

PROJECT IM - 16

Changwat : Phathum Thani, Nakhon Nayok

A. Lam Luk Ka - B. Khlong 16

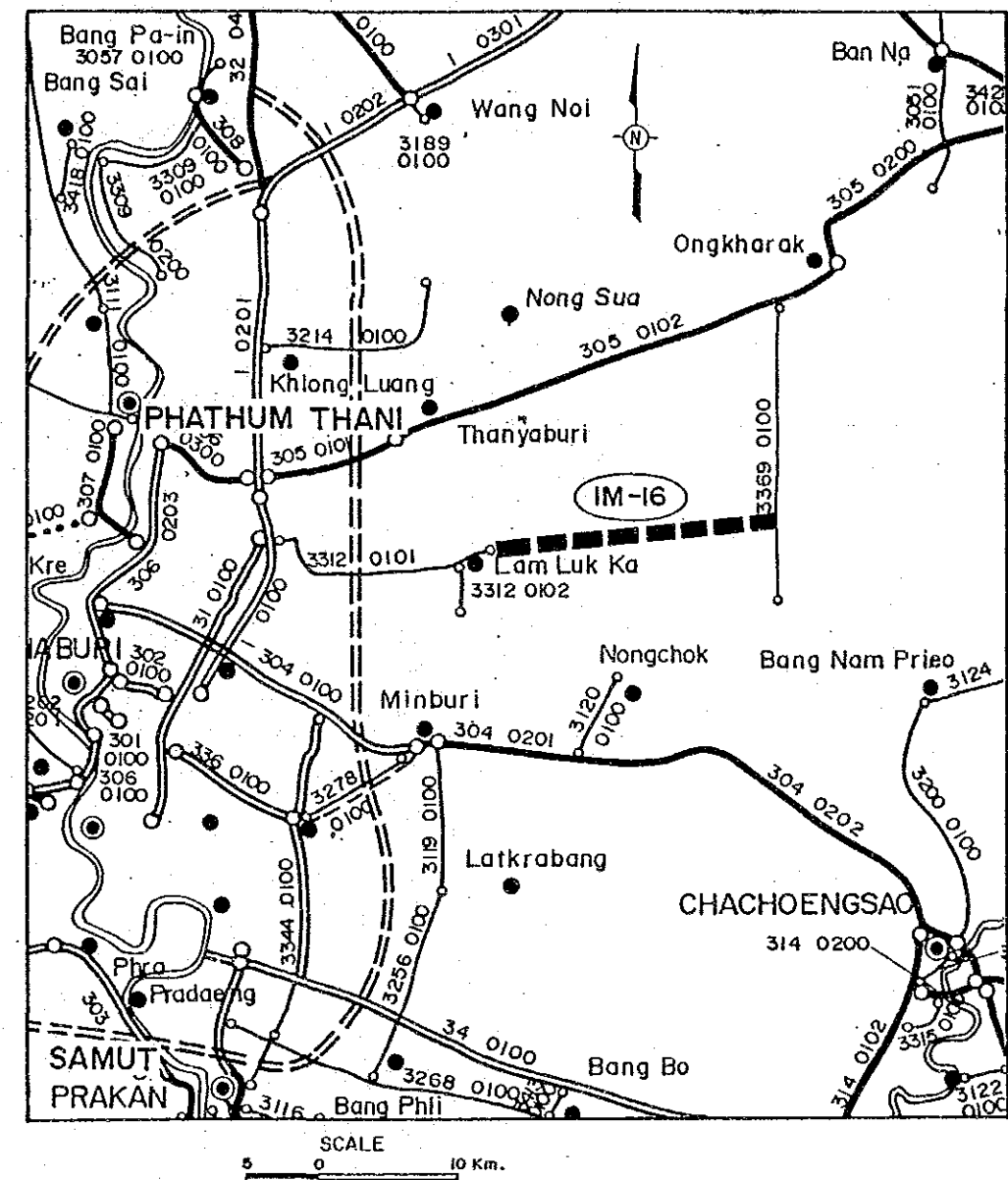
Length : 20.80 km

SUMMARY

PROJECT IM-16

Item	Description
Changwat	Phathum Thani/Nakhon Nayok
Origin	A. Lum Luk Ka
Destination	B. Khlong 16
Length	
Total	20.8 km
Improvement Section	20.8 km
DOH Road	No.3312 20.8 km
Others	-
New Alignment Section	Flat
Surface Type and Condition	S/A Fair
Terrain	Flat
Traffic (ADT)	
Existing	394
2000	924
2008	1,456
Existing Standard	Laterite, Substandard
Proposed Standard	F3
Construction Cost	
Financial	82,226 Thousand Baht
Economic	68,397 Thousand Baht
IRR	31.1 %
B/C	3.42

LOCATION OF PROJECT ROUTE



LEGEND:

■■■■■	PROJECT ROUTE	—	PROVINCIAL HIGHWAYS
====	DIVIDED HIGHWAYS	—	PROVINCIAL HIGHWAYS (Unpaved)
——	NATIONAL HIGHWAYS	●, ●	CHANGWAT, AMPHOE

1. GENERAL

The proposed route lies in Changwat Pathum Thani and Changwat Nakhon Nayok.

It originates at the end of paved Route 3312 in Amphoe Lam Luk Ka, runs eastward crossing eight khlongs and ends in Ban Khlong Seb Hok, with a total length of 20.8 km.

Out of eight khlongs located at about 2.5-km intervals, four are equipped with wooden bridges sufficient for motor vehicles. One khlong has only a 2-m wide wooden bridge limited to passenger cars and motorcycles. The remaining three have no bridges, and vehicles are forced to make detours to go to the other side.

The surrounding area is well cultivated with paddy, and houses are densely built along the khlongs. The existing road is entirely of laterite.

Upon completion of the proposed road, accessibility of area residents to Bangkok will be greatly improved.

2. TRAFFIC (Growth Rate Method)

Base Traffic Volume

Route	Section	Year	MC	PC	LB	HB	LT	MT	HT	ADT
IM-16	3312	1988	324	45	78	0	296	0	95	514
	FWD	1988	151	7	77	0	148	7	35	274
Average		-	238	26	78	0	222	4	65	394

Traffic Growth Rate

Route	Period	MC	PC	LB	HB	LT	MT	HT	ADT
IM-16	- 1993	6.78	8.30	5.70	5.73	5.66	6.62	3.47	6.78
	1994 - 2000	5.95	6.65	5.09	5.05	4.99	4.45	5.71	5.95
	2001 - 2008	6.67	7.39	5.86	5.87	5.63	5.62	5.70	6.67

Induced Traffic Ratio

Route	PC	LB	HB	LT	MT	HT
IM-16	1.25	1.27	1.16	1.26	1.00	1.00

Future Traffic Volume

Route	Section	Year	MC	PC	LB	HB	LT	MT	HT	ADT
IM-16	3312	1993	598	92	145	0	544	0	113	894
		2000	598	145	205	0	764	0	167	1281
		2008	1500	257	323	0	1184	0	260	2024
	PWD	1993	233	11	116	0	220	10	42	399
		2000	233	18	163	0	310	14	62	567
		2008	587	32	257	0	480	22	97	888
	Average	1993	416	52	131	0	382	5	78	647
		2000	622	82	184	0	537	7	115	924
		2008	1044	145	290	0	832	11	179	1456

3. BENEFITS

ROAD CONDITIONS

	LENGTH (KM)	ROAD CLASS	GRADIENTS	CURVE	NO. OF NARROW BRIDGE	NO. OF WOODEN BRIDGE
WITHOUT PROJECT	26.80	LATERITE FAIR	GOOD	GOOD	0	12
WITH PROJECT	20.80	PAVED F3	GOOD	GOOD	0	0

VOC SAVINGS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	4229.	2161.	4720.	0.	11975.	399.	15248.	38731.
2008	7092.	3827.	7438.	0.	18556.	627.	23771.	61312.

TIME SAVINGS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	384.	288.	1588.	0.	1169.	17.	283.	3729.
2008	645.	510.	2502.	0.	1812.	27.	440.	5936.

TOTAL BENEFITS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	4613.	2449.	6307.	0.	13144.	416.	15530.	42461.
2008	7737.	4337.	9941.	0.	20368.	654.	24211.	67248.

4. ENGINEERING

SUMMARY OF ROAD INVENTORY

(PROJECT NO. IM-16)

Item	Description
Changwat	Phathum Thani/Nakhon Nayok
Origin	A. Lum Luk Ka
Destination	B. Khlong 16
Length	
Total	20.8 km
Improvement Section	20.8 km
DOH Road	No.3312 20.8 km
Others	-
New Alignment Section	Flat
Terrain	Good/Good
Alignment (Hori./Vert.)	
Formation Width	
Embankment Section	
Length	20.8 km
Height	0.5 m
Cut Section	
Length	-
Depth	-
Surface Type and Condition	
SBST or DBST	-
Soil Aggregate	Fair
Earth	-
Box Culvert	-
Bridge	
Permanent Bridge	-
Narrow Concrete Bridge	-
Wooden Bridge	12 sites 260.5 m
Overflow Section	
Right of way	30.00 m

CONSTRUCTION QUANTITIES AND COSTS
(Project IM-16 Length = 20.8 km)

Item	Unit	Financial	Quantity	Financial	Economic Cost		Residual Value	
		Unit Rate Baht		Total Cost 1000 Baht	%	1000 Baht	%	1000 Baht
EARTHWORK					83		90	
Clearing & Grubbing	ha	9,500	8	76				
Earth Excavation	m3	16	-	0				
Embankment (Side Borrow)	m3	40	112,200	4,488				
Embankment (Borrow Pit)	m3	100	-	0				
Sub Total				4,564		3,788		3,409
PAVEMENT					83		50	
Subbase (Selected Material)	m3	180	30,600	5,508				
Subbase (Soil Aggregate)	m3	220	40,800	8,976				
Base (Soil Aggregate)	m3	350	21,400	7,490				
Shoulder (Soil Aggregate)	m3	250	9,200	2,300				
Asphaltic Prime/Tack Coat	m2	12	142,800	1,714				
DBST	m2	40	122,400	4,896				
AC Surfacing	m2	190	-	0				
Sub Total				30,884		25,634		12,817
STRUCTURES					83		50	
RC Pipe Culvert (D 1.00 Equivalent)	m	1,800	1,456	2,621				
RC Box Culvert (2 x 2.4 x 2.4 Equivalent)	m	20,000	84	1,680				
RC Bridge (W=7.0 L=10.0 Equivalent)	m	60,000	396	23,760				
Sub Total				28,061		23,291		11,646
INTERCHANGE/INTERSECTION	nos.	5,000,000	-	0	83	0	50	0
Total (a)					63,509	52,713		27,872
Miscellaneous Work ((a) x 7%)	1s			4,446	83	3,690	0	0
CONTRACT AMOUNT (b)					67,955	56,403		27,872
PHYSICAL CONTINGENCIES ((b) x 10%) (c)	1s			6,796		5,640		2,787
ENGINEERING AND SUPERVISION (((b) + (c)) x 10%) (d)					85	0		0
	1s			7,475		6,354		0
LAND ACQUISITION					100		100	
Highly Developed Land	ha	-	-	0				
Less Developed Land	ha	-	-	0				
Sub Total (e)	1s			0		0		0
PROJECT COST ((b) + (c) + (d) + (e))					82,226	68,397		30,659
AVERAGE COST PER KM					3,953			

5. ECONOMIC EVALUATION

COST AND BENEFIT STATEMENT

(1000 BAHT)

YEAR	COST		BENEFITS		DISCOUNTED (12%)	
	CONST. COST	VOC SAVING	TIME SAVING	TOTAL	COST	BENEFIT
1991	13,679			0	19,218	0
1992	34,199			0	42,899	0
1993	20,519			0	22,981	0
1994		28,386	2,761	31,147	0	27,810
1995		30,110	2,922	33,032	0	26,333
1996		31,834	3,084	34,918	0	24,854
1997		33,559	3,245	36,804	0	23,390
1998		35,283	3,406	38,689	0	21,953
1999		37,007	3,568	40,575	0	20,557
2000		38,731	3,729	42,460	0	19,207
2001	11,074	41,554	4,005	45,559	5,009	18,401
2002		44,377	4,281	48,658	0	17,547
2003		47,199	4,557	51,756	0	16,664
2004		50,022	4,833	54,855	0	15,770
2005		52,844	5,109	57,953	0	14,875
2006		55,667	5,385	61,052	0	13,992
2007		58,489	5,661	64,150	0	13,126
2008	(30,659)	61,312	5,937	67,249	(6,273)	12,286
TOTAL	48,812	646,373	62,480	708,857	83,834	286,765

NET PRESENT VALUE : 202,931
 BENEFIT COST RATIO : 3.42
 INTERNAL RATE OF RETURN : 31.1%

6. DEVELOPMENT AND SOCIAL IMPACTS

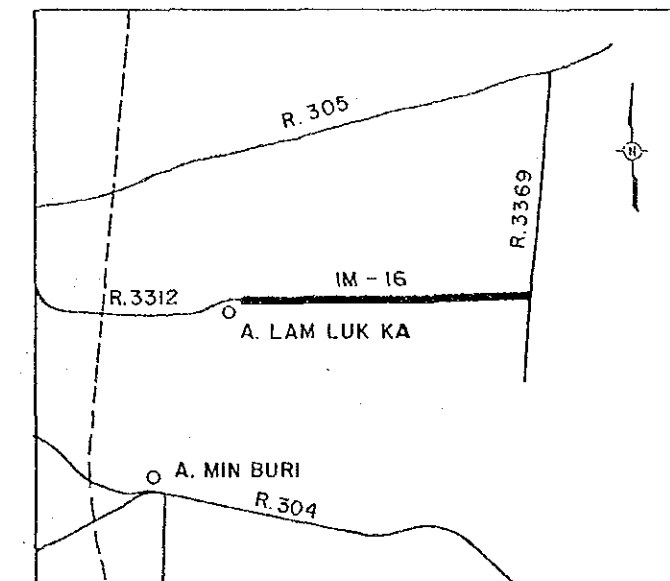
The completion of the project road would bring to the area an irreversible change in the dominant transportation mode from boats to motor vehicles. The pace of life would become faster and the range of person's daily travel would expand.

PROJECT NO. IM - 16

A. LAM LUK KA - B. KHLONG 16
C. PHATHUM THANI, C. NAKHON NAYOK

L = 20.80 KM.

LOCATION MAP

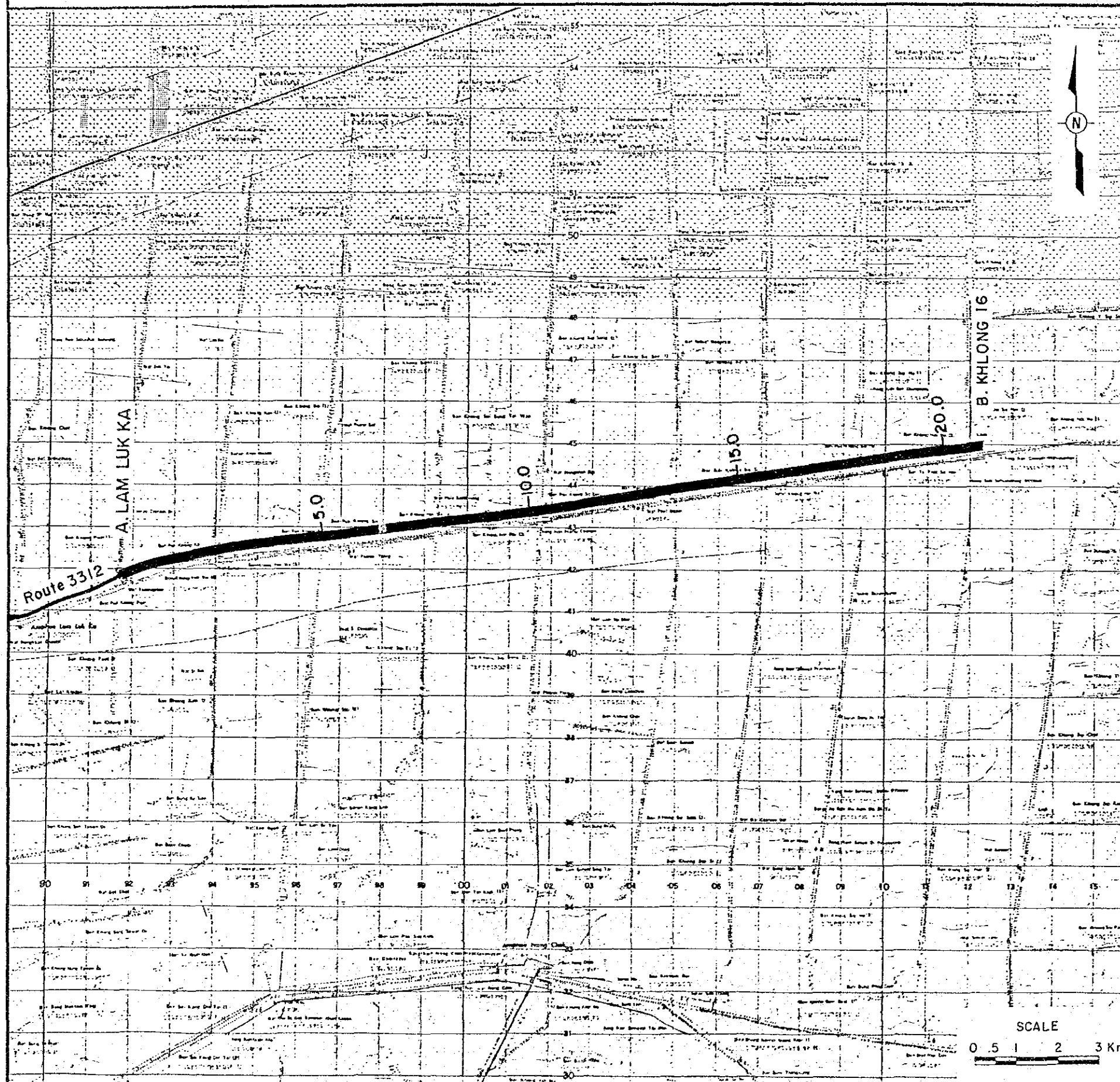


BRIDGE LIST

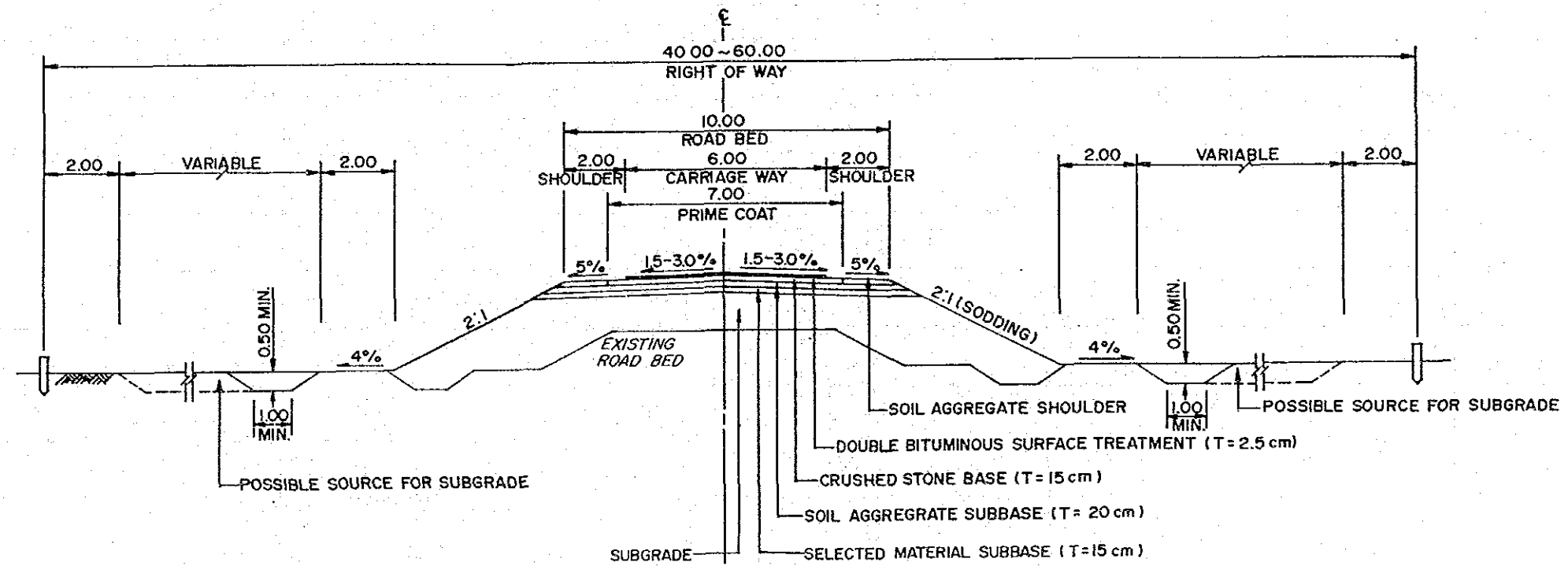
No.	Station Km.	Proposed Bridge	Existing Bridge
1	0.4	(BOX CULVERT)	W- 4.00x5.00
2	1.1	(BOX CULVERT)	W- 4.00x3.50
3	2.4	C- 7.00x44.00	W- 4.50x40.00
4	2.6	(BOX CULVERT)	W- 4.00x4.00
5	4.0	(BOX CULVERT)	W- 4.00x4.00
6	4.9	C- 7.00x 44.00	W- 4.00x44.00
7	6.0	(BOX CULVERT)	W- 4.00x4.00
8	7.0	(BOX CULVERT)	W- 4.00x4.00
9	7.7	C- 7.00x44.00	W- 5.00x44.00
10	9.0	C- 7.00x44.00	W- 5.00x40.00
11	10.2	C- 7.00x44.00	W- 2.00x38.00
12	13.5	C- 7.00x44.00	—
13	15.6	C- 7.00x44.00	—
14	18.0	C- 7.00x44.00	W- 5.00x30.00
15	20.5	C- 7.00x44.00	—

LEGEND

- PROPOSED ROUTE (IMPROVEMENT)
- PROPOSED ROUTE (NEW CONSTRUCTION)
- PAVED ROUTE
- UNPAVED ROUTE
- INVENTORY SURVEY ROUTE



TYPICAL CROSS SECTION



PROVINCIAL HIGHWAY (CLASS F3)

PROJECT NO. IM-16

ROAD INVENTORY
ROUTE NO. A. LUM LUK KA - B. KHLONG SIP HOK
C. PHATHUM THANI/NAKHON NAYOK

L = 20.8 km

STATION (Km)		024681012141618202224262830																	
VILLAGE Name of Village		891011121314151620+800																	
TERRAIN		Flat																	
CROSS SECTION	Formation Width (m)	6.0																	
	Embankment Height (m)	0.8		0.5															
	Cutting Depth (m)																		
SURFACE	Type/Length (km)	Laterite																	
	Condition	Fair												Poor		Fair			
FLOODING	Overflow Length (km)/Height (m)	No.																	
LAND USE	Left	Paddy																	
	Right	Paddy																	
BOX CULVERT & BRIDGE	Station (km)	0+400	1+100	2+400	2+600	4+000	4+900	6+000	7+000	7+700	9+000	10+200	13+500		15+600		18+000	20+500	
	Dimension (m) Bridge - Conc. or wooden - Width - (Side walk) - Length Box - width - Height - Length	W-Br. 4.00x5.00 W-Br. 4.00x3.50	W-Br. 4.50x40.00 W-Br. 4.00x4.00	W-Br. 4.00x4.00	W-Br. 4.00x44.00	W-Br. 4.00x4.00	W-Br. 4.00x4.00	W-Br. 4.00x4.00	W-Br. 5.00x44.00	W-Br. 5.00x40.00	W-Br. 2.00x38.00 (Passenger/Motorcycle only)	Crossing No. Bridge (width of Khlong : 40 m)		Crossing No. Bridge (width of Khlong : 40 m)		W-Br. 5.00x30.00			
RIGHT OF WAY (m) (Left/Right)		30.0 (15.0/15.0)																	
ALIGNMENT	Horizontal	Good												Fair		Good			
	Vertical	Good																	
ROUTE NO., AGENCIES		DOH Route No.3312																	

PROJECT IM - 17

**Changwat : Bangkok, Samut Prakan,
Chachoengsao**

A. Lat Krabang - B. Khlong Tha Thua

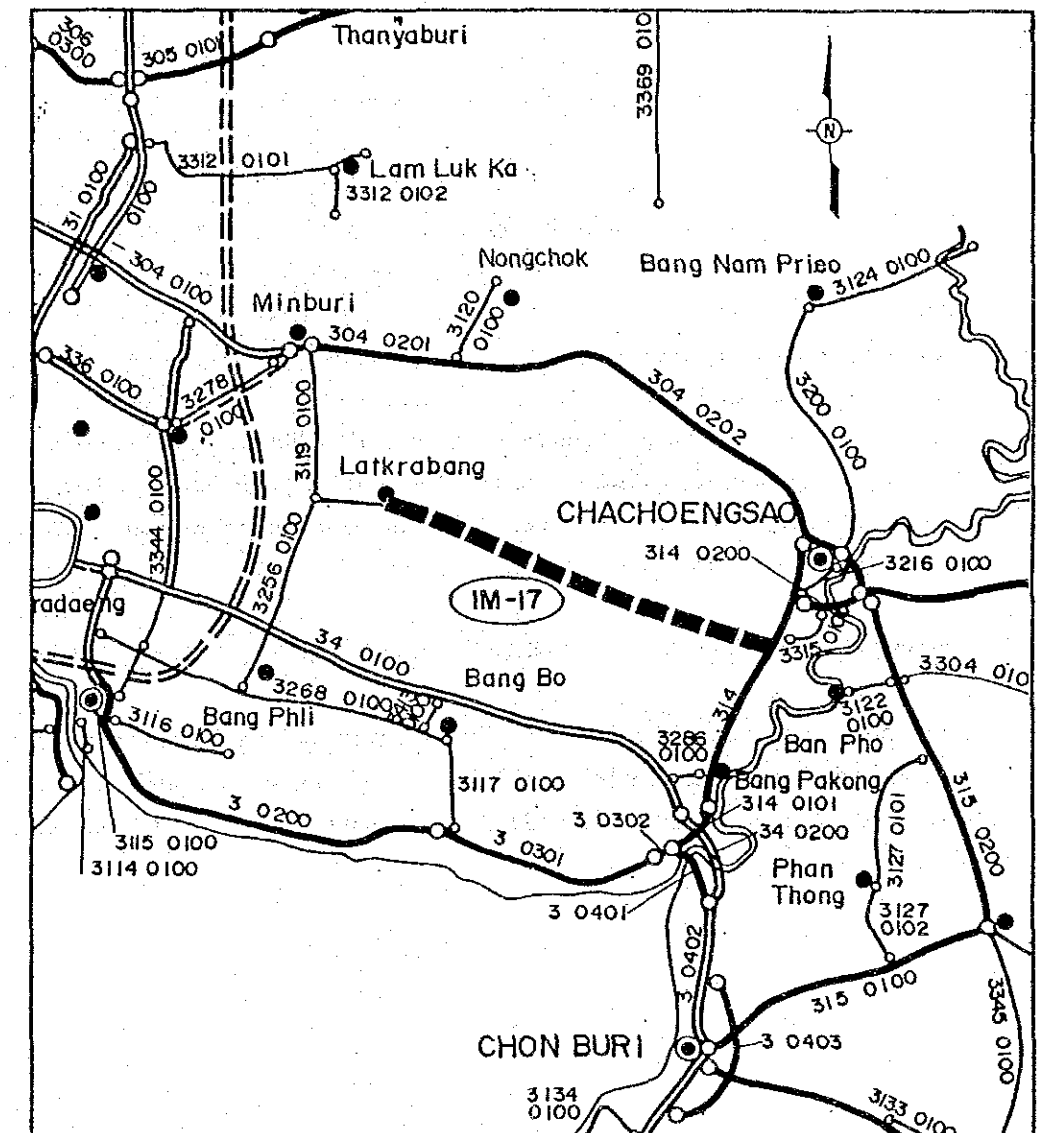
Length : 29.30 km

SUMMARY

PROJECT IM-17

Item	Description
Changwat	Bangkok/Samut Prakan/Chachoengsao
Origin	A. Lat Krabang
Destination	R. 314
Length	
Total	29.3 km
Improvement Section	29.3 km
DOH Road	-
Others	29.3 km
New Construction Section	-
Surface Type and Condition	SBST Fair/Poor S/A
Terrain	Flat
Traffic (ADT)	
Existing	1,371
2000	3,259
2008	5,086
Existing Standard	Laterite, Substandard
Proposed Standard	F3
Construction Cost	
Financial	79,437 Thousand Baht
Economic	66,078 Thousand Baht
IRR	45.6 %
B/C	6.34

LOCATION OF PROJECT ROUTE



SCALE
0 10 Km.

LEGEND :

■■■■■	PROJECT ROUTE	—	PROVINCIAL HIGHWAYS
====	DIVIDED HIGHWAYS	—	PROVINCIAL HIGHWAYS (Unpaved)
—	NATIONAL HIGHWAYS	●, ●	CHANGWAT, AMPHOE

1. GENERAL

The proposed route is located in the three Changwats of Bangkok, Samut Prakan and Chachoengsao.

The route originates in Amphoe Lat Krabang, runs eastward through or beside about 15 villages and ends at the intersection with Route 314 in Chachoengsao. Its total length is 29.3 km.

The existing road runs parallel to a major RID canal for its entire length at a distance of 200–300 m. The improved road is proposed to follow the existing alignment. Both sides of the road are rice paddies except for houses, which are frequent. The terrain is flat. The existing embankment is low, about 0.3 m, and evidence of submergence during the rainy season was observed. Because the road has to cross many canals running north-south, there are a large number of bridges and culverts. Three wooden bridges in the first two-thirds have longitudinal sections not suitable for heavy vehicles and are questionable in durability. Four concrete bridges have been completed, including one at Km 9 + 000 of 120 m in length and 8 m in width. PWD completed work on widening and four bridges in the last one-third section. When completed, this section will require only pavement work.

The existing road is paved with DBST for its entire length. The surface condition is fair to poor.

This route runs parallel to and between two east-west national highways (Routes 34 and 304), and will provide an alternate route to these two routes that are heavily trafficked. With relatively industrialized areas at both ends, it is expected that the route will be heavily used by industrial traffic.

2. TRAFFIC (Growth Rate Method)

Base Traffic Volume

Route	Section	Year	MC	PC	LB	HB	LT	MT	HT	ADT
IM-17	PWD	1988	529	69	281	7	558	164	292	1371

Traffic Growth Rate

Route	Period	MC	PC	LB	HB	LT	MT	HT	ADT
IM-17	- 1993	3.78	5.30	3.93	5.45	4.14	1.34	1.43	3.78
	1994 - 2000	6.19	6.72	6.56	5.43	5.89	5.19	5.84	6.19
	2001 - 2008	6.06	6.66	6.32	4.99	5.34	5.56	5.62	6.06

Induced Traffic Ratio

Route	PC	LB	HB	LT	MT	HT
IM-17	1.47	1.51	1.29	1.49	1.00	1.00

Future Traffic Volume

Route	Section	Year	MC	PC	LB	HB	LT	MT	HT	ADT
IM-17	PWD	1993	855	131	513	12	1018	175	313	2162
		2000	855	206	801	17	1520	249	466	3259
		2008	2093	344	1308	24	2304	384	722	5086

3. BENEFITS

ROAD CONDITIONS

	LENGTH (KM)	ROAD CLASS	GRADIENTS	CURVE	NO. OF NARROW BRIDGE	NO. OF WOODEN BRIDGE
WITHOUT PROJECT	29.30	LATERITE GOOD	GOOD	GOOD	0	3
WITH PROJECT	29.30	PAVED F3	GOOD	GOOD	0	0

VOC SAVINGS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	4458.	3051.	10001.	476.	18106.	6804.	26325.	69221.
2008	7142.	5097.	16333.	682.	27444.	10492.	40787.	107977.

TIME SAVINGS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	549.	492.	4509.	370.	2196.	431.	806.	9353.
2008	880.	821.	7364.	530.	3329.	664.	1249.	14837.

TOTAL BENEFITS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	5008.	3543.	14510.	846.	20302.	7234.	27131.	78573.
2008	8022.	5918.	23697.	1212.	30773.	11156.	42036.	122814.

4. ENGINEERING

SUMMARY OF ROAD INVENTORY

(PROJECT IM-17)

Item	Description	
Changwat	Bangkok/Samut Prakhon/Chachoengsao	
Origin	A. Lat Krabang	
Destination	R. 314	
Length		
Total	29.3 km	
Improvement Section	29.3 km	
DOH Road	-	
Others	29.3 km	
New Construction Section	-	
Terrain	Flat	
Alignment (Hori./Vert.)	Good / Good	
Formation Width	6.0 m ~ 7.0 m Improved Section 10.0 m	
Embankment Section		
Length	19.6 km	9.7 km
Height	0.3 m	1.0 m
Cut Section		
Length	-	-
Depth	-	-
Surface Type and Condition		
SBST or DBST	Fair/poor	-
Soil Aggregate	Poor	Good
Earth	-	-
Box Culvert	Small size boxes only	
Bridge		
Permanent Bridge	4 sites (211 m)	4 sites (130 m) Under Const.
Narrow Concrete Bridge	-	-
Wooden Bridge	3 sites (53 m)	-
Overflow Section		
Right of way	30 m	30 m

CONSTRUCTION QUANTITIES AND COSTS
(Project IM-17 Length = 29.3 km)

Item	Unit	Financial	Quantity	Financial	Economic Cost		Residual Value	
		Unit Rate Baht		Total Cost 1000 Baht	%	1000 Baht	%	1000 Baht
EARTHWORK					83		90	
Clearing & Grubbing	ha	9,500	8	76				
Earth Excavation	m3	16	-	0				
Embankment (Side Borrow)	m3	40	257,200	10,288				
Embankment (Borrow Pit)	m3	100	-	0				
Sub Total				10,364		8,602		7,742
PAVEMENT					83		50	
Subbase (Selected Material)	m3	180	43,400	7,812				
Subbase (Soil Aggregate)	m3	220	57,800	12,716				
Base (Soil Aggregate)	m3	350	30,300	10,605				
Shoulder (Soil Aggregate)	m3	250	13,000	3,250				
Asphaltic Prime/Tack Coat	m2	12	202,300	2,428				
DBST	m2	40	173,400	6,936				
AC Surfacing	m2	190	-	0				
Sub Total				43,747		36,310		18,155
STRUCTURES					83		50	
RC Pipe Culvert (D 1.00 Equivalent)	m	1,800	2,058	3,704				
RC Box Culvert (2 x 2.4 x 2.4 Equivalent)	m	20,000	-	0				
RC Bridge (W=7.0 L=10.0 Equivalent)	m	60,000	59	3,540				
Sub Total				7,244		6,013		3,007
INTERCHANGE/INTERSECTION	nos.	5,000,000	-	0	83	0	50	0
Total (a)					61,355	50,925		28,904
Miscellaneous Work ((a) x 7%)	1s			4,295	83	3,565	0	0
CONTRACT AMOUNT (b)					65,650	54,490		28,904
PHYSICAL CONTINGENCIES ((b) x 10%) (c)	1s			6,565		5,449		2,890
ENGINEERING AND SUPERVISION (((b) + (c)) x 10%) (d)					85	0		0
	1s			7,222		6,139		0
LAND ACQUISITION					100		100	
Highly Developed Land	ha	-	-	0				
Less Developed Land	ha	-	-	0				
Sub Total (e)	1s			0		0		0
PROJECT COST ((b) + (c) + (d) + (e))					79,437	66,078		31,794
AVERAGE COST PER KM					2,711			

5. ECONOMIC EVALUATION

COST AND BENEFIT STATEMENT

(1000 BAHT)

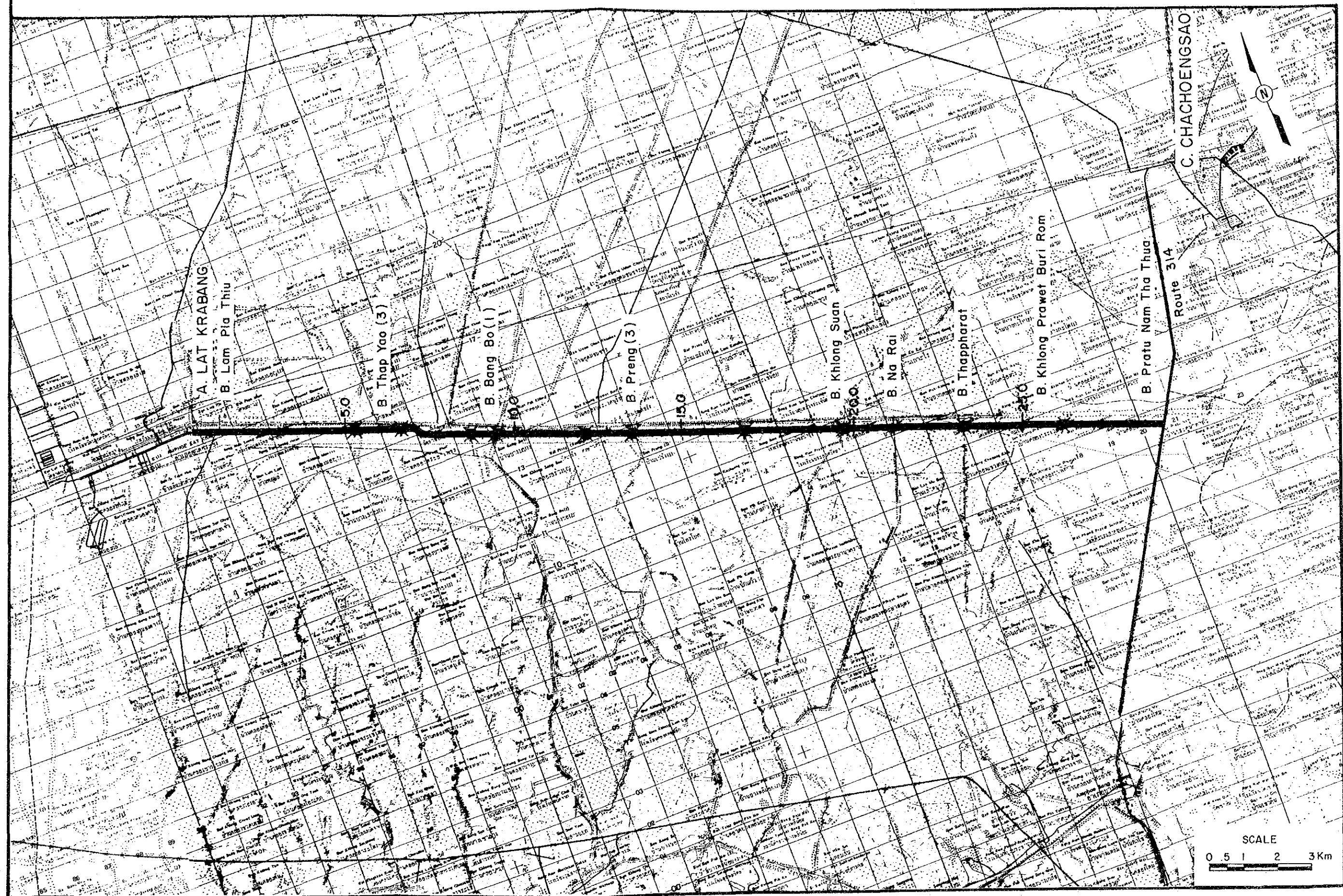
YEAR	COST		BENEFITS		DISCOUNTED(12%)	
	CONST. COST	VOC SAVING	TIME SAVING	TOTAL	COST	BENEFIT
1991	13,216			0	18,568	0
1992	33,039			0	41,444	0
1993	19,823			0	22,202	0
1994		49,481	6,595	56,076	0	50,068
1995		52,771	7,055	59,826	0	47,693
1996		56,061	7,514	63,575	0	45,251
1997		59,351	7,974	67,325	0	42,786
1998		62,641	8,434	71,075	0	40,330
1999		65,931	8,893	74,824	0	37,908
2000		69,221	9,353	78,574	0	35,543
2001	15,688	74,065	10,038	84,103	7,096	33,968
2002		78,910	10,724	89,634	0	32,323
2003		83,754	11,409	95,163	0	30,640
2004		88,599	12,095	100,694	0	28,947
2005		93,444	12,781	106,225	0	27,265
2006		98,288	13,466	111,754	0	25,611
2007		103,133	14,152	117,285	0	23,999
2008	(31,794)	107,977	14,837	122,814	(6,506)	22,438
TOTAL	49,972	1,143,627	155,319	1,298,947	82,804	524,770

NET PRESENT VALUE : 441,966
 BENEFIT COST RATIO : 6.34
 INTERNAL RATE OF RETURN : 45.6%

6. DEVELOPMENT AND SOCIAL IMPACTS

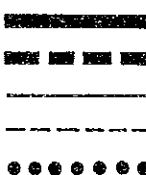
Impact of the proposed road to agricultural production in the surrounding area would be small as access does not seem to be a hindrance to agriculture in this area. The road, however, would give an extra boost to industrialization of Lat Krabang and Chachoengsao, where many industrial projects are being planned. Some spillover effects along the road would take place.

PROJECT NO. IM - 17 A. LAT KRABANG - B. KHLONG THA THUA L = 29.30 KM.
C. BANGKOK, C. SAMUT PRAKAN, C. CHACHOENGSAO

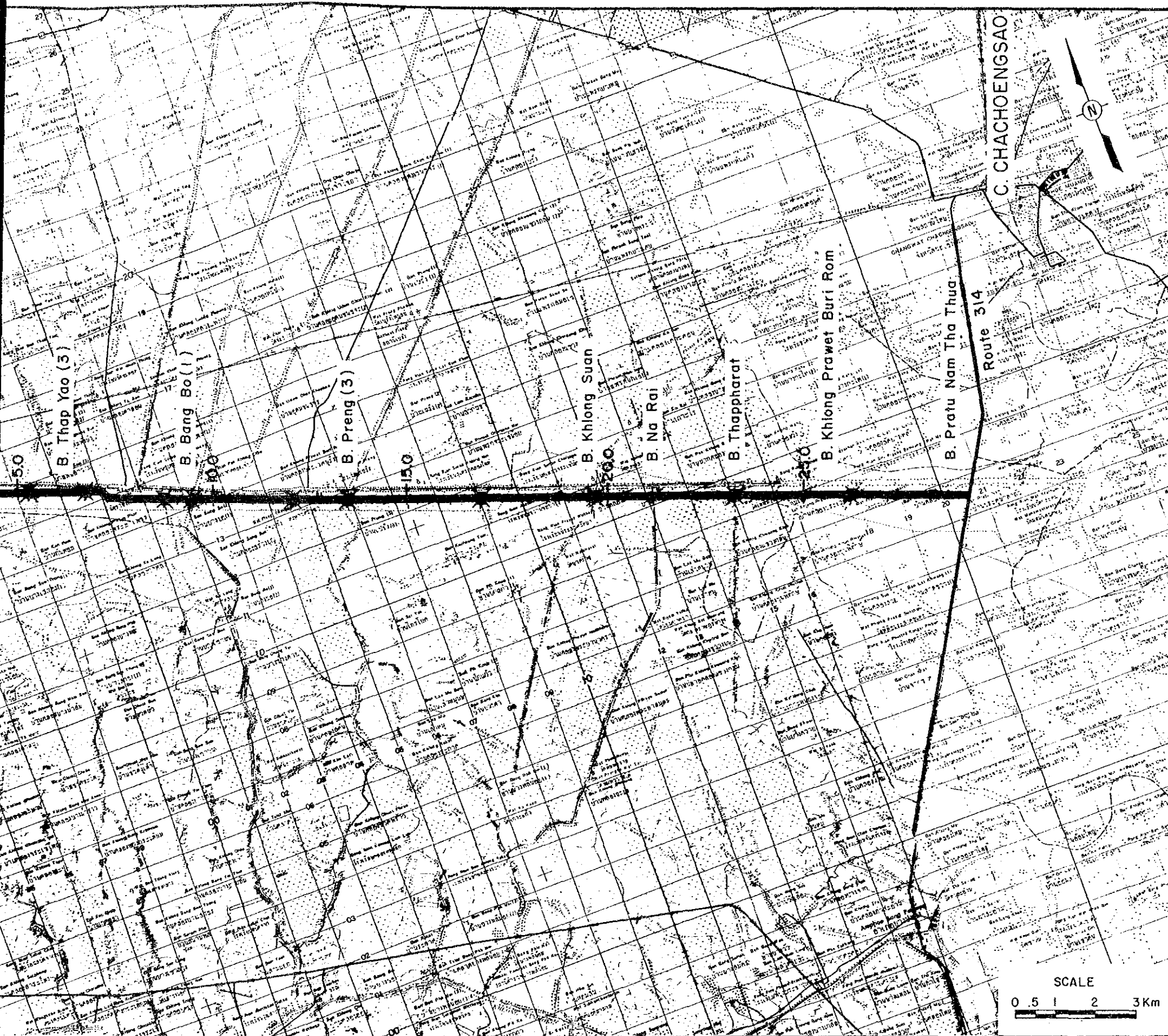


No.	Station Km.
1	4.8
2	6.3
3	8.4
4	9.3
5	11.7
6	13.4
7	16.7
8	19.6
9	21.3
10	23.2
11	26.2

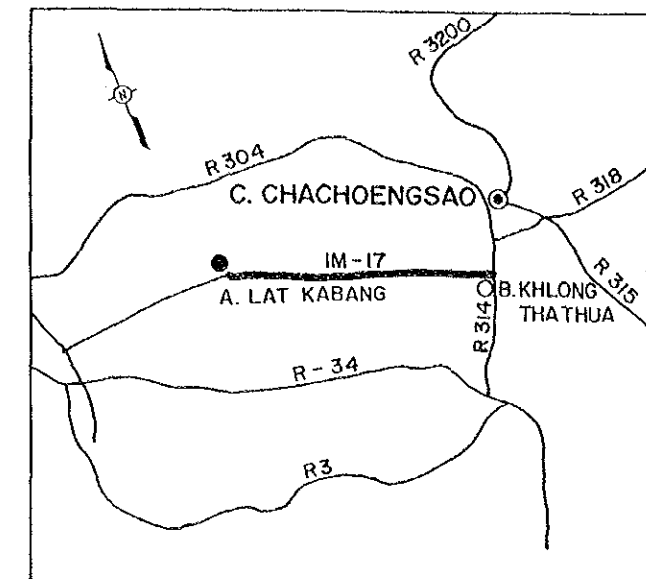
LEGEND



PROJECT NO. IM - 17 A. LAT KRABANG - B. KHLONG THA THUA
C. BANGKOK, C. SAMUT PRAKAN, C. CHACHOENGSAO L = 29.30 KM.



LOCATION MAP



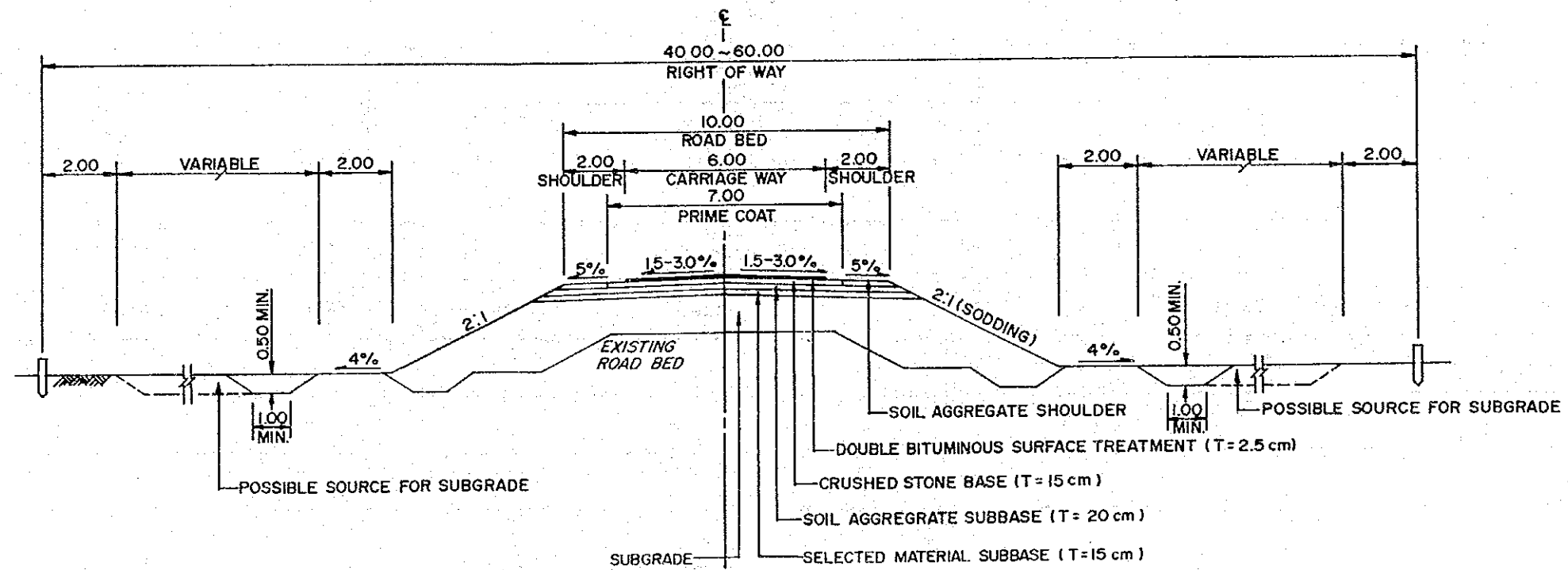
BRIDGE LIST

No	Station Km.	Proposed Bridge	Existing Bridge
1	4.8	—	C-7.00 x 32.00
2	6.3	—	C-7.00 x 41.00
3	8.4	—	C-7.00 x 18.00
4	9.3	—	C-7.00 x 120.00
5	11.7	C-7.00 x 17.00	W-4.00 x 15.00
6	13.4	C-7.00 x 26.00	W-6.00 x 24.00
7	16.7	C-7.00 x 16.00	W-7.00 x 14.00
8	19.6	—	C-7.00 x 40.00
9	21.3	—	C-7.00 x 30.00
10	23.2	—	C-7.00 x 30.00
11	26.2	—	C-7.00 x 30.00

LEGEND

- PROPOSED ROUTE (IMPROVEMENT)
- PROPOSED ROUTE (NEW CONSTRUCTION)
- PAVED ROUTE
- UNPAVED ROUTE
- INVENTORY SURVEY ROUTE

TYPICAL CROSS SECTION



PROVINCIAL HIGHWAY (CLASS F3)

PROJECT NO. IM-17

ROAD INVENTORY
ROUTE NO. A. LAT KRABANG - B. KHLONG THA THUA J.R. 314
C. BANGKOK/SAMUT PRAKAN/CHACHEONGSEO

L = 29.3 km

STATION (Km)		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	29.0	29.3	30
VILLAGE Name of Village		A.Lat Krabang				Wat. Racha Kosā						Wat.						J.R. 314	
TERRAIN																			
CROSS SECTION	Formation Width (m)			6.0 (1.0)					5.0-6.0 (1.0)					10.0					
	Embankment Height (m)			0.3					0.3					1.0					
	Cutting Depth (m)																		
SURFACE	Type/Length (km)			SBST					Laterite		SBST		Concrete		Laterite				
	Condition	Poor		Fair					Poor		Poor		Fair		Good				
FLOODING	Overflow Length (km)/Height (m)					1.0 0.2													
LAND USE	Left								Paddy										
	Right								Paddy										
BOX CULVERT & BRIDGE	Station (km)			4+800	6+300	8+400	9+300	11+700	13+400		16+700	19+600	21+300	23+200		26+200			
	Dimension (m) Bridge - Conc. or wooden - Width - (Side walk) - Length Box - width - Height - Length	C-Bx (Small)	C-Bx (S) C-Bx (S)	C-Br. 7.00(0)x32.00	C-Bx C-Br. 7.00(0)x41.00	C-Bx (S) C-Bx (S) C-Br. 7.00(0)x18.00	C-Br. 8.00(1.5)x120	W-Br. 4.00x15.00	W-Br. 6.00x24.00		C-Bx (S) C-Bx (S) W-Br. 7.00x14.00	C-Br. Under Const. L = 40 m	C-Br. Under Const. L = 30 m C-Bx.	C-Br. Under Const. L = 30 m	C-Bx (S) C-Bx (S)	C-Br. Under Const. L = 30 m			
RIGHT OF WAY (m) (Left/Right)									15 15										
ALIGNMENT	Horizontal								Good										
	Vertical								Good										
ROUTE NO., AGENCIES																			P.W.D. Under Construction

PROJECT IM - 18

Changwat : Nakhon Nayok, Prachin Buri

C. Nakhon Nayok - A. Ban Sang

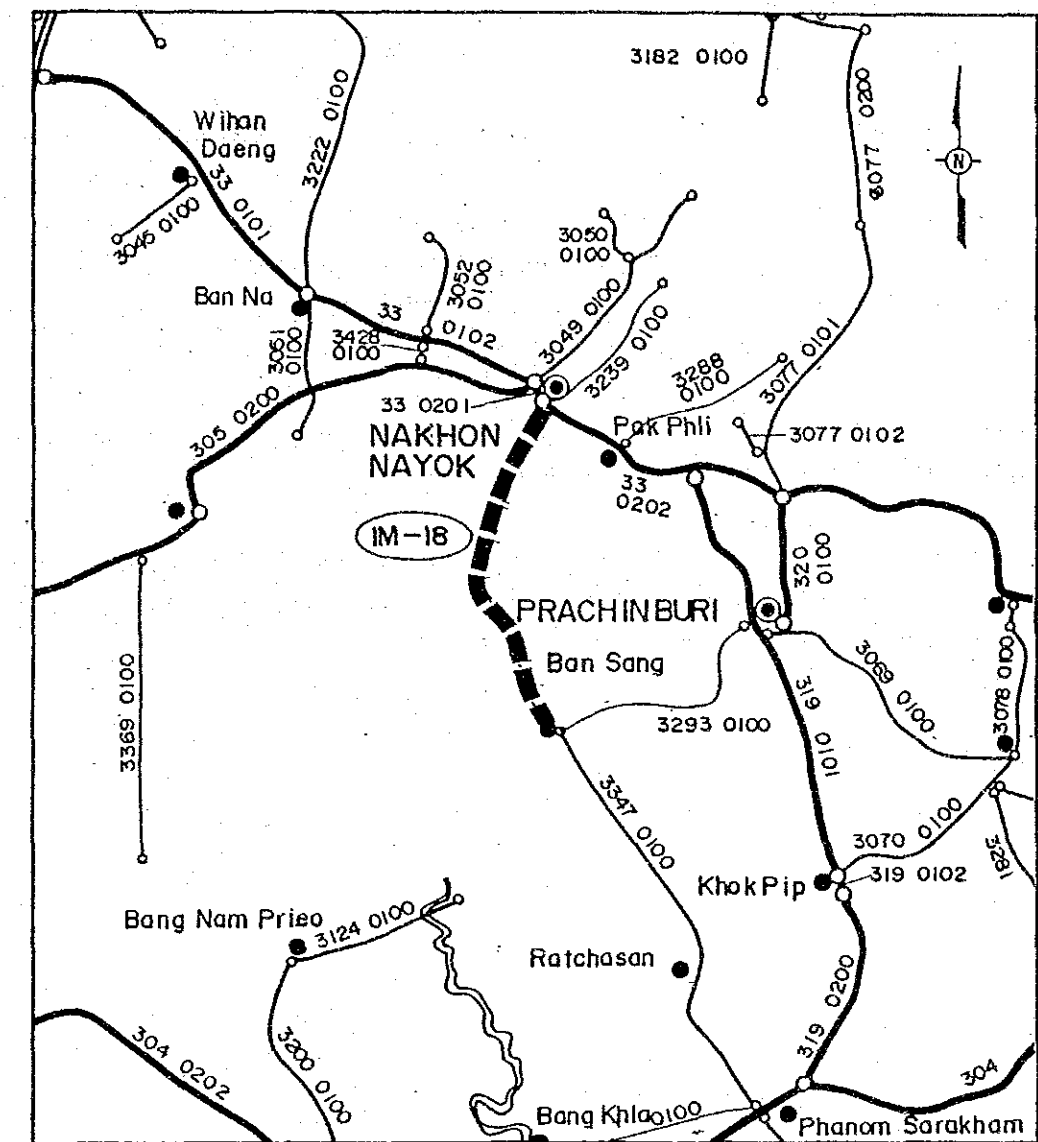
Length : 26.70 km

SUMMARY

PROJECT IM-18

Item	Description
Changwat	Nakhon Nayok/Prachin Buri
Origin	C. Nakhon Nayok
Destination	A. Ban Sang
Length	
Total	26.7 km
Improvement Section	
DOH Road	No.3076 6.7 km
Others	20.0 m
New Construction Section	-
Surface Type and Condition	SBST Fair/Poor
Terrain	Flat
Traffic (ADT)	
Existing	170
2000	550
2008	779
Existing Standard	Laterite, Substandard
Proposed Standard	F4
Construction Cost	
Financial	68,086 Thousand Baht
Economic	56,635 Thousand Baht
IRR	6.2 %
B/C	0.62

LOCATION OF PROJECT ROUTE



LEGEND :

■■■■■	PROJECT ROUTE	—	PROVINCIAL HIGHWAYS
====	DIVIDED HIGHWAYS	---	PROVINCIAL HIGHWAYS (Unpaved)
————	NATIONAL HIGHWAYS	●, ●	CHANGWAT, AMPHOE

1. GENERAL

The proposed route extends over the two Changwats of Nakhon Nayok and Prachinburi.

The route originates in Muang Nakhon Nayok, runs southward passing through or beside about 20 villages and ends in Amphoe Ban Sang. Its total length is 26.7 km.

Most of its middle section, about 18 km in length, runs atop the embankment of a large-scale IRD canal with a height above the field surface of 2.0–4.0 m. The surrounding terrain is flat for its entire length. The improved route will largely remain in the same alignment as the existing one. There are six permanent full size bridges, one of which in the final DOH-administered section is under construction, and one narrow concrete bridge. Land use in the surrounding is almost exclusively rice fields, except for scattered clusters of farm houses, and is well cultivated.

The surface condition of the short DBST sections near both ends are fair to poor, while the surface condition of the main laterite section is good to fair.

The proposed road, upon completion, will not only serve a wide area between Muang Nakhon Nayok and Amphoe Ban Sang, currently with no paved road, but also provide a shorter alternate route between Phanom Sarakam and Nakhon Nayok.

2. TRAFFIC (Growth Rate Method)

Base Traffic Volume

Route	Section	Year	MC	PC	LB	HB	LT	MT	HT	ADT
IM-18	RID	1987	58	8	28	0	95	29	10	170

Traffic Growth Rate

Route	Period	MC	PC	LB	HB	LT	MT	HT	ADT
IM-18	- 1993	9.66	11.00	9.34	10.76	10.18	7.47	7.05	9.66
	1994 - 2000	6.15	6.39	8.35	6.66	5.94	5.78	4.58	6.15
	2001 - 2008	4.63	5.46	5.43	4.98	4.18	4.25	2.86	4.63

Induced Traffic Ratio

Route	PC	LB	HB	LT	MT	HT
IM-18	1.27	1.28	1.17	1.28	1.00	1.00

Future Traffic Volume

Route	Section	Year	MC	PC	LB	HB	LT	MT	HT	ADT
IM-18	RID	1993	123	19	62	0	217	45	15	358
		2000	123	29	108	0	325	67	21	550
		2008	269	44	164	0	452	93	26	779

3. BENEFITS

ROAD CONDITIONS

	LENGTH (KM)	ROAD CLASS	GRADIENTS	CURVE	NO. OF NARROW BRIDGE	NO. OF WOODEN BRIDGE
WITHOUT PROJECT	26.70	LATERITE FAIR	GOOD	GOOD	1	0
WITH PROJECT	26.70	PAVED F4	GOOD	GOOD	0	0

VOC SAVINGS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	690.	478.	1509.	0.	4256.	1914.	899.	9747.
2008	993.	727.	2295.	0.	5915.	2657.	1113.	13699.

TIME SAVINGS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	140.	126.	1110.	0.	857.	198.	62.	2493.
2008	202.	192.	1688.	0.	1191.	275.	77.	3624.

TOTAL BENEFITS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	831.	604.	2618.	0.	5113.	2112.	961.	12240.
2008	1195.	918.	3982.	0.	7106.	2932.	1190.	17323.

4. ENGINEERING

SUMMARY OF ROAD INVENTORY

(PROJECT IM-18)

Item	Description
Changwat	Nakhon Nayok/Prachin Buri
Origin	C. Nakhon Nayok
Destination	A. Ban Sang
Length	
Total	26.7 km
Improvement Section	
DOH Road	No.3076 6.7 km
Others	20.0 m
New Construction Section	-
Terrain	Flat
Alignment (Hori./Vert.)	Good/Good
Formation Width	8.0 m
Embankment Section	
Length	26.7 km
Height	1.5 m ~ 4.0 m
Cut Section	
Length	-
Depth	-
Surface Type and Condition	
SBST or DBST	Fair/poor
Soil Aggregate	-
Earth	Good/Fair
Box Culvert	-
Bridgemanent Bridge	
Permanent Bridge	6 site (296.0 m including under const.)
Narrow Concrete Bridge	1 site 41.0 m
Wooden Bridge	-
Overflow Section	-
Right of way	30 m ~ 40 m

CONSTRUCTION QUANTITIES AND COSTS
(Project IM-18 Length=26.7 km)

Item	Unit	Financial	Quantity	Financial	Economic Cost		Residual Value	
		Unit Rate Baht		Total Cost 1000 Baht	%	1000 Baht	%	1000 Baht
EARTHWORK						83		90
Clearing & Grubbing	ha	9,500	7	67				
Earth Excavation	m3	16	-	0				
Embankment (Side Borrow)	m3	40	267,000	10,680				
Embankment (Borrow Pit)	m3	100	-	0				
Sub Total				10,747		8,920		8,028
PAVEMENT						83		50
Subbase (Selected Material)	m3	180	35,600	6,408				
Subbase (Soil Aggregate)	m3	220	47,500	10,450				
Base (Soil Aggregate)	m3	350	25,800	9,030				
Shoulder (Soil Aggregate)	m3	250	10,000	2,500				
Asphaltic Prime/Tack Coat	m2	12	171,400	2,057				
DBST	m2	40	145,000	5,800				
AC Surfacing	m2	190	-	0				
Sub Total				36,245		30,083		15,042
STRUCTURES						83		50
RC Pipe Culvert (D 1.00 Equivalent)	m	1,800	1,742	3,136				
RC Box Culvert (2 x 2.4 x 2.4 Equivalent)	m	20,000	-	0				
RC Bridge (W=7.0 L=10.0 Equivalent)	m	60,000	41	2,460				
Sub Total				5,596		4,645		2,323
INTERCHANGE/INTERSECTION	nos.	5,000,000	-	0	83	0	50	0
Total (a)					52,588		43,648	25,393
Miscellaneous Work ((a) x 7%)	1s			3,681	83	3,055	0	0
CONTRACT AMOUNT (b)					56,269		46,703	25,393
PHYSICAL CONTINGENCIES ((b) x 10%) (c)	1s			5,627		4,670		2,539
ENGINEERING AND SUPERVISION (((b) + (c)) x 10%) (d)					6,190	85	5,262	0
LAND ACQUISITION						100		100
Highly Developed Land	ha	-	-	0				
Less Developed Land	ha	-	-	0				
Sub Total (e)	1s			0		0		0
PROJECT COST ((b) + (c) + (d) + (e))					68,086		56,635	27,932
AVERAGE COST PER KM					2,550			

5. ECONOMIC EVALUATION

COST AND BENEFIT STATEMENT

(1000 BAHT)

YEAR	COST		BENEFITS		DISCOUNTED (12%)	
	CONST. COST	VOC SAVING	TIME SAVING	TOTAL	COST	BENEFIT
1991	0			0	0	0
1992	22,654			0	28,417	0
1993	88,981			0	99,659	0
1994		6,878	1,693	8,571	0	7,653
1995		7,356	1,826	9,182	0	7,320
1996		7,834	1,960	9,794	0	6,971
1997		8,313	2,093	10,406	0	6,613
1998		8,791	2,226	11,017	0	6,251
1999		9,269	2,360	11,629	0	5,892
2000		9,747	2,493	12,240	0	5,537
2001	13,141	10,241	2,634	12,875	5,944	5,200
2002		10,735	2,776	13,511	0	4,872
2003		11,229	2,917	14,146	0	4,555
2004		11,723	3,058	14,781	0	4,249
2005		12,217	3,200	15,417	0	3,957
2006		12,711	3,341	16,052	0	3,679
2007		13,205	3,482	16,687	0	3,414
2008	(27,932)	13,699	3,624	17,323	(5,715)	3,165
TOTAL	96,844	153,949	39,683	193,631	128,305	79,328

NET PRESENT VALUE : (48,977)
 BENEFIT COST RATIO : 0.62
 INTERNAL RATE OF RETURN : 6.2%

6. DEVELOPMENT AND SOCIAL IMPACTS

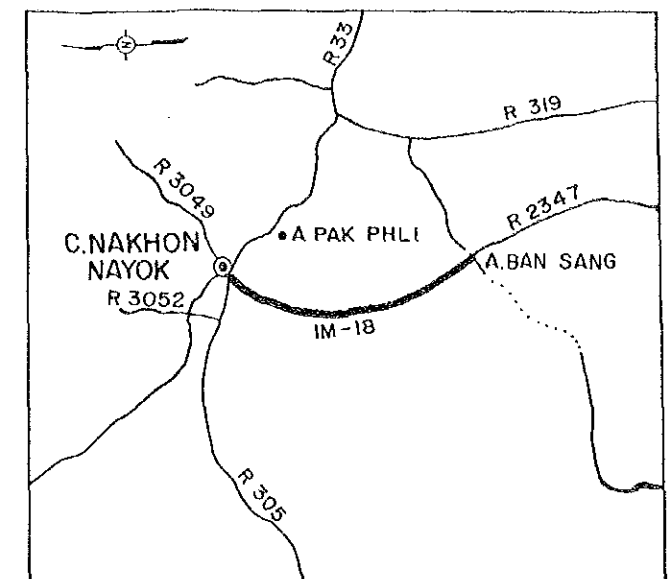
The area along the road is already extensively cultivated with good irrigation facilities. Impact of the improved road on agricultural production would probably be small. However, the resulting high speed access to Nakhon Nayok or, to a lesser degree, to Prachin Buri may well bring about significant social impact on village dwellers by means of enhanced exposure to urban services and other opportunities.

PROJECT NO. IM - 18

C. NAKHON NAYOK - A. BAN SANG
C. NAKHON NAYOK, C. PRACHIN BURI

L = 26.70 KM.

LOCATION MAP

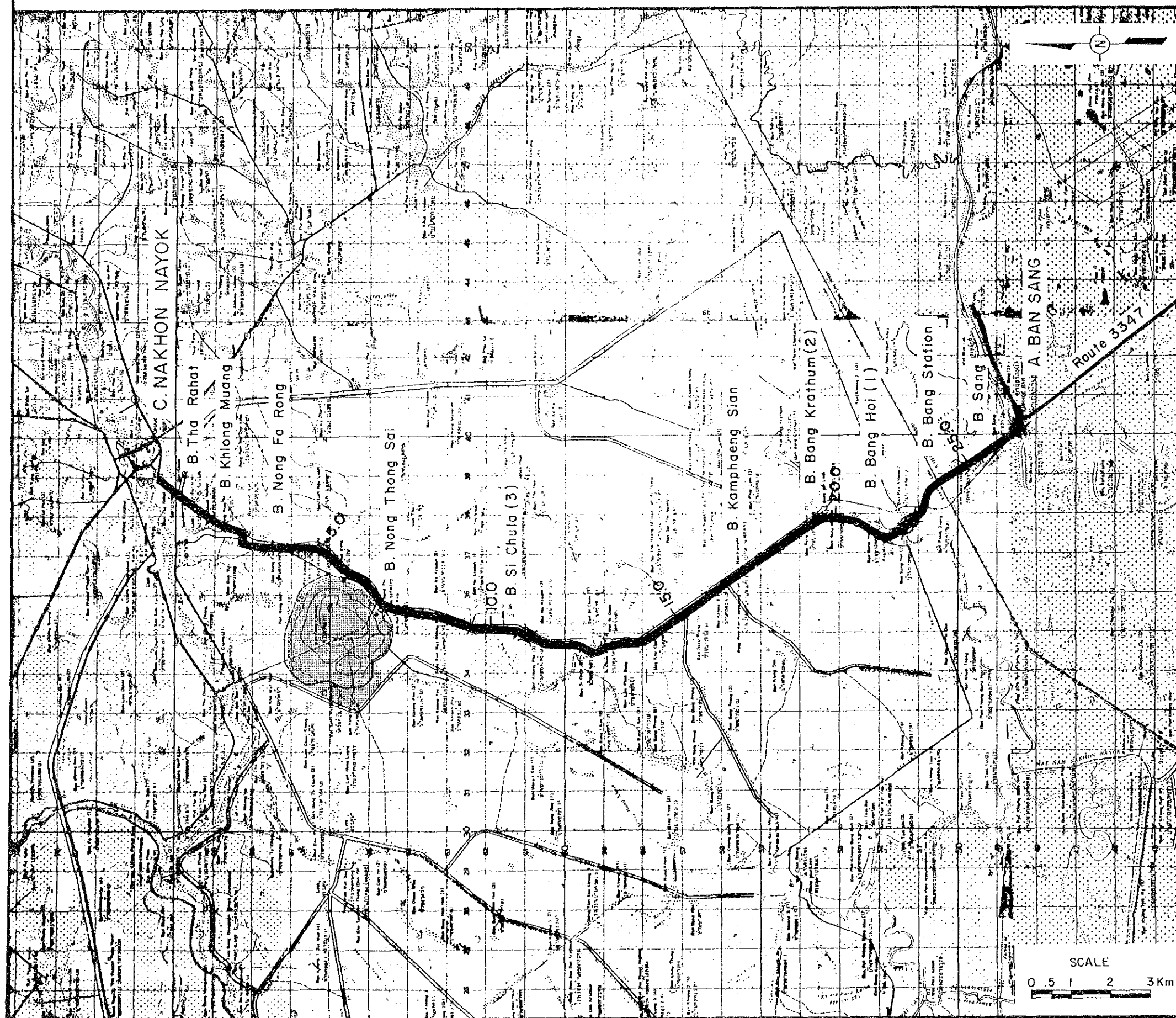


BRIDGE LIST

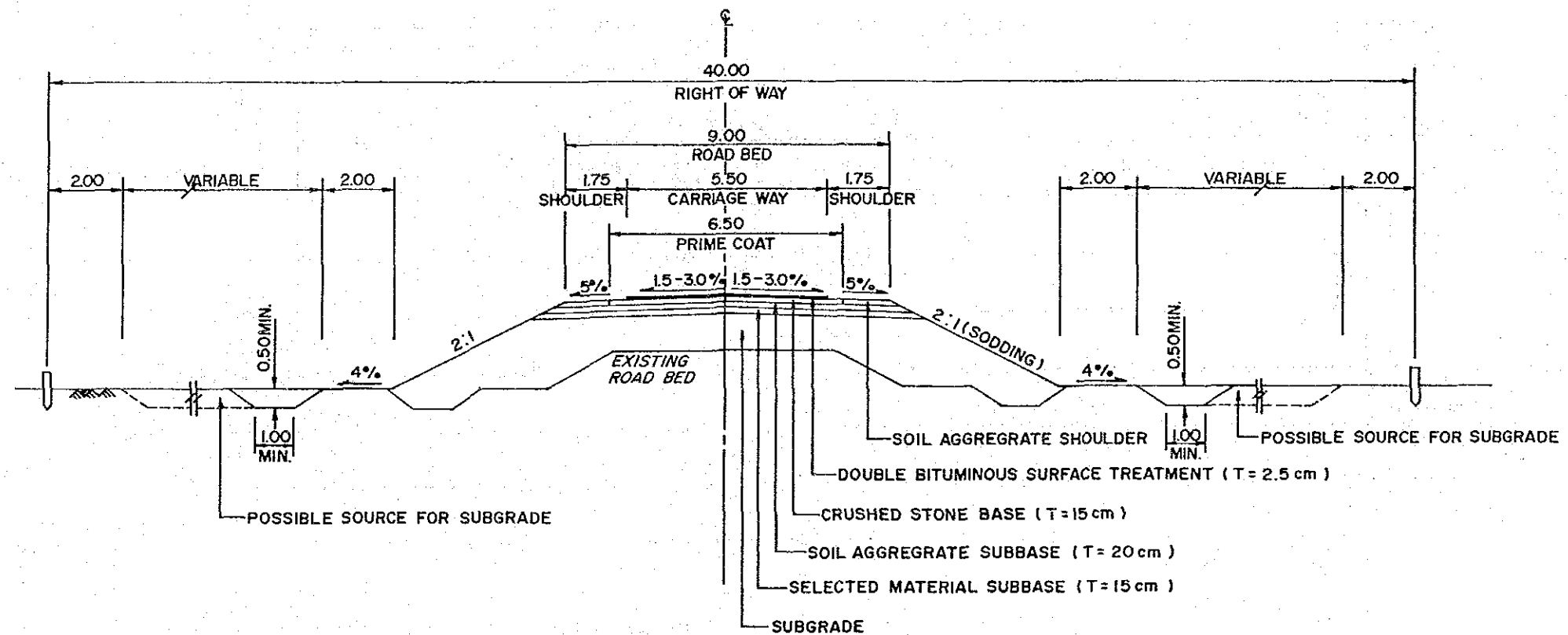
No	Station Km.	Proposed Bridge	Existing Bridge
1	0.7	—	C-7.20 x 30.00
2	2.7	—	C-7.00 x 42.00
3	11.4	—	C-7.00 x 30.00
4	22.5	—	C-7.00 x 18.00
5	22.8	—	C-7.00 x 46.00
6	24.4	C-7.00 x 41.00	M-3.50 x 41.00
7	26.5	—	C-8.00 x 130.00

LEGEND

- PROPOSED ROUTE (IMPROVEMENT)
- - - PROPOSED ROUTE (NEW CONSTRUCTION)
- PAVED ROUTE
- - - UNPAVED ROUTE
- INVENTORY SURVEY ROUTE



TYPICAL CROSS SECTION



PROVINCIAL HIGHWAY (CLASS F4)

PROJECT NO. IM-18

ROAD INVENTORY
ROUTE NO. RID C. NAKHON NAYOK - A. BAN SANG
C. NAKHON NAYOK/PRACHIN BURI

L = 26.7 km

STATION (Km)		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30							
VILLAGE Name of Village		C. Nakhon Nayok																	Canal	Canal		Railway		A. Ban Sang
TERRAIN		Flat																						
CROSS SECTION	Formation Width (m)	6.0 (1.0)		6.5 (1.0)		6.5 (0.75)						6.0 (1.0)												
	Embankment Height (m)	0.3	0.3	3.0	2.5	3.0	4.0	4.0	4.0	3.0	3.0 4.0	3.0	3.0 4.0	4.0	2.0	1.5	1.5	1.5	1.0	1.0				
	Cutting Depth (m)																							
SURFACE	Type/Length (km)	SB ST	Laterite												SBST	Laterite			SBST					
	Condition	P	Good/Fair												Fair/Poor	Good			F					
FLOODING	Overflow Length (km)/Height (m)	No																						
LAND USE	Left	Paddy	Canal												Village	Paddy								
	Right	Paddy	Paddy												Canal	Paddy								
BOX CULVERT & BRIDGE	Station (km)	0+700	2+700													11+400					22+500	22+800	24+400	26+500
	Dimension (m) Bridge - Conc. or Wooden - Width - (Sidewalk) - Length	C-Br. 7.20(0.90)x30.00	C-Br. 7.00(0.90)x42.00													C-Br. 7.00(0.90)x30.00					C-Br. (Under Const.) L = 18.00	C-Br. (Under Const.) L = 46.00	M-Br. 3.50(0)x41.00	C-Br. 8.00(1.00)x130.00
RIGHT OF WAY (m) (Left/Right)		10 10	Left Right												Canal 40	20.0 Canal	15 15							
ALIGNMENT	Horizontal	Good												Good										
	Vertical	Good												Good										
ROUTE NO., AGENCIES		RID												DOH Route No. 3076										

PROJECT IM - 19

Changwat : Prachin Buri

A. Sa Kaeo - DOH Const. Office

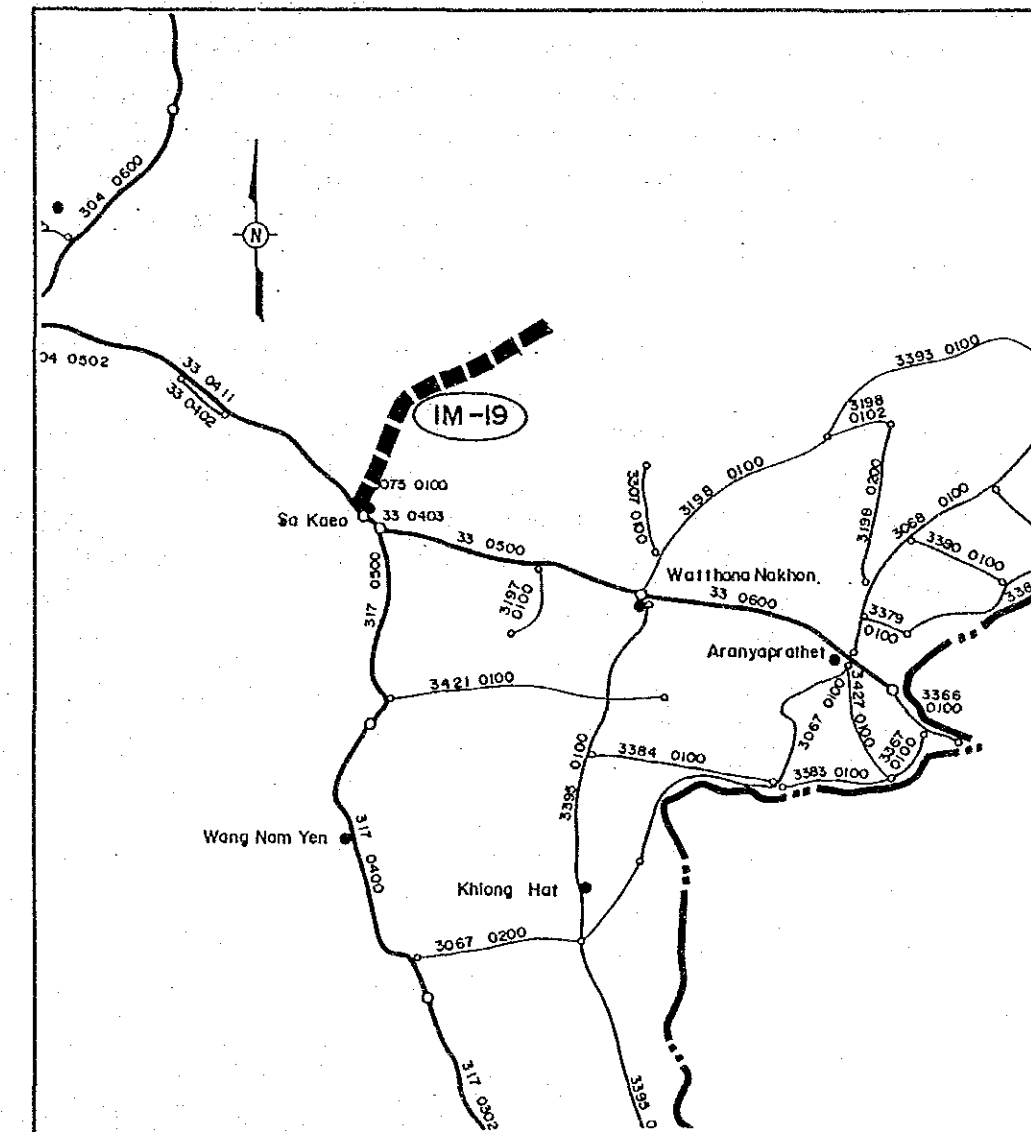
Length : 27.30 km

SUMMARY

PROJECT IM-19

Item	Description
Changwat	Prachin Buri
Origin	A. Sa Kaeo (J.R.33)
Destination	DOH Const. Office (Waterfall)
Length	
Total	27.3 km
Improvement Section	27.3 km
DOH Road	-
Others	27.3 km
New Construction Section	-
Surface Type and Condition	SBST Fair S/A Fair to Good
Terrain	Flat (Partly Rolling)
Traffic (ADT)	
Existing	183
2000	403
2008	565
Existing Standard	Laterite, Substandard
Proposed Standard	F3
Construction Cost	
Financial	70,595 Thousand Baht
Economic	58,723 Thousand Baht
IRR	12.7%
B/C	1.06

LOCATION OF PROJECT ROUTE



SCALE
5 0 10 km.

LEGEND :

- PROJECT ROUTE
- ==== DIVIDED HIGHWAYS
- NATIONAL HIGHWAYS
- PROVINCIAL HIGHWAYS
- PROVINCIAL HIGHWAYS (Unpaved)
- , ● CHANGWAT, AMPHOE

1. GENERAL

The proposed route lies entirely in Changwat Prachinburi.

The route originates in Amphoe Sa Kaeo at the junction with Route 33 in the middle of the Sa Kaeo commercial area, runs generally in a northeast direction and ends at a waterfall on the fringe of a mountain range. Its total length is 27.3 km. Except for the last 1-km, the route lies in flat land with occasional mild rolling undulations. For the most part, the embankment height is low, 0.3–0.5 m. Surface treatment is applied over sections located within clusters of houses. Otherwise, the surface is of laterite. Land alongside is well cultivated, rice paddies in flat terrain and cassava fields in rolling terrain. Major waterway crossings are provided with permanent concrete structures.

The condition of SBST sections is generally fair. The condition of laterite sections is fair to good.

There is a DOH field construction office near the end of the road, which is currently engaged in extending the road northward through the mountain range. This road will run along the national border to the Northeast Region, and will be of importance for national security. The proposed road, upon completion, will not only serve communities along the road but form a significant road network.

2. TRAFFIC (Growth Rate Method)

Base Traffic Volume

Route	Section	Year	MC	PC	LB	HB	LT	MT	HT	ADT
IM-19	RURAL	1988	290	12	0	0	109	42	21	183

Traffic Growth Rate

Route	Period	MC	PC	LB	HB	LT	MT	HT	ADT
IM-19	– 1993	6.81	7.33	7.61	6.89	6.77	5.39	5.67	6.81
	1994 – 2000	6.04	6.47	7.38	6.67	5.78	4.90	4.44	6.04
	2001 – 2008	4.73	5.24	6.07	4.22	4.38	3.90	3.43	4.73

Induced Traffic Ratio

Route	PC	LB	HB	LT	MT	HT
IM-19	1.15	1.16	1.10	1.15	1.00	1.00

Future Traffic Volume

Route	Section	Year	MC	PC	LB	HB	LT	MT	HT	ADT
IM-19	RURAL	1993	445	20	0	0	174	55	28	277
		2000	445	30	0	0	258	77	38	403
		2008	975	45	0	0	365	105	50	565

3. BENEFITS

ROAD CONDITIONS

	LENGTH (KM)	ROAD CLASS	GRADIENTS	CURVE	NO. OF NARROW BRIDGE	NO. OF WOODEN BRIDGE
WITHOUT PROJECT	27.30	LATERITE FAIR	GOOD	GOOD	1	0
WITH PROJECT	27.30	PAVED F3	GOOD	GOOD	0	0

VOC SAVINGS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	2654.	520.	0.	0.	3513.	2084.	1532.	10303.
2008	3849.	781.	0.	0.	4963.	2841.	2016.	14450.

TIME SAVINGS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	288.	74.	0.	0.	388.	124.	61.	935.
2008	417.	111.	0.	0.	549.	169.	81.	1327.

TOTAL BENEFITS

(1000 BAHT/YEAR)

YEAR	MC	PC	LB	HB	LT	MT	HT	TOTAL
2000	2941.	595.	0.	0.	3901.	2208.	1593.	11238.
2008	4266.	892.	0.	0.	5512.	3011.	2097.	15777.

4. ENGINEERING

SUMMARY OF ROAD INVENTORY

(PROJECT IM-19)

Item	Description
Changwat	Prachin Buri
Origin	A. Sa Kaeo (J.R.33)
Destination	DOH Const. Office (Waterfall)
Length	
Total	27.3 km
Improvement Section	27.3 km
DOH Road	-
Others	27.3 km
New Construction Section	-
Terrain	Flat (partly rolling)
Alignment (Hori./Vert.)	Good /Good (Fair)
Formation Width	7.0 m ~ 8.0 m
Embankment Section	
Length	27.3 km
Height	0.3 m ~ 0.5 m
Cut Section	-
Length	-
Depth	-
Surface Type and Condition	
SBST or DBST	Fair
Soil Aggregate	Fair to Good
Earth	-
Box Culvert	-
Bridge	
Permanent Bridge	5 sites 142.0 m
Narrow Concrete Bridge	1 site 18.0 m
Wooden Bridge	-
Overflow Section	-
Right of way	20 m ~ 30 m

CONSTRUCTION QUANTITIES AND COSTS
(Project IM-19 Length= 27.3 km)

Item	Unit	Financial	Quantity	Financial	Economic Cost		Residual Value	
		Unit Rate Baht		Total Cost 1000 Baht	%	1000 Baht	%	1000 Baht
EARTHWORK					83		90	
Clearing & Grubbing	ha	9,500	11	105				
Earth Excavation	m3	16	-	0				
Embankment (Side Borrow)	m3	40	257,800	10,312				
Embankment (Borrow Pit)	m3	100	-	0				
Sub Total				10,417		8,646		7,781
PAVEMENT					83		50	
Subbase (Selected Material)	m3	180	40,700	7,326				
Subbase (Soil Aggregate)	m3	220	54,300	11,946				
Base (Soil Aggregate)	m3	350	28,500	9,975				
Shoulder (Soil Aggregate)	m3	250	12,200	3,050				
Asphaltic Prime/Tack Coat	m2	12	190,000	2,280				
DBST	m2	40	162,800	6,512				
AC Surfacing	m2	190	-	0				
Sub Total				41,089		34,104		17,052
STRUCTURES					83		50	
RC Pipe Culvert (D 1.00 Equivalent)	m	1,800	1,078	1,940				
RC Box Culvert (2 x 2.4 x 2.4 Equivalent)	m	20,000	-	0				
RC Bridge (W=7.0 L=10.0 Equivalent)	m	60,000	18	1,080				
Sub Total				3,020		2,507		1,254
INTERCHANGE/INTERSECTION	nos.	5,000,000	-	0	83	0	50	0
Total (a)					54,526	45,257		26,087
Miscellaneous Work ((a) x 7%)	1s			3,817	83	3,168	0	0
CONTRACT AMOUNT (b)					58,343	48,425		26,087
PHYSICAL CONTINGENCIES ((b) x 10%) (c)	1s			5,834		4,843		2,609
ENGINEERING AND SUPERVISION (((b) + (c)) x 10%) (d)	1s			6,418	85	5,455	0	0
LAND ACQUISITION					100		100	
Highly Developed Land	ha	-	-	0				
Less Developed Land	ha	-	-	0				
Sub Total (e)	1s			0		0		0
PROJECT COST ((b) + (c) + (d) + (e))					70,595	58,723		28,696
AVERAGE COST PER KM					2,586			

5. ECONOMIC EVALUATION

COST AND BENEFIT STATEMENT

(1000 BAHT)

YEAR	COST		BENEFITS		DISCOUNTED(12%)	
	CONST. COST	VOC SAVING	TIME SAVING	TOTAL	COST	BENEFIT
1991	0			0	0	0
1992	23,489			0	29,465	0
1993	35,234			0	39,462	0
1994		7,548	678	8,226	0	7,345
1995		8,007	721	8,728	0	6,958
1996		8,466	764	9,230	0	6,570
1997		8,925	807	9,732	0	6,185
1998		9,385	850	10,235	0	5,808
1999		9,844	893	10,737	0	5,440
2000		10,303	936	11,239	0	5,084
2001	14,729	10,821	984	11,805	6,663	4,768
2002		11,339	1,033	12,372	0	4,461
2003		11,858	1,082	12,940	0	4,166
2004		12,376	1,131	13,507	0	3,883
2005		12,895	1,180	14,075	0	3,613
2006		13,413	1,229	14,642	0	3,356
2007		13,931	1,278	15,209	0	3,112
2008	(28,696)	14,450	1,327	15,777	(5,872)	2,882
TOTAL	44,756	163,561	14,893	178,454	69,718	73,631

NET PRESENT VALUE : 3,913
 BENEFIT COST RATIO : 1.06
 INTERNAL RATE OF RETURN : 12.7%

6. DEVELOPMENT AND SOCIAL IMPACTS

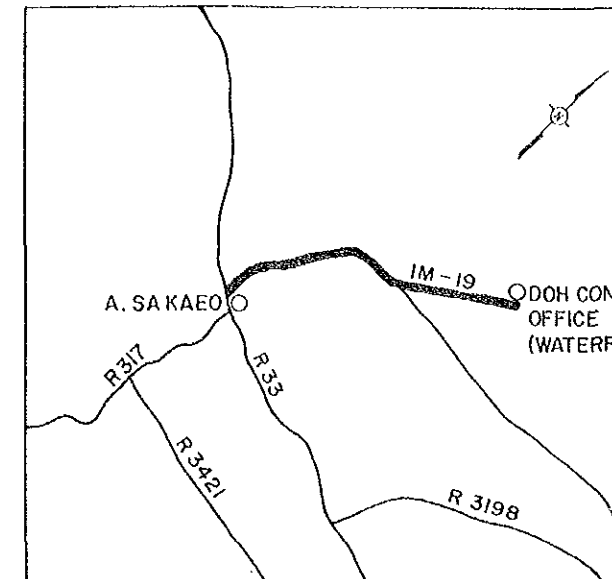
When the paving of entire length is completed, it will certainly generate tourist traffic from nearby towns particularly from Sa Kaeo to the waterfall at the end of the road. As the road does not seem to be prone to flooding and is kept in fair condition, agricultural production would not be affected much by its improvement. However, together with increased contacts with town people as tourists, enhanced exposure to urban life would result in changes in the attitude of village dwellers.

PROJECT NO. IM - 19

A. SA KAE0 - DOH CONST. OFFICE
C. PRACHIN BURI

L = 27.30 KM.

LOCATION MAP

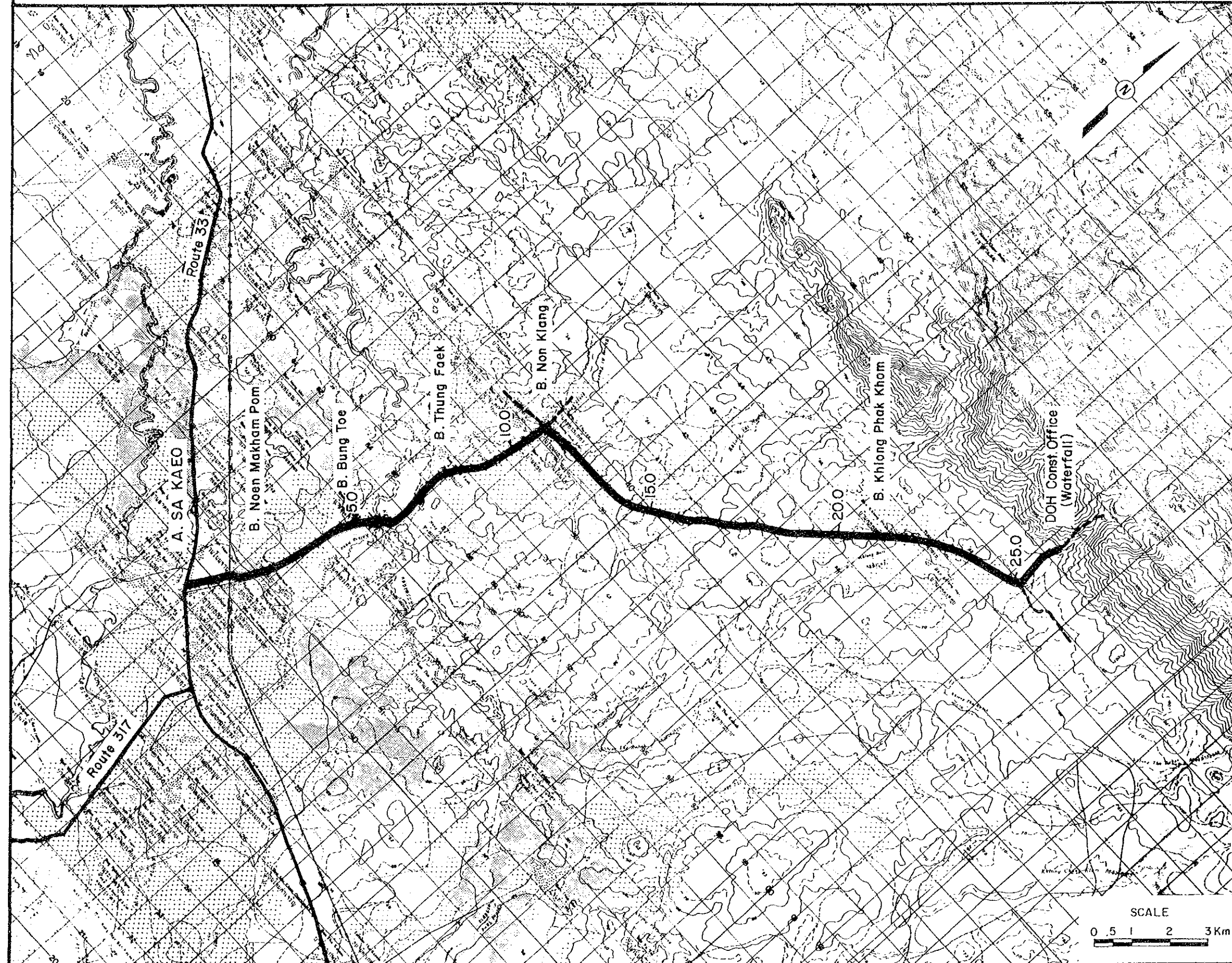


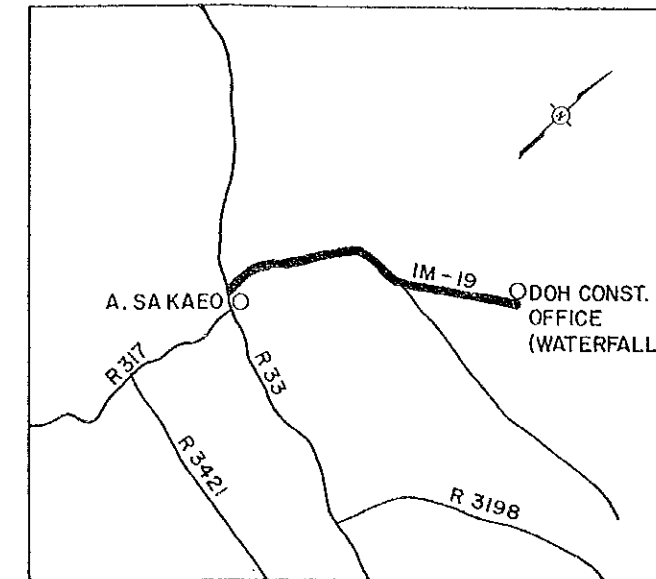
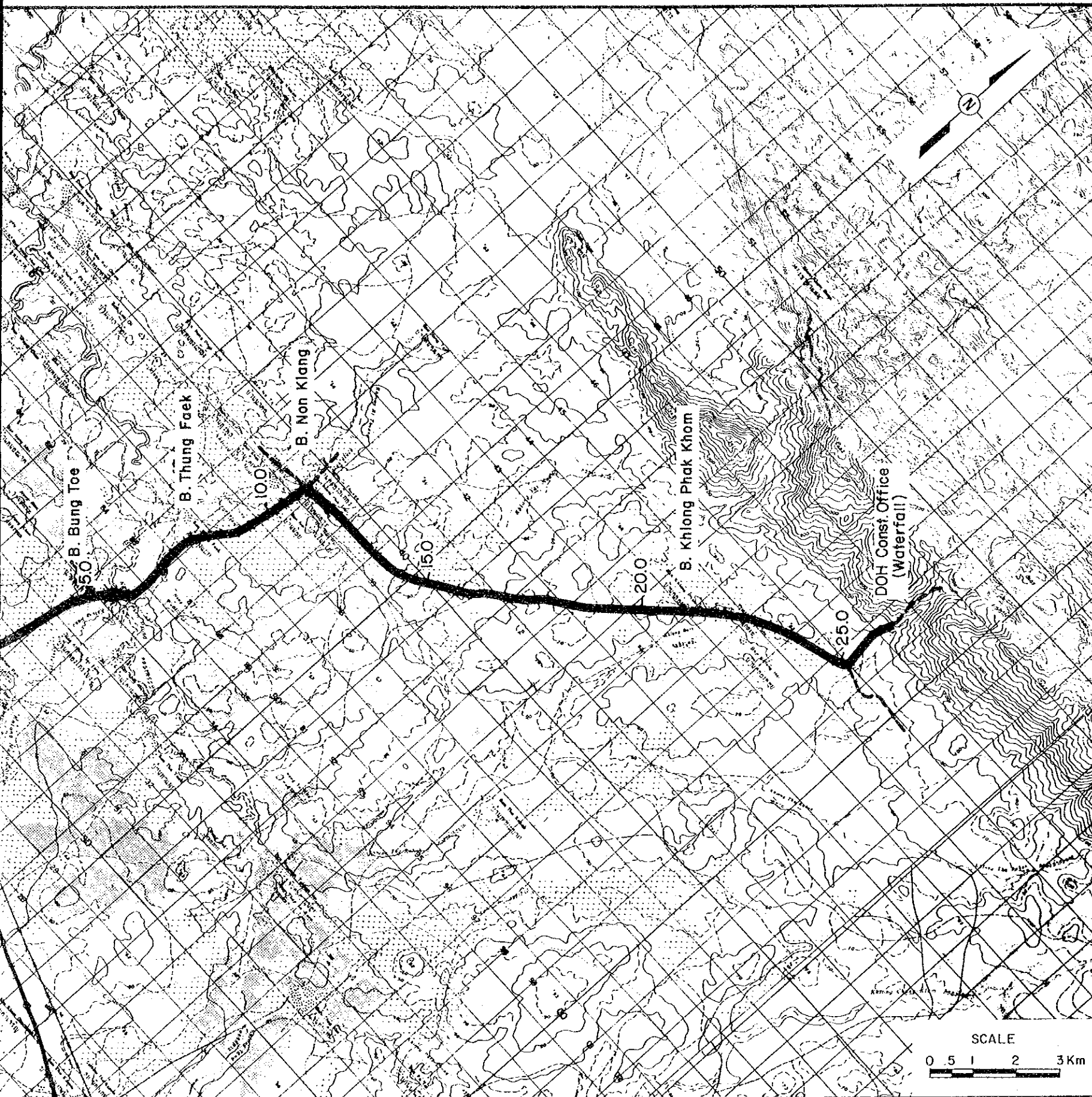
BRIDGE LIST

No	Station Km.	Proposed Bridge	Existing Bridge
1	5.5	—	C - 7.00 x 7.00
2	9.2	—	C - 7.00 x 18.00
3	13.5	C - 7.00 x 18.00	C - 3.30 x 18.00
4	20.2	—	C - 7.00 x 18.00
5	20.6	—	C - 7.00 x 18.00
6	22.7	—	C - 7.00 x 18.00

LEGEND

- PROPOSED ROUTE (IMPROVEMENT)
- PROPOSED ROUTE (NEW CONSTRUCTION)
- PAVED ROUTE
- UNPAVED ROUTE
- INVENTORY SURVEY ROUTE





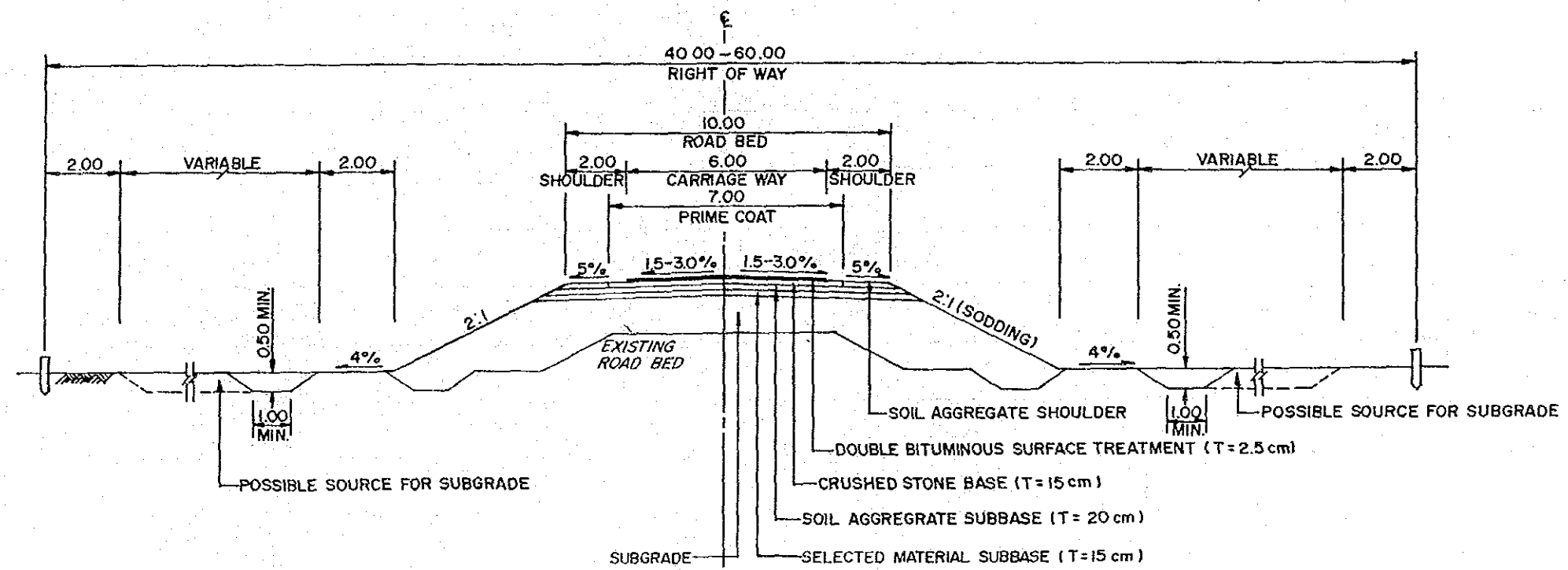
BRIDGE LIST

No	Station Km.	Proposed Bridge	Existing Bridge
1	5.5	—	C - 7.00 x 70.00
2	9.2	—	C - 7.00 x 18.00
3	13.5	C - 7.00 x 18.00	C - 3.30 x 18.00
4	20.2	—	C - 7.00 x 18.00
5	20.6	—	C - 7.00 x 18.00
6	22.7	—	C - 7.00 x 18.00

LEGEND

- PROPOSED ROUTE (IMPROVEMENT)
- PROPOSED ROUTE (NEW CONSTRUCTION)
- PAVED ROUTE
- UNPAVED ROUTE
- INVENTORY SURVEY ROUTE

TYPICAL CROSS SECTION



PROVINCIAL HIGHWAY (CLASS F3)

PROJECT NO. IM-19

ROAD INVENTORY

ROUTE NO. A. SA KAE (J.R. 33) - WATERFALL (DOH C/O)
ARD Rural C. PRACHIN BURI

L = 27.3 km

STATION (Km)		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
VILLAGE Name of Village		J.R. 33 A. Sa Kao				Village	B. Khok I Lang	Village		Village	Village		B. Khlong Phak Khom	B. Khlong Nam Kiew		DOH Const. Office	
TERRAIN		Flat										Rolling		Flat			
CROSS SECTION	Formation Width (m)	5.7 (1.0)			6.5 (1.0)			5.0 (1.0)			6.0 (1.0)		5.0 (1.0)	6.0 (1.0)	6.0 (1.0)		
	Embankment Height (m)				0.5			0.5			0.5		0.3		0.5		
	Cutting Depth (m)																
SURFACE	Type/Length (km)	SBST			Laterite			SBST			Laterite		SBST	Lat. SB ST	Lat.		
	Condition	Fair			Fair			Fair			Fair		Fair	Fair	F	Good	
FLOODING	Overflow Length (km)/Height (m)							No									
LAND USE	Left				Paddy	Cassava					Paddy/Cassava			Cassava	Forest		
	Right				Paddy	Cassava					Paddy/Cassava			Cassava	Forest		
BOX CULVERT & BRIDGE	Station (km)				5+500		9+200		13+500			20+200	20+600	22+700			
	Dimension (m)																
	Bridge																
	- Conc.or Wooden - Width - (Sidewalk) - Length				C-Br. 7.00(1.00)x70.00		C-Br. 7.00(1.20)x18.00		C-Br. 3.30(0)x18.00			C-Br. 7.00(1.20)x18.00 C-Br. 7.00(1.20)x18.00		C-Br. 7.00(1.20)x18.00			
RIGHT OF WAY (m) (Left/Right)		10.0			10-15 10-15		11.0				10 10						
ALIGNMENT	Horizontal	Curve			Good			Right Angle			Good				Right Angle		
	Vertical							Good		Fair		Good					
ROUTE NO., AGENCIES																	