

PROJECT AD-1

RT. 4153 / 4008 / 401 41-4142

CHANGWAT: SURAT THANI

2) ROUTE MAP

3.7 Route No. 401 (Rt.4 - Rt.4142) (AD-1)

1) Summary

The aim of the project is to increase traffic capacity of the highways between Phun Phin and the east part of Surat Thani to cope with the increasing traffic volume consisting of intra city and inter provincial traffics.

"SD" standard of divided four lane highway is applied to the project. The existing highway is a mixture of "F3/SD/S1/S3" standards from section to section. Excluding the existing "SD" section, a two lane highway is to be constructed along the existing highways which have at least 6 meter carriageway width with double surface treatment or asphalt concrete. It is assumed that the existing highways are to be fully utilized as a counterpart carriageway to the new additional lanes with no specific improvement works.

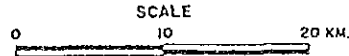
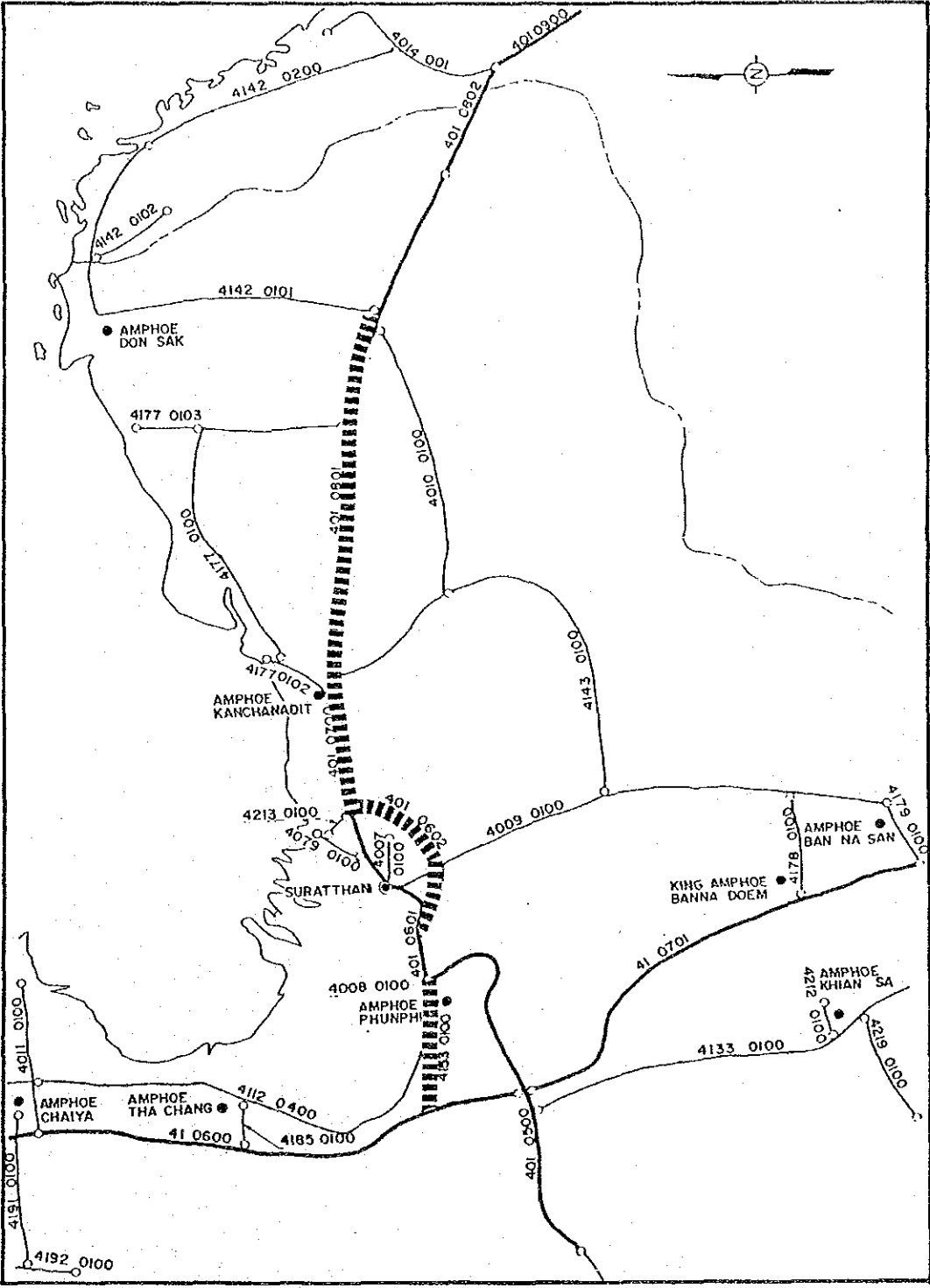
The project starts from the intersection with Route 41 and ends at the junction with Route 4142 via Phun Phin, Surat Thani Bypass (401-0602) and Kanchanadit. The existing highway sections of Route 4008 and 401-0601 which have four lanes now are excluded from this project. These sections form a part of this project but without any specific improvement works. Total length of the improvement amounts to 60.3 kilometers.

AD-1	Description
Changwat	: Surat Thani
Name or Location	: Rt.4153/4008/401 41 - 4142
Road Class	: SD (F3,S1 and S3)
Cross Section (m)	: <2.5+7.0+1.5>x2 (2.0+6.0+2.0)
Surface Type	: SA /ASC/ SA (SA/ASC/ SA)
Surface Condition	: (G and G/F)
Length: Total	: 60.3 km
DOH Road	: 60.3 km

AADT<'96/'01/'06>	: 9,000 / 13,800 / 19,700

Financial Cost	: 666.9 million baht
NPV	: 1,341 million baht (12% discount rate)
B/C	: 5.0 (12% discount rate)
EIRR	: 34.2 %

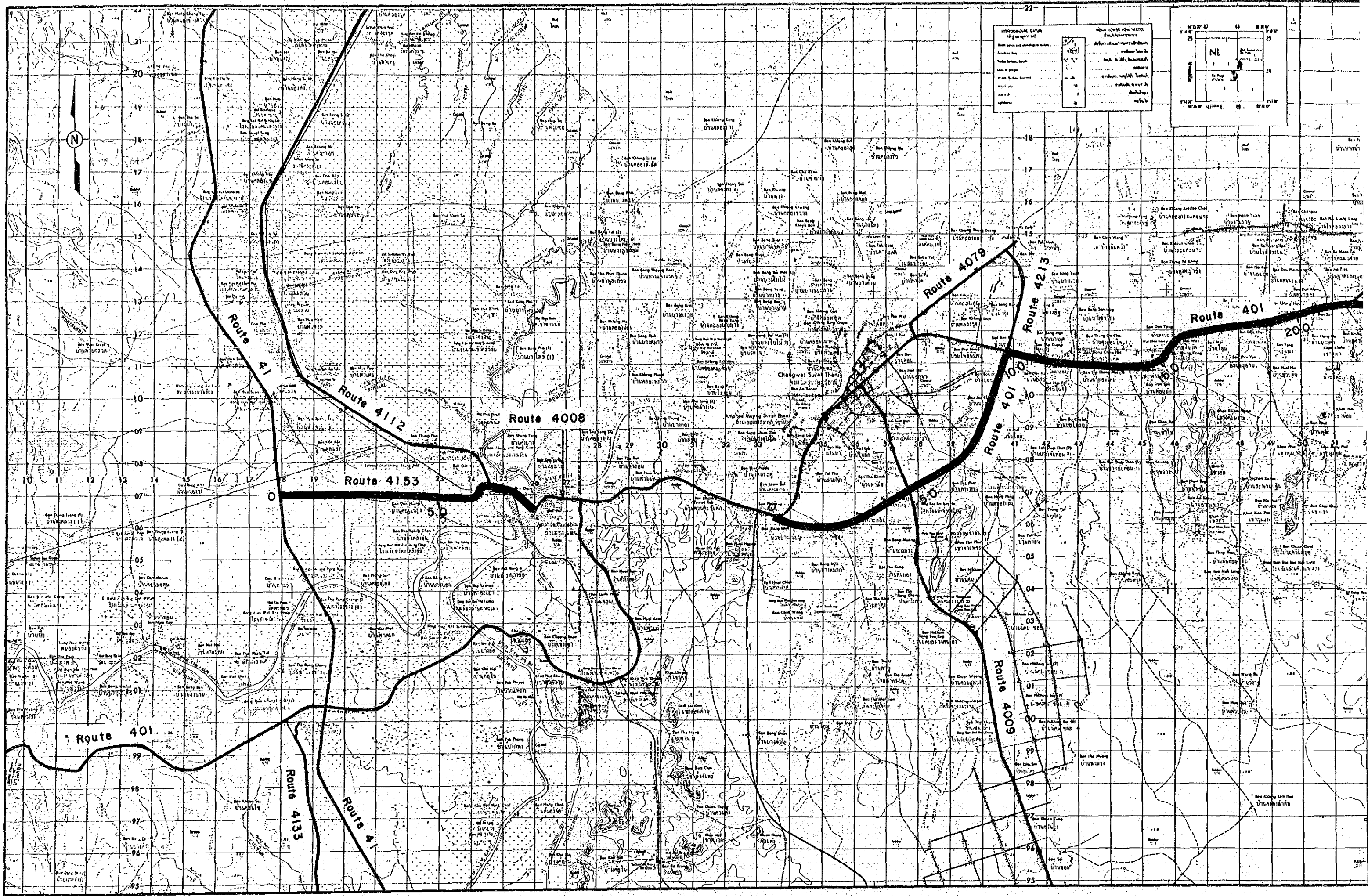
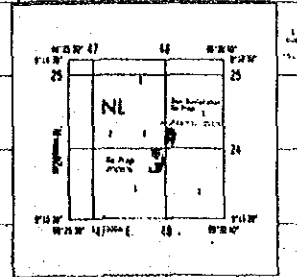
(): Existing Condition or Value

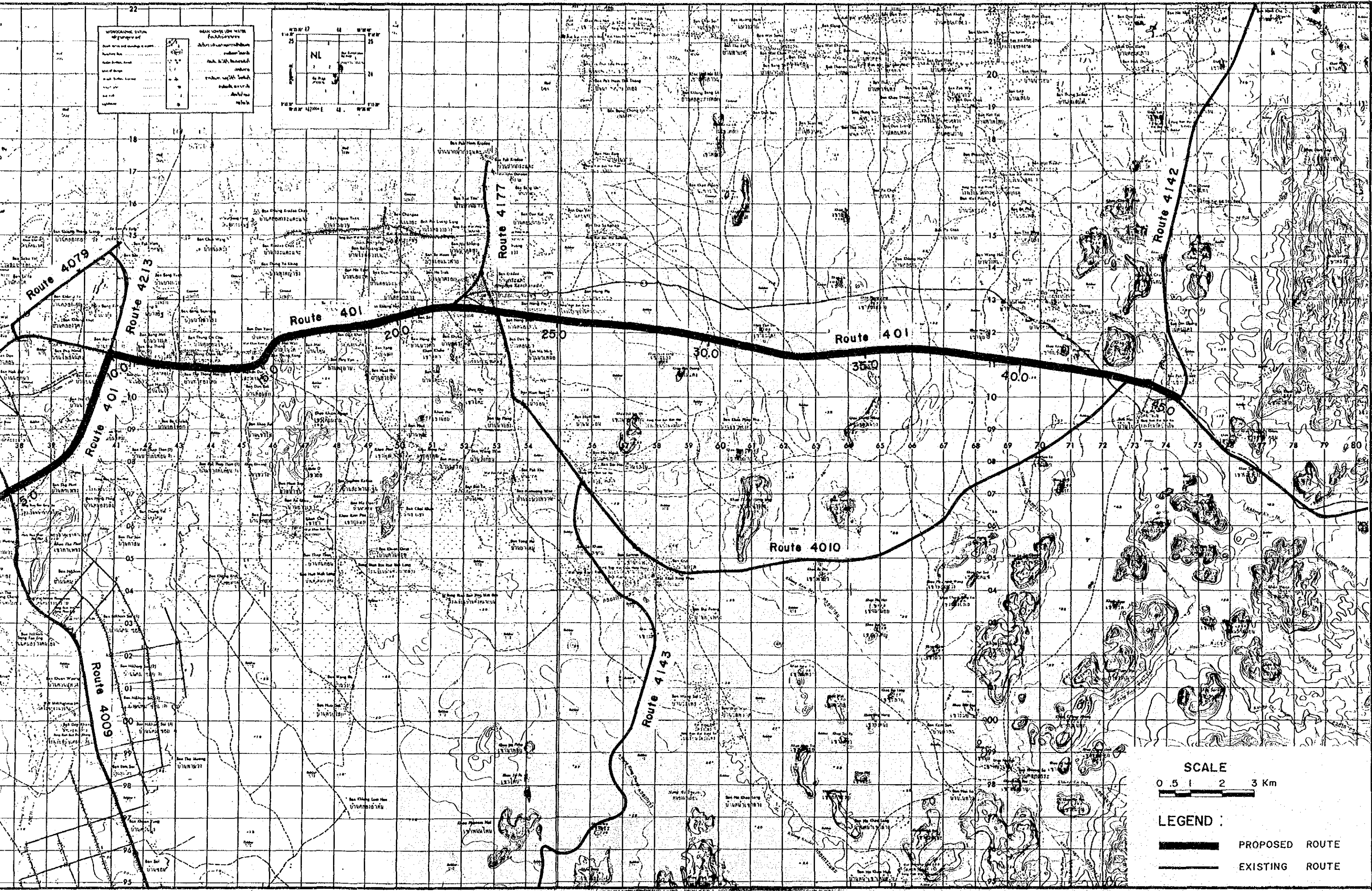


LEGEND :

	PROJECT ROUTE		PROVINCIAL HIGHWAYS
	DIVIDED HIGHWAYS		CHANGWAT , AMPHOE
	NATIONAL HIGHWAYS		

SYMBOLS FOR ROUTES		SYMBOLS FOR DISTANCES	
	Highway		Distance
	Proposed Highway		Distance
	Other Road		Distance
	Other Road		Distance
	Other Road		Distance





4) PROFILE OF PROJECT

PROJECT NO. AD-1 ROUTE NO. 401 (41-4142)

(1/3)

STATION (Km)		0	2+0752	4	6	7+760	8+536	10	10+538	12	14	16	17+521	18	20	21+999	22	24	26	28	28+056	30	
VILLAGE ROAD INTERSECTION		J. Rt. 41	DON RI			J. Rt. 4112	PHUNPHIN		J. Rt. 401				J. BYPASS			J. Rt. 4009				J. BYPASS			
LAND USE		RICE, RUBBER, 7 KM. (80%) DEVELOPED						RUBBER	RUBBER, RICE, ALL DEVELOPED						RICE, FRUIT, VEGETABLE 6.8 KM. DEVELOPED								
TERRAIN		FLAT 8.5 KM.						FLAT	FLAT 7.0 KM.						FLAT 10.5 KM.								
FLOODING LENGTH		NO FLOODING REPORTED						N.F.R	NO FLOODING REPORTED						NO FLOODING REPORTED								
EXISTING CONDITIONS	RIGHT OF WAY	40.00 M. (20.00+20.00)						35.00 M. (15.0+20.0)	50.00 M. (25.00+25.00)						50.00 M. (15.00+35.00)								
	ALIGNMENT	HOR.	NUMBER OF CURVES 9						N.O.C 6	NUMBER OF CURVES 20						NUMBER OF CURVES 5							
		VER.	NUMBER OF CURVES 20						N.O.C 8	NUMBER OF CURVES 25						NUMBER OF CURVES 22							
	CROSS SECTION	F3. 2.00+6.00+2.00=10.00 M.						SD. 2.50 +13.00+2.50	SD. 2.50+13.00+2.50=18.00 M.						SI. 2.50+7.00+2.50=12.00 M.								
	SURFACE	SA+DBST (FAIR)+SA						SA+PM (F) +SA	SA+PM (FAIR)+SA						SA+ASC (GOOD)+SA								
BRIDGES AND (Type - Width - Length (m))	BOX CULVERTS (Width - Height - Length (m))	0+131	0+881	2+336	2+766	5+403	8+156	8+178									21+116						
		BX 3-2.5x1.2	BX 3-2.5x1.2	BX 4-2.5x2.5	BX 3-2.5x1.2	BX 3-2.5x1.7	BX 4-2.5x2.0	ST 6.0x204.0										PC 9.0x10x16.0					
PROPOSED CONDITIONS	CROSS SECTION	SD (2.50+7.00+1.50)x 2						DOH ON-GOING PROJECT						SD (2.50+7.00+1.50)+EXISTING ROAD									
	TYPE OF IMPROVEMENT	AD.(1) 8,536 M.						(OUT OF PROJECT)						AD.(2) 10,535 M.						AD.(3)			
	BRIDGES (Type - Width - Length (m))	0+000					8+536						17+521 (8+536)								19+071		
						PC.11.0x 204.0											PC.11.0x 160.0						

PROJECT NO. AD-1 ROUTE NO. 401 (41-4142)

(2/3)

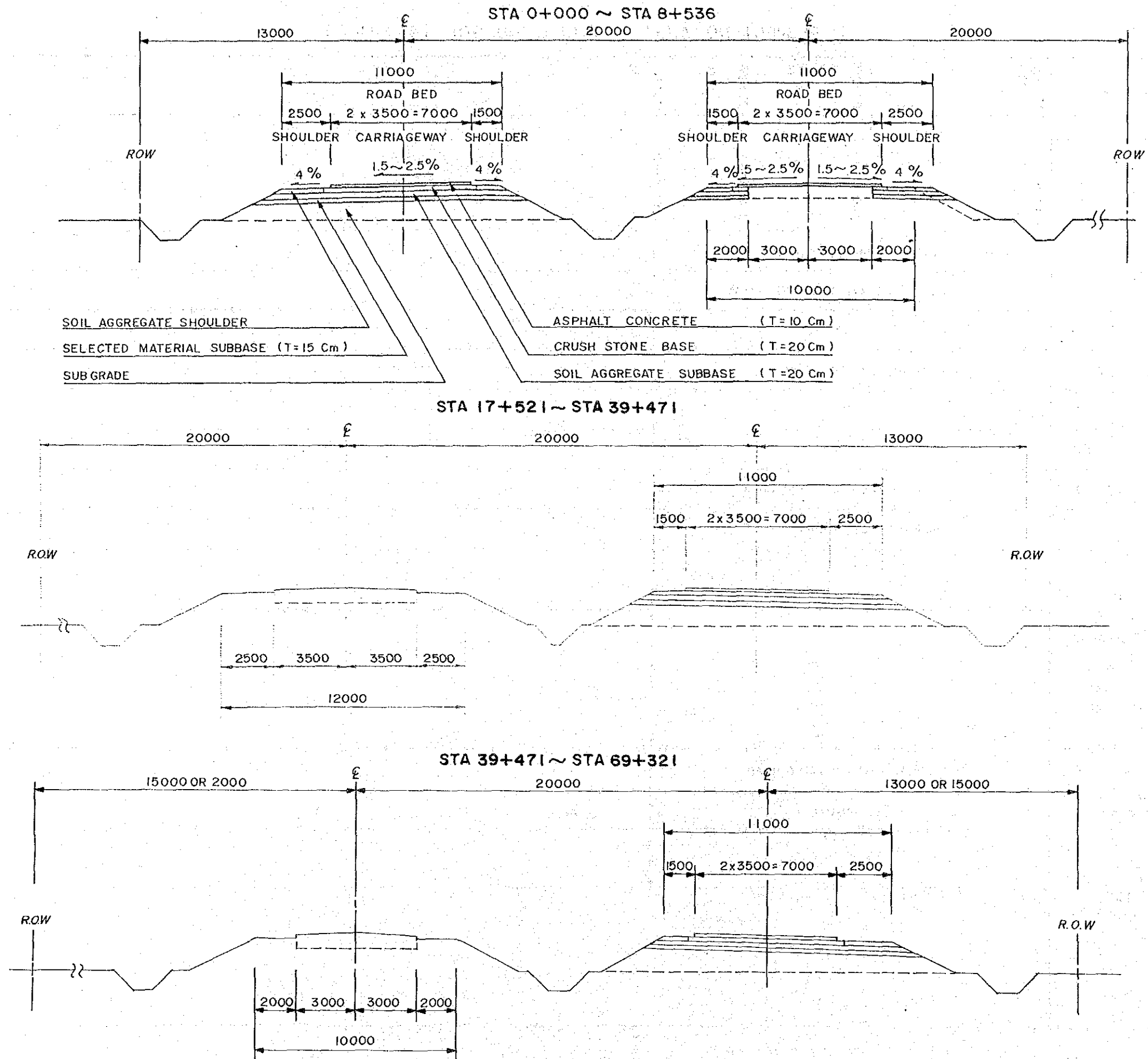
STATION (Km)		30	32	34	36	38	40	42	44	46	48	50	52	54	56	57+800	58	60+000	60+186			
VILLAGE ROAD INTERSECTION		THA THONG					J. Rt. 4143						SAMYEK - PUTTABAT			KAO RAE			BAN NAI	J. Rt. 4177		
LAND USE		RUBBER, RICE, 98% DEVELOPED								RICE, RUBBER, INDUSTRIAL, 80% DEVELOPED												
TERRAIN		FLAT 10.0 KM ROLLING 1.4 KM								FLAT 23.8 KM ROLLING 6.0 KM												
FLOODING LENGTH		NO FLOODING REPORTED								NA												
EXISTING CONDITIONS	RIGHT OF WAY	40.00 M (20.00+20.00)								40.00 M (20.00+20.00)												
	ALIGNMENT	HOR.	NA								NA											
		VER.	NA								NA											
	CROSS SECTION	SI. 2.50+7.00+2.50 = 12.00 M								S3. 2.00+6.00+2.00 = 10.00 M												
	SURFACE	SA+ASC (GOOD/FAIR)+SA								SA+ASC (GOOD/FAIR)+SA												
	BRIDGES AND (Type - Width - Length (m))	BOX CULVERTS (Width - Height - Length (m))	PC 7.0x11x15.5	BX 1-1.8x1.8	BX 2-2.1x2.1 RC 6.5x3x8.0	PC 6.5x3x12.0	BX 2-2.4x2.7	RC 7.0x10.0	RC 7.0x30.0								RC 7.0x20.0					
PROPOSED CONDITIONS	CROSS SECTION	SD (2.50+7.00+1.50)+EXISTING ROAD								SD (2.50+7.00+1.50)+EXISTING ROAD												
	TYPE OF IMPROVEMENT	AD.(3) 11,415 M								AD.(4) 29,850 M												
	BRIDGES (Type - Width - Length (m))	PC 11.0x170.5		RC 11.0x24.0		PC 11.0x36.0		RC 11.0x10.0	RC 11.0x30.0								RC 11.0x20.0					

PROJECT NO. AD-1 ROUTE NO. 401 (41-4142)

(3/3)

STATION (Km)		60+000 60+186	62	64 64+200	66	67+196	68	69+321	70	
VILLAGE ROAD INTERSECTION		BAN NAI J. Rt. 4177		KAO IN		J. Rt. 4010		J. Rt. 4142		
LAND USE		RICE, RUBBER, INDUSTRIAL								
TERRAIN		FLAT 23.8 KM ROLLING 6.0 KM								
FLOODING LENGTH		NA								
EXISTING CONDITIONS	RIGHT OF WAY	40.00 M (20.00+20.00)								
	ALIGNMENT	HOR.	NA							
		VER.	NA							
	CROSS SECTION	S3 2.00+6.00+2.00 = 10.00 M								
	SURFACE	SA+ASC (GOOD/FAIR)+ SA								
	BRIDGES AND (Type - Width - Length (m))									
BOX CULVERTS (Width - Height - Length (m))	RC 7.0 x 15.0									
PROPOSED CONDITIONS	CROSS SECTION	SD (11.00)+EXISTING ROAD								
	TYPE OF IMPROVEMENT	AD(4)								
	BRIDGES (Type - Width - Length (m))	RC 11.0 x 15.0								

5) TYPICAL CROSS SECTION



6) CONSTRUCTION QUANTITIES AND COSTS

CONSTRUCTION QUANTITIES AND COSTS
(Project AD -1 Length = 69.321 Km)
(Improved Length 60.336 Km)

ITEM	Unit	Financial		Financial		Economic cost		Residual Value	
		Unit Cost	Quantity	Total cost		%	%	%	%
		Baht		1000 Baht		1000 Baht		1000 Baht	
EARTH WORK									
Clearing & Grubbing	SQ.M	1,034,248		1,034			83		90
Roadway Excavation(Unclassified)	CU.M	30	0	0					
Embankment(Borrowed Material)	CU.M	100	791,925	79,193					
Slope Protection(Stripe Sodding)	SQ.M	6	433,364	2,600					
Sand Mat (t=0.5m)	SQ.M	50	0	0					
Excavate Existing Surface	SQ.M	2	0	0					
Thickness Over 10Cm (2 Lay)	SQ.M	14	56,338	789					
SUB TOTAL				83,616		69,401		62,461	
SUBBASE AND BASE									
Subbase(Selected Material)	CU.M	190	132,816	25,235			83		50
Subbase(Soil Aggregate)	CU.M	190	177,089	33,647					
Base Coarses(Crush Stone)	CU.M	280	94,442	26,444					
Shoulder(Soil Aggregate)	CU.M	190	46,833	8,898					
SUB TOTAL				94,224		78,206		39,103	
SURFACE									
Asphaltic Prime coat	SQ.M	13	430,888	5,602			83		50
Asphaltic Tack coat	SQ.M	7	482,104	3,375					
Asphalt concrete Surfacing	CU.M	1,900	48,210	91,600					
SUB TOTAL				100,576		83,478		41,739	
STRUCTURES(Equivalent)									
RC Pipe Culvert(D= 600 m)	M	1,380	405	556			83		50
(D= 800 m)	M	1,950	373	727					
(D=1000 m)	M	2,650	492	1,304					
(D=1200 m)	M	3,850	45	173					
RC Box Culvert(2-2.40*2.40 m)	M	11,400	134	1,528					
RC Bridge Widening	SQ.M	9,600	0	0					
RC Bridge (W=13.0 m)	M	83,200	99	8,237					
PC Bridge (W=13.0 m)	M	130,000	571	74,165					
SUB TOTAL				86,690		71,953		35,976	
TOTAL (a)				365,106		303,038		179,279	
Miscellaneous Works [(a)*7%]	Ls	1		25,557		21,213		12,550	
CONTRACT AMOUNT (b)				390,663		324,250		191,829	
PHYSICAL CONTINGENCIES [(b)*10%] (c)	Ls	1		39,066		32,425		19,183	
ENGINEERING & SUPERVISION [(b)+(c)*10%] (d)	Ls	1		42,973	85	36,527	0	0	0
LAND ACQUISITION(Average) (e)	SQ.M	300	647,413	194,224	100	194,224	100	194,224	
PROJECT COST [(b)+(c)+(d)+(e)]				666,926		587,426		405,236	
AVERAGE COST PER KM				11,054					

MAINTENANCE BUDGET CALCULATION

Project Road No, AD -1 Na= 8,200 Baht/Km/year
(Existing Road) Km= 1.001
Length = 69.321 Km

Asphalt Pavement

ITEMS	Existing		
	Condition		Factor
1. Surface /Base Type	X1	AC	0.00
2. Subgrade CBR	X2	4 %	0.50
3. A.D.T	X3	6,700	2.25
4. Service Life (year)	X4	10	1.40
5. Pavement Width (m)	X5	7 m	0.19
6. R-O-W Width (m)	Y1	40 m	0.00
7. Shoulder, Access, Median Width (m)	Y2	2.5 m	0.05
8. Traffic Service Operation Topography	Y3	0 - 3 %	0.00
9. Drainage Topography	Y4	0 - 3 %	0.00
10. Bridge Quantity (m/Km)	Y5	3	0.00
11. NO. Of Lanes		2	

Ka(Existing) =1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5)= 3.195
Maintenance cost + Overhead= Ka * Km * Na*1.28 = 33,568 Baht/Km/year
Total Cost(Existing) =Length *(Baht/Km/year)= 2,326,985 Baht/year
Financial Cost = 2,327,000 Baht/year
Economic Cost = 1,931,000 Baht/year
(1,931,410)Baht/year

Project Road No, AD -1 Na= 8,200 Baht/Km/year
(Proposed Road) Km= 1.001
Length = 69.321 Km

Asphalt Pavement

ITEMS	Proposed Road		
	Condition		Factor
1. Surface /Base Type	X1	AC	0.00
2. Subgrade CBR	X2	4 %	0.50
3. A.D.T	X3	3,700(7,400)	1.37
4. Service Life (year)	X4	5	0.40
5. Pavement Width (m)	X5	7.0 m * 2	0.38
6. R-O-W Width (m)	Y1	50 m	0.05
7. Shoulder, Access, Median Width (m)	Y2	2.50 m * 2	0.10
8. Traffic Service Operation Topography	Y3	0 - 3 %	0.00
9. Drainage Topography	Y4	0 - 3 %	0.00
10. Bridge Quantity (m/Km)	Y5	3	0.00
11. NO. Of Lanes		4	

Ka(Existing) =1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5)= 2.400
Maintenance cost + Overhead= Ka * Km * Na * 1.28 = 25,216 Baht/Km/year
Total Cost(Existing) =Length *(Baht/Km/year)= 1,747,970 Baht/year
Financial Cost = 1,748,000 Baht/year
Economic Cost = 1,451,000 Baht/year
(1,450,840)Baht/year

7) Construction Schedule

Project AD-1 Route No. 401 (41-4142)

year and Month	First Year												Second Year												Third Year											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Land Acquisition	=====																																			
Preparatory Works	=====																																			
Earth Works													=====												=====											
Pavement Works																									=====											
Bridge Works													=====												=====											
Improvement Works													=====												=====											
Miscellaneous Works													=====												=====											
Clearing -Up																									=====											
Percentage of Disbursement (%)	18 %												42 %												40 %											

8) Economic Evaluation

Project AD-1 Route No. 401 (41-4142)

(unit ; 1000 Baht)

Year	Const- ruction Cost	Mainte- nance Cost	Total Cost	VOC Saving	Time Saving	Balance	Sensi. Analysis Benefit= Cost =
1990	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	255,664	0	255,664	0	0	(255,664)	(306,797)
1994	167,703	0	167,703	0	0	(167,703)	(201,244)
1995	164,060	0	164,060	0	0	(164,060)	(196,872)
1996	0	(299)	(299)	15,600	87,080	102,979	82,503
1997	0	(299)	(299)	26,868	131,794	158,961	127,288
1998	0	(299)	(299)	38,135	176,508	214,943	172,074
1999	0	(299)	(299)	49,403	221,223	270,924	216,859
2000	0	(299)	(299)	60,670	265,937	326,906	261,645
2001	0	(299)	(299)	71,938	310,651	382,888	306,430
2002	0	(299)	(299)	90,387	436,688	527,374	422,019
2003	0	(299)	(299)	108,836	562,725	671,860	537,607
2004	0	(299)	(299)	127,284	688,762	816,345	653,196
2005	0	(299)	(299)	145,733	814,799	960,831	768,785
2006	0	(299)	(299)	164,182	940,836	1,105,317	884,373
2007	0	(299)	(299)	164,182	940,836	1,105,317	884,373
2008	0	(299)	(299)	164,182	940,836	1,105,317	884,373
2009	0	(299)	(299)	164,182	940,836	1,105,317	884,373
2010	0	(299)	(299)	164,182	940,836	1,105,317	884,373
Total	587,427	(4,485)	582,942	578,457	1,161,399	9,373,169	7,265,358
				EIRR =		34.19%	27.49%
				NPV (i;12%) =		1,341,181	
				B/C (i;12%) =		4.95	

PROJECT AD-2

RT. 402 KHOK KLOY - PHUKET

CHANGWAT: PHUKET, PHANGNGA

2) ROUTE MAP

3.8 Route No. 402 Phuket - Kok Kloi (AD-2)

1) Summary

The aim of the project is to ease the traffic congestions caused by both the tourist concentration to the Phuket Island from the outside and the increasing traffic demand on the Phuket Island. The project starts from Amphoe Kok Kloi and ends at the Phuket municipal area. The total length is 50.1 kilometers along the existing highway.

The existing highway is of "S3" standard with carriageway width of more than 6 meters and shoulders of 2.5 meters on both sides. In Phangnga province, a new highway of two lanes is to be constructed on a new embankment along the existing highway which is to be used as a counterpart carriageway with no specific improvement works. On the Phuket Island, however, the existing highway is to be widened to four lanes on the same embankment, being separated by a median due to the constraints of land acquisition.

The Sarasin Bridge together with the access roads in the vicinity is now under construction to increase the traffic capacity to four lane equivalent over a distance of 4.5 kilometers. This part is excepted from this project. The total improvement length is 45.6 kilometers, accordingly.

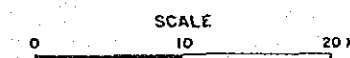
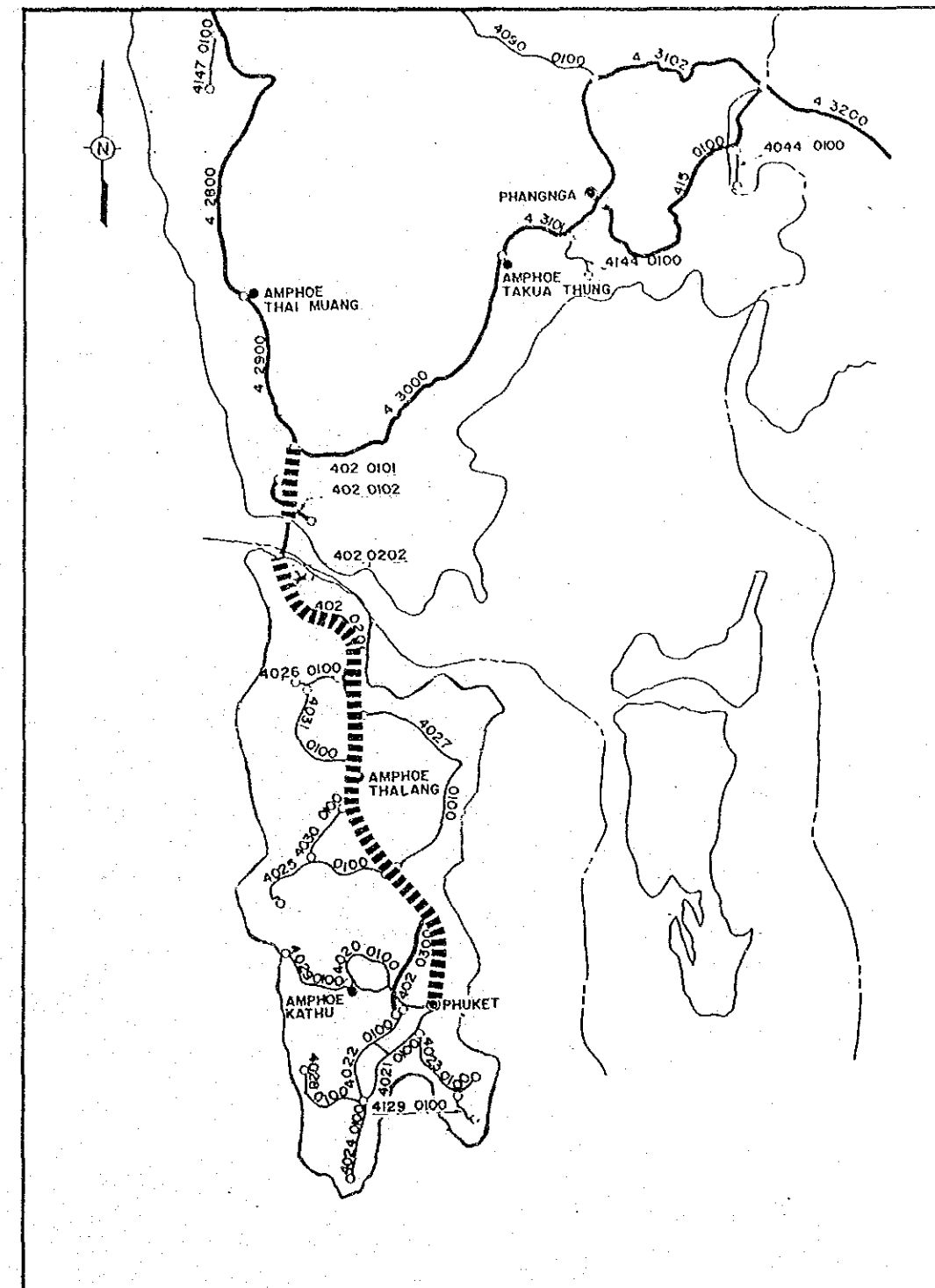
The EIRR is calculated at as high as 77.6 % because of the absolute capacity deficiency of the existing highway to cope with the increasing traffic demand in the future.

AD-2	Description
Changwat	: Phuket and Phangnga
Name or Location	: Rt.402 Khok Kloi - Phuket
Road Class	: SD (S3)
Cross Section (m)	: <2.5+7.0+1.5>x2 (2.5+7.0+2.5)
Surface Type	: SA /ASC/SA (SA /ASC/SA)
Surface Condition	: (G)
Length: Total	: 45.6 km
DOH Road	: 45.6 km

AADT<'96/'01/'06>	: 10,000 / 15,400 / 22,900

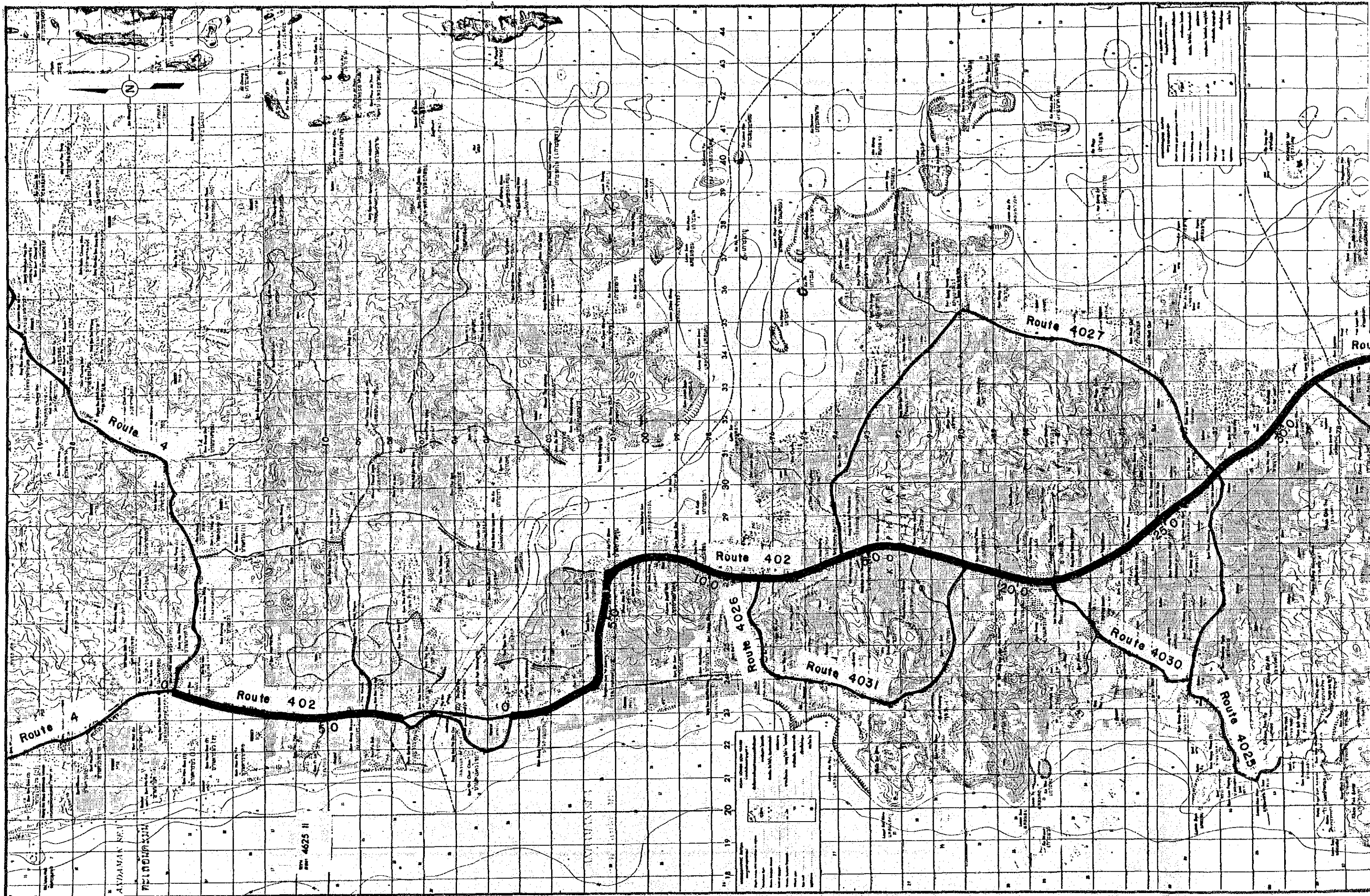
Financial Cost	: 528.6 million baht
NPV	: 4,388 million baht (12% discount rate)
B/C	: 17.5 (12% discount rate)
EIRR	: 77.6 %

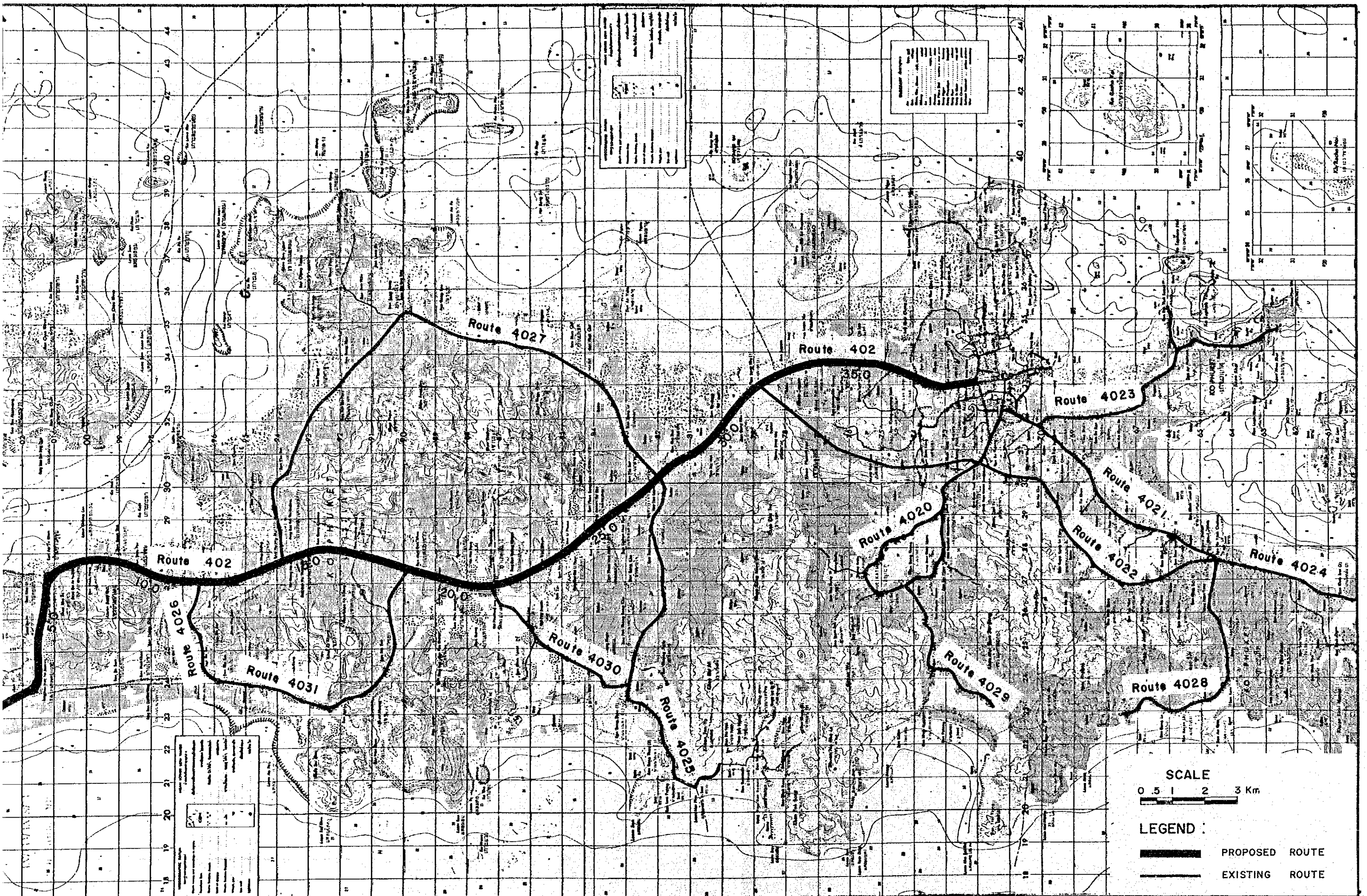
(): Existing Condition or Value



LEGEND :

- PROJECT ROUTE
- DIVIDED HIGHWAYS
- NATIONAL HIGHWAYS
- PROVINCIAL HIGHWAYS
- CHANGWAT, AMPHOE





4) PROFILE OF PROJECT

PROJECT NO. AD-2 ROUTE NO. 402 KHOK KLOY - PHUKET

(1/2)

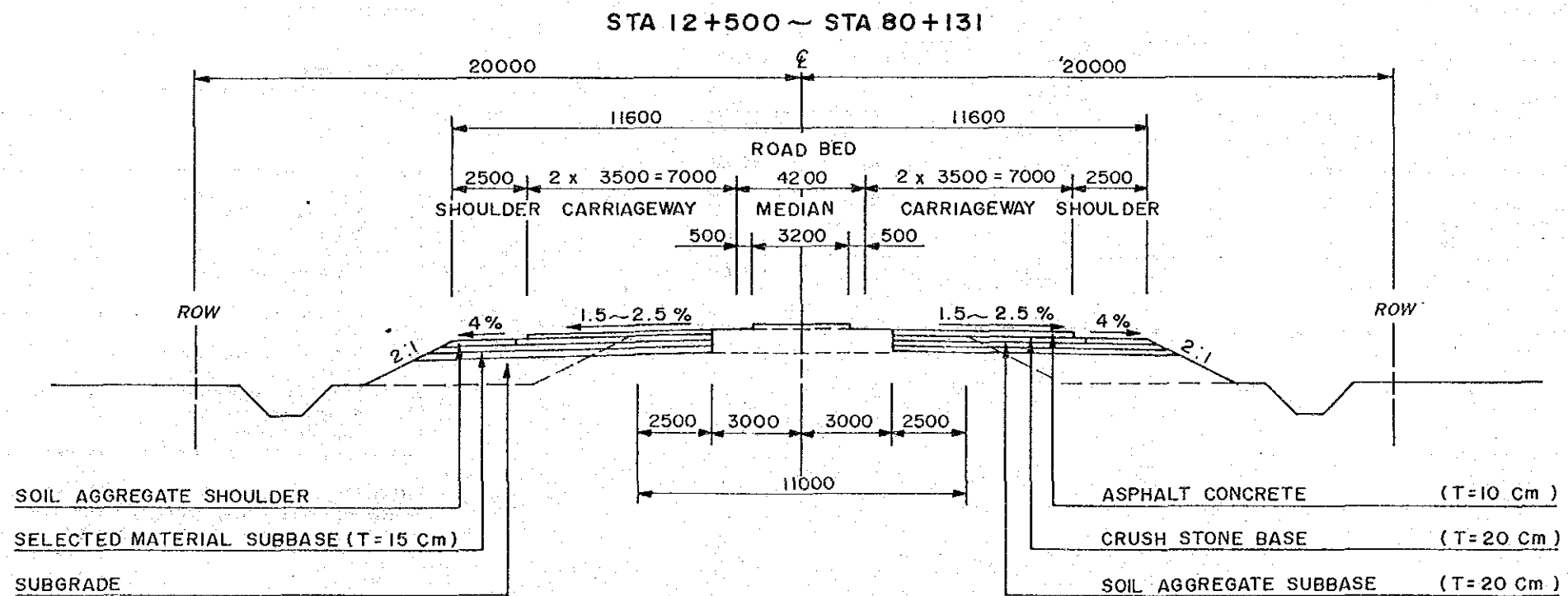
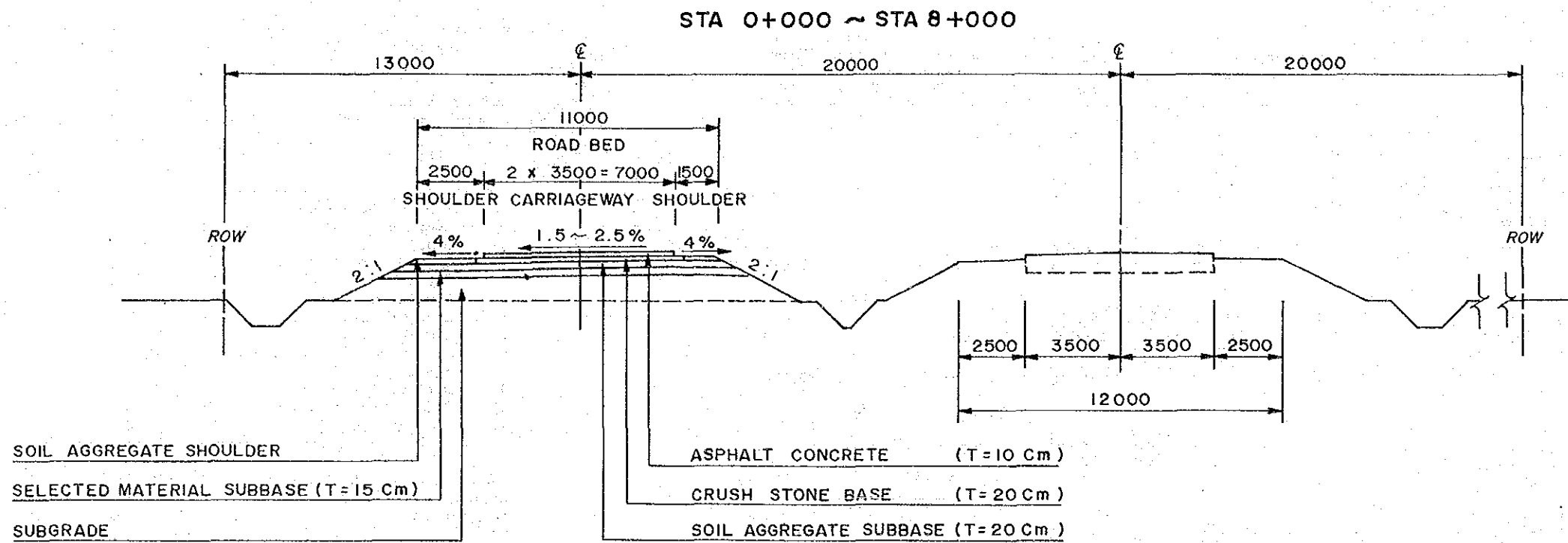
STATION (Km)		0		2		4		6		8		10		12		14		16		18		20		22		24		26		28		30	
VILLAGE ROAD INTERSECTION		KHOK KLOY		TONSAC		THANLIN		THA CHATCHAI		MAI KHAO		MUANG MAI																					
LAND USE		RUBBER, 7 KM (83%) ALREADY DEVELOPED										RUBBER, RICE, OTHERS, 40 KM (95%) ALREADY DEVELOPED																					
TERRAIN		FLAT 3.0 KM ROLLING 5.4 KM										FLAT 41.7 KM																					
FLOODING LENGTH		NA										NO FLOODING REPORTED																					
EXISTING CONDITIONS	RIGHT OF WAY	40.00 M (20.00+20.00)										40.00 M (20.00+20.00)																					
	ALIGNMENT	HOR.	NUMBER OF HORIZONTAL CURVES 16										NUMBER OF HORIZONTAL CURVES 113																				
		VER.	NA										FLAT																				
	CROSS SECTION	S3 2.50+7.00+2.50 = 12.00 M										S3 2.50+6.00+2.50 = 11.00 M																					
	SURFACE	BT+ASC (GOOD)+BT										BT+ASC (GOOD)+BT																					
BRIDGES AND (Type - Width - Length (m))	BRIDGES AND	0+175		0+361		1+190		8+707		15+414		20+430		24+342		25+327		27+909															
	BOX CULVERTS (Width - Height - Length (m))	RC 8.0x3x7.7		RC 8.0x3x6.7		RC 8.0x3x5.0		RC 8.0x8x45.0		RC 8.0x3x6.0		RC 8.0x1x10.0		BX 3-1.5x1.2x12.0		RC 8.0x1x10.0		BX 3-1.5x1.2x14.0															
PROPOSED CONDITIONS	CROSS SECTION	SD 11.00 + EXISTING ROAD										SD (2.50+7.00+0.50) x 2																					
	TYPE OF IMPROVEMENT	AD (1) 8,000 M										ON GOING 4,500 M																					
	BRIDGES (Type - Width - Length (m))	0+000		8+000		12+500 (15+000)		RC 20.0x3x6.0		RC 20.0x3x6.0		RC 20.0x3x6.0		RC 20.0x3x6.0																			

PROJECT NO. AD-2 ROUTE NO. 402 KHOK KLOY - PHUKET

(2/2)

STATION (Km)		30	32	34	36	38	40	42	44	46	48	50+131	52	54	56	58	60							
VILLAGE ROAD INTERSECTION		NAI YANG		CHOENG THALE		THA RUA		PA THONG		PHUKET														
LAND USE		RUBBER, RICE, OTHERS, 40 KM (95%) ALREADY DEVELOPED																						
TERRAIN		FLAT 41.7 KM																						
FLOODING LENGTH		NO FLOODING REPORTED 36+000 - 45+000 2.2 KM IN TOTAL AT 13 LOCATION																						
EXISTING CONDITIONS	RIGHT OF WAY	40.00 M (20.00+20.00)																						
	ALIGNMENT	HOR.	NUMBER OF HORIZONTAL CURVES 113																					
		VER.	FLAT																					
	CROSS SECTION	S3 2.50+6.00+2.50 = 11.00 M																						
	SURFACE	BT+ASC (GOOD)+BT																						
	BRIDGES AND BOX CULVERTS (Type - Width - Length (m))	33+156		34+567		36+033		36+534		37+253		37+789		40+253		40+819		41+419		43+308		43+884		48+753
	RC 8.0x2x7.0		RC 8.0x1x10.0		BX 2-1.2x1.8x13.0		BX 3-1.8x1.5x12.0		BX 3-1.8x1.5x12.0		RC 8.0x3x5.0		BX 3-2.1x1.8x12.0		BX 2-2.1x2.1x12.0		BX 3-1.5x1.5x12.0		BX 2-1.9x1.5x12.0		RC 8.0x3x7.3		RC 8.0x3x7.7	
PROPOSED CONDITIONS	CROSS SECTION	SD (2.50+7.00+0.50)x2																						
	TYPE OF IMPROVEMENT	AD(2)																						
	BRIDGES (Type - Width - Length (m))	RC 20.0x2x7.0		RC 20.0x1x10.0		RC 20.0x3x5.0						RC 20.0x3x7.3						RC 20.0x3x7.7						(45+631)

5) TYPICAL CROSS SECTION



6) CONSTRUCTION QUANTITIES AND COSTS

CONSTRUCTION QUANTITIES AND COSTS
(Project AD -2 Length = 50.131 Km)
(Improved Length 45.631 Km)

ITEM	Unit	Financial		Financial		Economic cost		Residual Value	
		Unit Cost Baht	Quantity	Total cost 1000 Baht	%	1000 Baht	%	1000 Baht	
EARTH WORK									
Clearing & Grubbing	SQ.M	1	595,098	595		83		90	
Roadway Excavation(Unclassified)	CU.M	30	0	0					
Embankment(Borrowed Material)	CU.M	100	494,273	49,427					
Slope Protection(Stripe Sodding)	SQ.M	6	306,093	1,837					
Sand Mat (t=0.5m)	SQ.M	50	0	0					
Excavate Existing Surface	SQ.M	2	0	0					
Thickness Over 10Cm (2 Lay)	SQ.M	14	285,996	4,004			46,366		41,730
SUB TOTAL				55,863					
SUBBASE AND BASE									
Subbase(Selected Material)	CU.M	190	128,084	24,336		83		50	
Subbase(Soil Aggregate)	CU.M	190	170,779	32,448					
Base Coarses(Crush Stone)	CU.M	280	108,495	30,379					
Shoulder(Soil Aggregate)	CU.M	190	38,555	7,326			78,425		39,213
SUB TOTAL				94,488					
SURFACE									
Asphaltic Prime coat	SQ.M	13	515,098	6,696		83		50	
Asphaltic Tack coat	SQ.M	7	515,098	3,606					
Asphalt concrete Surfacing	CU.M	1,900	51,510	97,869			89,782		44,891
SUB TOTAL				108,171					
STRUCTURES(Equivalent)									
RC Pipe Culvert(D= 600 m)	M	1,380	691	954		83		50	
(D= 800 m)	M	1,950	287	560					
(D=1000 m)	M	2,650	170	451					
(D=1200 m)	M	3,850	0	0					
RC Box Culvert(2-2.10*2.10 m)	M	10,000	117	1,170					
RC Bridge Widening	SQ.M	9,600	2,220	21,312					
RC Bridge (W=13.0 m)	M	83,200	58	4,842					
PC Bridge (W=13.0 m)	M	130,000	0	0					
SUB TOTAL				29,288			24,309		12,155
TOTAL (a)				287,810			238,882		137,988
Miscellaneous Works [(a)*7%]	Ls	1		20,147			16,722		9,659
CONTRACT AMOUNT (b)				307,956			255,604		147,647
PHYSICAL CONTINGENCIES [(b)*10%] (c)	Ls	1		30,796			25,560		14,765
ENGINEERING & SUPERVISION [(b)+(c)*10%] (d)	Ls	1		33,875	85	28,794	0	0	0
LAND ACQUISITION(Average) (e)	SQ.M	1,500	104,000	156,000	100	156,000	100	156,000	
PROJECT COST [(b)+(c)+(d)+(e)]				528,627		465,958		318,411	
AVERAGE COST PER KM				11,585					

MAINTENANCE BUDGET CALCULATION

Project Road No, AD -2 Na= 8,200 Baht/Km/year
(Existing Road) Km= 1.001
Length = 50.131 Km

Asphalt Pavement

ITEMS	Existing	
	Condition	Factor
1. Surface /Base Type	X1 AC	0.00
2. Subgrade CBR	X2 4 %	0.50
3. A.D.T	X3 9,600	2.25
4. Service Life (year)	X4 10	1.40
5. Pavement Width (m)	X5 6 m	0.05
6. R-O-W Width (m)	Y1 40 m	0.00
7. Shoulder, Access, Median Width (m)	Y2 2.5 m	0.05
8. Traffic Service Operation Topography	Y3 0 - 3 %	0.00
9. Drainage Topography	Y4 0 - 3 %	0.00
10. Bridge Quantity (m/Km)	Y5 3	0.00
11. NO. Of Lanes	2	

Ka(Existing) = 1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5) = 3.125
Maintenance cost + Overhead = Ka * Km * Na * 1.28 = 32,833 Baht/Km/year
Total Cost(Existing) = Length * (Baht/Km/year) = 1,645,941 Baht/year
Financial Cost = 1,646,000 Baht/year
Economic Cost = 1,366,000 Baht/year
(1,366,180)Baht/year

Project Road No, AD -2 Na= 8,200 Baht/Km/year
(Proposed Road) Km= 1.001
Length = 50.131 Km

Asphalt Pavement

ITEMS	Proposed Road	
	Condition	Factor
1. Surface /Base Type	X1 AC	0.00
2. Subgrade CBR	X2 4 %	0.50
3. A.D.T	X3 4,800(9,600)	1.76
4. Service Life (year)	X4 5	0.40
5. Pavement Width (m)	X5 7.0 m * 2	0.38
6. R-O-W Width (m)	Y1 50 m	0.05
7. Shoulder, Access, Median Width (m)	Y2 2.50 m * 2	0.10
8. Traffic Service Operation Topography	Y3 0 - 3 %	0.00
9. Drainage Topography	Y4 0 - 3 %	0.00
10. Bridge Quantity (m/Km)	Y5 3	0.00
11. NO. Of Lanes	4	

Ka(Existing) = 1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5) = 2.595
Maintenance cost + Overhead = Ka * Km * Na * 1.28 = 27,264 Baht/Km/year
Total Cost(Existing) = Length * (Baht/Km/year) = 1,366,789 Baht/year
Financial Cost = 1,367,000 Baht/year
Economic Cost = 1,135,000 Baht/year
(1,134,610)Baht/year

7) Construction Schedule

Project Ad-2 Route No. 402 Phuket - Kok Kloi

year and Month	First Year												Second Year												Third Year											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Land Acquisition	=====																																			
Preparatory Works	=====																																			
Earth Works													=====																							
Pavement Works																									=====											
Bridge Works													=====																							
Miscellaneous Works													=====												=====											
Clearing -Up																									=====											
Percentage Of Disbursement (%)	14 %												23 %												63 %											

8) Economic Evaluation

Project Ad-2 Route No. 402 Phuket - Kok Kloi

(unit ; 1000 Baht)

Year	Const- ruction Cost	Mainte- nance Cost	Total Cost	VOC Saving	Time Saving	Balance	Sensi. Analysis Benefit= Cost=
							0.8 1.2
1990	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	191,974	0	191,974	0	0	(191,974)	(230,368)
1994	102,846	0	102,846	0	0	(102,846)	(123,415)
1995	171,139	0	171,139	0	0	(171,139)	(205,366)
1996	0	(100)	(100)	89,654	476,604	566,358	453,126
1997	0	(100)	(100)	101,703	604,602	706,406	565,164
1998	0	(100)	(100)	113,752	732,601	846,453	677,203
1999	0	(100)	(100)	125,802	860,599	986,501	789,241
2000	0	(100)	(100)	137,851	988,598	1,126,548	901,279
2001	0	(100)	(100)	149,900	1,116,596	1,266,596	1,013,317
2002	0	(100)	(100)	149,469	1,223,508	1,373,077	1,098,501
2003	0	(100)	(100)	149,038	1,330,420	1,479,558	1,183,686
2004	0	(100)	(100)	148,607	1,437,331	1,586,038	1,268,871
2005	0	(100)	(100)	148,176	1,544,243	1,692,519	1,354,055
2006	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2007	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2008	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2009	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2010	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2011	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2012	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2013	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2014	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
2015	0	(100)	(100)	147,745	1,651,155	1,799,000	1,439,240
Total	465,958	(2,000)	463,958	2,791,402	26,826,652	29,154,096	23,137,693
						EIRR =	77.57%
						NPV (i;12%) =	4,387,620
						B/C (i;12%) =	17.45