-vehicle time for other economic activities resulting from running on the improved road system.

Time cost was allocated a monetary value for those "at work" and "to/from work," while no time cost was assumed for travels with other purposes. (See Appendix Note 11.2 for the values actually used). The updated hourly rate value of time is shown below:

<u>Descriptions</u>	<u>In Work</u>	<u>To/From Work</u>
Car: Driver, Owner	₱14.50	7.00
Driver otherwise		
and passenger	5.50	2.75
Jeepney passenger	2.75	1.40
Bus passenger 1)	3.13	1.58

Source: Manual of PPDO

- 1) A passenger on the average of a small and a large bus.

APPENDIX NOTE 11.2 d1 METHOD (APPLICATION OF BASIC TRAFFIC COSTS ON THE ROAD NETWORKS WITH AND WITHOUT THE PROJECT)

11.2.1 General

As stated in Chapter 6, the traffic volume was assigned on the road network by applying the Q-V relationship formula, the diversion curve and the time minimum path selection on the network. The results of the assignment work were then used for estimating the overall traffic cost on the road network in the designated area. The cost was estimated by using the "d1 method" of the then MPH. The following statements are the determination of the values in the factors of the d1 method.

The basic running cost is the cost of a vehicle running on a level, straight road with a good paved surface condition, free flow of traffic and insignificant roadside friction. Individual running cost on a road not in ideal conditions is assumed to be equal to the cost of running at an ideal conditions on the same length plus an extra distance which varies in accordance with the actual conditions of the link.

The MPWH has developed a set of d1 values applicable to various road conditions since 1971^{1/}. The method was applied for the study of Manila-Bataan Coastal Road and Its Related C-5 and C-6 Roads Project in 1980. The Study Team decided to adopt this system with an adjustment suitable to the actual road conditions for the road system in the Project Area. Most of the following items are the elements of d1 applicable to the Project which could be additive independently to obtain the actual traffic costs on a road section.

11.2.2 d1 Factors

1) Roadside Friction

Roadside frictions are categorized into four classes with the following definitions:

- a. None: Few or no houses along the carriageway.
- b. Light: Houses and/or intersections along and close to the carriageway, 100-200 meters apart. Pedestrian and other slow moving traffic seen occasionally.
- c. Medium: Scattered roadside development, 50-100 m, between buildings and/or intersections. Pedestrian and other slow moving traffic observed frequently.

^{1/} An example is shown in Road Feasibility Study II, June 1975 (MPWH and Norconsult A. A. & Hoff Overgard.)

- d. Heavy: Continuous roadside development. Pedestrian and other slow moving traffic tends to frequently disrupt motor vehicle traffic flow and reduce travel speed to under 40 KPH. even at low traffic densities.

2) Service Levels

Levels of service are classified as follows in terms of the volume capacity ratio per hour. The traffic volume per hour is estimated by multiplying the assigned traffic volume (AADT base) with 7.7% where the percent was determined by the average peak hour ratio of the 24 hour traffic count data. (See Appendix Tables 4.2-4 and 4.2-5). The capacity per hour is shown in Appendix Table 6.3-2.

Level of Service	Volume Capacity Ratio
A	0.00 - 0.20
B	0.21 - 0.50
C	0.51 - 0.70
D	0.71 - 0.85
E	0.86 - 1.00
F	1.01 - 1.15
G	1.16 - 1.30
H	1.31 - 1.50
I	1.51 -

3) Gradient and Pavement (dls)

a. Surface type: Paved

		Unit: in Km.							
Gradient Class		1	2	3	4	5	6	7	8
Length		<400				>400			
Gradient %	Condition	<3%	3-5%	6-7%	>7%	<3%	3-5%	6-7%	>7%
Good	S.J.	0.00	0.15	0.30	0.65	0.00	0.15	0.40	0.75
	B.T.	0.00	0.20	0.45	0.80	0.00	0.75	1.60	2.00
Fair	S.J.	0.20	0.35	0.50	0.80	0.20	0.35	0.55	0.90
	B.T.	0.30	0.50	0.70	1.05	0.30	1.00	1.80	2.20
Bad	S.J.	0.40	0.55	0.70	1.00	0.40	0.55	0.75	1.10
	B.T.	0.60	0.75	1.00	1.35	0.60	1.80	2.10	2.50
Very bad	S.J.	0.60	0.75	0.90	1.20	0.60	0.75	0.95	1.30
	B.T.	0.90	1.00	1.30	1.65	0.90	1.60	2.40	2.80

Note: Upper lines for light vehicles and lower lines for heavy vehicles.

Remarks: S: Small vehicles J: Jeepney
 B: Buses and T: Trucks

b. Surface type: Gravel

Unit: in Km.

Gradient Class		1	2	3	4	5	6	7	8
Length		≤400				>400			
Gradient %		<3%	3-5%	6-7%	>7%	<3%	3-5%	6-7%	>7%
Condition									
Good	S.J.	0.15	0.30	0.45	0.75	0.15	0.30	0.50	0.85
	B.T.	0.20	0.45	0.65	1.00	0.20	1.00	1.80	2.20
Fair	S.J.	0.30	0.45	0.65	0.90	0.30	0.45	0.65	1.00
	B.T.	0.40	0.70	0.90	1.25	0.40	1.20	2.00	2.40
Bad	S.J.	0.60	0.75	0.90	1.20	0.60	0.75	0.95	1.30
	B.T.	0.90	1.05	1.30	1.60	0.90	1.60	2.40	2.80
Very bad	S.J.	0.90	1.05	1.20	1.50	0.90	1.05	1.25	1.60
	B.T.	1.30	1.45	1.65	2.00	1.30	2.00	2.80	3.20

Note: Upper lines for light vehicles and lower lines for heavy vehicles.

Remarks: S: Small vehicles J: Jeepneys.
 B: Buses and T: Trucks.

4) d_1 Value Classified by Road Side Friction and Level of Service (d_{11})

A Degree of Friction	C' Level of Service	d_1 in Km.	
		S.J. Light Vehicle	B.T. Heavy Vehicle
None	A, B	0.00	0.00
	C, D	0.10	0.20
	E	0.40	0.50
	F, G	0.60	0.70
	H	0.80	0.90
	I	1.00	1.10
Light	A, B	0.00	0.00
	C	0.10	0.20
	D	0.20	0.30
	E	0.40	0.50
	F, G	0.60	0.70
	H	0.80	0.90
Medium	I	1.00	1.10
	A	0.00	0.00
	B	0.10	0.20
	C	0.20	0.30
	D	0.30	0.40
	E	0.50	0.60
	F, G	0.70	0.80
	H	0.90	1.00
	I	1.10	1.20

A Degree of Friction	C' Level of Service	d1 in Km.	
		S.J. Light Vehicle	B.T. Heavy Vehicle
Heavy	A	0.10	0.20
	B	0.20	0.30
	C	0.30	0.40
	D	0.40	0.50
	E	0.60	0.70
	F, G	0.90	1.00
	H	1.10	1.20
	I	1.30	1.40

C' is determined in item (11.2.2.2) of this Note.

Remarks: S: Small vehicles, J: Jeepneys
B: Buses and T: Trucks.

5) d1 Value for A Sharp Curve (d1₃)

R < 25M	S	0.10 per place
	J	0.10 per place
	B	0.20 per place
	Tr	0.20 per place

6) High Speed Penalty (d1₄)

The speed (V_f) under the assigned traffic volume, which was derived through the Q-V relationship formula of Appendix Fig. 6.3-1, was used to find if there was any section on which vehicles would run at a high speed because of less traffic.

If the speed (V_f) is high and lies in the range of the following criteria, an additional value is subsequently added to VOC.

(Velocity KPH)	60 - 69	70 - 79	80 -
V_{Sm}	0.00	0.00	0.10
V_J			
V_B	0.00	0.10	0.20
V_{Tr}			

The above two d1s (d1₃ and d1₄) were incorporated in the computer program. However, there were no road links which indicated any of the said d1 values because the traffic volume was substantially large. There was no section in the road network which had a sharp curve with $R < 25$ M.

7) Major Intersection (dls)

d1 value is assumed for one major intersection as follows:

Sm and J	0.25
B and Tr	0.35

8) Speed Associated with dt Calculation

When the actual link length l is increased by dls, the time consumed on the length of $l + dls$ is to be measured by the normal speed. However, the following is another approach:

If l is divided by V_0 , which is the speed obtained by the result of assigned traffic flow associated with Q-V formula, the travel time on the link of 1 Km. is calculated.

In this study, the aggregate length of the link $l + \sum d1$ is divided by the normal speed to obtain a travel time. The normal speed, V_0 , is assumed to be equal to V_1 or V_2 in Q-V curves as shown in Appendix Fig. 6.3-1. The speed for jeeps, buses and trucks are reduced by 20% in each road link.

9) Passenger Time Value

The time value of passenger was determined as in Appendix Note 11.1. Using this unit value, the average time value for a passenger vehicle was determined as follows:

a. Small Vehicles

It was assumed that owner drivers are 70% and employed drivers are 30%. Using the average passenger occupancy and the percent distribution by trip purposes from the result of the traffic survey (see Chapter 4), the passenger time value per hour per vehicle was calculated as follows:

A small vehicle with owner driver

	Composition	Driver	Others	@	@	Dr.	Ot.
In work	0.29	0.29	0.56	14.50	5.50	4.20	3.08
To/From Work	0.21	0.21	0.42	7.00	2.75	1.54	1.16
Others	0.49	0.49	0.95	-	-	-	-
Total	1.00	1.00	1.93	-	-	5.74	4.26
Total			2.93				10.00

A small vehicle with employed driver

	Composition	Driver	Others	@	@	Dr.	Ot.
In work	0.29	-	0.85	-	5.50	-	4.68
To/From Work	0.21	-	0.64	-	2.75	-	1.76
Others	0.49	-	1.44	-	-	-	-
Total	1.00	-	2.93	-	-	-	6.44

A small vehicle in average

$$10.00 \times 0.7 + 6.44 \times 0.3 = \underline{\text{₱}8.93/\text{H per vehicle}}$$

b. Jeepneys and Buses

The time value per vehicle was calculated as follows:

Jeepney

	Composition	Persons	@	Persons
In work	0.124	1.14	2.75	3.14
To/From Work	0.143	1.31	1.40	1.83
Others	0.733	6.74	-	-
Total	1.000	9.19		4.97

Bus

	Composition	Persons	@	Persons
In work	0.124	3.77	3.13	11.80
To/From Work	0.143	4.34	1.58	6.86
Others	0.733	22.26	-	-
Total	1.000	30.37	-	18.66

Considering the Philippine economy where full employment of resources and labor has not yet been attained though the economy has developed steadily, it should be noted that the saved time in transport system is not always used in other productive activities. In this Study, the above value is halved in the use of economic evaluation.

A small vehicle $8.93 \times 1/2 = \text{₱}4.47$ per hour

A jeepney $4.97 \times 1/2 = 2.49$ per hour

A bus $18.66 \times 1/2 = 9.33$ per hour