

8 . IMPLEMENTATION PROGRAM

8.1 GENERAL

The main purpose of this chapter is to establish the implementation program for the construction of the Project Road taking into account the available financial resources of the Malaysian Government, investment requirements of Highway Projects and investment timing of the Project Road. The implementation program will be established after the following studies:

- a. Comparative analysis between highway funds and investment requirements of highway projects.
- b. Financial cost estimates.
- c. Preparation of implementation schedule.
- d. Annual investment requirements.

Through discussions with the Government of Malaysia, the implementation program for Route IV-F with a 6-lane road for segment 1 and a 4-lane road for other segments is presented below.

8.2 COMPARATIVE ANALYSIS BETWEEN HIGHWAY FUNDS AND INVESTMENT REQUIREMENTS

8.2.1 Forecast of Highway Funds

The comparative analysis between highway funds and investment requirements of the proposed projects was already made in the implementation program of the Phase I Study. This Study, therefore, follows basically the analysis which is made in the Phase I Study.

In order to estimate the future highway funds, the past data is examined. Table 8.1 shows the past trend of expenditures during 1972 to 1978, showing that the growth rate of road expenditure was 14 per cent per annum during 1972. The road expenditure is further subdivided into that of Federal Road expenditure and of State Road expenditure as shown in Table 8.2.

Table 8.1 ROAD EXPENDITURE (1972 - 1975)

Year	Road Expenditure	Federal Road Expenditure	State Road Expenditure
1972	167.4	59.5	107.9
1973	203.9	94.3	109.6
1974	280.1	131.2	148.9
1975	325.9	173.6	152.3
1976*	370.8	—	—
1977*	424.0	—	—
1978*	414.0	—	—

Source: Highway Planning Unit

* Estimated provisionally by HPU.

The amount of road expenditure is largely dependent upon the national revenue which is proportionate to the GDP. Therefore, in this forecast, it is assumed that the road expenditure will grow in proportion to the GDP. As a result, the road expenditure is expected to increase from M\$445.9 million in 1978 to M\$711.5 million in 1985 and to M\$2,149.7 million in the year 2000. The allocation of road expenditure to the Study Area is assumed at 2 percent, 4 percent, 6 percent and 8 percent to total road expenditure. The results are shown in Table 8.2 and 8.3.

Table 8.2 FORECAST OF BUDGET (1981 -- 2000)
(In million M\$ at 1979 prices)

Year	Road Expenditure	Federal Road Expenditure	State Road Expenditure
1979	445.9	252.0	193.9
1985	711.5	602.0	309.5
2000	2,149.7	1,214.6	935.1

Table 8.3 FORECAST OF BUDGET ALLOCATED TO THE STUDY AREA
(In million M\$ at 1979 prices)

Year	Road Expenditure	Allocation to Study Area			
		2%	4%	6%	8%
1981	521.1	10.4	20.8	31.3	42.7
1985	711.5	14.2	28.5	42.7	56.9
1990	1,028.6	20.6	41.1	61.7	82.7
2000	2,149.7	43.0	86.0	129.0	174.0

8.2.2 Investment Requirements for Highway Projects in Penang

The investment requirements for the highway projects including the Project Road were established in the Phase I Study. According to this program, 23 projects for Penang Island and 20 projects for Province Wellesley amounting to M\$608 million were proposed.

The investment requirements of highway projects for the next five years from 1981 to 1985 will be about M\$200 million and those for the following five years from 1986 to 1990 will be about M\$219 million.

Table 8.4 INVESTMENT REQUIREMENTS BY PHASE
(In thousand M\$ at 1979 prices)

Items	Phase 1 (1981-1985)	Phase 2 (1986-1990)	Phase 3 (1991-2000)	Total
Highway Projects	199,525	218,712	189,714	607,951
Intersection Improvements	38,741	19,755	7,030	65,526
Others	7,718	679	172	8,569
Total	245,984	239,146	196,916	682,046

- Notes: 1) The construction cost includes the detailed engineering and construction supervision.
2) The cost of the Project Road is included in Phase 1 and 2.

8.2.3 Comparison between Funds and Expenditure

If an average of about 3% of the total budget of Malaysia during 1981 to the year 2000 is allocated to the Study Area of the Phase I Study, it seems possible to complete all the projects proposed in the Phase I Study. However, it is necessary to implement some projects in a later phase.

Table 8.5 COMPARISON BETWEEN FUNDS AND EXPENDITURE
(In million M\$ at 1979 prices)

Phase	Investment Requirements	Highway Funds
Phase 1 1981 - 1985	246.0	91.7
Phase 2 1986 - 1990	239.1	133.7
Phase 3 1991 - 2000	196.9	472.8
Total	682.0	698.2

8.3 IMPLEMENTATION SCHEDULE

To establish the implementation program of the Project, the results of the project evaluation and the available financial resource allocated for the Project Road should be taken into account. The results of the comparative analysis between highway funds and investment requirements of the proposed projects show that a large amount of funds is expected to be required for the 10 years (1981-1990). Considering those conditions, the Project Road should be implemented in stages and over a longer period than the period from 1982 to 1987 which was employed in the economic analysis.

On the other hand, the results of the project evaluation show the following:

- a. Staging of the acquisition for Right-of-Way and construction with a 2-lane road to be constructed initially but further widening with an additional 2-lane or 4-lane is not included in the schedule due to the difficulties in implementation.
- b. Staging of the construction of road section should be incorporated into the stage construction plan taking into account the priority section discussed in the previous section.

Considering the results of the above mentioned, the following stage construction plan is recommended:

Phase 1 : Southern Section (Section 1) of the Project Road. (Jalan Prai – Toll Expressway interchange to the intersection at the approach road of the North Butterworth Container Wharf).

Phase 2 : Northern Section (Section 2) of the Project Road. (From the intersection at the approach road of the North Butterworth Container Wharf to Jalan Sungai Dua – Toll Expressway interchange).

Based on the stage construction plan, the implementation schedule for the two phases as shown in Fig. 8.1, is recommended.

In order to construct the Section 1 of the Project Road by the end of 1987, the detailed engineering for the Project Road should be implemented immediately.

8.4 INVESTMENT REQUIREMENTS

Based on the implementation schedule, the investment requirements for the Project Road are estimated for land acquisition, compensation and construction of road and structures. They are divided into foreign and local currency and presented in 1981 prices. The annual investment requirements of the Project Road are shown in Table 8.7 and these by Phase are shown in Table 8.8 and 8.9 respectively.

Fig. 8.1 RECOMMENDED IMPLEMENTATION SCHEDULE

Items \ Year		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Detailed Engineering		[Horizontal bar from 1982 to 1983]									
Phase 1	Land Acquisition	[Horizontal bar from 1984 to 1985]									
	Road Construction	[Horizontal bar from 1985 to 1987]									
	Construction of Prai River Bridge	[Horizontal bar from 1984 to 1987]									
	Construction of Fly-over Bridges	[Horizontal bar from 1985 to 1987]									
Phase 2	Land Acquisition	[Horizontal bar from 1986 to 1987]									
	Road Construction	[Horizontal bar from 1988 to 1990]									
	Construction of Fly-over Bridges	[Horizontal bar from 1989 to 1990]									

Table 8.6 PROJECT COST
(In thousand M\$ at 1981 Prices)

Items	Foreign	Local	Total
Detailed Engineering and Construction Supervision	4,192	4,254	8,446
Phase 1			
Land Acquisition	0	12,198	12,198
Road Construction	5,148	5,897	11,045
Structure Construction	21,561	19,371	40,932
Total	26,709	37,466	64,175
Phase 2			
Land Acquisition	0	4,792	4,792
Road Construction	11,656	13,881	25,537
Structure Construction	3,550	3,393	6,943
Total	15,206	22,066	37,272
Total			
Land Acquisition	0	16,990	16,990
Road Construction	16,804	19,778	36,582
Structure Construction	25,111	22,764	47,875
Total	41,915	59,532	101,447
Grand Total	46,107	63,786	109,893

Note: Tax is included in Local Currency

Table 8.7 ANNUAL INVESTMENT REQUIREMENTS FOR PHASE 1 AND 2
(In thousand M\$ at 1981 Price)

Construction Year	Land Acquisition Local	Road Construction			Structure Construction			Total		
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
1982		528	528	1,056				528	528	1,056
1983		1,584	1,584	3,168				1,584	1,584	3,168
1984	9,148				3,224	2,838	6,062	3,224	11,988	15,210
1985	3,050	1,082	1,238	2,320	4,522	4,063	8,585	5,604	8,351	13,955
1986	2,396	1,621	1,857	3,478	7,434	6,710	14,144	9,055	10,963	20,018
1987	2,396	2,703	3,096	5,799	6,135	5,484	11,619	8,838	10,976	19,814
1988		4,895	5,830	10,725	1,263	1,202	2,465	6,158	7,032	13,190
1989		3,672	4,373	8,045	2,525	2,404	4,929	6,197	6,777	12,974
1990		3,672	4,372	8,044	1,262	1,202	2,464	4,934	5,574	10,508

Notes: a. The Construction includes the detailed engineering and construction supervision
b. Tax is included in the "Local Currency".

Table 8.8 ANNUAL INVESTMENT REQUIREMENTS FOR PHASE 1
(In Thousand M\$ at 1981 Prices)

Construction Year	Land Acquisition Local	Road Construction			Structure Construction			Total		
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
1984	9,148				3,071	2,703	5,774	3,071	11,851	14,922
1985	3,050	1,030	1,179	2,209	4,307	3,870	8,170	5,337	8,099	13,429
1986		1,544	1,769	3,313	7,080	6,390	13,470	8,624	8,159	16,783
1987		2,574	2,949	5,523	5,843	5,222	11,065	8,417	8,171	16,588

Notes: a. Excluding the detailed engineering and construction supervision
b. Tax is included in the "Local Currency".

Table 8.9 ANNUAL INVESTMENT REQUIREMENTS FOR PHASE 2
(In Thousand M\$ at 1981 Prices)

Construction Year	Land Acquisition Local	Road Construction			Structure Construction			Total		
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
1986	2,396							0	2,396	2,396
1987	2,396							0	2,396	2,396
1988	0	4,662	5,552	10,214	1,203	1,145	2,348	5,865	6,697	12,562
1989		3,497	4,165	7,662	2,405	2,289	4,694	5,902	6,454	12,356
1990		3,496	4,164	7,660	1,202	1,145	2,347	4,698	5,309	10,007

Notes: a. Excluding the detailed engineering and construction supervision.
b. Tax is included in the "Local Currency".



APPENDICES



APPENDIX-A BENEFIT-COST STREAM

1. APPENDIX-A

A-1 BENEFIT-COST STREAM

Alternative Route I with Full Service Interchange, High-Level Bridge and Plan I.

Discount Rate = 0.120
 B/C Ratio = 1.401
 N. P. W. = 23097.
 I. R. R. = 0.155

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	1182	0	1055	0
3 1983	1182	0	942	0
4 1984	21173	0	15071	0
5 1985	32401	0	20591	0
6 1986	14885	0	8446	0
7 1987	18799	0	9524	0
8 1988	500	11150	226	5044
9 1989	500	12248	202	4947
10 1990	500	13455	180	4852
11 1991	500	14781	161	4759
12 1992	500	16237	144	4668
13 1993	500	17836	128	4578
14 1994	500	19593	115	4490
15 1995	500	21524	102	4404
16 1996	500	23644	91	4320
17 1997	500	25973	82	4237
18 1998	500	28532	73	4156
19 1999	500	31343	65	4076
20 2000	500	31343	58	3639
21 2001	500	31343	52	3249
22 2002	500	31343	46	2901
23 2003	500	31343	41	2590
24 2004	500	31343	37	2313
25 2005	500	31343	33	2065
26 2006	500	31343	29	1844
27 2007	500	31343	26	1646
28 2008	500	31343	23	1470
29 2009	500	31343	21	1312
30 2010	500	31343	19	1172
31 2011	500	31343	17	1046
32 2012	500	31343	15	934

* TOTAL *

Undiscounted Cost = 102122
 Undiscounted Benefit = 643775
 Discounted Cost = 57615
 Discounted Benefit = 80712

A-2 BENEFIT-COST STREAM

Alternative Route II with Full Service Interchange, High-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.384
 N. P. W. = 23290.
 I. R. R. = 0.154

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	1381	0	1233	0
3 1983	1381	0	1101	0
4 1984	19637	0	13977	0
5 1985	33006	0	20976	0
6 1986	17401	0	9874	0
7 1987	22710	0	11506	0
8 1988	502	11219	227	5075
9 1989	502	12381	203	5000
10 1990	502	13664	181	4927
11 1991	502	15080	162	4855
12 1992	502	16643	144	4784
13 1993	502	18367	129	4714
14 1994	502	20270	115	4645
15 1995	502	22371	103	4578
16 1996	502	24689	92	4511
17 1997	502	27247	82	4445
18 1998	502	30071	73	4380
19 1999	502	33187	65	4316
20 2000	502	33187	58	3853
21 2001	502	33187	52	3440
22 2002	502	33187	46	3072
23 2003	502	33187	41	2743
24 2004	502	33187	37	2449
25 2005	502	33187	33	2186
26 2006	502	33187	30	1952
27 2007	502	33187	26	1743
28 2008	502	33187	24	1556
29 2009	502	33187	21	1390
30 2010	502	33187	19	1241
31 2011	502	33187	17	1108
32 2012	502	33187	15	989

*** TOTAL ***

Undiscounted Cost = 108066
 Undiscounted Benefit = 676620
 Discounted Cost = 60662
 Discounted Benefit = 83952

A-3 BENEFIT-COST STREAM

Alternative Route III with Full Service Interchange, High-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.704
 N. P. W. = 51578.
 I. R. R. = 0.175

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	1801	0	1608	0
3 1983	1801	0	1436	0
4 1984	23394	0	16651	0
5 1985	39868	0	25337	0
6 1986	22688	0	12874	0
7 1987	26733	0	13544	0
8 1988	466	15722	211	7112
9 1989	466	17341	188	7004
10 1990	466	19126	168	6897
11 1991	466	21095	150	6792
12 1992	466	23266	134	6688
13 1993	466	25662	120	6587
14 1994	466	28303	107	6486
15 1995	466	31217	95	6388
16 1996	466	34430	85	6290
17 1997	466	37975	76	6195
18 1998	466	41884	68	6100
19 1999	466	46195	61	6007
20 2000	466	50951	54	5916
21 2001	466	56196	48	5826
22 2002	466	56196	43	5722
23 2003	466	56196	39	4644
24 2004	466	56196	34	4147
25 2005	466	56196	31	3702
26 2006	466	56196	27	3306
27 2007	466	56196	24	2951
28 2008	466	56196	22	2635
29 2009	466	56196	20	2353
30 2010	466	56196	17	2101
31 2011	466	56196	16	1876
32 2012	466	56196	14	1675

* TOTAL *

Undiscounted Cost	=	127935
Undiscounted Benefit	=	1067519
Discounted Cost	=	73302
Discounted Benefit	=	124880

A-4 BENEFIT-COST STREAM

Alternative Route IV with Full Service Interchange, High-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.694
 N. P. W. = 52992.
 I. R. R. = 0.174

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	2001	0	1787	0
3 1983	2001	0	1595	0
4 1984	21857	0	15557	0
5 1985	40474	0	25722	0
6 1986	25205	0	14302	0
7 1987	30644	0	15525	0
8 1988	468	15770	212	7134
9 1989	468	17461	189	7052
10 1990	468	19335	169	6972
11 1991	468	21410	151	6893
12 1992	468	23707	135	6815
13 1993	468	26250	120	6738
14 1994	468	29067	107	6661
15 1995	468	32185	96	6586
16 1996	468	35639	86	6511
17 1997	468	39462	76	6437
18 1998	468	43696	68	6364
19 1999	468	48385	61	6292
20 2000	468	53576	54	6221
21 2001	468	59324	49	6150
22 2002	468	59324	43	5491
23 2003	468	59324	39	4903
24 2004	468	59324	35	4377
25 2005	468	59324	31	3908
26 2006	468	59324	28	3490
27 2007	468	59324	25	3116
28 2008	468	59324	22	2782
29 2009	468	59324	20	2484
30 2010	468	59324	17	2218
31 2011	468	59324	16	1980
32 2012	468	59324	14	1768

* TOTAL *

Undiscounted Cost = 133882
 Undiscounted Benefit = 1117831
 Discounted Cost = 76351
 Discounted Benefit = 129343

A-5 BENEFIT-COST STREAM

Alternative Route V with Full Service Interchange, High-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.606
 N. P. W. = 47007.
 I. R. R. = 0.168

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	2031	0	1813	0
3 1983	2031	0	1619	0
4 1984	23171	0	16493	0
5 1985	41514	0	26383	0
6 1986	25583	0	14517	0
7 1987	29446	0	14918	0
8 1988	472	15842	214	7166
9 1989	472	17452	191	7049
10 1990	472	19226	170	6933
11 1991	472	21180	152	6819
12 1992	472	23333	136	6708
13 1993	472	25704	121	6598
14 1994	472	28317	108	6490
15 1995	472	31195	97	6383
16 1996	472	34365	86	6278
17 1997	472	37858	77	6175
18 1998	472	41706	69	6074
19 1999	472	45945	61	5975
20 2000	472	50615	55	5877
21 2001	472	55759	49	5780
22 2002	472	55759	44	5161
23 2003	472	55759	39	4608
24 2004	472	55759	35	4114
25 2005	472	55759	31	3674
26 2006	472	55759	28	3280
27 2007	472	55759	25	2929
28 2008	472	55759	22	2615
29 2009	472	55759	20	2335
30 2010	472	55759	18	2084
31 2011	472	55759	16	1861
32 2012	472	55759	14	1662

*** TOTAL ***

Undiscounted Cost	=	135576
Undiscounted Benefit	=	1061846
Discounted Cost	=	77621
Discounted Benefit	=	124628

A-3 BENEFIT-COST STREAM

Alternative Route VI with Full Service Interchange, High-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.539
 N. P. W. = 43465.
 I. R. R. = 0.164 Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	2230	0	1991	0
3 1983	2230	0	1778	0
4 1984	21635	0	15399	0
5 1985	42121	0	26769	0
6 1986	28099	0	15944	0
7 1987	33357	0	16900	0
8 1988	474	15597	214	7055
9 1989	474	17276	191	6978
10 1990	474	19135	171	6900
11 1991	474	21195	153	6824
12 1992	474	23476	136	6749
13 1993	474	26002	122	6674
14 1994	474	28801	109	6600
15 1995	474	31901	97	6528
16 1996	474	35335	87	6456
17 1997	474	39138	77	6384
18 1998	474	43350	69	6314
19 1999	474	48016	62	6244
20 2000	474	53184	55	6175
21 2001	474	53184	49	6113
22 2002	474	53184	44	6053
23 2003	474	53184	39	5995
24 2004	474	53184	35	5939
25 2005	474	53184	31	5884
26 2006	474	53184	28	5830
27 2007	474	53184	25	5777
28 2008	474	53184	22	5725
29 2009	474	53184	20	5674
30 2010	474	53184	18	5624
31 2011	474	53184	16	5575
32 2012	474	53184	14	5527

* TOTAL *

Undiscounted Cost	=	141522
Undiscounted Benefit	=	1040614
Discounted Cost	=	80665
Discounted Benefit	=	124130

A-7 BENEFIT-COST STREAM

Alternative Route III with Full Service Interchange, High-Level Bridge and Plan 2.

Discount Rate = 0.120
 B/C Ratio = 1.672
 N.P.W. = 56722.
 I.R.R. = 0.168

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	2113	0	1887	0
3 1983	2113	0	1684	0
4 1984	26741	0	19034	0
5 1985	45886	0	29161	0
6 1986	26614	0	15102	0
7 1987	30822	0	15615	0
8 1988	492	15623	223	7067
9 1989	492	17286	199	6982
10 1990	492	19126	177	6897
11 1991	492	21162	158	6814
12 1992	492	23415	141	6731
13 1993	492	25907	126	6650
14 1994	492	28665	113	6569
15 1995	492	31717	101	6490
16 1996	492	35093	90	6411
17 1997	492	38829	80	6334
18 1998	492	42962	72	6257
19 1999	492	47536	64	6182
20 2000	492	52596	57	6107
21 2001	492	58195	51	6033
22 2002	492	64390	46	5960
23 2003	492	71244	41	5888
24 2004	492	78828	36	5817
25 2005	492	87220	32	5746
26 2006	492	87220	29	5131
27 2007	492	87220	26	4581
28 2008	492	87220	23	4090
29 2009	492	87220	21	3652
30 2010	492	87220	18	3261
31 2011	492	87220	16	2911
32 2012	492	87220	15	2599

' TOTAL '

Undiscounted Cost	=	146589
Undiscounted Benefit	=	1370334
Discounted Cost	=	64438
Discounted Benefit	=	141160

A-8 BENEFIT-COST STREAM

Alternative Route IV with Full Service Interchange, High-Level Bridge and Plan 2.

Discount Rate = 0.120
 B/C Ratio = 1.683
 N. P. W. = 59735.
 I. R. R. = 0.169

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	2312	0	2064	0
3 1983	2312	0	1843	0
4 1984	25206	0	17941	0
5 1985	46494	0	29548	0
6 1986	29131	0	16530	0
7 1987	34734	0	17597	0
8 1988	494	15669	223	7088
9 1989	494	17406	200	7030
10 1990	494	19335	178	6972
11 1991	494	21478	159	6915
12 1992	494	23859	142	6859
13 1993	494	26503	127	6803
14 1994	494	29441	113	6747
15 1995	494	32704	101	6692
16 1996	494	36329	90	6637
17 1997	494	40356	81	6583
18 1998	494	44829	72	6529
19 1999	494	49797	64	6476
20 2000	494	55317	57	6423
21 2001	494	61448	51	6370
22 2002	494	68259	46	6318
23 2003	494	75825	41	6266
24 2004	494	84229	36	6215
25 2005	494	93565	33	6164
26 2006	494	93565	29	5504
27 2007	494	93565	26	4914
28 2008	494	93565	23	4388
29 2009	494	93565	21	3918
30 2010	494	93565	18	3498
31 2011	494	93565	16	3123
32 2012	494	93565	15	2788
* TOTAL *				
Undiscounted Cost	=		152539	
Undiscounted Benefit	=		1451304	
Discounted Cost	=		87485	
Discounted Benefit	=		147220	

A-9 BENEFIT-COST STREAM

Alternative Route III with Full Service Interchange, Medium-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.626
 N. P. W. = 48060.
 I. R. R. = 0.169

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	1519	0	1356	0
3 1983	1519	0	1211	0
4 1984	30493	0	21704	0
5 1985	44483	0	28270	0
6 1986	19133	0	10857	0
7 1987	22838	0	11570	0
8 1988	466	15722	211	7112
9 1989	466	17341	188	7004
10 1990	466	19126	168	6897
11 1991	466	21099	150	6792
12 1992	466	23266	134	6688
13 1993	466	25662	120	6587
14 1994	466	28303	107	6486
15 1995	466	31217	95	6388
16 1996	466	34430	85	6290
17 1997	466	37975	76	6195
18 1998	466	41884	68	6100
19 1999	466	46195	61	6007
20 2000	466	50951	54	5916
21 2001	466	56196	48	5826
22 2002	466	56196	43	5720
23 2003	466	56196	39	4644
24 2004	466	56196	34	4147
25 2005	466	56196	31	3702
26 2006	466	56196	27	3306
27 2007	466	56196	24	2951
28 2008	466	56196	22	2635
29 2009	466	56196	20	2353
30 2010	466	56196	17	2101
31 2011	466	56196	16	1876
32 2012	466	56196	14	1675

* TOTAL *

Undiscounted Cost	=	131635
Undiscounted Benefit	=	1067519
Discounted Cost	=	76820
Discounted Benefit	=	124880

A-10 BENEFIT-COST STREAM

Alternative Route IV with Full Service Interchange, Medium-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.619
 N. P. W. = 49474.
 I. R. R. = 0.168

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	1718	0	1534	0
3 1983	1718	0	1370	0
4 1984	28957	0	20611	0
5 1985	45089	0	28655	0
6 1986	21649	0	12284	0
7 1987	26749	0	13552	0
8 1988	468	15770	212	7134
9 1989	468	17461	189	7052
10 1990	468	19335	169	6972
11 1991	468	21410	151	6893
12 1992	468	23707	135	6815
13 1993	468	26250	120	6738
14 1994	468	29067	107	6661
15 1995	468	32185	96	6586
16 1996	468	35639	86	6511
17 1997	468	39462	76	6437
18 1998	468	43696	68	6364
19 1999	468	48385	61	6292
20 2000	468	53576	54	6221
21 2001	468	59324	49	6150
22 2002	468	59324	43	5491
23 2003	468	59324	39	4903
24 2004	468	59324	35	4377
25 2005	468	59324	31	3908
26 2006	468	59324	28	3490
27 2007	468	59324	25	3116
28 2008	468	59324	22	2782
29 2009	468	59324	20	2484
30 2010	468	59324	17	2218
31 2011	468	59324	16	1980
32 2012	468	59324	14	1768

TOTAL

Undiscounted Cost = 137580
 Undiscounted Benefit = 1117831
 Discounted Cost = 79869
 Discounted Benefit = 129343

A-11 BENEFIT-COST STREAM

Alternative Route III with Partial Service Interchange, High-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.504
 N. P. W. = 36424.
 I. R. R. = 0.162

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	1784	0	1593	0
3 1983	1784	0	1422	0
4 1984	23338	0	16612	0
5 1985	39639	0	25191	0
6 1986	22481	0	12756	0
7 1987	26421	0	13386	0
8 1988	329	14691	149	6645
9 1989	329	16061	133	6487
10 1990	329	17558	119	6332
11 1991	329	19195	106	6180
12 1992	329	20985	95	6033
13 1993	329	22941	84	5888
14 1994	329	25080	75	5748
15 1995	329	27418	67	5610
16 1996	329	29975	60	5476
17 1997	329	32769	54	5345
18 1998	329	35824	48	5218
19 1999	329	39164	43	5093
20 2000	329	42816	38	4971
21 2001	329	46808	34	4852
22 2002	329	46808	30	4333
23 2003	329	46808	27	3868
24 2004	329	46808	24	3454
25 2005	329	46808	22	3084
26 2006	329	46808	19	2753
27 2007	329	46808	17	2458
28 2008	329	46808	15	2195
29 2009	329	46808	14	1960
30 2010	329	46808	12	1750
31 2011	329	46808	11	1562
32 2012	329	46808	10	1395
* TOTAL *				
Undiscounted Cost	=		123672	
Undiscounted Benefit	=		906173	
Discounted Cost	=		72266	
Discounted Benefit	=		108690	

A-12 BENEFIT-COST STREAM

Alternative Route IV with Partial Service Interchange, High-Level Bridge and Plan 1.

Discount Rate = 0.120
 B/C Ratio = 1.494
 N. P. W. = 37235.
 I. R. R. = 0.161

Unit : 1000 M\$

Year	Undiscounted		Discounted	
	Cost	Benefit	Cost	Benefit
1 1981	0	0	0	0
2 1982	1984	0	1771	0
3 1983	1984	0	1582	0
4 1984	21801	0	15518	0
5 1985	40245	0	25576	0
6 1986	24997	0	14184	0
7 1987	30332	0	15367	0
8 1988	331	14740	150	6668
9 1989	331	16179	134	6534
10 1990	331	17757	119	6403
11 1991	331	19489	107	6275
12 1992	331	21391	95	6149
13 1993	331	23478	85	6026
14 1994	331	25768	76	5905
15 1995	331	28283	68	5787
16 1996	331	31042	60	5671
17 1997	331	34070	54	5558
18 1998	331	37394	48	5446
19 1999	331	41043	43	5337
20 2000	331	45047	38	5230
21 2001	331	49442	34	5126
22 2002	331	49442	31	4576
23 2003	331	49442	27	4086
24 2004	331	49442	24	3648
25 2005	331	49442	22	3257
26 2006	331	49442	19	2908
27 2007	331	49442	17	2597
28 2008	331	49442	16	2319
29 2009	331	49442	14	2070
30 2010	331	49442	12	1848
31 2011	331	49442	11	1650
32 2012	331	49442	10	1473

*** TOTAL ***

Undiscounted Cost	=	129618
Undiscounted Benefit	=	948985
Discounted Cost	=	75312
Discounted Benefit	=	112547

APPENDIX-B O-D TRAFFIC VOLUME

Table B.1 OD TRAFFIC VOLUME IN 1979

O \ D	Study Area								External Area				Total
	1	2	3	4	5	6	7	8	9	10	11	12	
1	13858	16314	3299	5328	4047	4105	5795	1891	5461	2015	3471	4380	69364
2	0	6122	866	1448	3195	2434	2177	1122	2795	1192	1243	2020	24614
3	0	0	910	1650	156	305	1433	265	1417	636	964	2264	10020
4	0	0	0	1005	408	792	4426	419	121	56	112	101	7500
5	0	0	0	0	1868	833	558	304	1970	494	124	656	7807
6	0	0	0	0	0	3712	6345	293	1149	1836	785	847	14967
7	0	0	0	0	0	0	39417	478	2634	5551	6762	2320	57462
8	0	0	0	0	0	0	0	0	528	182	326	308	1404
9	0	0	0	0	0	0	0	0	0	436	1400	3119	4955
10	0	0	0	0	0	0	0	0	0	20	211	642	873
11	0	0	0	0	0	0	0	0	0	0	23	2757	2780
12	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	13858	22436	5075	9431	10674	12181	60211	4792	16075	12718	15481	19414	202346

Table B.2 OD TRAFFIC VOLUME IN 1985

O \ D	Study Area								External Area				Total
	1	2	3	4	5	6	7	8	9	10	11	12	
1	31243	14769	6600	5989	3197	3509	10432	2608	5848	3338	4705	6606	98844
2	0	12225	4268	3212	4322	2851	6744	1280	4716	2445	3069	2377	47509
3	0	0	4180	4253	1275	2810	6977	927	3650	1991	2635	3195	31893
4	0	0	0	1731	929	1844	6131	1052	2335	1440	2100	3146	20708
5	0	0	0	0	2390	871	2213	313	2095	981	1151	519	10533
6	0	0	0	0	0	4467	6188	367	2384	1688	1745	556	17395
7	0	0	0	0	0	0	53770	1406	6797	6208	7467	3896	79544
8	0	0	0	0	0	0	0	0	713	400	619	319	2051
9	0	0	0	0	0	0	0	0	0	349	1047	4685	6081
10	0	0	0	0	0	0	0	0	0	167	837	2012	3066
11	0	0	0	0	0	0	0	0	0	0	186	4108	4294
12	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	31243	26994	15048	15185	12113	16352	92455	7953	28538	19007	25611	31419	321918

Table B.3 OD TRAFFIC VOLUME IN 1990

D 0	Study Area								External Area				
1	32153	15747	7941	7179	3090	3240	10666	2674	6119	3589	4607	9020	106025
2	0	12493	5334	4030	4088	2783	7249	1186	5042	2678	3037	3373	51293
3	0	0	5135	5449	1340	2801	7786	866	4130	2308	2804	3741	36359
4	0	0	0	2937	1145	2147	7863	1097	3084	1932	2592	3351	26148
5	0	0	0	0	2185	791	2312	304	2137	1030	1113	896	10772
6	0	0	0	0	0	3707	5930	323	2323	1665	1605	1287	16840
7	0	0	0	0	0	0	59100	1377	7306	6781	9451	5151	69166
8	0	0	0	0	0	0	0	29	828	460	651	963	2931
9	0	0	0	0	0	0	0	0	0	409	1090	6355	7854
10	0	0	0	0	0	0	0	0	0	190	936	2329	3455
11	0	0	0	0	0	0	0	0	0	0	217	5173	5390
12	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	32153	28240	18410	19595	11852	15469	100906	7855	30969	21042	28103	41639	356233

Table B.4 OD TRAFFIC VOLUME IN 2000

D 0	Study Area								External Area				Total
	1	2	3	4	5	6	7	8	9	10	11	12	
1	43357	22110	13029	13531	3778	3678	17270	5053	9313	5435	7015	14936	158505
2	0	18557	9736	8239	5100	3626	13003	2264	8455	4372	4912	5905	84179
3	0	0	9406	11836	1899	3564	14391	1758	7385	4074	5026	7328	66666
4	0	0	0	7897	1910	3377	17359	2696	6501	4019	5441	7693	56898
5	0	0	0	0	2369	785	3275	620	2820	1346	1478	1332	13925
6	0	0	0	0	0	3270	7556	493	2831	1981	1959	1733	19828
7	0	0	0	0	0	0	91532	3019	12640	11437	16232	9770	144630
8	0	0	0	0	0	0	0	76	76	1671	928	1320	6112
9	0	0	0	0	0	0	0	0	0	671	1794	11102	13567
10	0	0	0	0	0	0	0	0	0	304	1514	3815	5633
11	0	0	0	0	0	0	0	0	0	0	319	8866	9185
12	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	43357	40667	32171	41503	15056	18298	164386	15884	51626	34567	47010	74602	579127

APPENDIX-C TRAFFIC VOLUME ON ALTERNATIVE ROUTE

URBAN TRANSPORT STUDY

IN

GEORGETOWN, BUTTERWORTH AND DATARAN

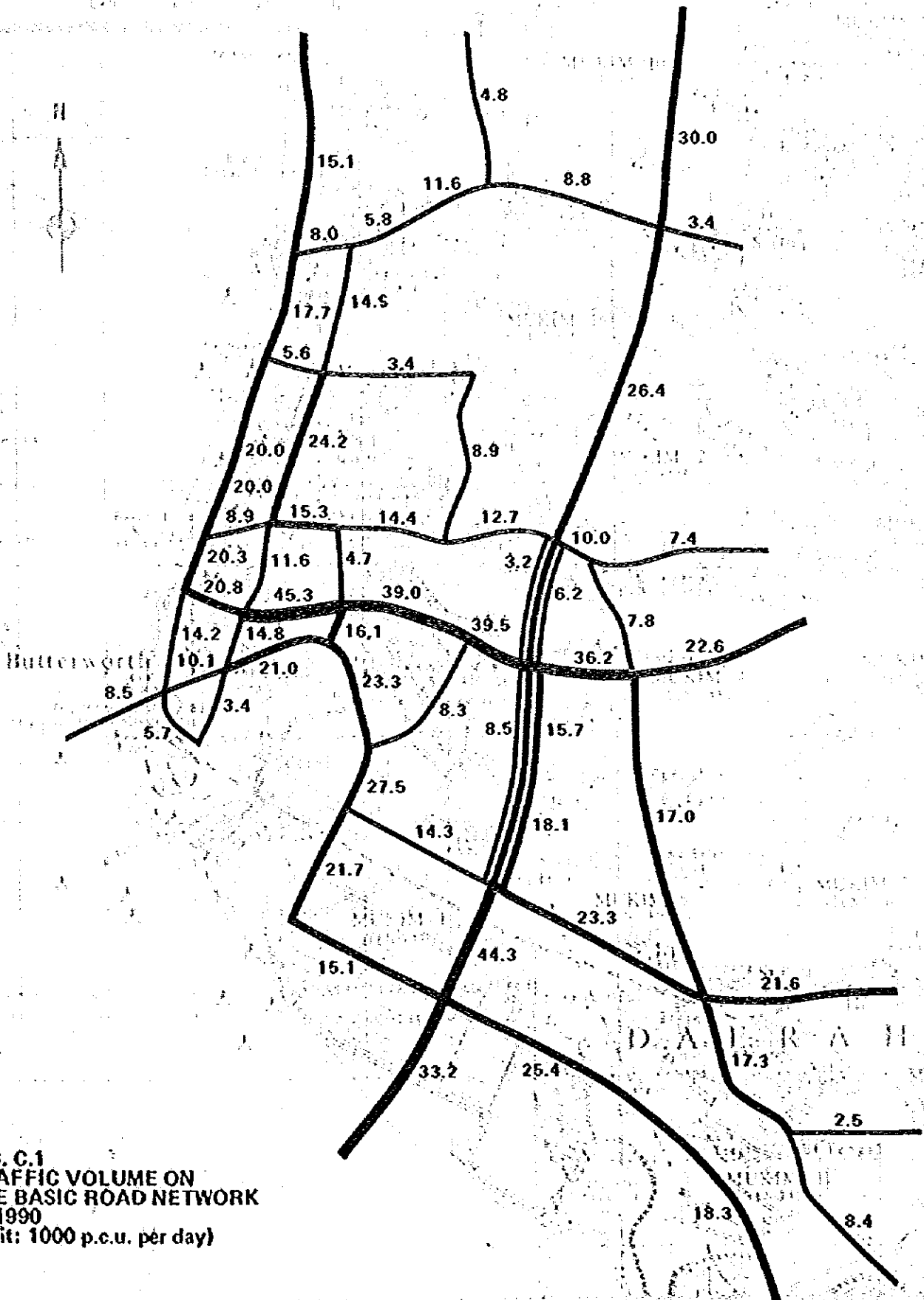
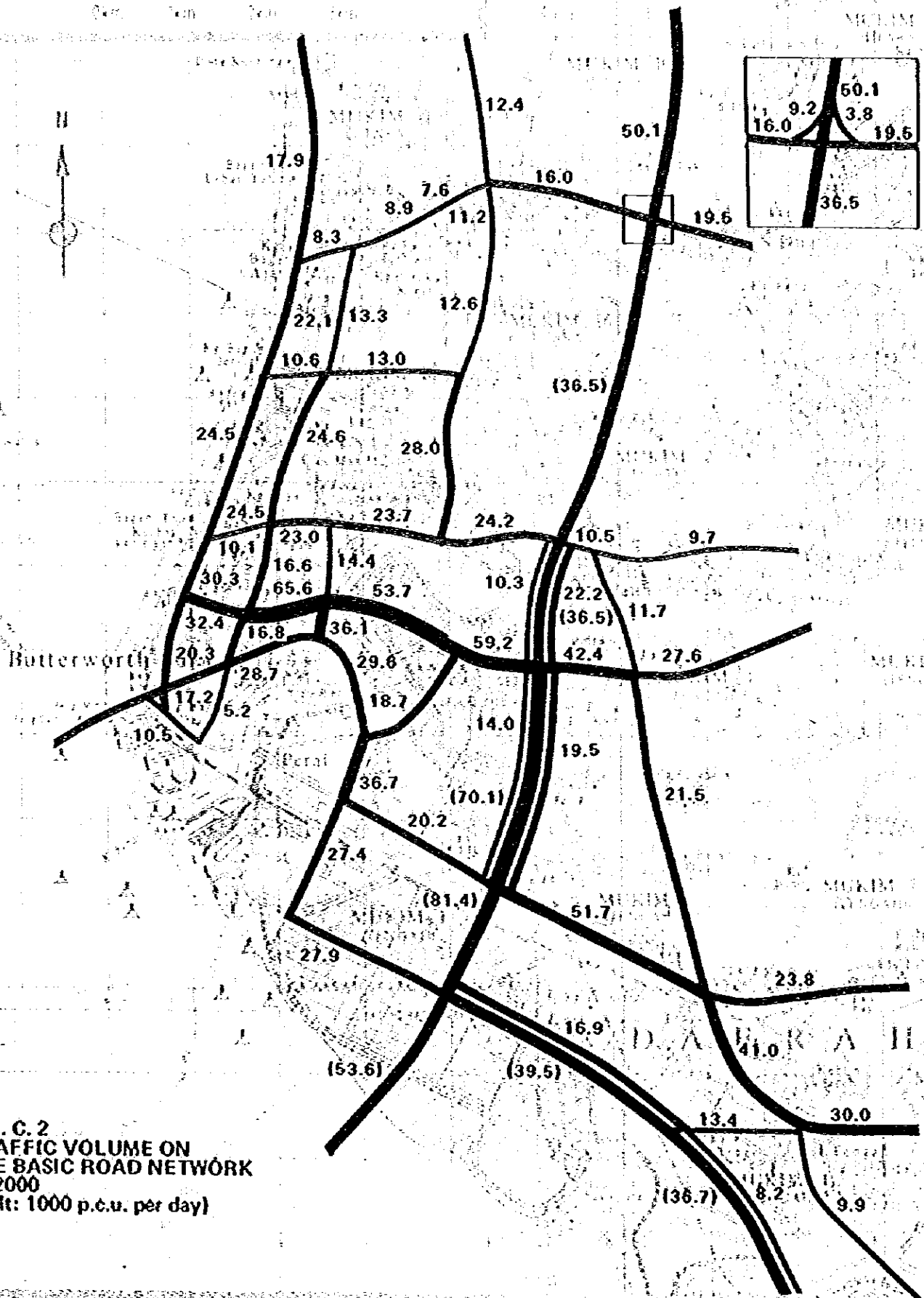


FIG. C.1
TRAFFIC VOLUME ON
THE BASIC ROAD NETWORK
IN 1990
(Unit: 1000 p.c.u. per day)

URBAN TRANSPORT STUDY IN GEORGETOWN, BUTTERWORTH & BUKIT MERGASAM

SCALE

0 100 200 300 400
Meters



**FIG. C. 2
TRAFFIC VOLUME ON
THE BASIC ROAD NETWORK
IN 2000
(Unit: 1000 p.c.u. per day)**

URBAN TRANSPORT STUDY
 IN
 GEORGETOWN, BUTTERWORTH & PENANG

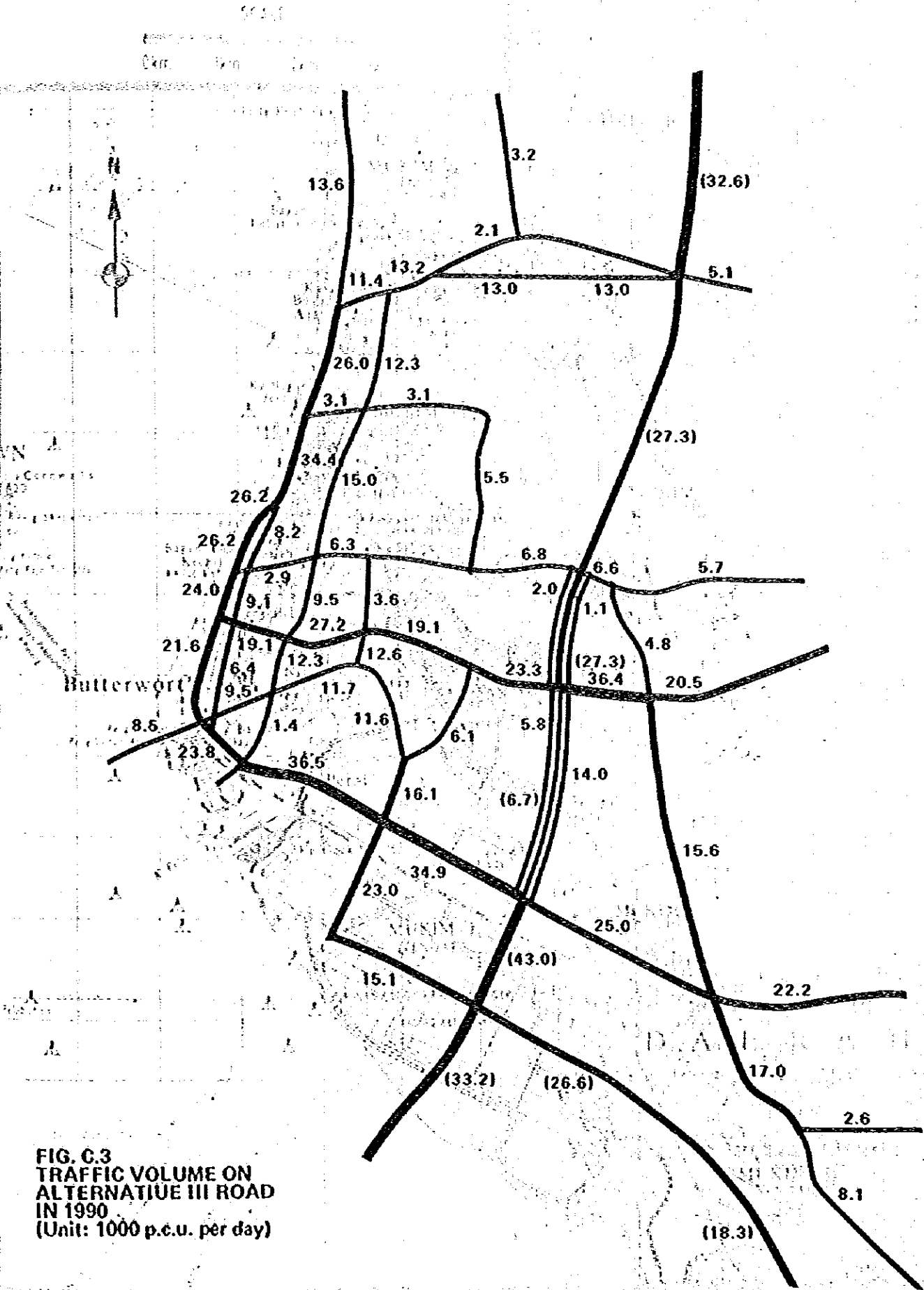


FIG. C.3
 TRAFFIC VOLUME ON
 ALTERNATIVE III ROAD
 IN 1990
 (Unit: 1000 p.c.u. per day)

URBAN TRANSPORT STUDY
 IN
 GEORGETOWN, BUTTERWORTH & DURET MALAYSIAN
 PENINSULA

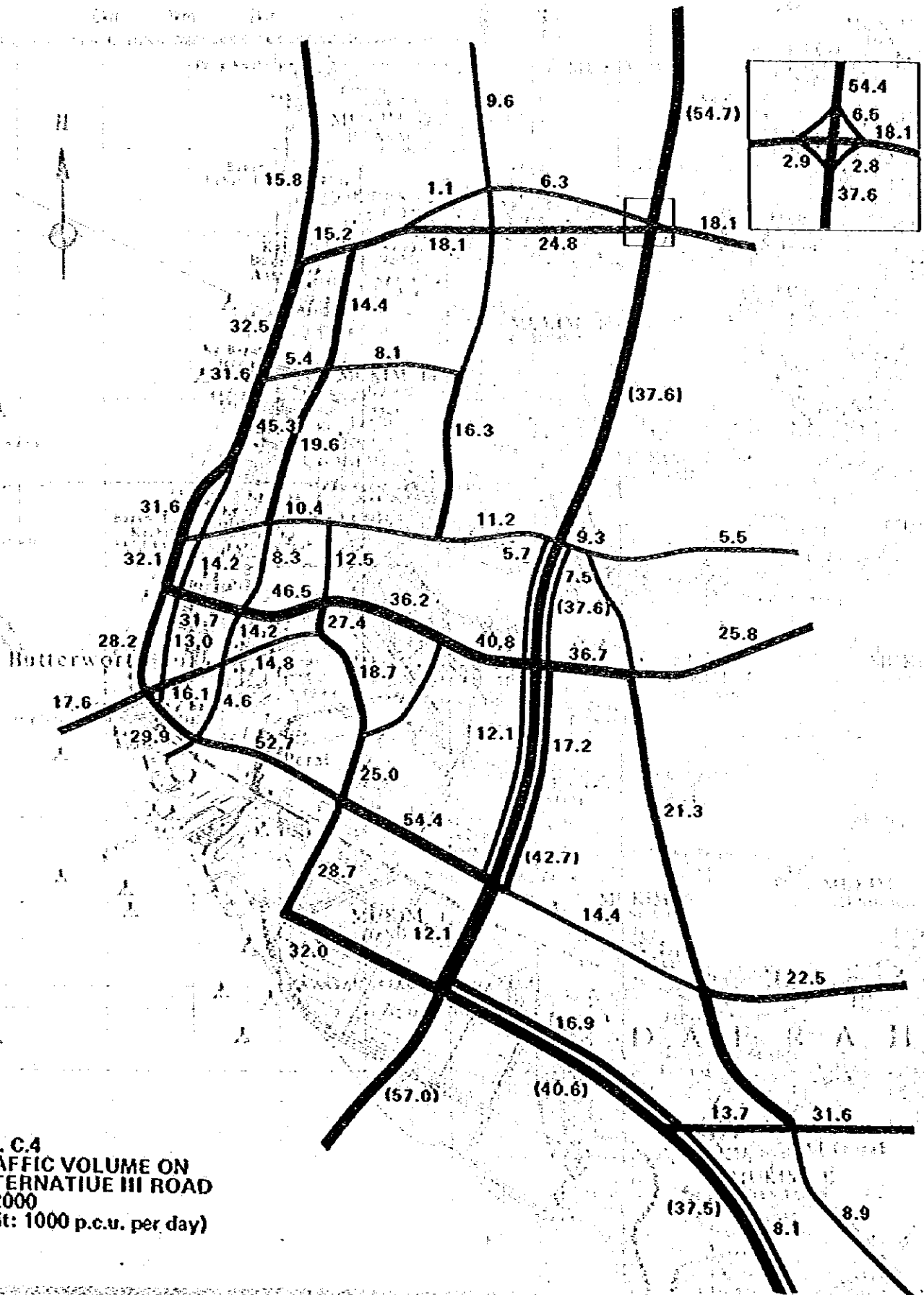
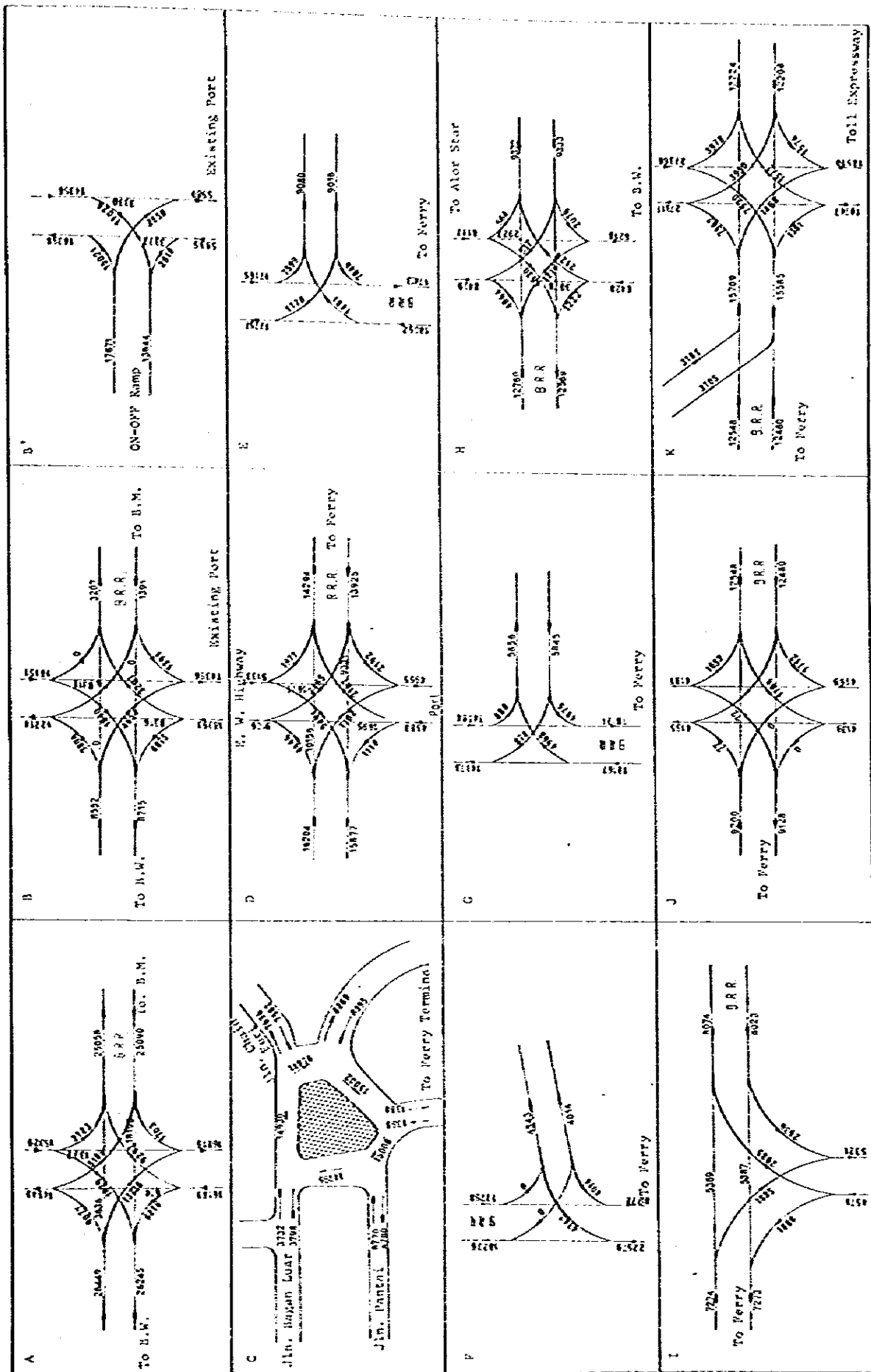


FIG. C.4
 TRAFFIC VOLUME ON
 ALTERNATIVE III ROAD
 IN 2000
 (Unit: 1000 p.c.u. per day)

TURNING MOVEMENT TRAFFIC FLOW BY EACH INTERSECTION

(p.c.u. per day in year 2070)



**APPENDIX-D ROUGH CONSTRUCTION COST OF THE ROAD 600^m (2000 feet)
FROM THE EXISTING SEASHORE LINE**

Rough Construction Cost of the Road 600 m (2000 feet) offshore from
the Existing Seashore Line

1. General

Along the existing seashore area in Butterworth, two alternative routes, that is, Route D and Route E, are proposed for the B.R.R. project. Route D is located on the existing seashore line and Route E is located on the existing Jalan Bagan Ajam as the improvement to the existing road. Additionally, the study team was requested in the Technical Committee Meeting to estimate the rough construction cost of the road 600 m (2000 feet) offshore from the existing seashore line.

In response to this request, the rough construction cost estimation is made in this section.

2. Premises of the offshore Road

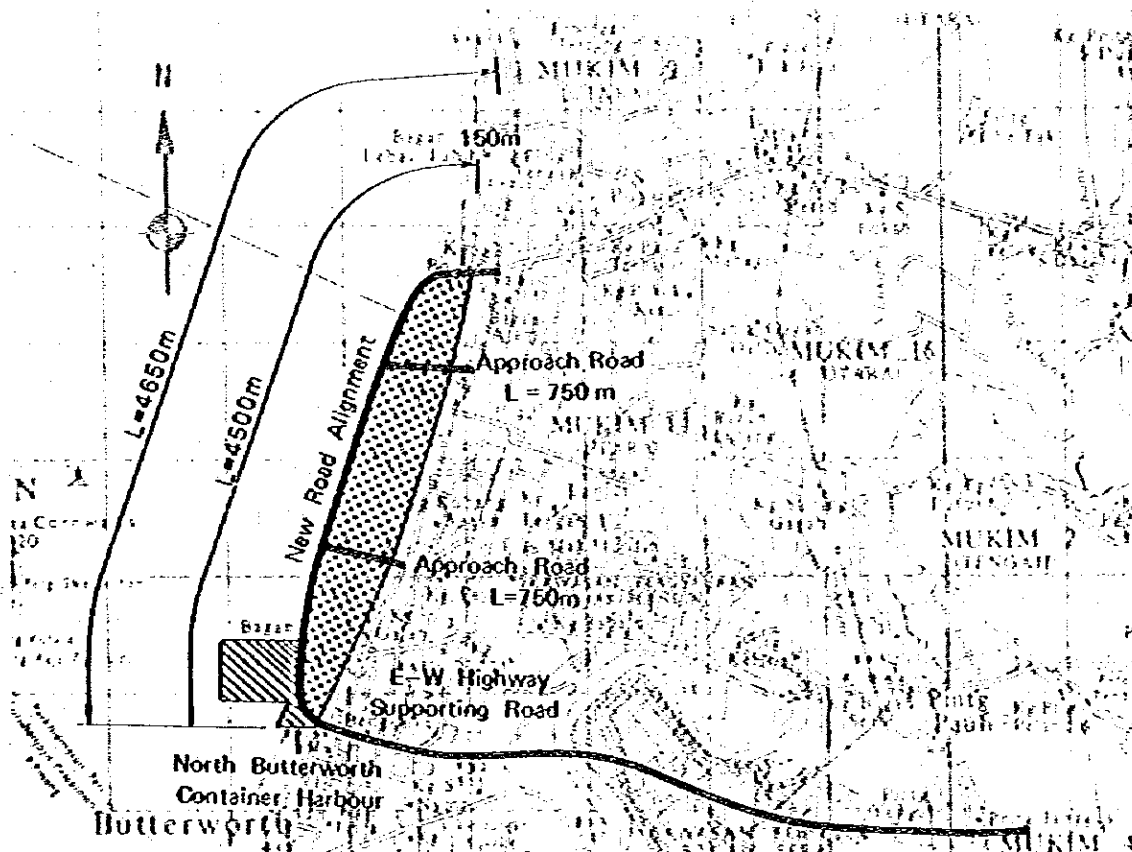
The premises of this road are as follows:

- a. The design standard follows that of the B.R.R. project.
- b. The design speed is adopted to be 80 km per hour.
- c. The alignment of this road is from the North Butterworth Container Wharf to Kg. Bagan Ajam as shown in Fig. D.1.
- d. The alignment of this road is located in the sea with a distance of 600 m (2000 feet) from the existing seashore line.
- e. The typical cross-section of this road follows that of the B.R.R. cross-section in the seashore area as shown in Fig. D.2.
- f. The typical cross-section of the approach road which connects this road to the existing Jalan Bagan Ajam is recommended to be a 74 feet road as shown in Fig. D.3.
- g. This plan does not include the reclamation of the sea between this road and the existing seashore line.
- h. Each intersection is planned to be at grade intersection.

3. Premises of the rough construction cost estimation.

The premises of the rough construction cost estimation are as follows:

- a. The construction cost is estimated at 1981 prices.
- b. The construction cost consists of the road and the approach road only.
- c. The same units cost as the B.R.R. project is recommended.
- d. The construction cost comprises that of this road and the approach road only.
- e. The construction cost does not include any compensation.
- f. The construction period of the road and reclamation is different. The construction of the road is a faster process than carrying out the reclamation.



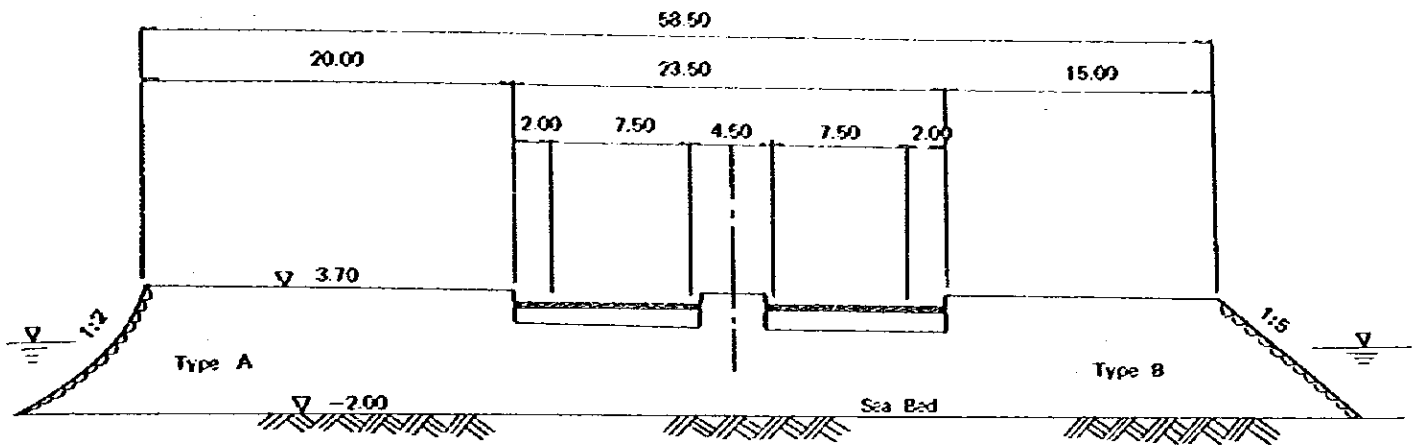


Fig. D.2 TYPICAL CROSS-SECTION OF THE ROAD

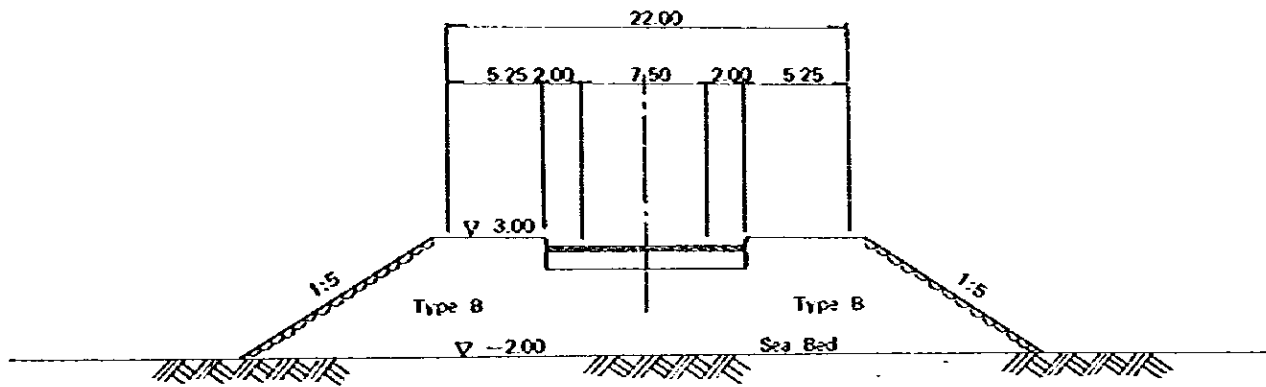


Fig. D.3 TYPICAL CROSS-SECTION OF APPROACH ROAD

Construction Cost

The total construction cost of the road and the approach road is about M\$ 39.89 million . The construction cost of the road alone is about M\$ 33.8 million

The road will be constructed after reclamation is carried out to provide an area of about 200 ha. but as previously mentioned, the construction cost mentioned here excludes reclamation cost.

The construction cost is shown in Table D.1.

Table D.1 CONSTRUCTION COST

Item	Class	Quantity	Unit	Unit Cost (M\$)	Cost (1000M\$)
Excavation	Soft Soil	221,400	m ³	3.60	797
Embankment	Soil	2,012,200	m ³	5.82	11,711
Turfing	Grass & Tree	157,500	m ³	5.55	874
Drainage	0.5 x 1.0	9,300	m	109.11	1,015
	Pipe 600	1,400	m	129.15	181
	Box 3.0 x 3.0	930	m	1,406.91	1,308
Wall	Type A	4,500	m	2,121.10	9,545
	Type B	4,500	m	770.40	3,467
Pavement	Carriageway	79,050	m ²	31.68	2,504
	Shoulder	13,950	m ²	23.87	333
	Sidewalk	27,900	m ²	13.72	383
Road Facility	Kerb	9,300	m	24.22	225
	Central Split	4,650	m	68.00	316
	Guard Rail	9,000	m	53.56	482
	Lighting	4,650	m	66.00	307
	Lane Mark	4,650	m	1.15	5
Intersection	At-Grade	4	Vol.	100,404	402
Sub-Total			km		33,855
Construction Cost per Kilometer					7,281
Approach Road (e = 1.5 km)			m		6,035
Total			km		39,890

4. Comparison of Construction Cost between the Offshore Route and Route D

Table D.2 COMPARISON OF CONSTRUCTION COST (M\$ 1000)

Item	Component	Construction Cost	
		Offshore route	Route D
Road	Financial cost	39,890	18,725
Bridge	Financial cost	0	4,872
Land Acquisition	Financial cost	0	94
Compensation	Financial cost	0	1,833
Total	Financial cost	39,890	25,524

The construction costs of the 2000 feet offshore road and Route D are estimated at about M\$39.89 million and M\$25.52 million respectively. With the high cost of embankment construction for the offshore road, its total construction cost is found to exceed some M\$14.3 million over that of Route D. Moreover as it was pointed out earlier, reclamation cost was not included, which would in fact bring the total cost of the offshore road much higher than Route D. Hence, this offshore road is regarded as economically not feasible.

**APPENDIX-E EXAMINATION OF THE INTERSECTION OF THE BRR AND
THE EXISTION PORT**

Examination of the Intersection of the BRR and the Existing Port

1. General

The result of the reconnaissance survey at this intersection and its vicinity are as follows (Refer to Fig. E.1)

- a) The width of carriageway and the right of way of Jalan Bagan Dalam are 10.0 meters and 20.0 meters respectively.
- b) There is a Mosque and a Post Office located near to this intersection on opposite of Jalan Bagan Dalam. The distance between these two structures is about 30.0 metres. The Mosque with a floor area of about 400 sq.m. is a wooden structure. Within the Mosque compound, there is no cemetery. The Post Office having a floor area of about 1500 sq.m. is made of concrete.
- c) The Malayan Railway line is located parallel to and at a distance of 80.0 meters from Jalan Bagan Dalam and behind the Post Office Building.
- d) Land ownership on opposite sides of Jalan Bagan Dalam at this intersection is different. Land to the north of Jalan Bagan Dalam is owned by the government while land on the opposite side of the road is owned by private individuals.
- e) The existing Butterworth Port is connected to Jalan Bagan Dalam by an approach road with a carriageway width of 10.0 meters the approach road is elevated as a flyover in crossing over the Malayan Railway line.
- f) The new road that will eventually connects the existing port to Jalan Chain Ferry has already been planned by the State J.K.R. about 10 years ago. Land acquisition for this proposed road has been very difficult and at present this process of acquisition is still going on.
- g) There are some squatter communities on the private land south of Jalan Bagan Dalam.

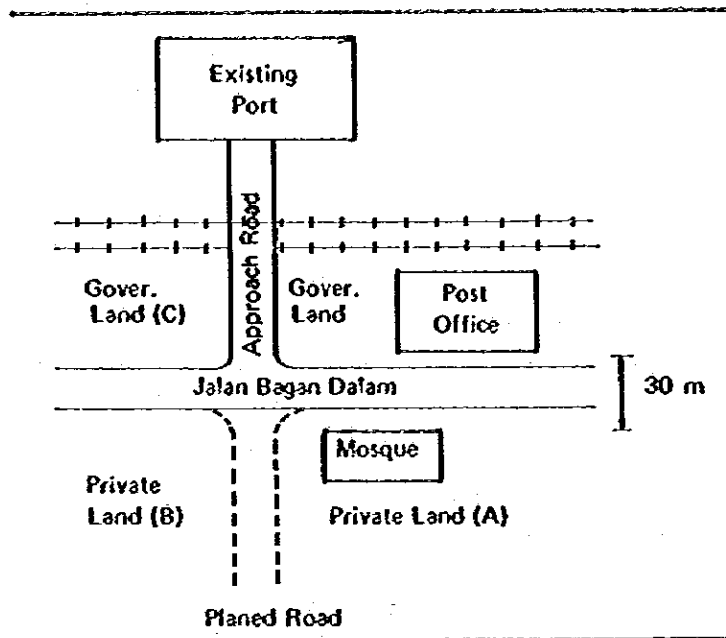


Fig. E.1 LOCATION OF EXISTING PORT AND JALAN BAGAN DALAM

2. Alternative Alignment of the B.R.R at this Intersection

(1) Alternative routes

On the basis of the proposed Route B, three alternative alignments have been considered namely Plan A, Plan B and Plan C.

The alignment for Plan A is parallel to Jalan Bagan Dalam behind the Post Office Building. Plan B follows the alignment of Jalan Bagan Dalam while Plan C has the alignment behind the Mosque, passing through the private land. (see Fig. E.2 below)

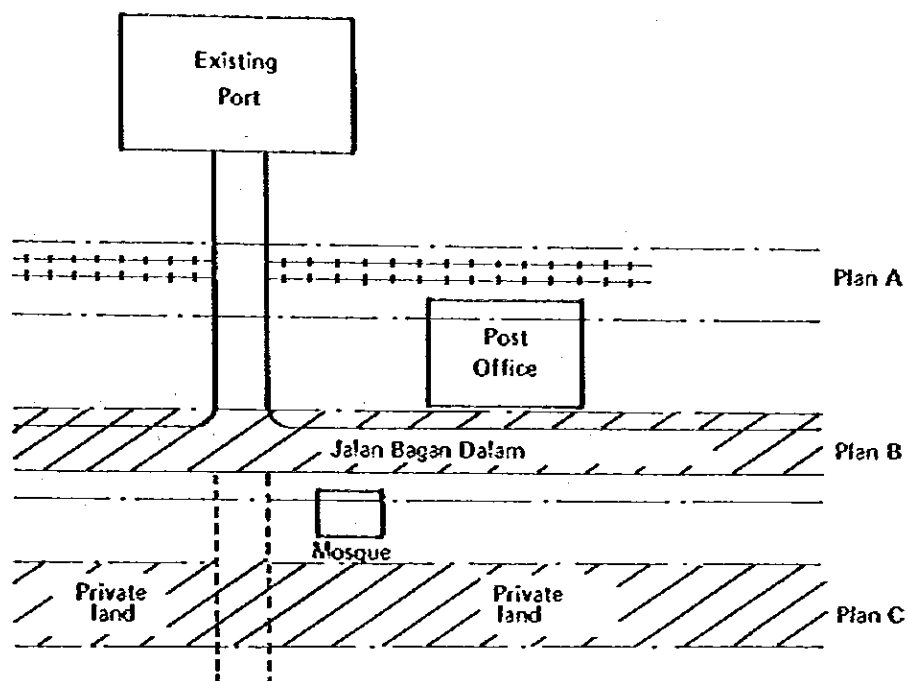


Fig. E.2 ALTERNATIVE ALIGNMENT

(2) Screening of the alternative alignment

1) Plan A

- a. The space between the Post Office and the Malayan Railway line is too narrow to accommodate the alignment without affecting the Post Office or the railway line.
- b. If the railway line is to be preserved, the alignment would entail the total removal of the Post Office.
- c. This plan involves the eviction of some squatter houses.
- d. Land acquisition is required.

2) Plan B

- a. The width of the Right of way of the proposed road is to be 40.0 meters, but the distance between the Post Office and the Mosque is only 30.0 meters. Hence this alignment will have to affect either one of these structures.**
- b. This plan involves the removal of only a few squatter houses.**
- c. Land acquisition is minimal.**

3) Plan C

- a. This alignment would be above to avoid affecting the Post Office as well as the Mosque.**
- b. Extensive land acquisition is necessary.**
- c. Difficulty in land acquisition can be anticipated as it involves many private land.**
- d. Many squatter communities need to be evicted.**

The above discussion suggests that Plan A and C are very costly with foreseen Land acquisition problems. Plan B is relatively cheaper and easier to implement. In addition, the possibility of shifting the Mosque was rechecked with the Municipal Authority. Hence Plan B is recommended as the alignment for Route B.

3. Alternative Intersection Plan

(1) Alternative Plan

Several grade-separated alternative intersection plans have been prepared (Refer to the Technical Report No. 8 "Highway Study") and the loop-type intersection plan is selected after screening through these alternative plans.

For the loop intersection, two alternative plans are proposed, (see Fig. E. 3 below) namely Plan A and Plan B.

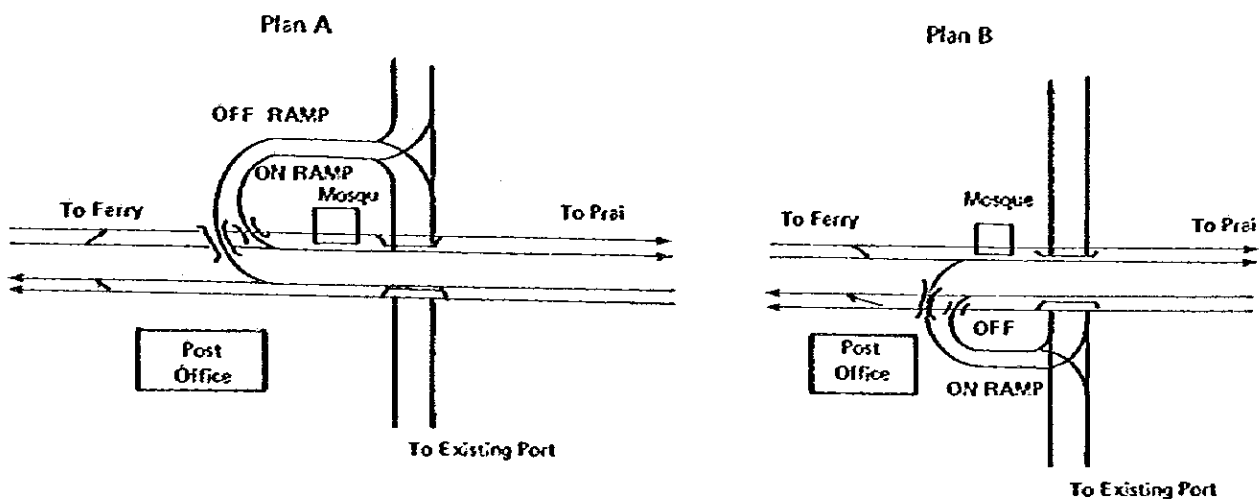


Fig. E.3 ALTERNATIVE INTERSECTION PLANS

(2) Screening of Alternative Plan

1) Plan A

- a. Horizontal curvature of the "ON" and "OFF" ramps are desirably gradual.
- b. The Construction cost is higher than Plan B.
- c. Extensive acquisition of private land is necessary.
- d. The construction of a new road that connects the existing port to Jalan Chain Ferry is required.

2) Plan B

- a. Due to land constraint, a minimal horizontal curvature has to be used for the ramps.

- b. The ramps are planned on Government land and hence no acquisition problem can be expected.
- c. The construction cost is lower than Plan A.

Taking into account the construction cost, problem of land acquisition, traffic control and other technical viewpoints, Plan B is recommended. However, it is felt that for the detail study stage in future, the design for this intersection would be re-examined.

**APPENDIX—F REPLY TO THE STEERING COMMITTEE'S COMMENTS
ON THE PRAFT FINAL REPORT**

REPLAY TO THE STEERING COMMITTEE'S COMMENTS
ON THE DRAFT FINAL REPORT

Comment 1 : Alternative Road 600 m offshore

The steering Committee has requested the study team to make an estimate of the rough construction cost of this alternative offshore route. In response to this request, the study team has prepared the following which can be found in the Appendix – D

- 1) Location of the offshore alternative route including the typical cross-sections of the proposed road and the approach road,
- 2) Estimation of the rough construction cost and,
- 3) A comparison of this estimated construction cost of the offshore route with that of Route D.

With regards to the request of the Malaysian's Government on indicating the exact location of the offshore 600 m road; as no study was actually conducted, exact alignment was not prepared. A rough idea of this alternative route however can be obtained from the said Appendix above.

Comment 2 : Construction Cost Estimates

In the Interim Report, the construction costs of the alternative routes were indicated by their economic cost component. However, in the Draft Final Report, these costs were indicated by their financial component. Therefore there appeared some discrepancies between the costs of these alternative routes in the Interim Report and the Draft Final Report, even though the costs remained unchanged as shown below:

(M\$ 1000)

Route	Component	Report	
		Interim	Draft Final
Route B	Economic Cost	46,939	46,939
	Financial Cost	48,567	48,608
Route D	Economic Cost	53,614	53,614
	Financial Cost	38,886	38,886
Route E	Economic Cost	66,273	66,273
	Financial Cost	64,185	64,185
Route G	Economic Cost	11,402	11,402
	Financial Cost	11,748	11,748

In the Final Report, the construction costs of the various alternative routes were consistently indicated by their financial cost component.

Comment 3 : Reference Page A-1, Main Volume Summary of Findings

In the Draft Final Report, exact location of terminal points of the alternative routes were not indicated in the Draft Final Report. However, we have already taken consideration for facilitating the decision making by indicating these exact terminal points and alignments of the alternative route in the Final Report.

**Comment 4 : Reference Page B-18, Main Volume Alternative Routes
(after screening)**

As requested, we have indicated the link of the Butterworth Ring Road at Sq Dua to the East-West Highway in the various illustrative figures throughout the Final Report.

Comment 5 (a) : Annual Maintenance Cost

The issue of using an accurate maintenance cost for the project road was brought up during the 5th Technical Committee Meeting. A meeting and discussion was duly arranged with the State JKR and a revised list of maintenance cost items and unit cost was made. These figures were adopted in the Draft Final Report and the same for the Final Report.

Comment 5 (b) : Alternative Intersection Plan

We have recognised the controversy in removing religious buildings in the project. With regards to the said affected Mosque, we have infact carried out the following considerations:

- 1) In trying to avoid the Mosque or the Post office, 3 alternative routes were proposed at first, one behind the Post office; in between the Post office and the Mosque; and one behind the Mosque. The former route was ruled out as it directly affect the railway while the last alternative was ruled out in view of its extemely high compensation and land acquisition cost. This leave us with the alternative 2, and with the existing 30.0 metres between the Mosque and the Post office to accommodate a proposed 40.0 metre road, either one of the buildings will have to be affected.
- 2) The Post office is a permanent, and new structure as compared to the temporary wooden structure of the Mosque. It is hence economically more sensible to preserve the Post office building.
- 3) Confirmation on the possibility of shifting the Mosque was obtained from the Muncipal Council. As cemetery does not exist in the Mosque Compound, merely shifting the building was considered possible and easy.

In view of these considerations the route was proposed as shown in the Final Report.

Comment 6 : Main Volume Item B.41

We acknowledged the typing error of "medium" to read "median" and have duely amended the error in the Final Report.

APPENDIX-G LIST OF REPORT

LIST OF REPORTS

1. Inception Report
2. Progress Report (I)
3. Progress Report (II)
4. Interim Report
5. Draft Final Report
 - a. Main Volume
 - b. Supplementary Volume
 - c. Preliminary Engineering Plans
6. Technical Report
 - a. Geotechnical Investigation
 - b. Hydrological Study
 - c. Existing Traffic Study
 - d. Bridge Study
 - e. Land Use Study
 - f. Traffic Projection Study
 - g. Environmental Study
 - h. Highway Study
 - i. Traffic Study

APPENDIX-H LIST OF COMMITTEE AND STUDY TEAM MEMBER

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Economic Planning Unit, Prime Minister's Department
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Ministry of Transport
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JICA