

PROPOSED ROUTE NO. IM - 23

Changwat : Ubon Ratchathani

B. Don Chik (J.R.217) - B Non Rieng

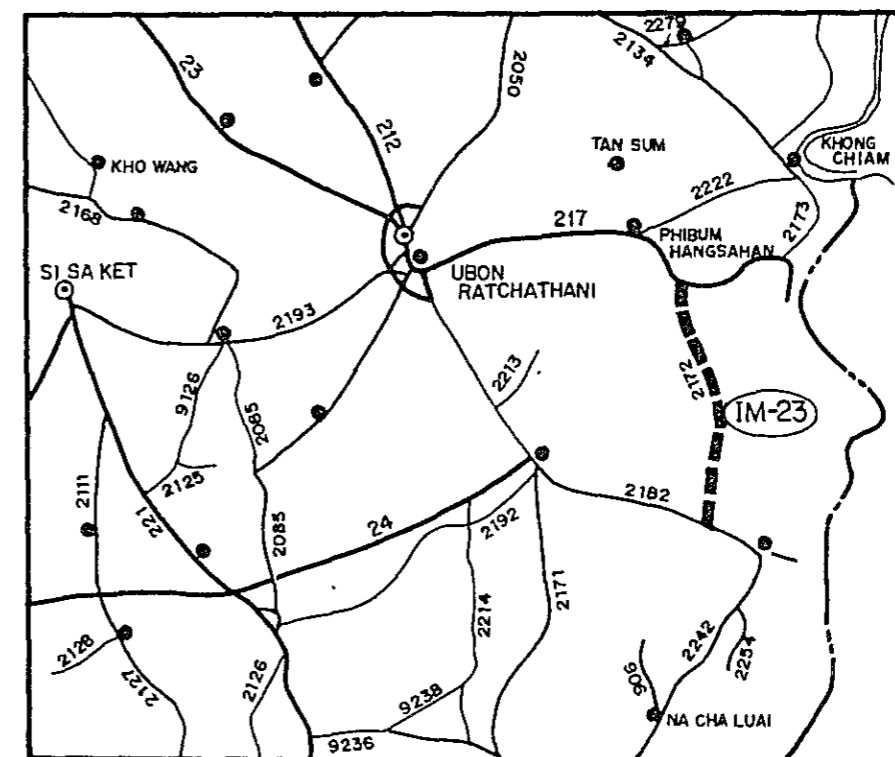
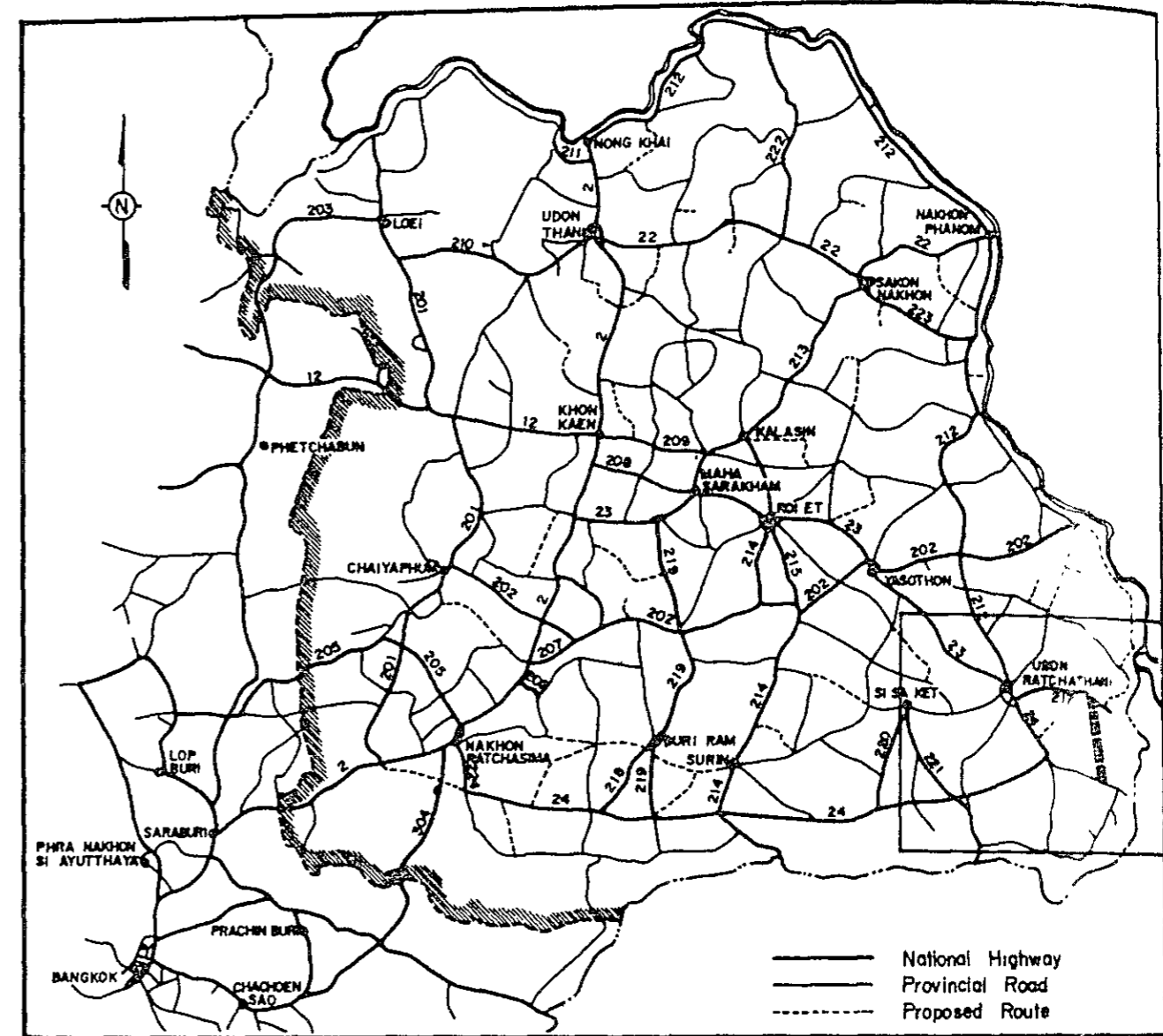
Length · 44.8 KM.

LOCATION OF PROPOSED ROUTE

SUMMARY

PROPOSED ROUTE IM-23

Item	Description
Changwat	Ubon Ratchathani
Origin	B. Don Chik (J.R.217)
Destination	B. Non Rieng (J.R.2182)
Length	
Total	44.8 km
Improvement Section	44.8 km
DOH Road	R.2172 44.8 km
ARD Road	0 km
Others	0 km
New Alignment Section	0 km
Surface Type and Condition	Soil Aggregate, Good
Terrain	Flat and Rolling
Influence Area	
Area	314 km ²
Population (1982)	25,900
Principal Crops	Paddy
Traffic (ADT)	
Existing	141
1993	667
2001	1,008
Proposed Standard	F4 (DBST)
Construction Cost	
Financial	74,174 . 10 ³ ฿
Economic	67,049 . 10 ³ ฿
IRR	10.7 %
B/C	0.90
Recommendation	For further consideration



1. 概要

1.1 計画路線の概要

本路線は、Ubon Ratchathaniの南東部に位置する。ルートは、Don Chik村を起点とし、南に走り、Ang Sila村、Na Phu村、Na Khan村を経て、Non Rieng村で終わる。その総延長は、44.8kmである。(Figure 23.5.2 参照)

沿道の地形は、ほとんど平坦だが、一部に丘陵も含む。影響圏内には、いくつかの村があるが、その総人口は、25,900人である。沿道には、医療センターが2ヶ所あるが、病院はない。教育施設としての中学校はない。

国境を通るこのルートは国家防衛上、非常に重要な路線である。

1.2 現道の状況

計画路線に利用した現道の状況はTable 23.1.1に要約し、その詳細はTable 23.1.2のイベントリー調査の結果に示した。

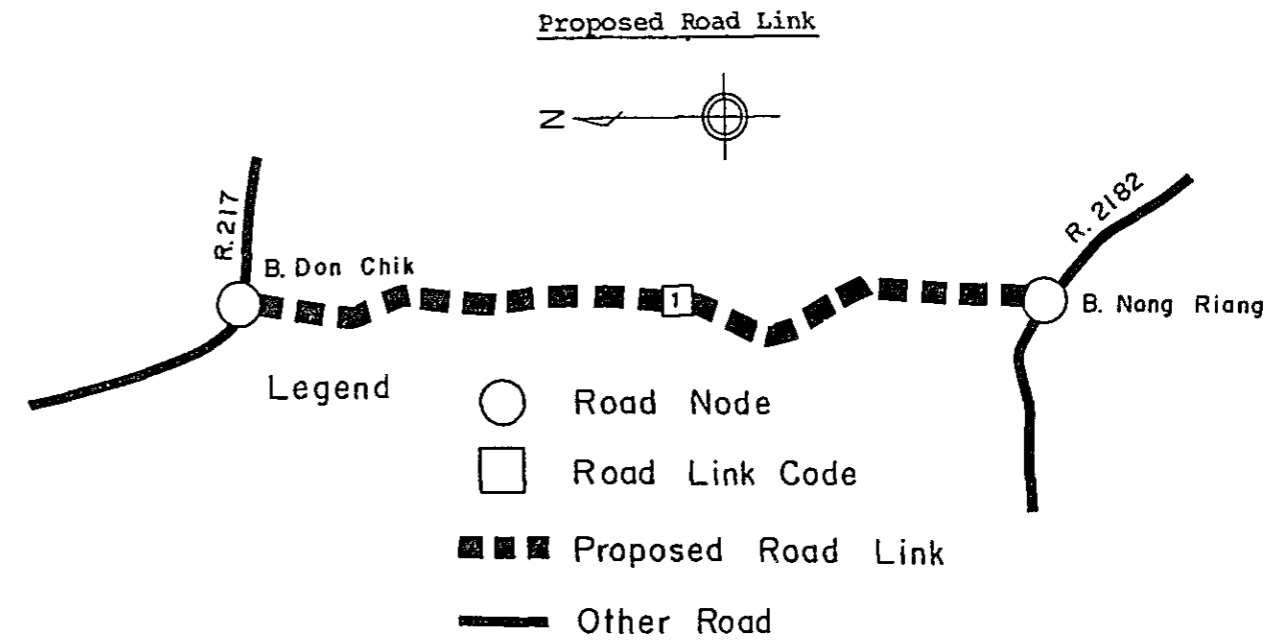
2. 交通

2.1 予測手法

計画対象路線に関し道路改良後の転換交通はほとんど無視し得るので、交通量予測には「伸び率方式」を適用することとした。

2.2 基準年交通量

道路リンク別車種別の基準年交通量は、DOH交通量調査結果および本調査で実施したマニュアルカウンティングのデータを基として次のように推定した。



Traffic Volume in Base Year

Source (base year)	Link No.	Vehicle Type									
		P/C	P/P	L/B	M/B	H/B	P/T	4/T	6/T	10/T	ADT
DOH (1981)	1 ^{1/}	24	17	26	32	52	3	8	20	-	182
Manual Counts (1982)	1	-	31	1	46	2	3	4	11	-	93
Estimated	1	12	24	14	39	27	3	6	16	-	141

Note: 1/ Route 2172 Section 0100 Station Km 13+100

2.3 交通需要

計画路線上の旅客交通需要（トリップ/日）および貨物交通需要（トン/日）は、先に求めた基準年の交通量に路側インタビューによって得られる平均乗車人員もしくは平均貨物積載量をかけることによって推定した。推定結果は以下のとおりである。

PASSENGER MOVEMENT (1982)

PROPOSED ROAD LINK	TRIPS PER DAY
1	2179

FREIGHT MOVEMENT (1982)

PROPOSED ROAD LINK	TONAGE PER DAY		
	NON-AGRI.	AGRI.	TOTAL
1	31	10	41

2.4 交通需要の将来伸び率

1981-1987, 1987-1993, 1993-2001の各期間における旅客および貨物の交通需要の将来伸び率は、メインレポートの7.3.3の1)で述べた予測式に従って求めた。予測の前提および得られた将来伸び率は以下の通りである。

GROWTH RATE OF PASSENGER MOVEMENT

ITEM	GROWTH RATE (% P.A.)		
	1981	1987	1993
	1987	1993	2001
PER CAPITA INCOME	4.2	4.5	4.7
TRANS. PRICE INCREASE	4.5	4.5	4.5
POPULATION	1.8	1.5	1.3
PASSENGER MOVEMENT	5.8	5.9	6.0

GROWTH RATE OF FREIGHT MOVEMENT

ITEM	GROWTH RATE (% P.A.)		
	1981	1987	1993
	1987	1993	2001
NON-AGRI. AGRICULTURE	7.5	7.6	7.7
	0.2	0.2	0.2
FREIGHT	5.7	5.8	5.8

2.5 誘発および開発交通量

メインレポートの7.3.3の3)で述べた方式を基に誘発および開発交通量の通常交通量に対する比率を求めた。

RATE OF INDUCED AND DEVELOPED TRAFFIC

ITEM	YEAR		
	1987	1993	2001
	(%)		
INDUCED	15.0	15.0	15.0
DEVELOPED	0.0	1.8	1.8

2.6 将来交通量

1) 車種構成

計画路線上の旅客・貨物に関する将来交通需要を、以下の車種構成比によって車種別交通量に変換した。

TRAFFIC COMPOSITION

(UNIT : %)

LINK NO.	YEAR	PASSENGER					FREIGHT			
		P/C	P/P	L/B	M/B	H/B	P/T	4/T	6/T	10/T
1	1982	10.3	20.7	12.1	33.6	23.3	12.0	24.0	64.0	0.0
	1987	10.3	23.3	14.5	31.7	20.2	13.3	21.9	56.4	8.4
	1993	10.3	26.5	17.4	29.3	16.4	14.9	19.4	47.2	18.5
	2001	10.2	30.8	21.3	26.2	11.5	17.0	16.0	35.0	32.0

2) 将来ADT

計画路線上のリンク加重平均将来交通量は以下に示すとおりであり、またその道路リンク別交通タイプ別の詳細はTable 23.2.1に示す。

AVERAGE FUTURE TRAFFIC ON PROPOSED ROUTE

YEAR	TYPE OF VEHICLE								ADT	M/C	TOTAL
	P/C	L/B	M/B	H/B	P/P&T	4/T	6/T	10/T			
1987	19	27	60	39	48	6	16	2	217	271	488
1993	30	51	86	48	83	6	15	6	325	342	667
2001	54	112	138	0	168	6	13	12	564	444	1008

3. 農業開発

3.1. 現況

影響圏の農耕地の殆どは、水田であり、畑地にはケナフ、キャッサバ及び落花生が栽培されているが、限られている。未開発可耕地は、圏内の南部に、主として畑作適地が残っている。

圏内の土地利用及び土地適応性の状況はTable 23.3.1とFigure 23.3.1に示し、また、Ubon Ratchathani県地域の代表的作物暦は、Figure 23.3.2のとおりである。

3.2. 開発予測

影響圏内の将来の農業開発状況を、With ProjectとWithout Projectの双方について予測した。予測した作付面積、単位当たり収量及び生産量はTable 23.3.2のとおりである。代表的作物の農家庭先価格と農業生産費とは、各県の資料及び現地調査の結果を参考にし、Table 23.3.3.のように見積った。

上記のごとく各作物ごとに予測された生産量と庭先価格により、生産価値を計算し、これから農業生産費及び別途見積られた開墾費を差引き、純生産価値(N.P.V)をTable 23.3.4.のように算出した。

このN.P.VのWith Projectの場合と、Without Projectの場合の差が、この道路の開発便益である。

4. 走行費の節減

本報告書、第1巻、第7章で述べた概念と基礎データにもとづき関連する各道路リンクの走行費（以下“VOC”という）をWith ProjectとWithout Projectの両ケースについて計算した。

各リンクにおけるVOCのコスト増に影響を与える道路状況は以下に示すとおりである。

Road Condition

Link No.	Terrain	Without Project			With Project		Nos. of Wooden Narrow Bridge	
		Length (Km)	Nos. of Road Class	Nos. of Wooden Narrow C.Bridge	Length (Km)	Roads Class Case 1 Case 2		
1	Flat & Rolling	44.8	2B	7	0	44.8	1 (F4) 2A (F5)	0

- ^{/1} Road 1 : Paved Road
 Road 2A : Laterite Road with good surface condition and alignment
 Road 2B : Laterite Road with good surface condition but poor alignment
 Road 3 : Laterite Road with poor surface condition and alignment
 Road 4 : Earth Road

VOC節減は、With Projectの全リンクのVOCとWithout Projectの際のVOCとの差で、当道路におけるVOCの節減は次に示すとおりである。

Vehicle Operating Cost Saving

(Unit: 1,000 Baht)

Road Class	1987	1993	2001
1 (F4)	5,328	7,832	12,681
2A (F5)	1,817	2,939	4,901

5. エンジニアリング

5.1 予備設計

予備設計は、次に示す設計規準を基本に行った。

Design Standard	:	F4 (if not feasible, F5)
Geometric Design	:	AASHTO (Rural Highways)
Typical Cross Section	:	as shown in Figure 23.5.1
Minimum Height of Embankment		
Ordinary Section	:	1.0m
Approach of Bridge in Flat Area	:	2.0m
Flood Section	:	0.7m (above flood level)

Pavement Structure

In case of F4 Standard

DBST		2.5cm
Crushed Stone Base	CBR _{>} 80%	15.0cm
Soil Aggregate Subbase	CBR _{>} 20%	15.0cm
Selected Material	CBR _≥ 6%	20.0cm

In case of F5 Standard

Soil Aggregate Surface	CBR _≥ 20%	15.0cm
Selected Material	CBR _≥ 6%	20.0cm

Pipe Culvert

Standard Size	:	∅ 100cm
Standard Interval		
Paddy Area	:	200 m
Others	:	500 m

Box Culvert

Standard Size : 2.4m x 2.4m
Location : as required

Bridge

Standard Type (width 7.0m)

Short Span Bridge : RC - Slab

Long Span Bridge : PC - Girder

Location : as shown in Bridge List
in Figure 23.5.2

ルートの線形は、Figure 23.5.2 示す。

5.2 工事数量および建設費

予備設計による工事数量は建設費は、各工事ごとに単価を付してTable 23.5.1に示す。

道路規格別の建設費を財務費用および経済費用に分けて集計すると、下表に示すとおりとなる。

Road Class	Length (Km)	Construction Cost (10 ³ ¥)		Remark
		Financial Cost	Economic Cost	
F4 (DBST)	44.8	74,174	67,049	
F5 (Soil Aggregate)	44.8	38,544	34,785	

6. 経済価格

年次別経済費用と便益及び評価結果はTable 23.6.1及び23.6.2に示す通りである。

このルートはF4規格ではフィージブルでないがF5規格ではフィージブルである。

7. 社会インパクト

社会インパクトを示すデータ及び評価結果はTable 23.7.1に示す通りである。

Table 23.1.1 SUMMARY OF ROAD INVENTORY

Item	Description	
Origin	B. Don Chik (J.R. 217)	
Destination	B. Non Rieng (J.R. 2182)	
Length		
Total		44.8 km
Improvement Section		44.8 km
DOH Road	R.2172	44.8 km
ARD Road		0 km
Others		0 km
New Alignment Section		0 km
Terrain	Flat and Rolling	
Alignment (Hori./Vert.)	Fair / Fair	
Formation Width	4.5 m - 7.0 m, 6.7 m (Weighted average)	
Embankment Section		
Length		44.8 km
Height	0.2 m -	1.2 m
Cut Section		
Length		0 km
Depth	m -	m
Surface Type and Condition		
SBST or DBST	Good	14.5 km
Soil Aggregate	Good	30.3 km
Earth		0 km
Pipe Culvert	35 each	
Box Culvert	0 each	0 m
Bridge		
Permanent Bridge	3 each	85.0 m
Narrow Concrete Bridge	0 each	0 m (4m)
Wooden Bridge	8 each	144.4 m
Overflow Section	0 place	0 km

Table 23.1.2 ROAD INVENTORY (1)

PROPOSED ROUTE NO. IM-23

ROUTE NO. 2172

B. DON CHIK (J.R. 217) ~ B. NON RIANG (J.R. 2182)

L = 44.8 Km

UBON RATCHATHANI

STATION (Km)		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
VILLAGE																		
- Name																		
- Household (H)																		
- Population (P)																		
TERRAIN																		
CROSS SECTION	Formation Width (m)																	
	Embankment Height (m)																	
	Cutting Depth (m)																	
PAVEMENT	Type/Length																	
	Condition																	
FLOODING	Overflow Length(Km)/Height(m)																	
LAND USE	Left																	
	Right																	
PIPE CULVERT	Total Number																	
BOX CULVERT & BRIDGE	Station (Km)																	
	Dimension																	
RIGHT OF WAY (m)																		
ALIGNMENT	Horizontal																	
	Vertical																	
ROUTE NO., AGENCIES																		

PROPOSED ROUTE NO. IM-23 ROUTE NO. 2172

STATION (Km)		30	32	34	36	38	40	42	44								
VILLAGE		B. NA DHO H = 810 P = 4050		B. DON TA NO H = 130 P = 650		B. NA KHAN H = 135 P = 675		B. BOK NOI H = 35 P = 175		B. MAK MIAN H = 150 P = 750		B. NON RIANG H = 208 P = 1040					
TERRAIN		Rolling				Flat											
CROSS SECTION	Formation Width (m)	7.00				6.00		4.50		7.00							
	Embankment Height (m)	0.30	0.50	0.30	0.50	0.30	0.60	0.30	0.60	0.20	0.50	1.00					
	Cutting Depth (m)																
PAVEMENT	Type/Length	DT		Laterite				DT		Laterite		DT		Laterite			
	Condition	Good															
FLOODING	Overflow Length(Km)/Height(m)																
LAND USE	Left	Paddy															
	Right	Paddy															
PIPE CULVERT	Total Number																
BOX CULVERT & BRIDGE	Station (Km)	31.8				37.4				40.5				44.1			
	Dimension	W-Br. 4.30 x 15.30				W-Br. 4.80 x 24.50				W-Br. 4.20 x 30.00				W-Br. 4.00 x 30.00			
RIGHT OF WAY (m)																	
ALIGNMENT	Horizontal	Fair															
	Vertical	Fair															
ROUTE NO., AGENCIES		DOH 2172															

Table 23.2.1 TRAFFIC VOLUME ON ROUTE IM - 23

YEAR	1987		1993		2001		
	1 AVR.		1 AVR.		1 AVR.		
P/C	N+D	17	17	26	26	46	46
	I	3	3	4	4	7	7
	DV	0	0	1	1	1	1
	TOTAL	19	19	30	30	54	54
L/B	N+D	24	24	44	44	96	96
	I	4	4	7	7	14	14
	DV	0	0	1	1	2	2
	TOTAL	27	27	51	51	112	112
M/B	N+D	52	52	74	74	118	118
	I	8	8	11	11	18	18
	DV	0	0	2	2	2	2
	TOTAL	60	60	86	86	138	138
H/B	N+D	33	33	41	41	52	52
	I	5	5	6	6	8	8
	DV	0	0	1	1	1	1
	TOTAL	38	38	48	48	60	60
P/P&T	N+D	42	42	70	70	144	144
	I	6	6	11	11	22	22
	DV	0	0	1	1	3	3
	TOTAL	48	48	83	83	168	168
4/T	N+D	5	5	5	5	5	5
	I	1	1	1	1	1	1
	DV	0	0	0	0	0	0
	TOTAL	6	6	6	6	6	6
6/T	N+D	14	14	13	13	11	11
	I	2	2	2	2	2	2
	DV	0	0	0	0	0	0
	TOTAL	16	16	15	15	13	13
10/T	N+D	2	2	5	5	10	10
	I	0	0	1	1	2	2
	DV	0	0	0	0	0	0
	TOTAL	2	2	6	6	12	12
ADT	N+D	189	189	278	278	481	481
	I	28	28	42	42	72	72
	DV	0	0	6	6	10	10
	TOTAL	217	217	325	325	564	564
M/C	N+D	248	248	314	314	416	416
	I	22	22	25	25	25	25
	DV	0	0	3	3	3	3
	TOTAL	271	271	342	342	444	444
TOTAL	N+D	437	437	591	591	898	898
	I	51	51	67	67	97	97
	DV	0	0	9	9	13	13
	TOTAL	488	488	667	667	1008	1008

NOTE

N : NORMAL TRAFFIC

DV : DEVELOPED TRAFFIC

D : DIVERTED TRAFFIC

I : INDUCED TRAFFIC

Figure 23.3.1 LAND USE AND CAPABILITY OF INFLUENCE AREA
PROPOSED ROUTE NO. IM - 23

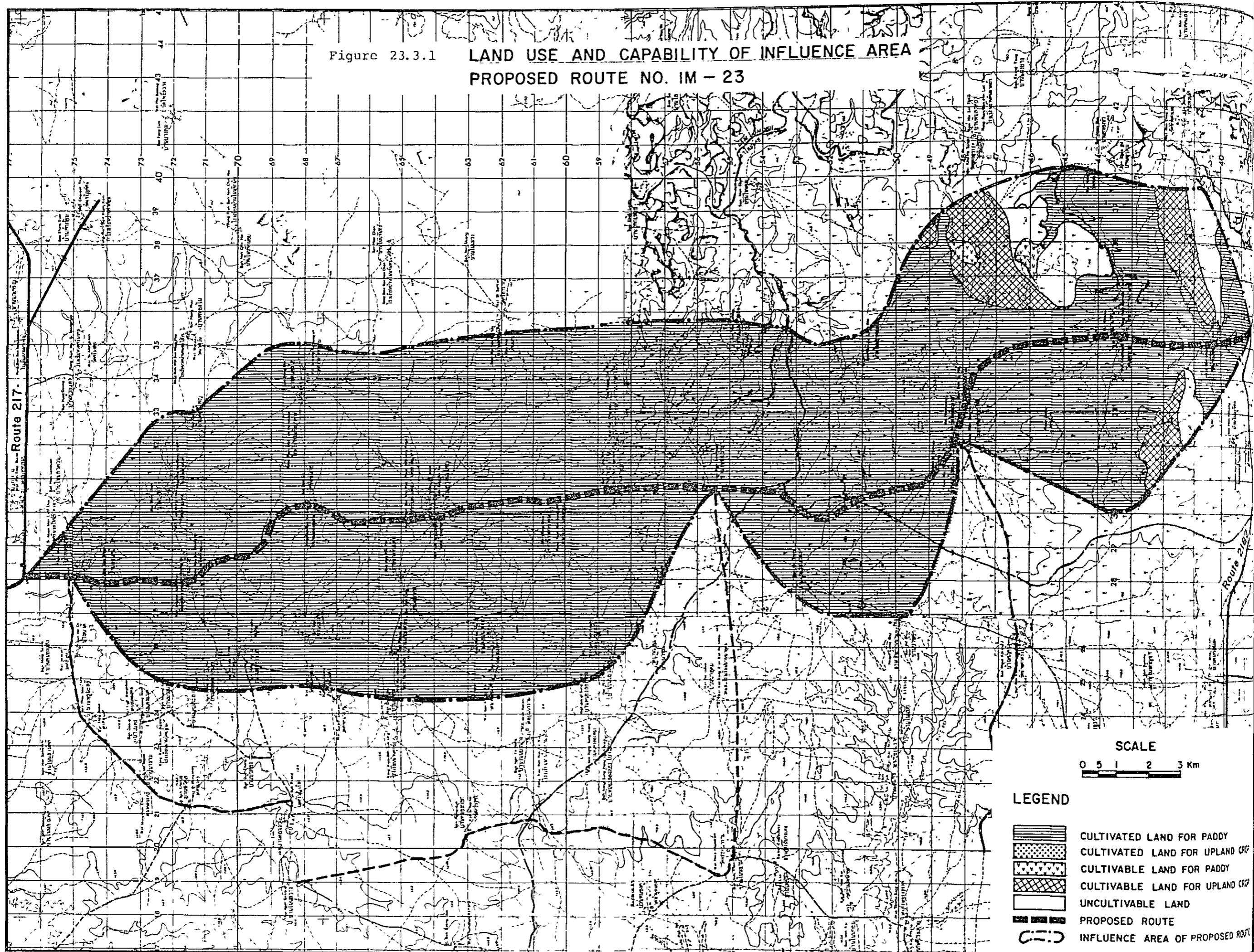
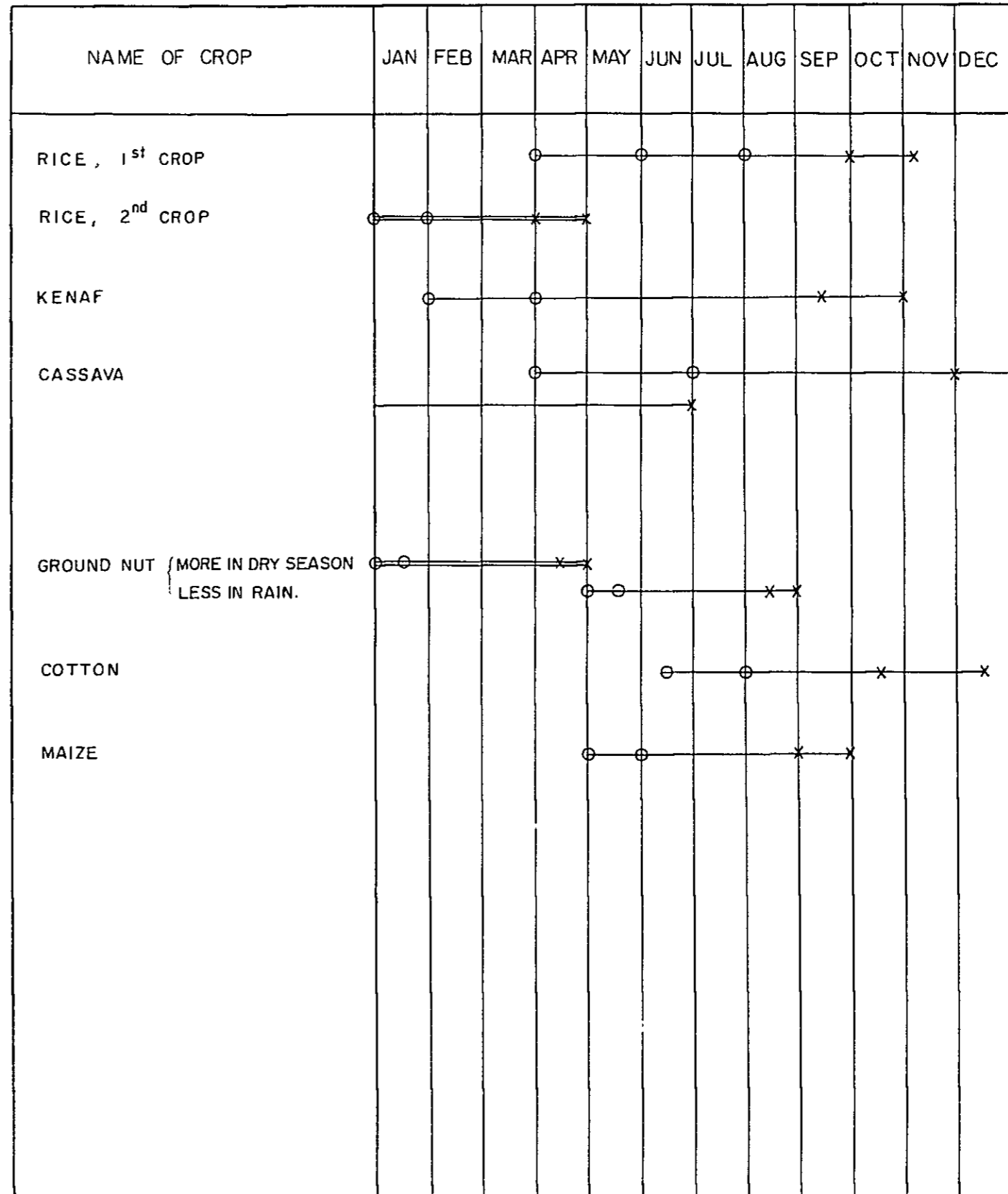


Figure 23.3.2 CROPPING CALENDAR

1100 CHANGWAT UBON RATCHATHANI



Note

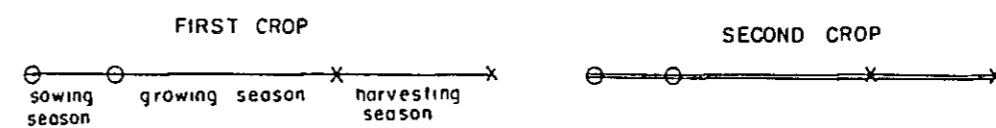


TABLE 23.3.1 CULTIVATED & CULTIVABLE LAND

(1979)

[UNIT : 1000 RAI (RM 2)]

AMPHOE CODE	AMPHOE NAME	CULTIVATED LAND			UNUSED CULTIVABLE LAND		
		PADDY	UPLAND	TOTAL	PADDY	UPLAND	TOTAL
		178.125 (285.0)	-	178.125 (285.0)	0.625 (1.0)	9.375 (15.0)	10.000 (16.0)
1116	PIBUN MANGSAHAN	121.250 (194.0)	-	121.250 (194.0)	-	-	-
1117	DET UDOM	10.000 (16.0)	-	10.000 (16.0)	-	-	-
1120	BUNTHARIK	46.875 (75.0)	-	46.875 (75.0)	0.625 (1.0)	9.375 (15.0)	10.000 (16.0)

TABLE 23.3.2 CROP PRODUCTION

ITEM	PADDY	MAIZE	BEANS	GRUND NUTS	CASSAVA	SUGAR CANE	PENAF	COTTON	UPLAND TOTAL	TOTAL
PLANTED AREA (1000 RAI)										
1981	171.73	-	-	0.06	0.33	-	0.71	-	1.10	172.83
1987	171.73	-	-	0.06	0.35	-	0.71	-	1.12	172.84
1993	WITHOUT PROJECT	171.73	-	0.06	0.36	-	0.71	-	1.13	172.86
	WITH PROJECT	174.84	-	0.06	0.39	-	0.72	-	1.17	176.02
2001	WITHOUT PROJECT	171.73	-	0.06	0.38	-	0.71	-	1.15	172.88
	WITH PROJECT	174.84	-	0.06	0.41	-	0.72	-	1.20	176.04
CROP YIELD (KG/RAI)										
1981	156.5	-	-	112.0	2000.0	-	168.0	-	-	-
1987	158.3	-	-	114.0	2000.0	-	168.0	-	-	-
1993	WITHOUT PROJECT	160.2	-	116.1	2000.0	-	168.0	-	-	-
	WITH PROJECT	162.2	-	116.8	2012.0	-	168.0	-	-	-
2001	WITHOUT PROJECT	162.8	-	118.9	2000.0	-	168.0	-	-	-
	WITH PROJECT	167.4	-	120.6	2028.2	-	168.0	-	-	-
CROP PRODUCTION (TON)										
1981	26,867	-	-	6	666	-	119	-	792	27,659
1987	27,191	-	-	6	694	-	119	-	820	28,011
1993	WITHOUT PROJECT	27,519	-	7	724	-	119	-	850	28,369
	WITH PROJECT	28,355	-	7	787	-	121	-	915	29,270
2001	WITHOUT PROJECT	27,962	-	7	766	-	119	-	892	28,854
	WITH PROJECT	29,275	-	8	839	-	121	-	967	30,243

NOTE : SYMBOL "-" MEANS ZERO OR NEGLIGIBLE SMALL

TABLE 23.3.3 FARMGATE PRICE AND PRODUCTION COST

ITEM	PADDY	MAIZE	BEANS	GRIND NUTS	CASSAVA	SUGAR CANE	KENAF	COTTON
FARMGATE PRICE (BAHT/TON)								
WITHOUT PROJECT (1981 - 2001)	3,741	-	-	8,693	577	-	4,666	-
WITH PROJECT (1987 - 2001)	3,835	-	-	8,693	591	-	4,783	-
CROP PRODUCTION COST (BAHT/RAI)								
WITHOUT PROJECT (1981 - 2001)	406	-	-	848	677	-	729	-
WITH PROJECT (1987 - 2001)	406	-	-	868	697	-	729	-

TABLE 23.3.4 NET PRODUCTION VALUE

YEAR	(1000 BAHT)					
	WITHOUT PROJECT			WITH PROJECT		
	PADDY	UPLAND	TOTAL	PADDY	UPLAND	TOTAL
1987	31,955	214	32,169	34,556	229	34,785
1993	33,182	222	33,404	37,755	254	38,009
2001	34,840	233	35,073	41,284	272	41,556

Figure 23.5.1 TYPICAL CROSS SECTION AND TYPICAL PAVEMENT STRUCTURE

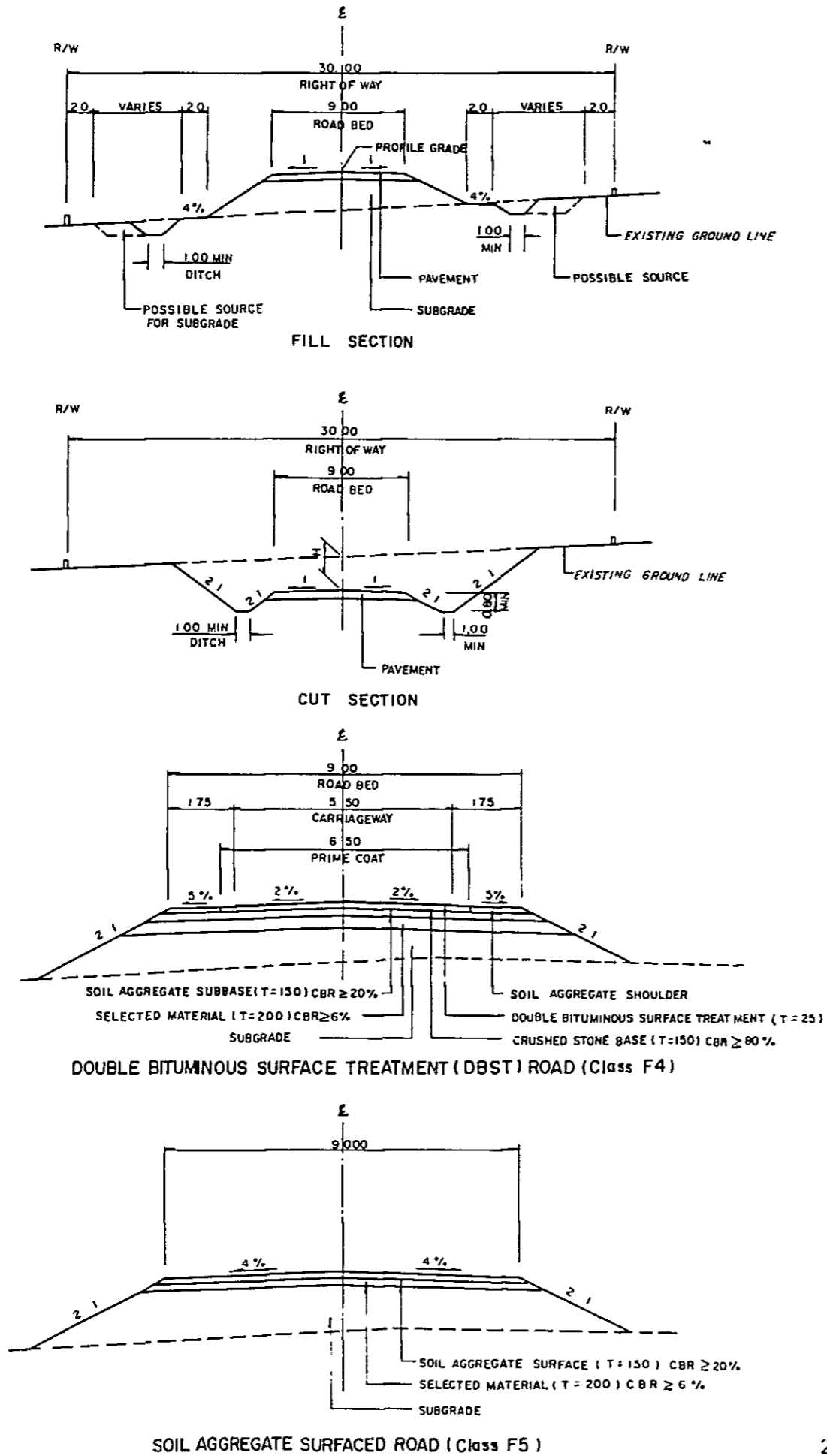


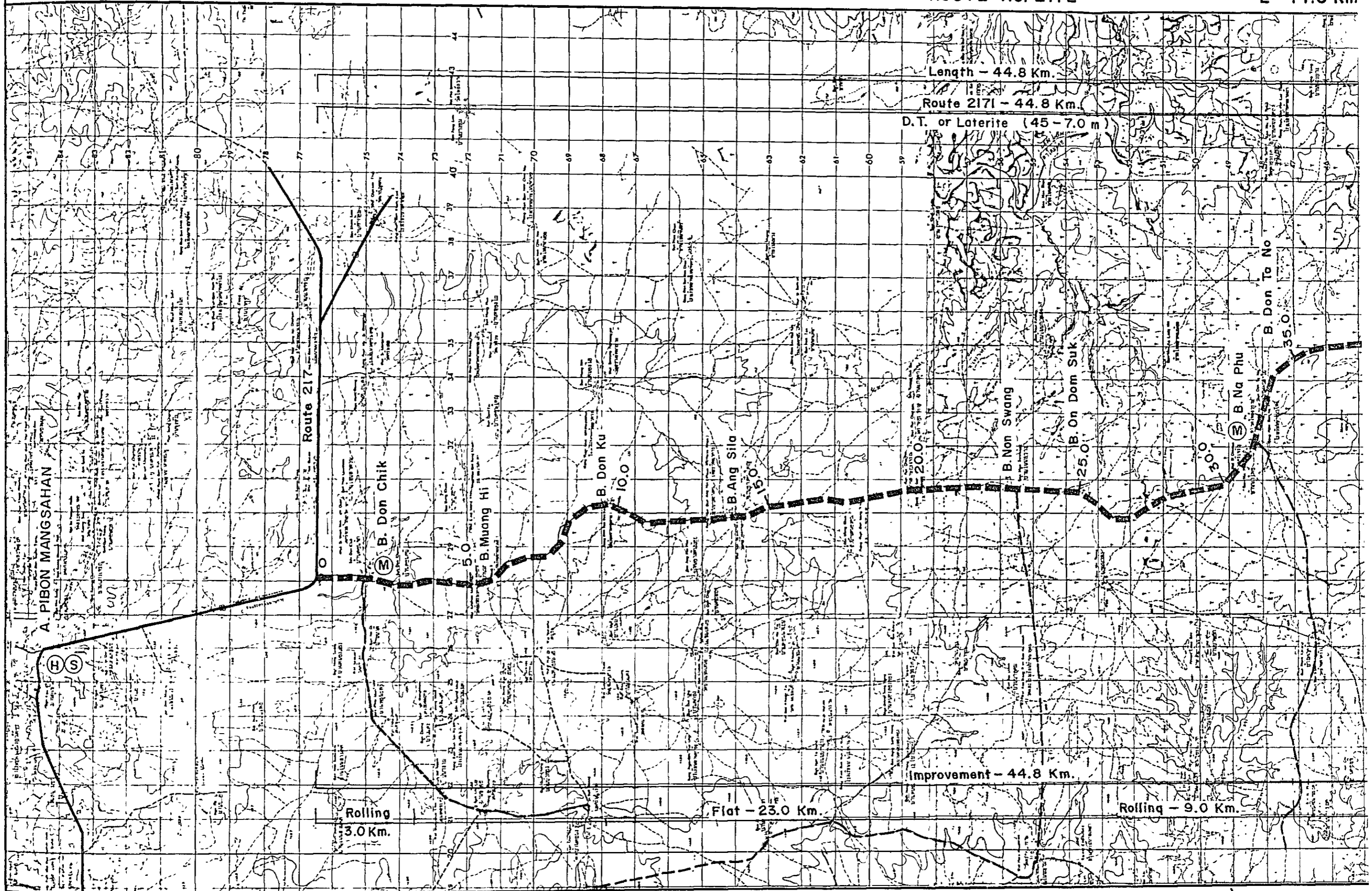
Figure 23.5.2 PROPOSED ROUTE NO. IM-23

C. UBON RATCHATHANI

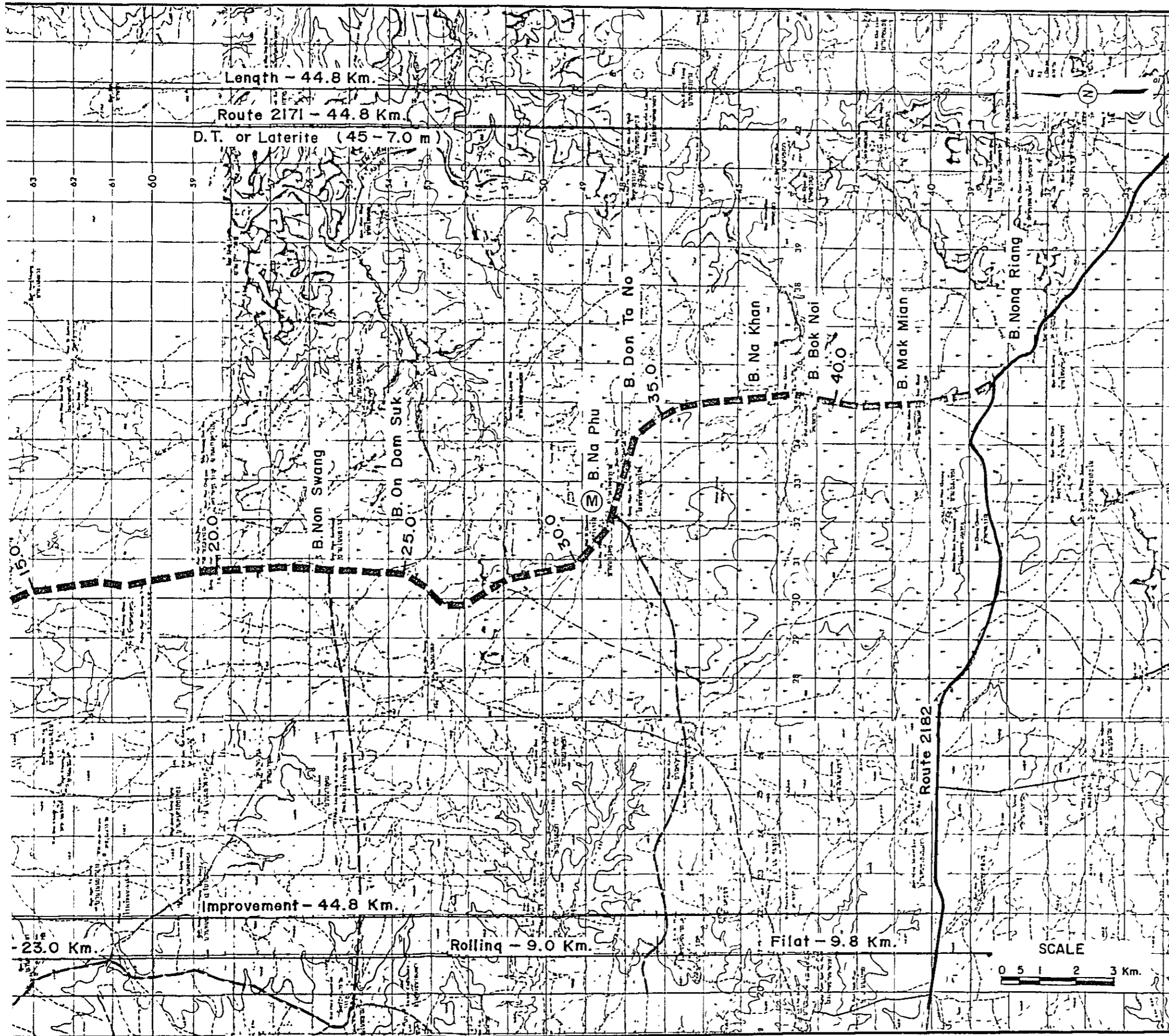
B. DON CHIK (J.R.217) - B. NON RIANG (J.R.2182)

ROUTE NO. 2172

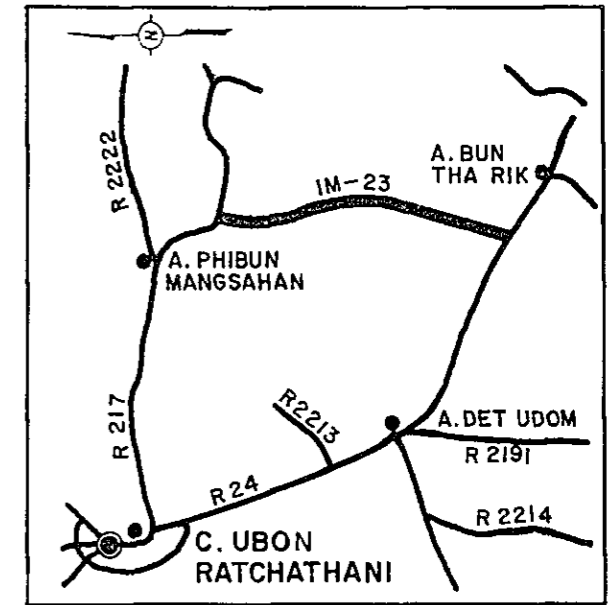
L = 44.8 Km



30N RATCHATHANI B. DON CHIK (J.R.217) - B. NON RIANG (J.R.2182)
ROUTE NO. 2172 L = 44.8 Km.



LOCATION MAP



BRIDGE LIST

No.	Station Km.	Proposed Bridge	Existing Bridge
1	1.9	(BOX CULVERT)	W-4 20 x 4 00
2	2.2	—	C-10.00x62.00
3	7.1	—	C-11.00x 5 00
4	10.7	C-700 x 18.00	W-4.80 x 15.60
5	14.7	C-7.00x 12.00	W-4 20 x 10.00
6	15.7	C-7 00x 18.00	W-4.50 x 15.00
7	16.1	—	C- 7.00x 18.00
8	31.8	C-700 x 18.00	W-4.30 x 15.30
9	37.4	C-700 x 27.00	W-4.80 x 24.50
10	40.5	C-7.00 x 32.00	W-4.20 x 30.00
11	44.1	C-700 x 32 00	W-4 00 x 30 00

LEGEND

- PROPOSED ROUTE (IMPROVEMENT)
- PROPOSED ROUTE (NEW CONSTRUCTION)
- PAVED ROUTE
- UNPAVED ROUTE
- INVENTORY SURVEY ROUTE
- HOSPITAL
- MEDICAL CENTER
- SECONDARY SCHOOL

Table 23.5.1 CONSTRUCTION QUANTITIES AND COSTS IM-23 (44.8 km)

Items	Unit of Q'ty	Financial Unit Rate ₺	(DEBT)			(Soil Aggregate Surface)		
			Q'ty	Financial Cost (10 ³ ₺)	Economic Cost (10 ³ ₺)	Q'ty	Financial Cost (10 ³ ₺)	Economic Cost (10 ³ ₺)
DIRECT CONSTRUCTION COST								
Clearing and Grubbing	ha	15,000	104	1,560	1,419	104	1,560	1,419
Excavation - Soil	m ³	20	0	0	0	0	0	0
Excavation - Hard Rock	m ³	160	0	0	0	0	0	0
Embankment	m ³	45	122,600	5,517	5,020	122,600	5,517	5,020
Selected Material	m ³	80	77,000	6,160	5,482	77,000	616	548
Soil Aggregate Surface or Subbase	m ³	105	53,900	5,659	5,036	53,900	5,659	5,036
Crushed Stone Base	m ³	370	35,400	13,098	12,050	6,300	2,331	2,144
Soil Aggregate Shoulder	m ³	105	15,200	1,596	1,420	2,700	283	252
Prime Coat and DEBT	m ²	55	199,700	10,984	9,886	35,800	1,969	1,772
Pipe Culvert	m	2,100	2,020	4,242	3,902	2,020	4,242	3,902
Box Culvert	m	16,000	10	160	144	10	160	144
Long Span Bridge	m	80,000	0	0	0	0	0	0
Short Span Bridge	m	40,000	162	6,480	5,767	162	6,480	5,767
Sub Total (a)				55,457	50,130		29,318	26,008
Miscellaneous Works (a) x 7%				3,882	3,509		2,017	1,920
Total (b)				59,339	53,639		30,835	29,928
PHYSICAL CONTINGENCY (b) x 15%				8,901	8,046		4,625	4,174
ENGINEERING AND ADMINISTRATION (b) x 10%				5,934	5,364		3,083	2,782
Sub Total				14,835	13,410		7,708	6,956
LAND ACQUISITION								
Highly Developed Land	ha	50,000	0	0	0	0	0	0
Less Developed Land	ha	15,000	0	0	0	0	0	0
Sub Total				0	0		0	0
GRAND TOTAL				74,174	67,049		38,544	34,785

Table 23.6.1 COST AND BENEFITS
(F4 STANDARD)

YEAR	COST		BENEFITS		DISCOUNTED(12%)		
	CONST. COST	AGRI. BENEFIT	VOC SAVING	RMC SAVING	TOTAL	COST	BENEFIT
1984	13,410	0	0	0	0	13,410	0
1985	33,524	0	0	0	0	33,524	0
1986	20,115	0	0	0	0	20,115	0
1987	0	2,616	5,328	-91	7,853	0	7,011
1988	0	2,864	5,745	-78	8,531	0	6,801
1989	0	3,112	6,163	-65	9,210	0	6,555
1990	0	3,360	6,580	-52	9,888	0	6,284
1991	0	3,609	6,997	-39	10,567	0	5,996
1992	0	3,857	7,414	-26	11,245	0	5,697
1993	0	4,105	7,832	-13	11,924	0	5,394
1994	21,683	4,402	8,438	7	12,847	9,808	5,189
1995	0	4,699	9,044	27	13,770	0	4,966
1996	0	4,997	9,650	47	14,693	0	4,731
1997	0	5,294	10,256	67	15,616	0	4,489
1998	0	5,591	10,862	86	16,540	0	4,245
1999	0	5,888	11,468	106	17,463	0	4,002
2000	0	6,186	12,074	126	18,386	0	3,762
2001	-30,842	6,483	12,681	146	19,309	-5,635	3,528
TOTAL	57,890	67,062	130,532	247	197,842	87,595	78,651

DISCOUNTED ECONOMIC COSTS :	87,595
DISCOUNTED ECONOMIC BENEFITS :	78,651
AGRICULTURAL DEVELOPMENT BENEFIT	26,666
VOC SAVING	52,103
RMC SAVING	-119
NET PRESENT VALUE :	-8,944
BENEFIT COST RATIO :	0.90
INTERNAL RATE OF RETURN :	10.7 %

Table 23.6.2 COST AND BENEFITS
(F5 STANDARD)

YEAR	COST		BENEFITS		DISCOUNTED(12%)		
	CONST. COST	AGRI. BENEFIT	VOC SAVING	RMC SAVING	TOTAL	COST	BENEFIT
1984	0	0	0	0	0	0	0
1985	13,914	0	0	0	0	13,914	0
1986	20,871	0	0	0	0	20,871	0
1987	0	2,616	1,817	5	4,438	0	3,962
1988	0	2,864	2,004	4	4,873	0	3,884
1989	0	3,112	2,191	4	5,307	0	3,778
1990	0	3,360	2,378	3	5,742	0	3,649
1991	0	3,609	2,565	3	6,177	0	3,505
1992	0	3,857	2,752	3	6,611	0	3,350
1993	0	4,105	2,939	2	7,046	0	3,187
1994	3,146	4,402	3,184	-1	7,585	1,423	3,063
1995	0	4,699	3,429	-5	8,124	0	2,930
1996	0	4,997	3,675	-8	8,663	0	2,789
1997	0	5,294	3,920	-12	9,202	0	2,645
1998	0	5,591	4,165	-15	9,741	0	2,500
1999	0	5,888	4,411	-19	10,280	0	2,356
2000	0	6,186	4,656	-23	10,819	0	2,214
2001	-16,001	6,483	4,901	-26	11,358	-2,923	2,075
TOTAL	21,930	67,062	48,989	-85	115,965	39,329	45,888

DISCOUNTED ECONOMIC COSTS :	39,329
DISCOUNTED ECONOMIC BENEFITS :	45,888
AGRICULTURAL DEVELOPMENT BENEFIT	26,666
VOC SAVING	19,231
RMC SAVING	-10
NET PRESENT VALUE :	6,559
BENEFIT COST RATIO :	1.17
INTERNAL RATE OF RETURN :	13.9 %

Table 23.7.1 SOCIAL INDICATORS
(Proposed Route IM-23)

Population (1,000)		Education		<p>Note:</p> <p><u>1/</u> () shows the length or distance in without project case. Unless otherwise, lengths are same both in with project case and without project case.</p> <p><u>2/</u> Number of secondary school student estimated based on the projected population of the areas of influence applying ratios of secondary school students to the total population in the sample area.</p> <p><u>3/</u> Numbers of the sample areas</p> <p><u>4/</u> (Number of University Graduate Teachers)/(Total Number of Student) x 1,000</p> <p><u>5/</u> (Total of Teachers)/(Total Number of Student) x 1,000</p> <p><u>6/</u> Sum of <u>4/</u> and <u>5/</u></p> <p><u>7/</u> Ratio of E value of each route to an average value of the same indicator E in case of the sample areas, 33 in number, along paved road near the proposed routes. The average value of E in case of paved roads were calculated at 68.4 from the following data: Number of university graduate teachers 438 Number of Teachers 1,285 Number of student 25,196</p> <p><u>8/</u> Estimated gross value of crop production in the areas of influence</p> <p><u>9/</u> "A" indicates an average per capita value of crop production in the Northeastern Region, which is estimated assuming that: - GRP per capita of the Northeast is estimated at 11,897 Baht in 1993, - Agricultural sector shares 40% of GRP, and - Crop production shares 80% of agricultural production.</p>
1982	: 25.9	Access to Secondary School		
1993	: 30.9	Number of Student in 1993 (1,000) <u>2/</u>	: 7.1	
Average travelling speed, without (kph)	: 48	Average distance to school (km)	: 4.8	
Isolation		Per capita time savings (10 ⁻⁴)	: 0.047	
Access to Amphoe		Score	: 25	
Average distance to Amphoe (km) <u>1/</u>	: 11.4	Teacher Intensity		
Per capita time savings (10 ⁻⁴)	: 0.026	Number of teachers <u>3/</u>		
Score	: 76	University graduate	: 3	
Access to Artery Highway		Total	: 30	
Average distance to highway (km) <u>1/</u>	: -	Number of Student	: 977	
Per capita time savings (10 ⁻⁴)	: -	Indicators		
Score	: 100	E1 <u>4/</u>	: 3.1	
Impassability		E2 <u>5/</u>	: 30.7	
Impassable week a year	: -	E <u>6/</u>	: 33.8	
Impassability per year	: 0	Degree of Improvement <u>7/</u>	: 2.02	
Impassability per capita (10 ⁻⁴)	: 0	Score	: 129	
Score	: 0	Disparity		
Health		G.P.V. in 1993 (Mn B) <u>8/</u>		
Access to Hospital		With project	: 109.9	
Average distance to Hospital (km) <u>1/</u>	: 16.3	Without project	: 104.0	
Per capita time savings (10 ⁻⁴)	: 0.037	Per capita G.P.V. in 1993 (B)		
Score	: 86	With project (W)	: 3,557	
Access to Medical Facilities		Without project (w)	: 3,366	
Average distance to facilities (km) <u>1/</u>	: 7.9	Degree of Disparity		
Per capita time savings (10 ⁻⁴)	: 0.018	(A/W) - (A/w) <u>9/</u>	: 0	
Score	: 72	Score	: 0	
		Total Score	: 488	

PROPOSED ROUTE NO. IM - 24

Changwat : Ubon Ratchathani

B. Na Suang (J.R.24) - B. Na Yia

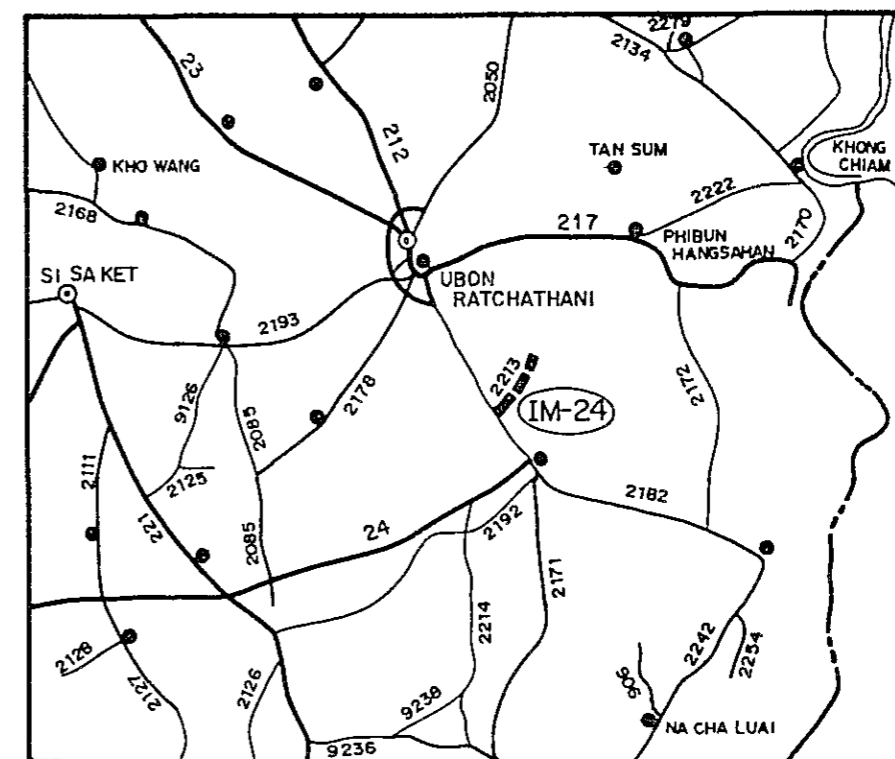
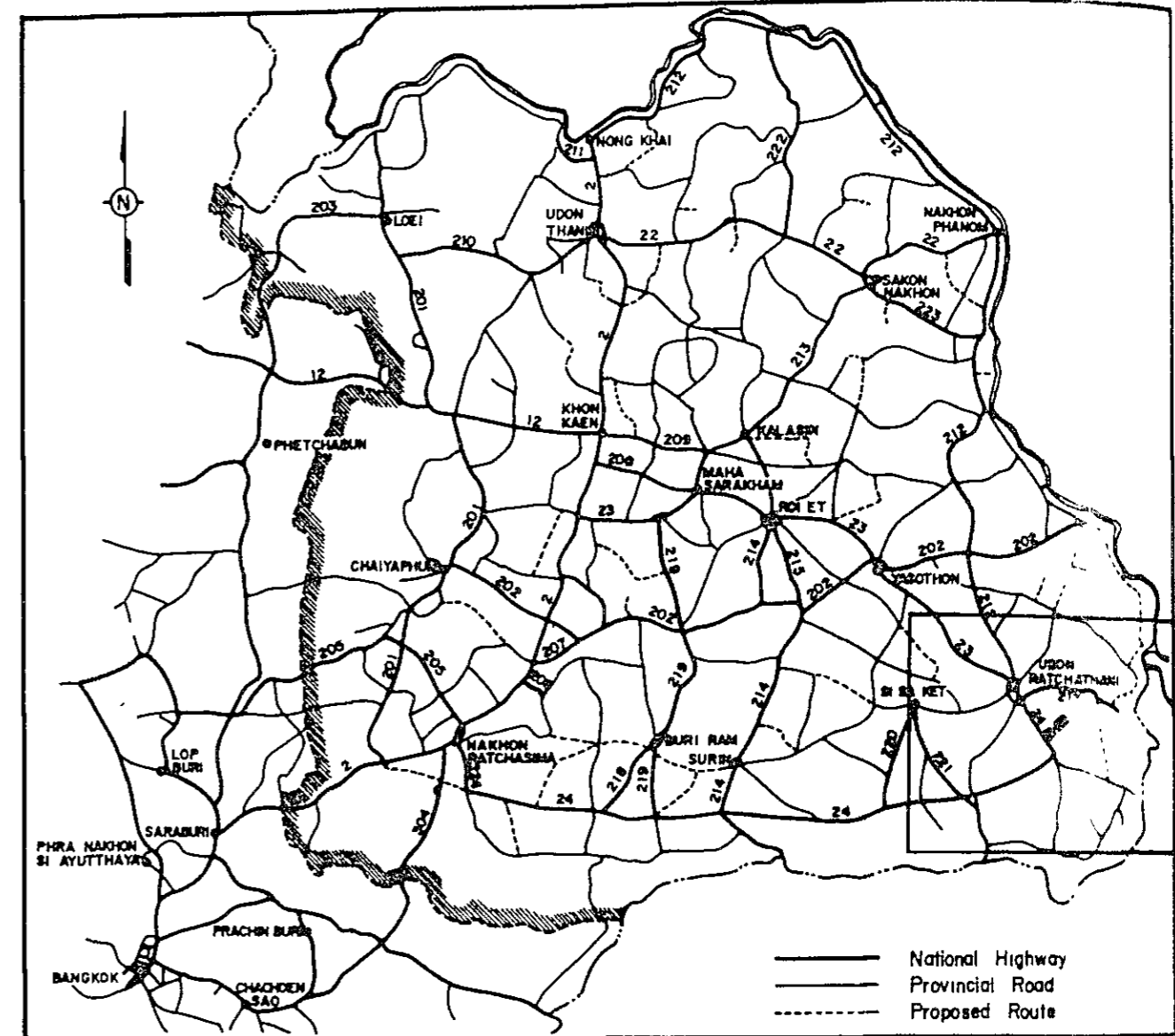
Length · 14.5 KM.

SUMMARY

PROPOSED ROUTE IM-24

Item	Description
Changwat	Ubon Ratchathani
Origin	B. Na Suang (J.R.24)
Destination	B. Na Yia
Length	
Total	14.5 km
Improvement Section	14.5 km
DOH Road	R.2213 14.5 km
ARD Road	0 km
Others	0 km
New Alignment Section	0 km
Surface Type and Condition	Soil Aggregate, Good
Terrain	Rolling
Influence Area	
Area	71 km ²
Population (1982)	6,000
Principal Crops	Paddy
Traffic (ADT)	
Existing	169
1993	727
2001	1,027
Proposed Standard	F4 (DBST)
Construction Cost	
Financial	25,653 . 10 ³ ฿
Economic	23,184 . 10 ³ ฿
IRR	10.6 %
B/C	0.89
Social Impact	High
Recommendation	For immediate implementation

LOCATION OF PROPOSED ROUTE



1. 概要

1.1 計画路線の概要

本路線は、Ubon Ratchathani県の南東部に位置している。ルートは、Na Suang村で県道24号線と交差している場所を起点とし、Na Chik村を経て、Na Yia村で終わる。その総延長は、14.5kmである。(Figure 24.5.2 参照)

沿道の地形は、丘陵地である。影響圏内には、村が1つあり、その総人口は、6,000人である。

ルートの終点には医療センターが1ヶ所あり、教育施設として中学校が1ヶ所ある。

本路線は農業的に開発の進んだ地域において、国道24号線とを結ぶ重要な路線である。

1.2 現道の状況

計画路線に利用した現道の状況はTable 24.1.1に要約し、その詳細はTable 24.1.2のイベントリー調査の結果に示した。

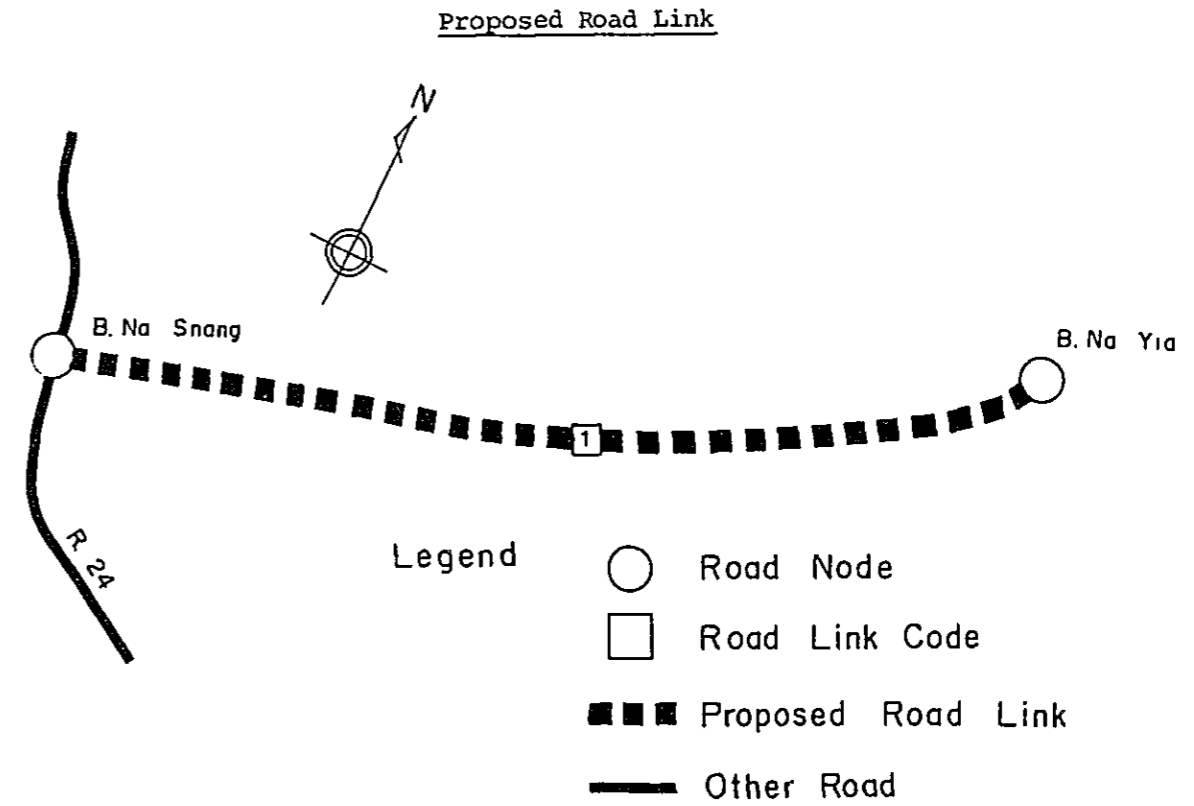
2. 交通

2.1 予測手法

計画対象路線に関し道路改良後の転換交通はほとんど無視し得るので、交通量予測には「伸び率方式」を適用することとした。

2.2 基準年交通量

道路リンク別車種別の基準年交通量は、DOH交通量調査結果および本調査で実施したマニュアルカウンティングのデータを基として次のように推定した。



Traffic Volume in Base Year

Source (base year)	Link No	Vehicle Type									
		P/C	P/P	L/B	M/B	H/B	P/T	4/T	6/T	10/T	ADT
DOH (1981)	1 ^{1/}	4	47	34	42	16	8	24	37	25	237
Manual Counts (1982)	1	-	31	1	46	2	3	4	11	-	98
Estimated	1	2	39	18	44	9	6	14	24	13	169

Note: ^{1/} Route 2213 Section 0100 Section Km 4+000

2.3 交通需要

計画路線上の旅客交通需要（トリップ/日）および貨物交通需要（トン/日）は、先に求めた基準年の交通量に路側インタビューによって得られる平均乗車人員もしくは平均貨物積載量をかけることによって推定した。推定結果は以下のとおりである。

PASSENGER MOVEMENT (1982)

PROPOSED ROAD LINK	TRIPS PER DAY
1	1670

FREIGHT MOVEMENT (1982)

PROPOSED ROAD LINK	TONAGE PER DAY		
	NON-AGRI.	AGRI.	TOTAL
1	159	19	178

2.4 交通需要の将来伸び率

1981-1987, 1987-1993, 1993-2001の各期間における旅客および貨物の交通需要の将来伸び率は、メインレポートの7.3.3の1)で述べた予測式に従って求めた。予測の前提および得られた将来伸び率は以下の通りである。

GROWTH RATE OF PASSENGER MOVEMENT

ITEM	GROWTH RATE (% P.A.)			
	1981	1987	1993	
	1987	1993	2001	
PER CAPITA INCOME	4.2	4.5	4.7	
TRANS. PRICE INCREASE	4.5	4.5	4.5	
POPULATION	1.8	1.5	1.3	
PASSENGER MOVEMENT	5.8	5.9	6.0	

GROWTH RATE OF FREIGHT MOVEMENT

ITEM	GROWTH RATE (% P.A.)		
	1981	1987	1993
	1987	1993	2001
NON-AGRI. AGRICULTURE	7.5	7.6	7.7
FREIGHT	6.7	6.8	6.9

2.5 誘発および開発交通量

メインレポートの7.3.3の3)で述べた方式を基に誘発および開発交通量の通常交通量に対する比率を求めた。

RATE OF INDUCED AND DEVELOPED TRAFFIC

ITEM	YEAR		
	1987	1993	2001
	INDUCED	15.0	15.0
DEVELOPED	0.0	0.1	0.1

2.6 将来交通量

1) 車種構成

計画路線上の旅客・貨物に関する将来交通需要を、以下の車種構成比によって車種別交通量に変換した。

TRAFFIC COMPOSITION

(UNIT : %)

LINK NO.	YEAR	PASSENGER					FREIGHT			
		P/C	P/P	L/B	M/B	H/B	P/T	4/T	6/T	10/T
1	1982	1.8	34.8	16.1	39.3	8.0	10.5	24.6	42.1	22.8
	1987	4.0	33.8	17.4	35.8	8.9	12.2	22.3	40.2	25.2
	1993	6.7	32.5	19.1	31.7	10.0	14.3	19.6	38.0	28.1
	2001	10.2	30.8	21.3	26.2	11.5	17.0	16.0	35.0	32.0

2) 将来ADT

計画路線上のリンク加重平均将来交通量は以下に示すとおりであり、またその道路リンク別交通タイプ別の詳細はTable 24.2.1に示す。

AVERAGE FUTURE TRAFFIC ON PROPOSED ROUTE

YEAR	TYPE OF VEHICLE								ADT	M/C	TOTAL
	P/C	L/B	M/B	H/B	P/P&T	4/T	6/T	10/T			
1987	7	30	62	15	69	19	35	22	259	299	557
1993	16	47	78	25	97	24	46	34	367	360	727
2001	41	85	104	46	155	31	67	61	588	439	1027

3. 農業開発

3.1. 現況

影響圏の農耕地の殆どが、水田であり、畑地では、ケナフ、キャッサバ、メイズ及び落花生を栽培している。

圏内の土地利用及び土地適応性の状況はTable 24.3.1とFigure 24.3.1に示し、また、Ubon Ratchathani県地域の代表的作物暦は、Figure 24.3.2のとおりである。

3.2. 開発予測

影響圏内の将来の農業開発状況を、With ProjectとWithout Projectの双方について予測した。予測した作付面積、単位当たり収量及び生産量はTable 24.3.2のとおりである。代表的作物の農家庭先価格と農業生産費とは、各県の資料及び現地調査の結果を参考にし、Table 24.3.3.のように見積った。

上記のごとく各作物ごとに予測された生産量と庭先価格により、生産価値を計算し、これから農業生産費及び別途見積られた開墾費を差引き、純生産価値(N.P.V)をTable 24.3.4.のように算出した。

このN.P.VのWith Projectの場合と、Without Projectの場合の差が、この道路の開発便益である。

4. 走行費の節減

本報告書、第1巻、第7章で述べた概念と基礎データにもとづき関連する各道路リンクの走行費(以下"VOC"という)をWith ProjectとWithout Projectの両ケースについて計算した。

各リンクにおけるVOCのコスト増に影響を与える道路状況は以下に示すとおりである。

Road Condition

Link	Without Project					With Project			
	No.	Terrain	Length (km)	Road Class	Nos. of Bridge	Nos. of Narrow C.Bridge	Length (Km)	Road Class	
Class 1								Class 2	
1	Rolling	14.5	2B	2	0	14.5	1 (F4)	2A (F5)	0

- ¹ Road 1 : Paved Road
- Road 2A : Laterite Road with good surface condition and alignment
- Road 2B : Laterite Road with good surface condition but poor alignment
- Road 3 : Laterite Road with poor surface condition and alignment
- Road 4 : Earth Road

VOC節減は、With Projectの全リンクのVOCとWithout Projectの際のVOCとの差で、当道路におけるVOCの節減は次に示すとおりである。

Vehicle Operating Cost Saving

(Unit: 1,000 Baht)

Road Class	1987	1993	2001
1 (F4)	2,122	3,238	5,678
2A (F5)	744	1,321	2,681

5. エンジニアリング

5.1 予備設計

予備設計は、次に示す設計規準を基本に行った。

Design Standard	: F4 (if not feasible, F5)
Geometric Design	: AASHTO (Rural Highways)
Typical Cross Section	: As shown in Figure 24.5.1
Minimum Height of Embankment	
Ordinary Section	: 1.0m
Approach of Bridge in Flat Area	: 2.0m
Flood Section	: 0.7m (above flood level)

Pavement Structure

In case of F4 Standard

DBST		: 2.5cm
Crushed Stone Base	CBR _{>} 80%	: 15.0cm
Soil Aggregate Subbase	CBR _{>} 20%	: 15.0cm
Selected Material	CBR _≥ 6%	: 20.0cm

In case of F5 Standard

Soil Aggregate Surface	CBR _{>} 20%	: 15.0cm
Selected Material	CBR _≥ 6%	: 20.0cm

Pipe Culvert

Standard Size	: φ 100cm
Standard Interval	
Paddy Area	: 200 m
Others	: 500 m

Box culvert

Standard Size : 2.4m x 2.4m
 Location : as required

Bridge

Standard Type (width 7.0m)
 Short Span Bridge : RC - Slab
 Long Span Bridge : PC - Girder
 Location : as shown in Bridge List in Figure 24.5.2

ルートの線形は、Figure 24.5.2 示す。

5.2 工事数量および建設費

予備設計による工事数量は建設費は、各工事ごとに単価を付してTable 24.5.1に示す。
 道路規格別の建設費を財務費用および経済費用に分けて集計すると、下表に示すとおりとなる。

Financial and Economic Construction Cost

Road Class	Length (Km)	Construction Cost (10 ³ 円)		Remark
		Financial Cost	Economic Cost	
F4 (DBST)	14.5	25,653	23,184	
F5 (Soil Aggregate)	14.5	13,387	12,027	

6. 経済価格

年次別経済費用と便益及び評価結果はTable 24.6.1及び24.6.2に示す通りである。
 このルートはF4規格、F5規格共に1987年を供用開始とした場合にフィージブルでない。

7. 社会インパクト

社会インパクトを示すデータ及び評価結果はTable 24.7.1に示す通りである。

Table 24.1.1 SUMMARY OF ROAD INVENTORY

Item	Description	
Origin	B. Na Suang (J.R. 24)	
Destination	B. Na Yai	
Length		
Total		14.5 km
Improvement Section		14.5 km
DOH Road	R. 2213	14.5 km
ARD Road		0 km
Others		0 km
New Alignment Section		0 km
Terrain	Rolling	
Alignment (Hori./Vert.)	Fair / Fair	
Formation Width	6.0 m - 7.0 m, 6.7 m (Weighted average)	
Embankment Section		
Length		14.5 km
Height	0.3 m - 1.0 m	
Cut Section		
Length		0 km
Depth	m - m	
Surface Type and Condition		
SBST or DBST		0 km
Soil Aggregate	Good	14.5 km
Earth		0 km
Pipe Culvert	22 each	
Box Culvert	0 each	0 m
Bridge		
Permanent Bridge	0 each	0 m
Narrow Concrete Bridge	0 each	0 m (4m)
Wooden Bridge	2 each	36.1 m
Overflow Section	0 place	0 km

Table 24.1.2 ROAD INVENTORY

PROPOSED ROUTE NO. IM-24

ROUTE NO. 2213

B. NA SUANG (J.R. 24) ~ B. NA YIA

L = 14.5 Km

UBON RATCHATHANI

STATION (Km)		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
VILLAGE																		
- Name																		
- Household (H)																		
- Population (P)																		
TERRAIN		Rolling																
CROSS SECTION	Formation Width (m)	6.00			7.00													
	Embankment Height (m)	0.30	1.00	0.30	1.00	0.80			1.00	0.70								
	Cutting Depth (m)																	
PAVEMENT	Type/Length	Laterite																
	Condition	Good																
FLOODING	Overflow Length(Km)/Height(m)																	
LAND USE	Left	Paddy																
	Right	Paddy																
PIPE CULVERT	Total Number	22 pipes																
BOX CULVERT & BRIDGE	Station (Km)	1.7														12.5		
	Dimension	W-Br. 4.50 x 25.40														W-Br. 4.00 x 10.70		
RIGHT OF WAY (m)																		
ALIGNMENT	Horizontal	Fair																
	Vertical	Fair																
ROUTE NO., AGENCIES		DOH 2213																

Table 24.2.1 TRAFFIC VOLUME ON ROUTE IM - 24

YEAR	1987		1993		2001		
LINK	1 AVR.		1 AVR.		1 AVR.		
P/C	N+D	6	6	14	14	35	35
	I	1	1	2	2	5	5
	DV	0	0	0	0	0	0
	TOTAL	7	7	16	16	41	41
L/B	N+D	26	26	41	41	73	73
	I	4	4	6	6	11	11
	DV	0	0	0	0	0	0
	TOTAL	30	30	47	47	85	85
M/B	N+D	54	54	68	68	90	90
	I	8	8	10	10	14	14
	DV	0	0	0	0	0	0
	TOTAL	62	62	78	78	104	104
H/B	N+D	13	13	21	21	40	40
	I	2	2	3	3	6	6
	DV	0	0	0	0	0	0
	TOTAL	15	15	25	25	46	46
P/P&T	N+D	60	60	84	84	134	134
	I	9	9	13	13	20	20
	DV	0	0	0	0	0	0
	TOTAL	69	69	97	97	155	155
4/T	N+D	17	17	21	21	27	27
	I	3	3	3	3	4	4
	DV	0	0	0	0	0	0
	TOTAL	19	19	24	24	31	31
6/T	N+D	30	30	40	40	58	58
	I	5	5	6	6	9	9
	DV	0	0	0	0	0	0
	TOTAL	35	35	46	46	67	67
10/T	N+D	19	19	30	30	53	53
	I	3	3	4	4	8	8
	DV	0	0	0	0	0	0
	TOTAL	22	22	34	34	61	61
ADT	N+D	225	225	319	319	511	511
	I	34	34	48	48	77	77
	DV	0	0	0	0	1	1
	TOTAL	259	259	367	367	588	588
M/C	N+D	275	275	335	335	416	416
	I	24	24	25	25	22	22
	DV	0	0	0	0	0	0
	TOTAL	299	299	360	360	439	439
TOTAL	N+D	500	500	653	653	927	927
	I	57	57	73	73	99	99
	DV	0	0	1	1	1	1
	TOTAL	557	557	727	727	1027	1027

NOTE

N : NORMAL TRAFFIC
DV : DEVELOPED TRAFFIC

D : DIVERTED TRAFFIC
I : INDUCED TRAFFIC

Figure 24.3.1 LAND USE AND CAPABILITY OF INFLUENCE AREA
PROPOSED ROUTE NO. IM - 24

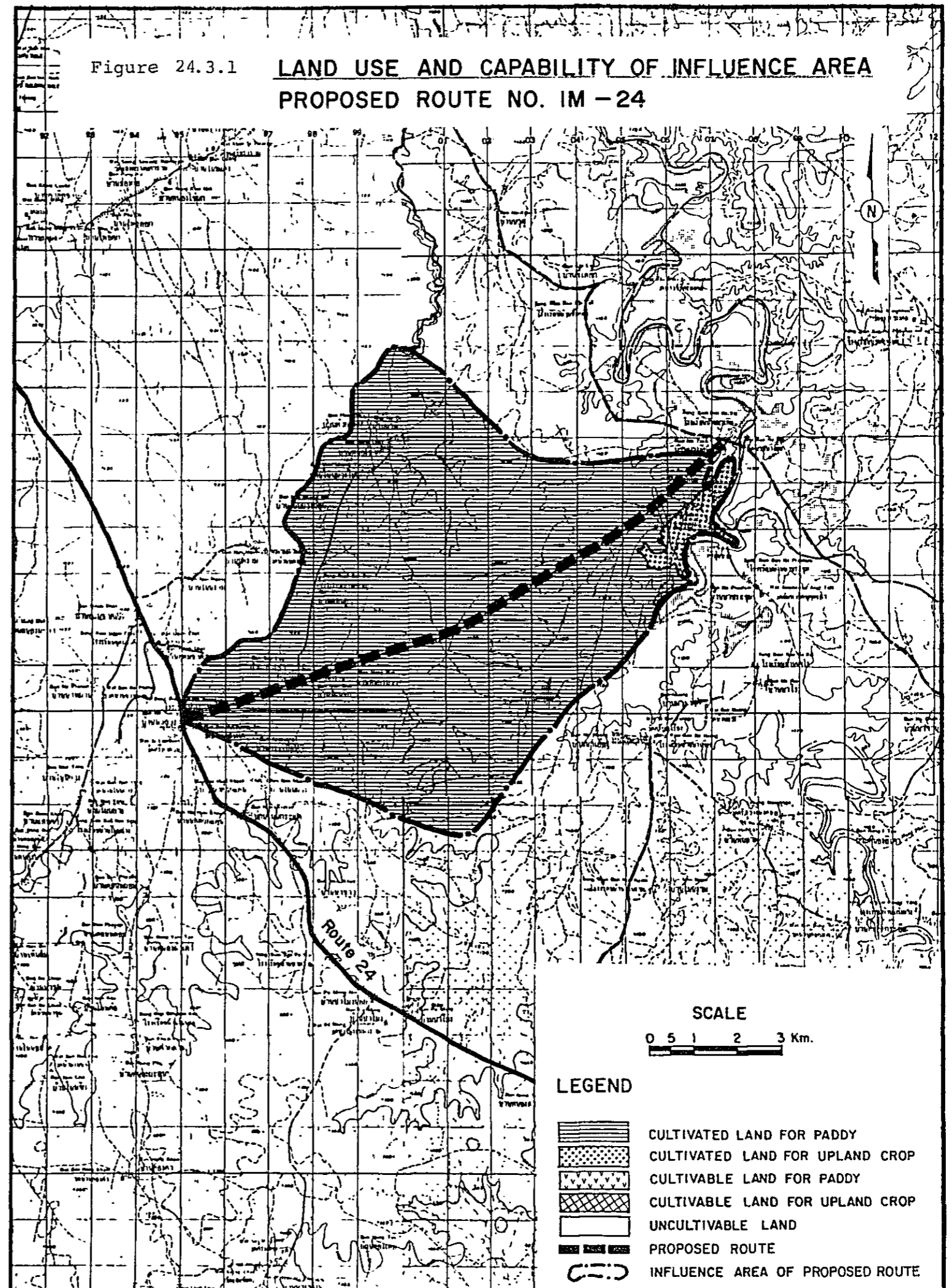
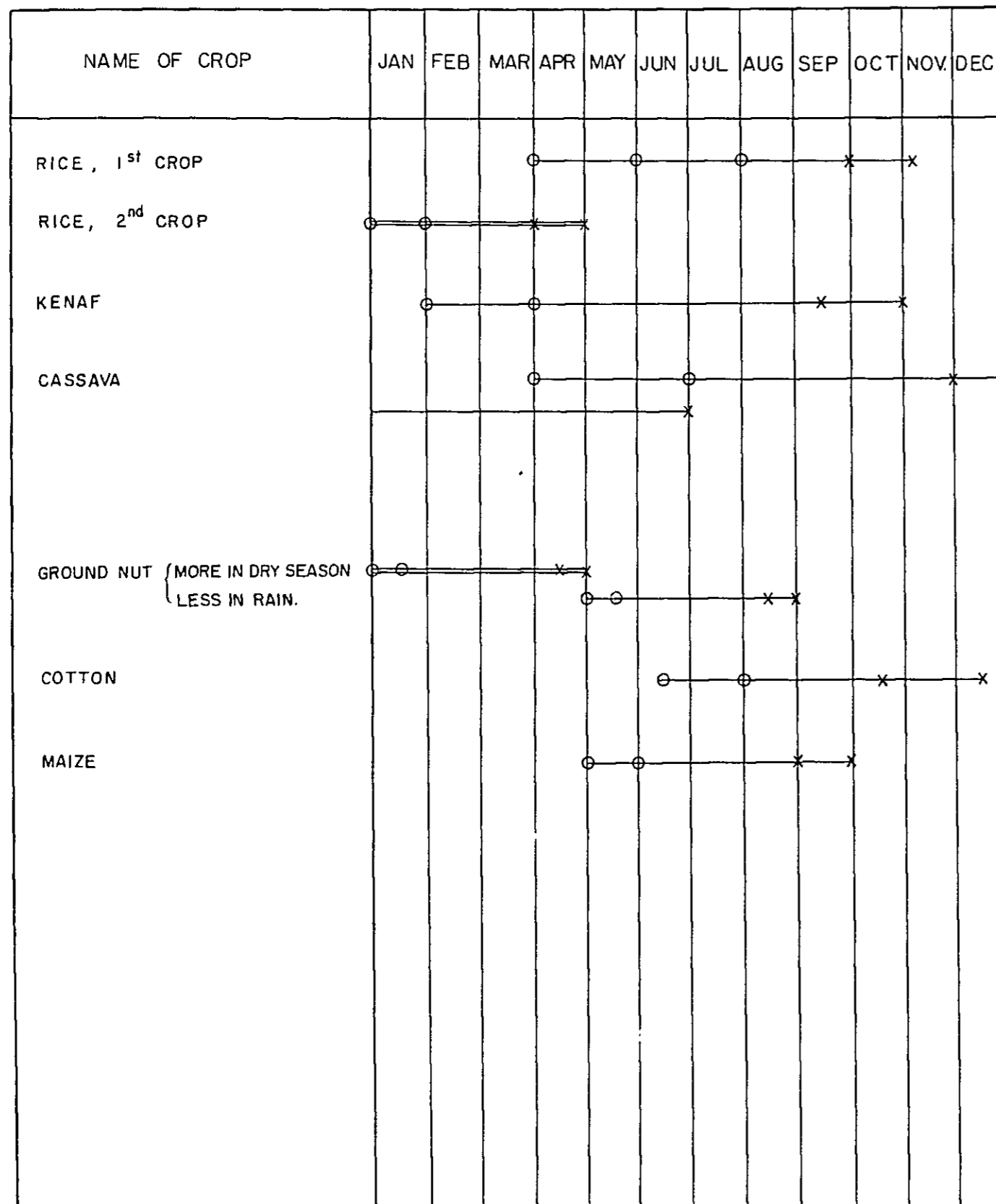


Figure 24.3.2 CROPPING CALENDAR

1100 CHANGWAT UBON RATCHATHANI



Note

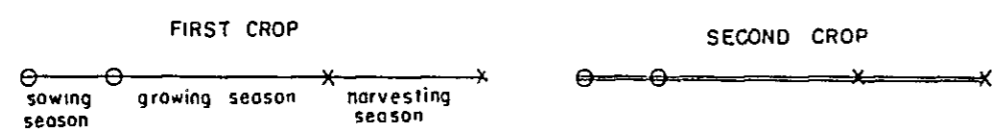


TABLE 24.3.1 CULTIVATED & CULTIVABLE LAND

(1979)

[UNIT : 1000 RAI (KM²)]

AMPHOE CODE	AMPHOE NAME	CULTIVATED LAND			UNUSED CULTIVABLE LAND		
		PADDY	UPLAND	TOTAL	PADDY	UPLAND	TOTAL
		43.125 (69.0)	1.250 (2.0)	44.375 (71.0)	-	-	-
1117	DET UDOM	43.125 (69.0)	1.250 (2.0)	44.375 (71.0)	-	-	-

TABLE 24.3.2 CROP PRODUCTION

ITEM	PADDY	MAIZE	BEANS	GRUND NUTS	CASSAVA	SUGAR CANE	KENAF	COTTON	UPLAND TOTAL	TOTAL
PLANTED AREA (1000 RAI)										
1981	40.05	0.09	-	0.07	0.29	-	0.80	-	1.25	41.30
1987	40.05	0.09	-	0.07	0.30	-	0.80	-	1.26	41.31
1993	40.05	0.09	-	0.07	0.31	-	0.80	-	1.28	41.32
	40.05	0.09	-	0.08	0.34	-	0.81	-	1.32	41.37
2001	40.05	0.09	-	0.07	0.33	-	0.80	-	1.30	41.34
	40.05	0.09	-	0.08	0.36	-	0.81	-	1.34	41.39
CROP YIELD (KG/RAI)										
1981	162.8	240.0	-	150.0	2000.0	-	168.0	-		
1987	163.8	241.4	-	150.0	2000.0	-	168.0	-		
1993	164.8	242.9	-	150.0	2000.0	-	168.0	-		
	166.8	245.8	-	150.9	2012.0	-	168.0	-		
2001	166.1	244.8	-	150.0	2000.0	-	168.0	-		
	170.8	251.8	-	152.1	2028.2	-	168.0	-		
CROP PRODUCTION (TON)										
1981	6,521	21	-	10	574	-	135	-	740	7,261
1987	6,560	21	-	10	598	-	135	-	765	7,326
1993	6,600	22	-	10	624	-	135	-	791	7,391
	6,679	22	-	12	678	-	137	-	848	7,528
2001	6,653	22	-	10	659	-	135	-	828	7,481
	6,841	23	-	12	722	-	137	-	894	7,736

NOTE : SYMBOL "-" MEANS ZERO OR NEGLIGIBLE SMALL

TABLE 24.3.3 FARMGATE PRICE AND PRODUCTION COST

ITEM	PADDY	MAIZE	BEANS	GRUND NUTS	CASSAVA	SUGAR CANE	KENAF	COTTON
FARMGATE PRICE (BAHT/TON)								
WITHOUT PROJECT (1981 - 2001)	3,741	2,503	-	8,693	577	-	4,666	-
WITH PROJECT (1987 - 2001)	3,835	2,566	-	8,693	591	-	4,783	-
CROP PRODUCTION COST (BAHT/RAI)								
WITHOUT PROJECT (1981 - 2001)	416	492	-	1,028	677	-	729	-
WITH PROJECT (1987 - 2001)	426	512	-	1,048	697	-	729	-

TABLE 24.3.4 NET PRODUCTION VALUE

YEAR	(1000 BAHT)					
	WITHOUT PROJECT			WITH PROJECT		
	PADDY	UPLAND	TOTAL	PADDY	UPLAND	TOTAL
1987	7,883	219	8,102	8,099	233	8,332
1993	8,031	225	8,256	8,555	258	8,813
2001	8,229	235	8,464	9,176	275	9,451

Figure 24.5.1 TYPICAL CROSS SECTION AND TYPICAL PAVEMENT STRUCTURE

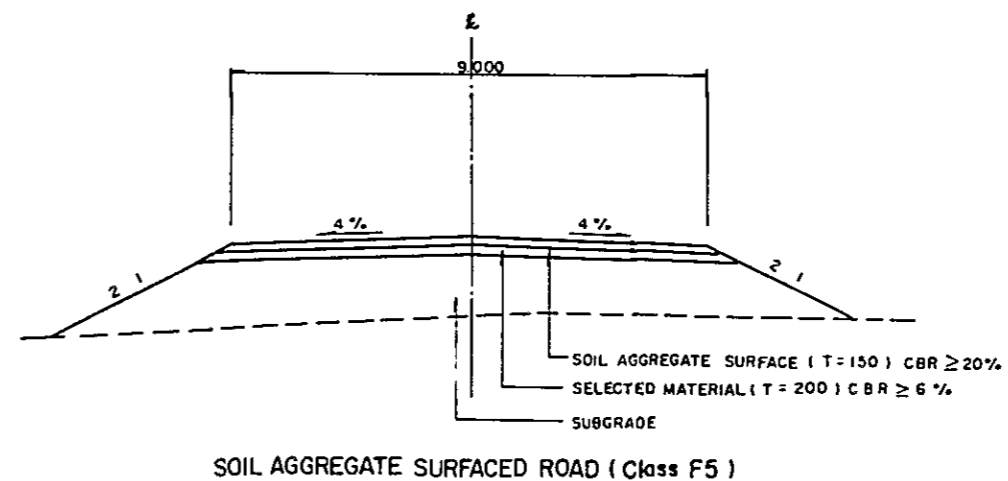
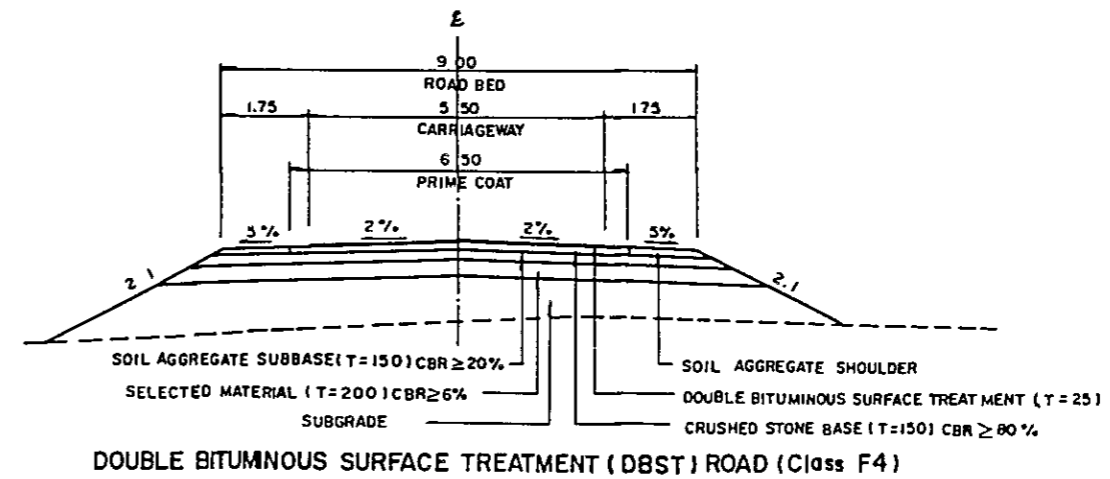
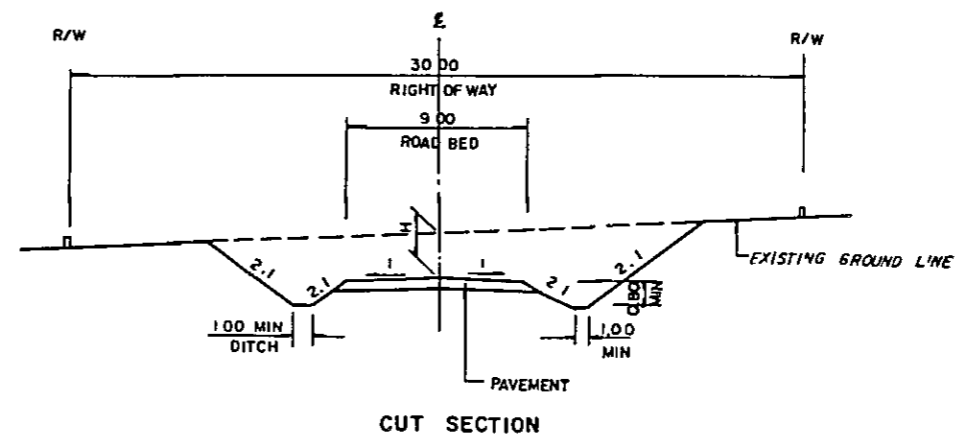
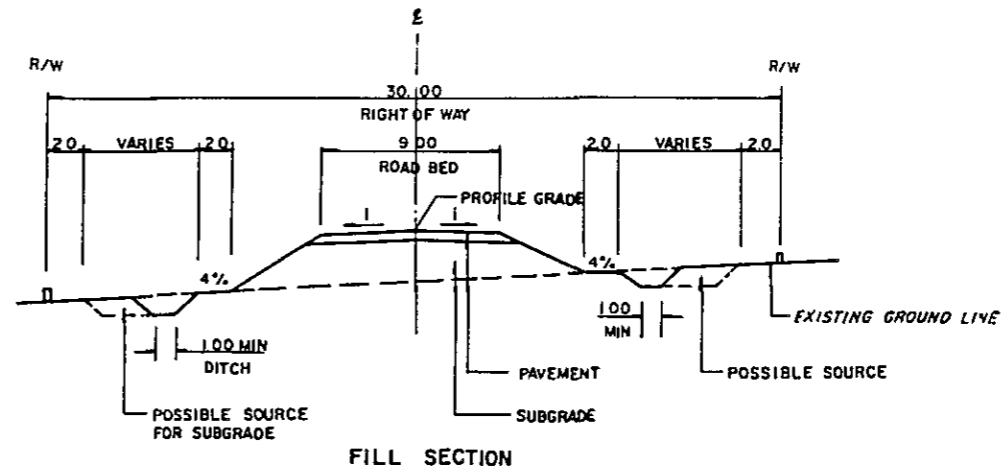
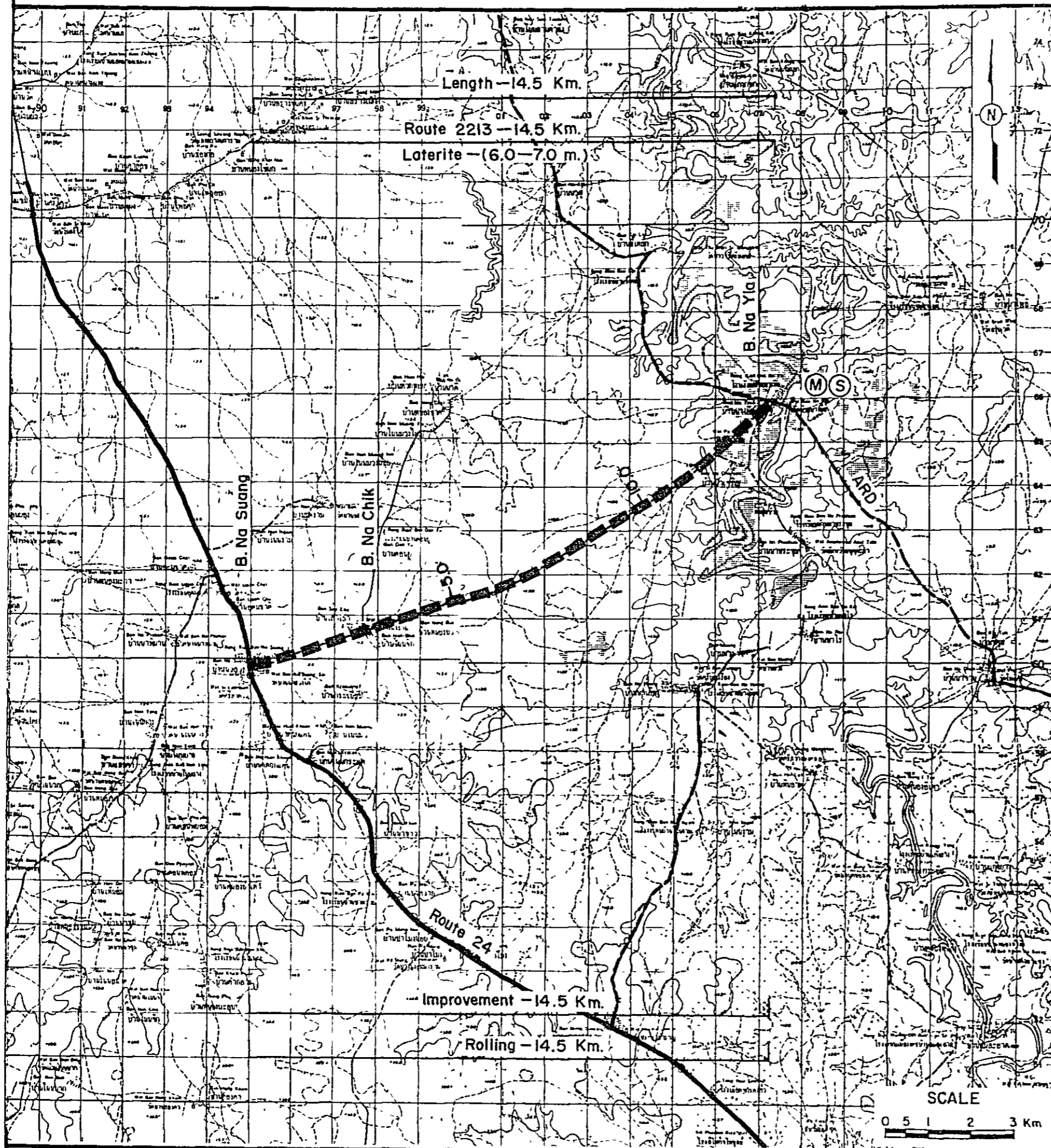
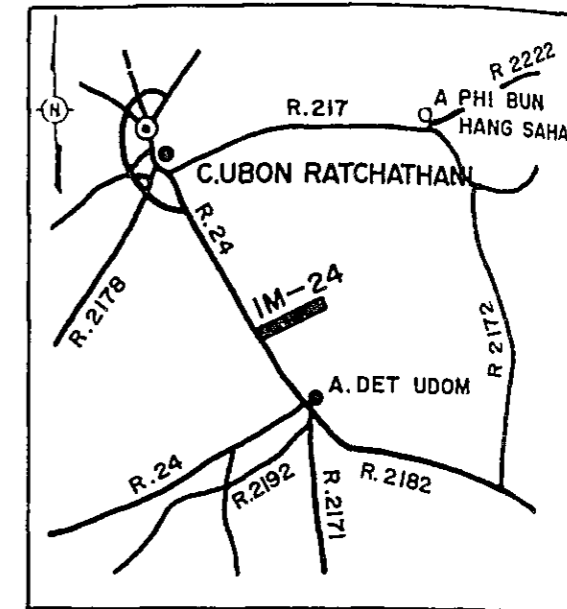


Figure 24.5.2

PROPOSED ROUTE NO.IM-24 C.UBON RATCHATHANI B.NA SUANG(J.R.24) - B.NA YIA
ROUTE NO.2213 L = 14.5 Km.



LOCATION MAP



BRIDGE LIST

No.	Station Km.	Proposed Bridge	Existing Bridge
1.	1.7	C-7.00x 28.00	W-4 50 x 25.40
2.	12.5	C-7.00x 14.00	W-4 00 x 10.70

LEGEND

- PROPOSED ROUTE (IMPROVEMENT)
- PROPOSED ROUTE (NEW CONSTRUCTION)
- PAVED ROUTE
- UNPAVED ROUTE
- INVENTORY SURVEY ROUTE
- HOSPITAL
- MEDICAL CENTER
- SECONDARY SCHOOL

Table 24.5.1 CONSTRUCTION QUANTITIES AND COSTS IM-24 (14.5 km)

Items	Unit of Q'ty	Financial Unit Rate ₪	(DBST)			(Soil Aggregate Surface)		
			Q'ty	Financial Cost (10 ³ ₪)	Economic Cost (10 ³ ₪)	Q'ty	Financial Cost (10 ³ ₪)	Economic Cost (10 ³ ₪)
DIRECT CONSTRUCTION COST								
Clearing and Grubbing	ha	15,000	34	510	464	34	510	464
Excavation - Soil	m ³	20	0	0	0	0	0	0
Excavation - Hard Rock	m ³	160	0	0	0	0	0	0
Embankment	m ³	45	17,580	791	719	17,600	792	720
Selected Material	m ³	80	30,700	2,456	2,185	30,700	2,456	2,185
Soil Aggregate Surface or Subbase	m ³	105	21,500	2,257	2,009	21,500	2,257	2,009
Crushed Stone Base	m ³	370	14,100	5,217	4,799	1,500	555	510
Soil Aggregate Shoulder	m ³	105	6,100	640	570	600	63	56
Prime Coat and DBST	m ²	55	79,800	4,389	3,950	8,300	456	410
Pipe Culvert	m	2,100	590	1,239	1,139	590	1,239	1,139
Box Culvert	m	16,000	0	0	0	0	0	0
Long Span Bridge	m	80,000	0	0	0	0	0	0
Short Span Bridge	m	40,000	42	1,680	1,495	42	1,680	1,495
Sub Total (a)				19,180	17,334		10,009	8,992
Miscellaneous Works (a) x 7%				1,343	1,213		700	629
Total (b)				20,523	18,547		10,709	9,621
PHYSICAL CONTINGENCY (b) x 15%				3,078	2,782		1,606	1,443
ENGINEERING AND ADMINISTRATION (b) x 10%				2,052	1,855		1,070	962
Sub Total				5,130	4,637		2,676	2,405
LAND ACQUISITION								
Highly Developed Land	ha	50,000	0	0	0	0	0	0
Less Developed Land	ha	15,000	0	0	0	0	0	0
Sub Total				0	0		0	0
GRAND TOTAL				25,653	23,184		13,387	12,027

Table 24.6.1 COST AND BENEFITS
(F4 STANDARD)

(1000 BAHT)							
YEAR	COST		BENEFITS			DISCOUNTED(12%)	
	CONST. COST	AGRI. BENEFIT	VOC SAVING	RMC SAVING	TOTAL	COST	BENEFIT
1984	0	0	0	0	0	0	0
1985	9,273	0	0	0	0	11,632	0
1986	13,911	0	0	0	0	15,580	0
1987	0	230	2,122	-18	2,334	0	2,084
1988	0	283	2,308	-13	2,579	0	2,056
1989	0	337	2,494	-7	2,823	0	2,010
1990	0	390	2,680	-2	3,068	0	1,950
1991	0	443	2,866	3	3,313	0	1,880
1992	0	497	3,052	9	3,557	0	1,802
1993	0	550	3,238	14	3,802	0	1,720
1994	7,018	605	3,543	23	4,170	3,175	1,684
1995	0	659	3,848	31	4,538	0	1,637
1996	0	714	4,153	40	4,906	0	1,580
1997	0	768	4,458	48	5,275	0	1,516
1998	0	823	4,763	57	5,643	0	1,448
1999	0	878	5,068	65	6,011	0	1,378
2000	0	932	5,373	74	6,379	0	1,305
2001	-10,665	987	5,678	83	6,747	-1,948	1,233
TOTAL	19,537	9,097	55,642	407	65,145	28,438	25,282

DISCOUNTED ECONOMIC COSTS :	28,438
DISCOUNTED ECONOMIC BENEFITS :	25,282
AGRICULTURAL DEVELOPMENT BENEFIT	3,387
VOC SAVING	21,808
RMC SAVING	87
NET PRESENT VALUE :	-3,157
BENEFIT COST RATIO :	0.89
INTERNAL RATE OF RETURN :	10.6 %

Table 24.6.2 COST AND BENEFITS
(F5 STANDARD)

(1000 BAHT)							
YEAR	COST		BENEFITS			DISCOUNTED(12%)	
	CONST. COST	AGRI. BENEFIT	VOC SAVING	RMC SAVING	TOTAL	COST	BENEFIT
1984	0	0	0	0	0	0	0
1985	2,405	0	0	0	0	3,017	0
1986	9,622	0	0	0	0	10,777	0
1987	0	230	744	2	977	0	872
1988	0	283	840	3	1,127	0	898
1989	0	337	937	4	1,277	0	909
1990	0	390	1,033	4	1,427	0	907
1991	0	443	1,129	5	1,577	0	895
1992	0	497	1,225	6	1,727	0	875
1993	0	550	1,321	7	1,877	0	849
1994	726	605	1,491	8	2,103	328	850
1995	0	659	1,661	10	2,330	0	840
1996	0	714	1,831	11	2,556	0	823
1997	0	768	2,001	12	2,782	0	800
1998	0	823	2,171	14	3,008	0	772
1999	0	878	2,341	15	3,234	0	741
2000	0	932	2,511	17	3,460	0	708
2001	-5,532	987	2,681	18	3,686	-1,011	673
TOTAL	7,221	9,097	23,915	137	33,148	13,111	12,412

DISCOUNTED ECONOMIC COSTS :	13,111
DISCOUNTED ECONOMIC BENEFITS :	12,412
AGRICULTURAL DEVELOPMENT BENEFIT	3,387
VOC SAVING	8,979
RMC SAVING	46
NET PRESENT VALUE :	-699
BENEFIT COST RATIO :	0.95
INTERNAL RATE OF RETURN :	11.4 %

Table 24.7.1 SOCIAL INDICATORS
(Proposed Route IM-24)

Population (1,000)	
1982	: 6.0
1993	: 7.2
Average travelling speed, without (kph)	
	: 48
Isolation	
Access to Amphoe	
Average distance to Amphoe (km) <u>1/</u>	: 7.5
Per capita time savings (10 ⁻⁴)	: 0.072
Score	: 218
Access to Artery Highway	
Average distance to highway (km) <u>1/</u>	: -
Per capita time savings (10 ⁻⁴)	: -
Score	: 100
Impassability	
Impassable week a year	: -
Impassability per year	: 0
Impassability per capita (10 ⁻⁴)	: 0
Score	: 0
Health	
Access to Hospital	
Average distance to Hospital (km) <u>1/</u>	: 7.5
Per capita time savings (10 ⁻⁴)	: 0.072
Score	: 167
Access to Medical Facilities	
Average distance to facilities (km) <u>1/</u>	: 4.4
Per capita time savings (10 ⁻⁴)	: 0.043
Score	: 172

Education	
Access to Secondary School	
Number of Student in 1993 (1,000) <u>2/</u>	: 1.0
Average distance to school (km)	: 3.8
Per capita time savings (10 ⁻⁴)	: 0.260
Score	: 135
Teacher Intensity	
Number of teachers <u>3/</u>	
University graduate	: 3
Total	: 36
Number of Student	: 889
Indicators	
E1 <u>4/</u>	: 3.4
E2 <u>5/</u>	: 40.5
E <u>6/</u>	: 43.9
Degree of Improvement <u>7/</u>	: 1.56
Score	: 99
Disparity	
G.P.V. in 1993 (Mn B) <u>8/</u>	
With project	: 26.8
Without project	: 25.8
Per capita G.P.V. in 1993 (B)	
With project (W)	: 3,722
Without project (w)	: 3,583
Degree of Disparity	
(A/W) - (A/w) <u>9/</u>	: 0
Score	: 0
Total Score	: 1,379

Note:

- 1/ () shows the length or distance in without project case. Unless otherwise, lengths are same both in with project case and without project case.
- 2/ Number of secondary school student estimated based on the projected population of the areas of influence applying ratios of secondary school students to the total population in the sample area.
- 3/ Numbers of the sample areas
- 4/ (Number of University Graduate Teachers)/(Total Number of Student) x 1,000
- 5/ (Total of Teachers)/(Total Number of Student) x 1,000
- 6/ Sum of 4/ and 5/
- 7/ Ratio of E value of each route to an average value of the same indicator E in case of the sample areas, 33 in number, along paved road near the proposed routes. The average value of E in case of paved roads were calculated at 68.4 from the following data:

Number of university graduate teachers	438
Number of Teachers	1,285
Number of student	25,196
- 8/ Estimated gross value of crop production in the areas of influence
- 9/ "A" indicates an average per capita value of crop production in the Northeastern Region, which is estimated assuming that:
 - GRP per capita of the Northeast is estimated at 11,897 Baht in 1993,
 - Agricultural sector shares 40% of GRP, and
 - Crop production shares 80% of agricultural production.

PROPOSED ROUTE NO. IM - 25

Changwat : Yasothon / Si Sa Ket

A.Maha Chana Chai(JR.2083)-A Yang Chum Noi(JR.2165)

Length : 38.2 KM.

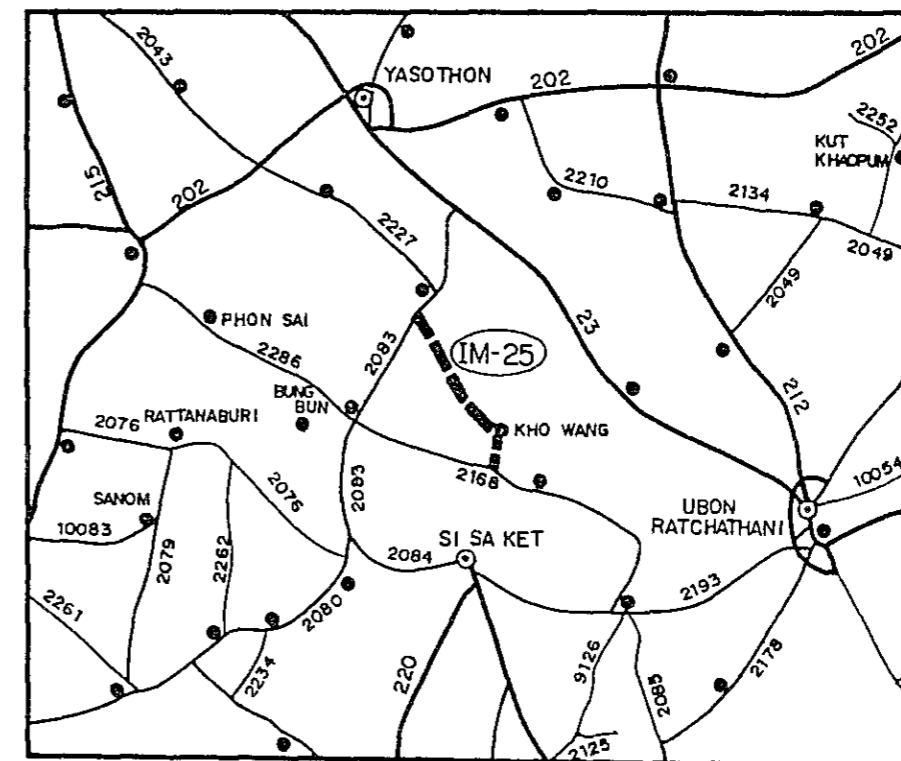
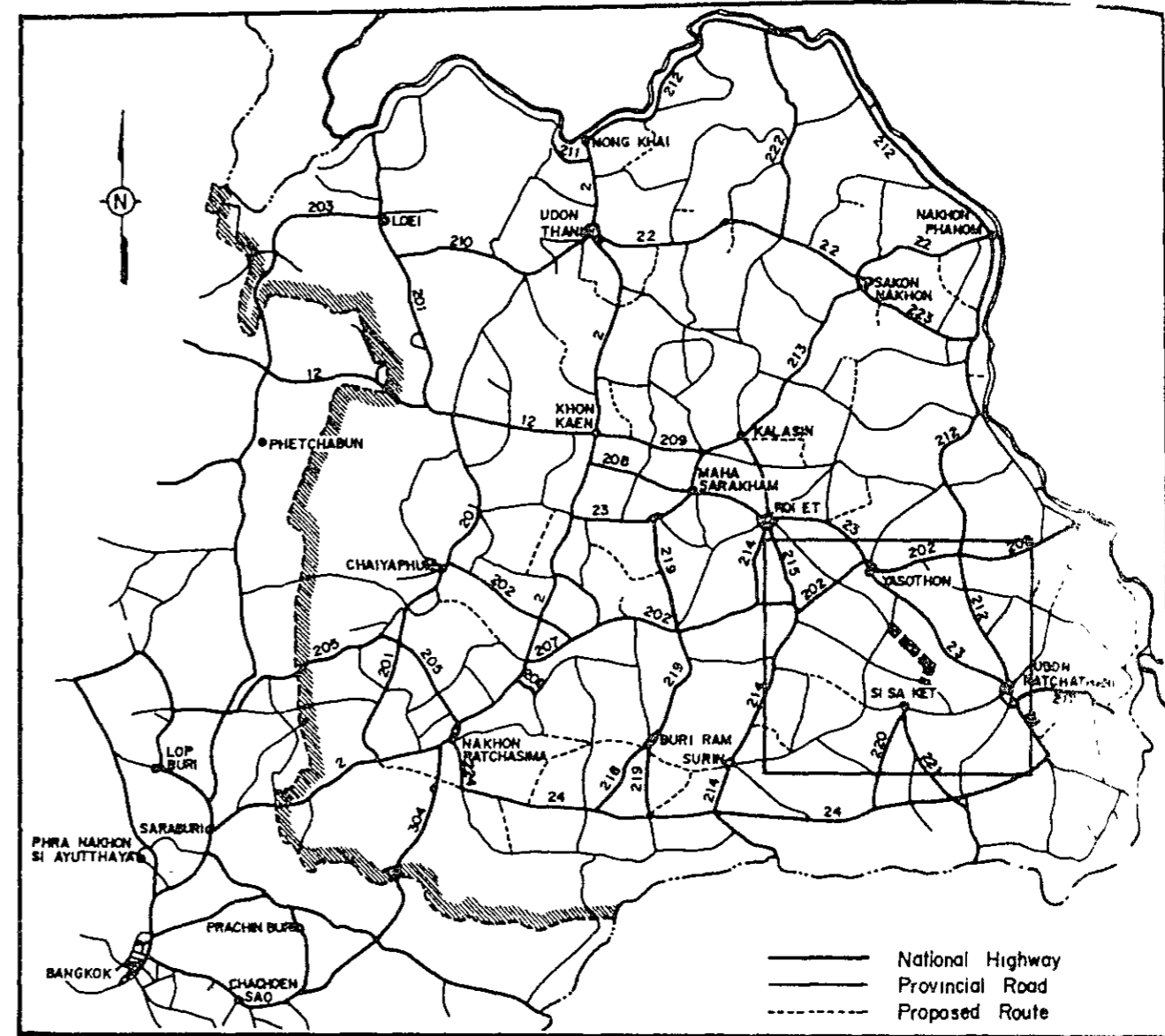
LOCATION OF PROPOSED ROUTE

SUMMARY

PROPOSED ROUTE IM-25

Item	Description
Changwat	Yasothon/Si Sa Ket
Origin	A. Maha Chana Chai (J.R.2083)
Destination	A. Yang Chum Noi (J.R.2165)
Length	
Total	38.2 km
Improvement Section	38.2 km
DOH Road	0 km
ARD Road	18.0 km
Others	20.2 km
New Alignment Section	0 km
Surface Condition	Soil Aggregate and Earth, Good - Poor
Terrain	Flat
Influence Area	
Area	212 km ²
Population (1982)	38,900
Principal Crops	Paddy
Traffic (ADT)	
Existing	88
1993	573
2001	781
Proposed Standard	F4 (DBST)
Total Section	
Construction Cost	
Financial	68,025 . 10 ³ ฿
Economic	61,658 . 10 ³ ฿
IRR	8.6 %
B/C	0.74
Section 1 (23 km) ^{1/}	
Construction Cost	
Financial	39,928 . 10 ³ ฿
Economic	36,224 . 10 ³ ฿
IRR	12.6 %
B/C	1.05
Recommendation	For immediate implementation of Section 1

^{1/} A section which has ADT of more than 300 in 7th year after opening.



1. 概要

1.1 計画路線の概要

本路線は、YasothonおよびSi Sa Ket 両県にまたがる。ルートは、Mhana Chai郡にある県道2083号線と2227号線の交差する所を起点とし、南東に走り、Ilua Don 村、Kho Wang郡、Fa lluan 村を経て、Yang Chum 郡の県道2168号線と交差して終わる。その総延長は、38.2 kmである。(Figure 25. 5. 2 参照)

沿道の地形は、平坦である。影響圏内には、いくつかの村があり、その総人口は、38,900人である。

沿道には、医療センターが2ヶ所、病院が2ヶ所あり、教育施設として中学校が1ヶ所ある。

本路線は、農業的に開発の進んだ地域における2つの幹線道路県道2083号線と2168号線をつなぐ重要な道路網の形成を目的に計画されたものである。

1.2 現道の状況

計画路線に利用した現道の状況はTable 25. 1. 1に要約し、その詳細はTable 25. 1. 2のイベントリ調査の結果に示した。

2. 交通

2.1 予測手法

本計画路線は道路改良後、交通所要時間の節約により転換交通や誘発交通が大量に期待できるため、交通量予測の手法として「配分方式」を適用することとした。

2.2 ゾーニング

本路線によって交通上変化が予想される地域について、5つの発生ゾーンを設定した。この地域から発生する交通の主要な着ゾーンとしてはMaha Chana Chai, Kho Wang, Yang Chum の3つのAmphoeを設定した。計画路線および関連する周辺道路は、計4リンクに分割して予測を行うこととした。ゾーン界図およびゾーン・道路リンクの特性はFigure 25. 2. 1およびTable 25. 2. 1, Table 25. 2. 2に示すとおりである。

2.3 交通需要

1) 旅客需要

基準年におけるO/Dペア別の旅客需要(トリップ/日)推定値はメインレポートの7.3.3.の1)で述べた算定方式に従って求めた。

推定結果は以下の通りである。

Zone	1	2	3	4	5
1	0	439	750	402	128
2	0	0	232	305	208
3	0	0	0	521	468
4	0	0	0	0	371
5	0	0	0	0	0

Grand Total = 3822.56

この交通需要を道路リンクに配分することによって得られるリンク別交通需要の推定値は次のとおりである。

PASSENGER MOVEMENT (1982)

PROPOSED ROAD LINK	TRIPS PER DAY
1	1275
2	1370
3	1181
4	259

2) 貨物需要

計画路線上の貨物交通需要(トン/日)はメインレポートの7.3.3.の1)で述べた方式によって求めた。推定のための基礎データおよび結果は次に示すとおりである。

Ratios of Total/Non-Agricultural Freight Movement

Year	1987	1993	2001
Ratio	1.55	1.38	1.22

FREIGHT MOVEMENT (1982)

PROPOSED ROAD LINK	TONAGE PER DAY		
	NON-AGRI.	AGRI.	TOTAL
1	58	43	101
2	63	48	111
3	52	40	92
4	7	6	13

2.4 交通需要の将来伸び率

1981-1987, 1987-1993, 1993-2007の各期間における旅客および貨物の交通需要の将来伸び率は、メインレポートの7.3.3.の1)で述べた予測式に従って求めた。予測の前提および得られた将来伸び率は以下の通りである。

GROWTH RATE OF PASSENGER MOVEMENT

ITEM	GROWTH RATE (% P.A.)		
	1981-1987	1987-1993	1993-2001
PER CAPITA INCOME	4.2	4.5	4.7
TRANS. PRICE INCREASE	4.5	4.5	4.5
POPULATION	1.3	1.1	1.0
PASSENGER MOVEMENT	5.4	5.5	5.7

GROWTH RATE OF FREIGHT MOVEMENT

ITEM	GROWTH RATE (% P.A.)		
	1981-1987	1987-1993	1993-2001
NON-AGRI. AGRICULTURE	6.9	7.1	7.3
AGRICULTURE	0.3	0.3	0.3
FREIGHT	5.0	5.5	6.0

2.5 誘発および開発交通量

メインレポートの7.3.3.の3)で述べた方式を基に誘発および開発交通量の通常交通量に対する比率を求めた。

RATE OF INDUCED AND DEVELOPED TRAFFIC

(%)

ITEM	YEAR		
	1987	1993	2001
INDUCED	83.8	85.4	87.4
DEVELOPED	0.0	0.0	0.0

2.6 将来交通量

1) 車種構成

計画路線上の旅客・貨物に関する将来交通需要を、以下の車種構成比によって車種別交通量に交換した。

TRAFFIC COMPOSITION

(UNIT : %)

LINK NO.	YEAR	PASSENGER					FREIGHT			
		P/C	P/P	L/B	M/B	H/B	P/T	4/T	6/T	10/T
1-4	1982	22.3	20.6	25.1	30.4	1.6	6.1	18.2	39.3	36.4
	1987	19.3	23.6	23.9	29.1	4.1	9.0	17.6	38.2	35.2
	1993	15.6	27.3	22.5	27.5	7.1	12.4	16.9	36.8	33.9
	2001	10.7	32.2	20.6	25.4	11.1	17.0	16.0	35.0	32.0

2) 将来ADT

計画路線上のリンク加重平均将来交通量は以下に示すとおりであり、またその道路リンク別交通タイプ別の詳細はTable 25.2.3に示す。

AVERAGE FUTURE TRAFFIC ON PROPOSED ROUTE

YEAR	TYPE OF VEHICLE								ADT	M/C	TOTAL
	P/C	L/B	M/B	H/B	P/P&T	4/T	6/T	10/T			
1987	32	40	49	7	43	6	13	12	202	257	459
1993	34	49	60	16	66	9	19	17	270	304	574
2001	34	66	81	36	118	14	31	28	408	373	781

3. 農業開発

3.1. 現況

影響圏の農耕地の殆どが、水田であるが、水稻の平均単位当り収量は、古い水田地帯で塩害があるために比較的低い。畑地では、ケナフが主要な作物である。未開発可耕地には、畑地のみが残っているが、これも限られている。

圏内の土地利用及び土地適応性の状況はTable 25.3.1とFigure 25.3.1に示し、また、Yasothon及びSi Sa Ket 両県地域の代表的作物暦は、Figure 25.3.2のとおりである。

3.2. 開発予測

影響圏内の将来の農業開発状況を、With ProjectとWithout Project の双方について予測した。予測した作付面積、単位当り収量及び生産量はTable 25.3.2のとおりである。代表的作物の農家庭先価格と農業生産費とは、各県の資料及び現地調査の結果を参考にし、Table 25.3.3.のように見積った。

上記のごとく各作物ごとに予測された生産量と庭先価格により、生産価値を計算し、これから農業生産費及び別途見積られた開墾費を差引き、純生産価値 (N.P.V) を Table 25.3.4. のように算出した。

この N.P.V の With Project の場合と、Without Project の場合の差が、この道路の開発便益である。

4. 走行費の節減

本報告書、第1巻、第7章で述べた概念と基礎データにもとづき関連する各道路リンクの走行費 (以下 "VOC" という) を With Project と Without Project の両ケースについて計算した。

各リンクにおける VOC のコスト増に影響を与える道路状況は以下に示すとおりである。

Road Condition

Link No.	Terrain	Without Project				With Project			
		Length (Km)	/1 Nos of Road Class	Nos of Wooden Bridge	Nos of Narrow C. Bridge	Length (Km)	Road Class	/1 Nos of Wooden Bridge	Nos of Narrow
1	Flat	7.0	3	0	0	7.0	1 1		0
1	Flat	2.0	4	0	0	2.0	1 1		0
2	Flat	6.0	2B	0	0	6.0	1 1 1	2A	0
3	Flat	8.0	2B	0	0	8.0	(F4) 1 1	(F5)	0
4	Flat	4.0	3	0	0	4.0	2A -		0
4	Flat	11.2	4	1	0	11.2	2A -		

/1 Road 1 : Paved Road

Road 2A : Laterite Road with good surface condition and alignment

Road 2B : Laterite Road with good surface condition but poor alignment

Road 3 : Laterite Road with poor surface condition and alignment

Road 4 : Earth Road

VOC 節減は、With Project の全リンクの VOC と Without Project の際の VOC との差で、当道路における VOC の節減は次に示すとおりである。

Vehicle Operating Cost Saving

(Unit: 1,000 Baht)

Road Class	1987	1993	2001
1 (F4)	3,974	5,698	9,331
1+2A (F4+F5)	3,553	5,112	8,404
1 (F4 from Link 1 to Link 4)	2,630	3,773	6,190
2A (F5)	1,999	2,978	5,064

5. エンジニアリング

5.1 予備設計

予備設計は、次に示す設計規準を基本に行った。

Design Standard	: F4 (if not feasible, F5)
Geometric Design	: AASHTO (Rural Highways)
Typical Cross Section	: as shown in Figure 25.5.1
Minimum Height of Embankment	
Ordinary Section	: 1.0m
Approach of Bridge in Flat Area	: 2.0m
Flood Section	: 0.7m (above flood level)

Pavement Structure

In case of F4 Standard

DBST : 2.5cm
 Crushed Stone Base CBR_>80% : 15.0cm
 Soil Aggregate Subbase CBR_>20% : 15.0cm
 Selected Material CBR_> 6% : 20.0cm

In case of F5 Standard

Soil Aggregate Surface CBR_>20% : 15.0cm
 Selected Material CBR_> 6% : 20.0cm

Pipe Culvert

Standard Size : φ 100cm
 Standard Interval
 Paddy Area : 200 m
 Others : 500 m

Box Culvert

Standard Size : 2.4m x 2.4m
 Location : as required

Bridge

Standard Type (width 7.0m)
 Short Span Bridge : RC - Slab
 Long Span Bridge : PC - Girder
 Location : as shown in Bridge List in Figure 25.5.2

ルートの線形は、Figure 25.5.2 示す。

5.2 工事数量および建設費

予備設計による工事数量は建設費は、各工事ごとに単価を付してTable 25.5.1に示す。
 道路規格別の建設費を財務費用および経済費用に分けて集計すると、下表に示すとおりとなる。

Financial and Economic Construction Cost				
Road Class	Length (Km)	Construction Cost (10 ³ ¥)		Remark
		Financial Cost	Economic Cost	
F4 (DBST)	38.2	68,025	61,658	
F5 (Laterite)	38.2	36,655	33,126	
F4 + F5	38.2	58,473	52,896	
Section 1 (F4)	23.0	39,928	36,224	Adopted to link _{>} 300 in ADT
Section 2 (F5)	15.2	18,548	16,678	Adopted to link _{<} 300 in AD

6. 経済評価

年次別経済費用と便益及び評価結果はTable 25.6.1, 25.6.2, 25.6.3及び25.6.4に示す通りである。

このルートはF4規格ではフィージブルでないがADTの多い一部区間ではF4規格でフィージブルである。

7. 社会インパクト

社会インパクトを示すデータ及び評価結果はTable 25.7.1に示す通りである。

Table 25.1.1 SUMMARY OF ROAD INVENTORY

Item	Description	
Origin	A. Maha Chana Chai (J.R. 2083)	
Destination	A. Yang Chum Noi (J.R. 2165)	
Length		
Total		38.2 km
Improvement Section		38.2 km
DOH Road		0 km
ARD Road		18.0 km
Others		20.2 km
New Alignment Section		0 km
Terrain	Flat	
Alignment (Hori./Vert.)	Fair / Fair	
Formation Width		5.0 m
Embankment Section		
Length		38.2 km
Height	0.3 m -	1.0 m
Cut Section		
Length		0 km
Depth	m -	m
Surface Type and Condition		
SBST or DBST		0 km
Soil Aggregate	Good	14.0 km
Earth	Poor	14.2 km
Pipe Culvert	36 each	
Box Culvert	2 each	13.2 m
Bridge		
Permanent Bridge	1 each	30.0 m
Narrow Concrete Bridge	0 each	0 m (4m)
Wooden Bridge	2 each	10.2 m
Overflow Section	0 place	0 km

Table 25.1.2 ROAD INVENTORY (1)

PROPOSED ROUTE NO. IM-25

ROUTE NO. ARD

A. MAHA CHANA CHAI (J.R. 2083) ~ A. YANG CHUM NO. 1 (J.R. 2165)

L = 38.2 Km

YASOTHON/SI SA KET

STATION (Km)		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
VILLAGE - Name - Household (H) - Population (P)				B. MUAD H = 113 P = 565			B. HUA DON H = 55 P = 275	B. SIPHUTTANA H = 170 P = 850				B. PHIPHUAN H = 58 P = 290	B. DONGMAWI				B. FA HUAN H = 210 P = 1050	
TERRAIN		Flat																
CROSS SECTION	Formation Width (m)	5.00																
	Embankment Height (m)	0.30	1.20	0.40	0.60	1.00	0.60	1.00	1.20	0.30	1.00	0.30	1.00	0.30	1.00	0.30	1.30	
	Cutting Depth (m)																	
PAVEMENT	Type/Length	Laterite	Earth				Laterite								Earth			
	Condition		Poor				Good								Poor	Fair	Poor	
FLOODING	Overflow Length(Km)/Height(m)																	
LAND USE	Left	Paddy				Forest			Paddy				Forest	Paddy	Forest	Paddy		
	Right	Paddy						Paddy				Forest	Paddy	Forest	Paddy			
PIPE CULVERT	Total Number	36 pipes																
BOX CULVERT & BRIDGE	Station (Km)	1.3							10.4							29.1		
	Dimension	C-Box 2.00 x 2.00 x 7.00							C-Br. 9.70 x 30.00							W-Br. 3.60 x 6.10		
RIGHT OF WAY (m)		10.0				30.0												
ALIGNMENT	Horizontal	Fair																
	Vertical	Fair																
ROUTE NO., AGENCIES		Rural						ARD						Rural				

ROAD INVENTORY (2)

PROPOSED ROUTE NO. IM-25

ROUTE NO. ARD

A. MAHA CHANA CHAI (J.R. 2083) A. YANG CHUM NO. 1 (J.R. 2165) (Cont'd)

L = 38.2 Km.

YASOTHON/SI SA KET

STATION (Km)		30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
VILLAGE																	
- Name																	
- Household (H)																	
- Population (P)																	
TERRAIN			Flat														
CROSS SECTION	Formation Width (m)		5.00														
	Embankment Height (m)	0.30	0.50	1.00	0.60	0.20											
	Cutting Depth (m)																
PAVEMENT	Type/Length		Earth														
	Condition		Poor														
FLOODING	Overflow Length(Km)/Height(m)	L=1.0 H=0.3															
LAND USE	Left		Paddy														
	Right		Paddy														
PIPE CULVERT	Total Number																
BOX CULVERT & BRIDGE	Station (Km)	30.8				37.5											
	Dimension	C-Box 3.00 x 10.20 x 6.20				W-Br. 4.00 x 4.10											
RIGHT OF WAY (m)																	
ALIGNMENT	Horizontal		Fair														
	Vertical		Fair														
ROUTE NO., AGENCIES			Rural														

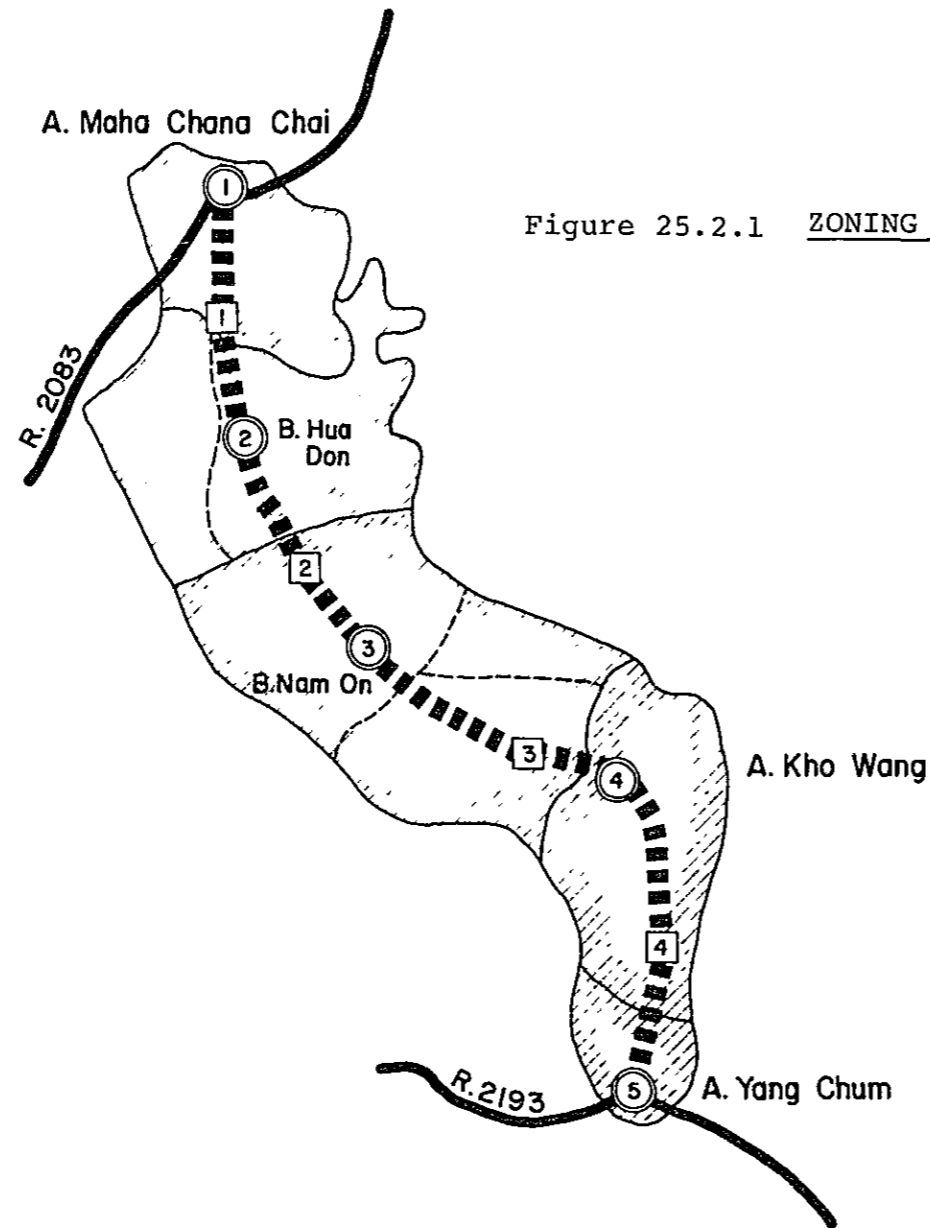


Figure 25.2.1 ZONING AND ROAD NETWORK

PROPOSED ROUTE NO. IM-25

LEGEND

- ① Traffic Zone
- Ⓜ Dummy Node
- 35 Road Link Code
- ▣▣▣▣ Proposed Road Link
- Other Road

Table 25.2.1 ZONE CHARACTERISTICS

Zone	Administrative Division			Population		Zone Attraction
	Changwat	Amphoe	Tambon Code	Tambon	%	
1	Yasothon	Maha Chana Chai	1	8,139	100	8.1 52.7
2	Yasothon	Maha Chana Chai	4	3,891	100	3.9
			9	4,040	100	4.0
			Total		7.9	-
3	Yasothon	Kho Wang	2	8,160	30	2.4
			3	4,767	100	4.8
			4	6,349	100	6.3
			Total		13.5	-
4	Yasothon	Kho Wang	1	8,835	100	8.8 24.2
5	Si Sa Ket	Yang Chum	1	10,127	50	5.1 29.3

Table 25.2.2 LINK CHARACTERISTICS

Link No	Node Pair		Length		Grade		Remark
	Start Node	End Node	\bar{W}	W	\bar{W}	W	
1.	1. A. Maha Chama Chai	2. B. Hua Don	9.0	9.0	8	4	ACD
2	2. B. Hua Don	3. B. Nam On	6.0	6.0	8	4	ABD
3	3. B. Nam On	4. A. Kho Wang	12.0	12.0	8	4	ACD
4	4. A. Kho Wang	5. A. Yang Chum Noi	11.0	11.0	11	4	ACD

Table 25.2.3 TRAFFIC VOLUME ON ROUTE IM - 25

YEAR	1987					1993					2001					
	LINK	1	2	3	4 AVR.	1	2	3	4 AVR.	1	2	3	4 AVR.			
P/C	N+D	25	27	24	5	17	27	29	25	5	18	27	29	25	5	18
	I	9	13	17	18	15	9	14	18	19	16	9	14	18	19	16
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	34	40	41	23	32	36	43	43	25	34	37	43	43	25	34
L/B	N+D	32	34	29	6	21	39	42	36	8	27	52	56	48	11	35
	I	11	16	21	23	19	14	20	26	28	23	18	27	35	37	31
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	43	50	50	29	40	53	62	62	36	49	70	83	83	48	66
M/B	N+D	38	41	36	8	26	48	51	44	10	32	64	69	59	13	44
	I	13	20	26	28	23	17	24	32	34	28	22	33	43	46	38
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	52	61	61	35	49	64	76	76	44	60	86	102	102	59	81
H/B	N+D	5	6	5	1	4	12	13	11	2	8	28	30	26	6	19
	I	2	3	4	4	3	4	6	8	9	7	10	14	19	20	16
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	7	9	9	5	7	17	20	20	11	16	38	45	45	26	36
P/P&T	N+D	34	37	31	7	23	53	57	49	10	36	93	101	86	18	63
	I	12	17	22	24	20	18	27	35	37	31	33	49	63	66	55
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	46	54	54	31	43	71	84	84	47	66	126	149	149	84	118
4/T	N+D	5	6	5	1	4	7	8	7	1	5	11	12	10	1	7
	I	2	3	3	3	3	2	4	5	4	4	4	7	8	7	7
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	7	9	8	3	6	10	12	11	5	9	16	19	19	9	14
6/T	N+D	12	13	11	2	8	16	17	14	2	10	25	27	22	3	16
	I	4	5	7	6	5	5	8	11	9	8	9	14	18	16	15
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	15	18	18	7	13	21	26	25	11	19	34	42	41	19	31
10/T	N+D	11	12	10	1	7	15	16	13	2	9	23	25	20	3	15
	I	3	5	6	5	5	5	8	10	8	8	9	13	17	14	13
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	14	17	16	7	12	20	24	23	10	17	31	38	37	17	28
ADT	N+D	163	176	151	31	110	216	234	200	41	146	323	349	298	60	217
	I	55	82	106	110	92	75	111	144	149	124	115	171	221	226	190
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	219	258	257	141	202	291	345	344	189	270	438	520	519	286	408
M/C	N+D	227	239	216	68	163	270	283	257	84	196	338	352	324	113	248
	I	46	63	85	139	94	51	69	94	165	108	55	70	98	204	126
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	273	302	301	207	257	322	352	351	250	304	393	422	422	317	373
TOTAL	N+D	390	415	366	99	273	487	517	457	125	341	661	701	622	173	465
	I	101	145	191	249	186	126	180	238	314	233	170	241	319	430	316
	DV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	492	560	558	348	459	613	697	695	439	574	831	942	941	603	781

NOTE
 N : NORMAL TRAFFIC D : DIVERTED TRAFFIC
 DV : DEVELOPED TRAFFIC I : INDUCED TRAFFIC

Figure 25.3.1

LAND USE AND CAPABILITY OF INFLUENCE AREA PROPOSED ROUTE NO. IM - 25

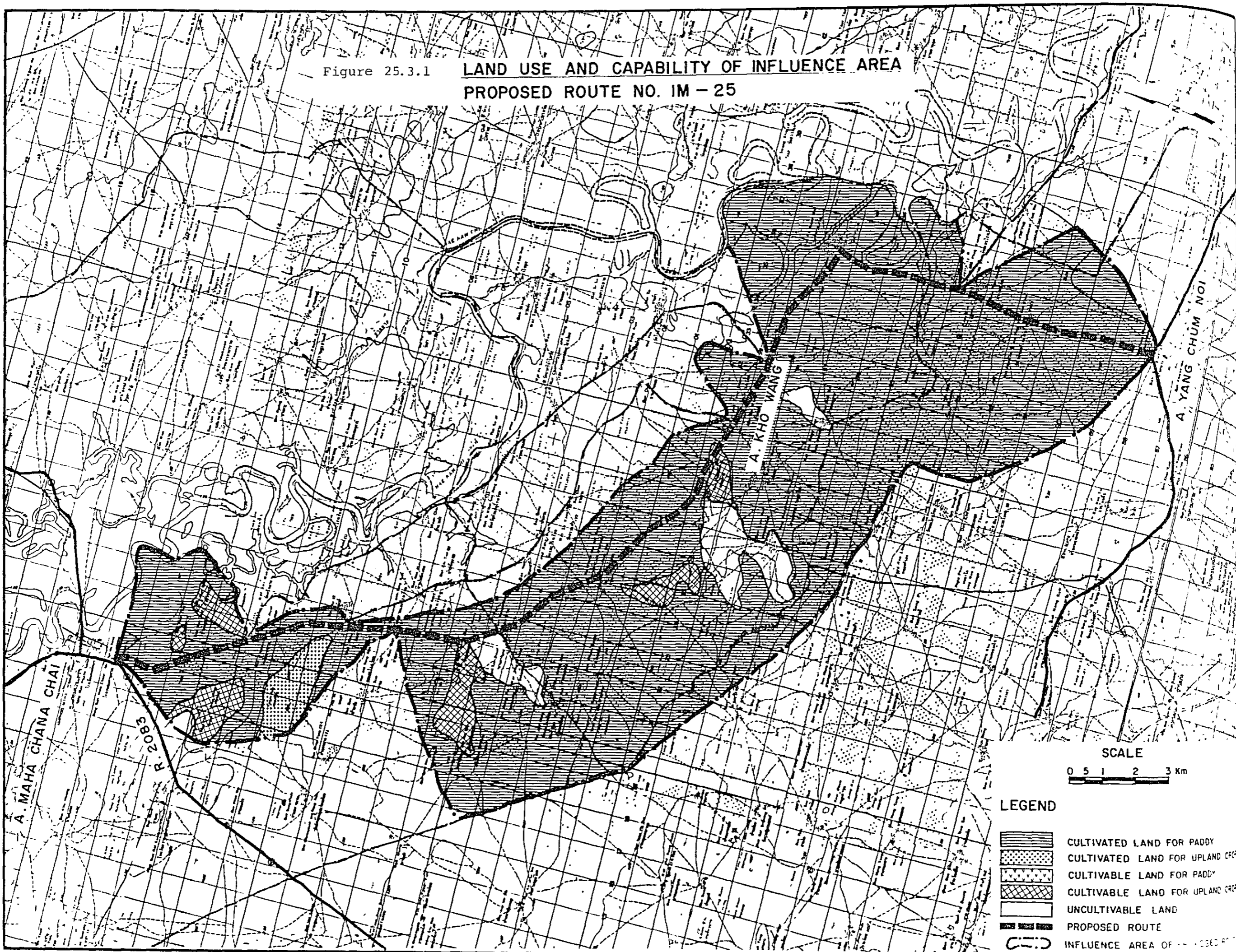


Figure 25.3.2 CROPPING CALENDAR(1)

CROPPING CALENDAR(2)

1000 CHANGWAT YASOTHON

1600 CHANGWAT SI SA KET

NAME OF CROP	JAN	FEB	MAR	APR.	MAY	JUN	JUL.	AUG.	SEP.	OCT	NOV.	DEC.
RICE, 1 st CROP				⊙	—	⊙	—	⊙	—	✕	—	✕
KENAF		⊙	—	⊙	—	—	—	—	✕	—	✕	
CASSAVA			⊙	—	—	—	⊙	—	—	—	—	✕
GROUND NUT	⊙	⊙	—	✕	✕	—	—	—	✕	✕		
					⊙	⊙	—	—	✕	✕		
COTTON						⊙	—	⊙	—	✕	—	✕

NAME OF CROP	JAN	FEB	MAR.	APR	MAY	JUN.	JUL.	AUG	SEP	OCT	NOV	DEC
RICE, 1 st CROP					⊙	—	⊙	—	⊙	—	✕	✕
RICE, 2 nd CROP	⊙	⊙	—	✕	✕							
KENAF		⊙	—	⊙	—	—	—	—	✕	—	✕	
CASSAVA				⊙	—	—	⊙	—	—	—	—	✕
MAIZE					⊙	⊙	—	—	✕	✕		
GROUND NUT	⊙	⊙	—	✕	✕							

Note

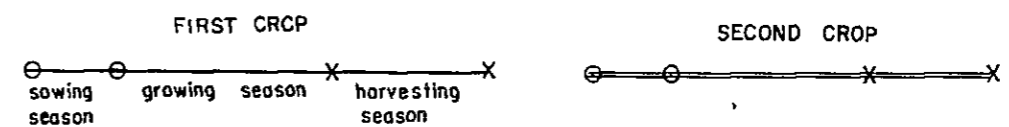


TABLE 25.3.1 CULTIVATED & CULTIVABLE LAND

(1979)

[UNIT : 1000 RAI (KM²)]

AMPHOE	AMPHOE	CULTIVATED LAND			UNUSED CULTIVABLE LAND				
		CODE	NAME	PADDY	UPLAND	TOTAL	PADDY	UPLAND	TOTAL
				118.750 (190.0)	1.875 (3.0)	120.625 (193.0)	-	5.625 (9.0)	5.625 (9.0)
1007	MAHA CHANA CHAI			26.250 (42.0)	1.875 (3.0)	28.125 (45.0)	-	3.750 (6.0)	3.750 (6.0)
1008	KHO WANG			55.625 (89.0)	-	55.625 (89.0)	-	1.875 (3.0)	1.875 (3.0)
1602	RASI SALAI			8.125 (13.0)	-	8.125 (13.0)	-	-	-
1603	YANG CHUM NOI			28.750 (46.0)	-	28.750 (46.0)	-	-	-

TABLE 25.3.2 CROP PRODUCTION

ITEM	PADDY	MAIZE	BEANS	GRUND NUTS	CASSAVA	SUGAR CANE	KENAF	COTTON	UPLAND TOTAL	TOTAL
PLANTED AREA (1000 RAI)										
1981	116.41	-	-	-	-	-	1.94	-	1.98	118.39
1987	116.66	-	-	-	-	-	1.94	-	1.97	118.64
1993	WITHOUT PROJECT	-	-	-	-	-	1.94	-	1.97	118.64
	WITH PROJECT	-	-	-	-	-	1.94	-	1.97	118.64
2001	WITHOUT PROJECT	-	-	-	-	-	1.94	-	1.97	118.64
	WITH PROJECT	-	-	-	-	-	1.94	-	1.97	118.64
CROP YIELD (KG/RAI)										
1981	175.9	-	-	-	-	-	165.0	-	-	-
1987	179.1	-	-	-	-	-	165.0	-	-	-
1993	WITHOUT PROJECT	-	-	-	-	-	165.0	-	-	-
	WITH PROJECT	-	-	-	-	-	165.0	-	-	-
2001	WITHOUT PROJECT	-	-	-	-	-	165.0	-	-	-
	WITH PROJECT	-	-	-	-	-	165.0	-	-	-
CROP PRODUCTION (TON)										
1981	20,476	-	-	-	-	-	320	-	327	20,802
1987	20,892	-	-	-	-	-	320	-	327	21,218
1993	WITHOUT PROJECT	-	-	-	-	-	320	-	327	21,597
	WITH PROJECT	-	-	-	-	-	320	-	327	21,982
2001	WITHOUT PROJECT	-	-	-	-	-	320	-	327	22,113
	WITH PROJECT	-	-	-	-	-	320	-	327	23,043

NOTE : SYMBOL "-" MEANS ZERO OR NEGLIGIBLE SMALL

TABLE 25.3.3 FARMGATE PRICE AND PRODUCTION COST

ITEM	PADDY	MAIZE	BEANS	GRUND NUTS	CASSAVA	SUGAR CANE	KENAF	COTTON
FARMGATE PRICE (BAHT/TON)								
WITHOUT PROJECT (1981 - 2001)	3,678	-	-	-	-	-	4,264	-
WITH PROJECT (1987 - 2001)	3,770	-	-	-	-	-	4,371	-
CROP PRODUCTION COST (BAHT/RAI)								
WITHOUT PROJECT (1981 - 2001)	436	-	-	-	-	-	625	-
WITH PROJECT (1987 - 2001)	436	-	-	-	-	-	625	-

TABLE 25.3.4 NET PRODUCTION VALUE

YEAR	(1000 BAHT)					
	WITHOUT PROJECT			WITH PROJECT		
	PADDY	UPLAND	TOTAL	PADDY	UPLAND	TOTAL
1987	26,028	170	26,198	27,898	204	28,102
1993	27,421	170	27,591	30,776	204	30,980
2001	29,319	170	29,489	34,778	205	34,983

Figure 25.5.1 TYPICAL CROSS SECTION AND TYPICAL PAVEMENT STRUCTURE

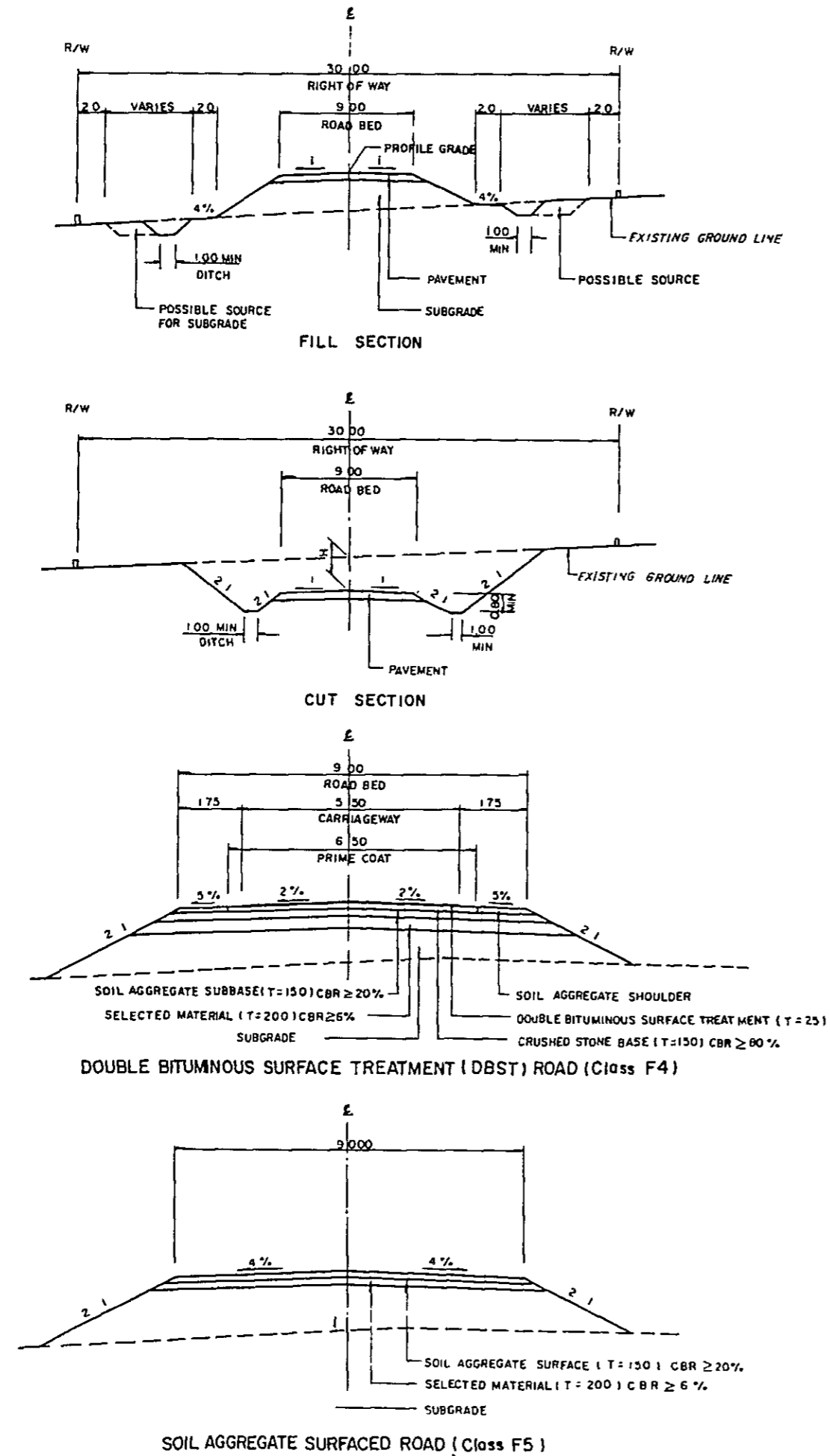
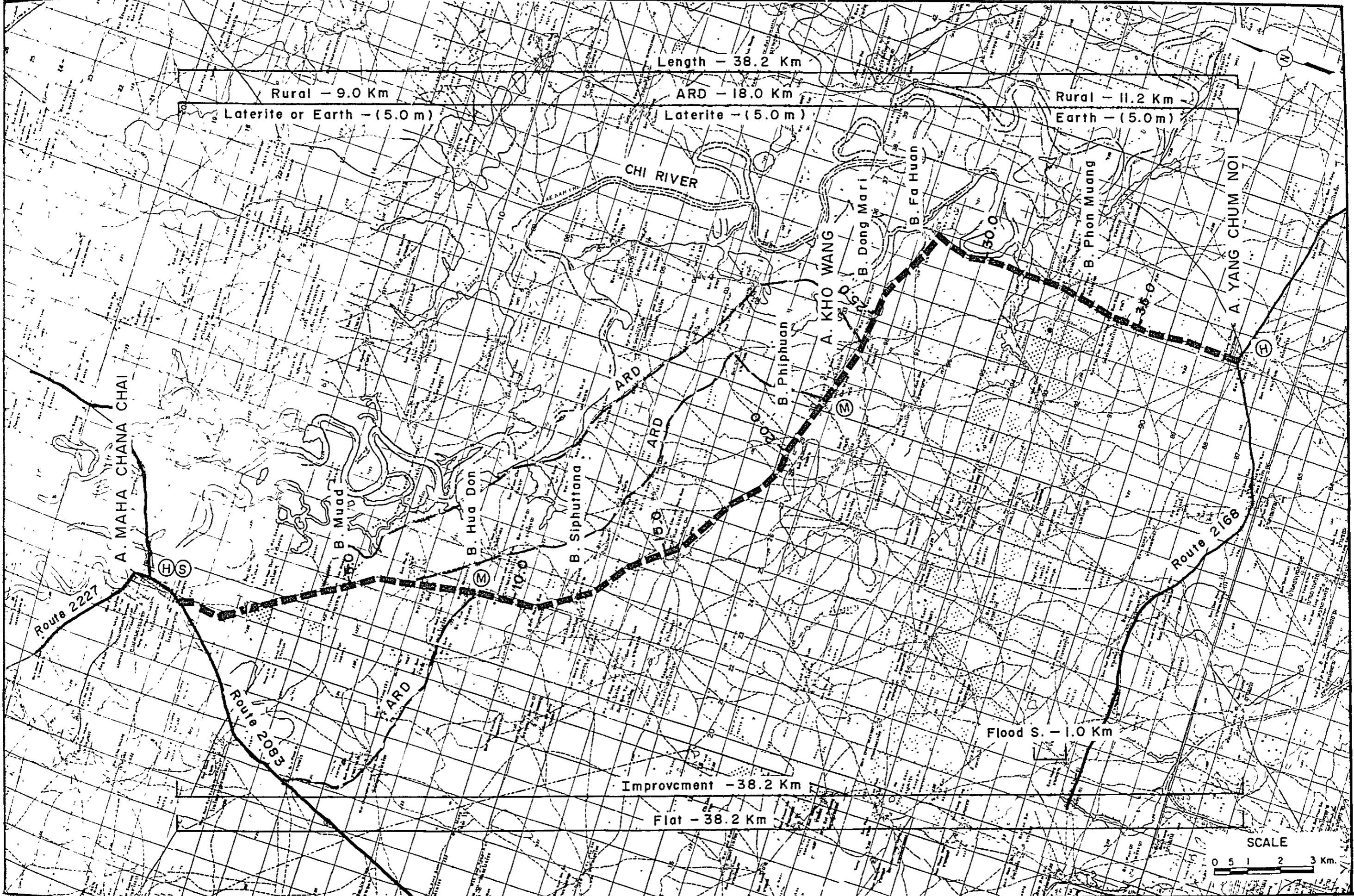


Figure 25.5.2

PROPOSED ROUTE NO. IM - 25

C. YASOTHON
SISAKET

A. MAHA CHANA CHAI (J.R. 2083) - A. YANG CHUM NOI (J.R. 2168)
ROUTE NO. ARD+Rural
L = 38.2 Km.

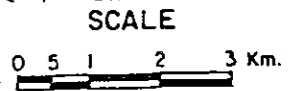


Length - 38.2 Km
 Rural - 9.0 Km ARD - 18.0 Km Rural - 11.2 Km
 Laterite or Earth - (5.0 m) Laterite - (5.0 m) Earth - (5.0 m)

Improvcment - 38.2 Km

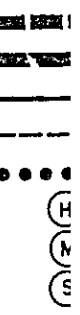
Flat - 38.2 Km

Flood S. - 1.0 Km



No.	SI
1	1
2	2
3	3

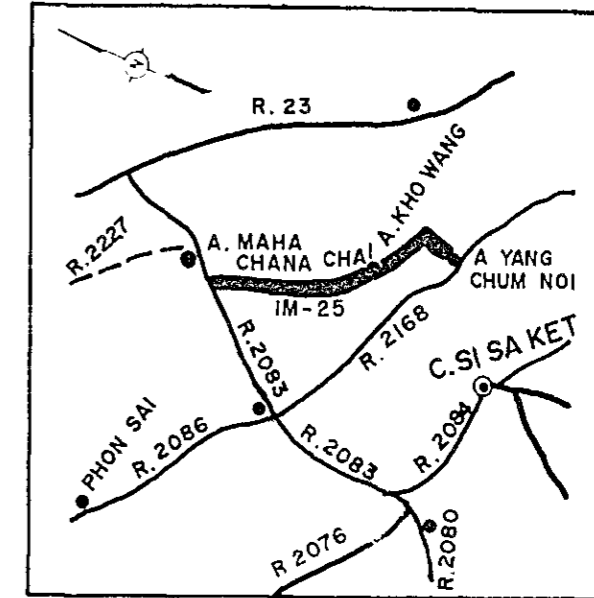
LEGE



C. YASOTHON
SISAKET

A. MAHA CHANA CHAI (J.R. 2083) — A. YANG CHUM NOI (J.R. 2168)
ROUTE NO. ARD+Rural
L = 38.2 Km.

LOCATION MAP



BRIDGE LIST

No.	Station Km.	Proposed Bridge	Existing Bridge
1	10.4	—	C - 9 70 x 30 00
2	29 1	C - 7 00 x 8 00	W - 3 60 x 6 10
3	37 5	-(BOX CULVERT)	W - 4 00 x 4 10

LEGEND

- PROPOSED ROUTE (IMPROVEMENT)
- PROPOSED ROUTE (NEW CONSTRUCTION)
- PAVED ROUTE
- UNPAVED ROUTE
- INVENTORY SURVEY ROUTE
- HOSPITAL
- MEDICAL CENTER
- SECONDARY SCHOOL

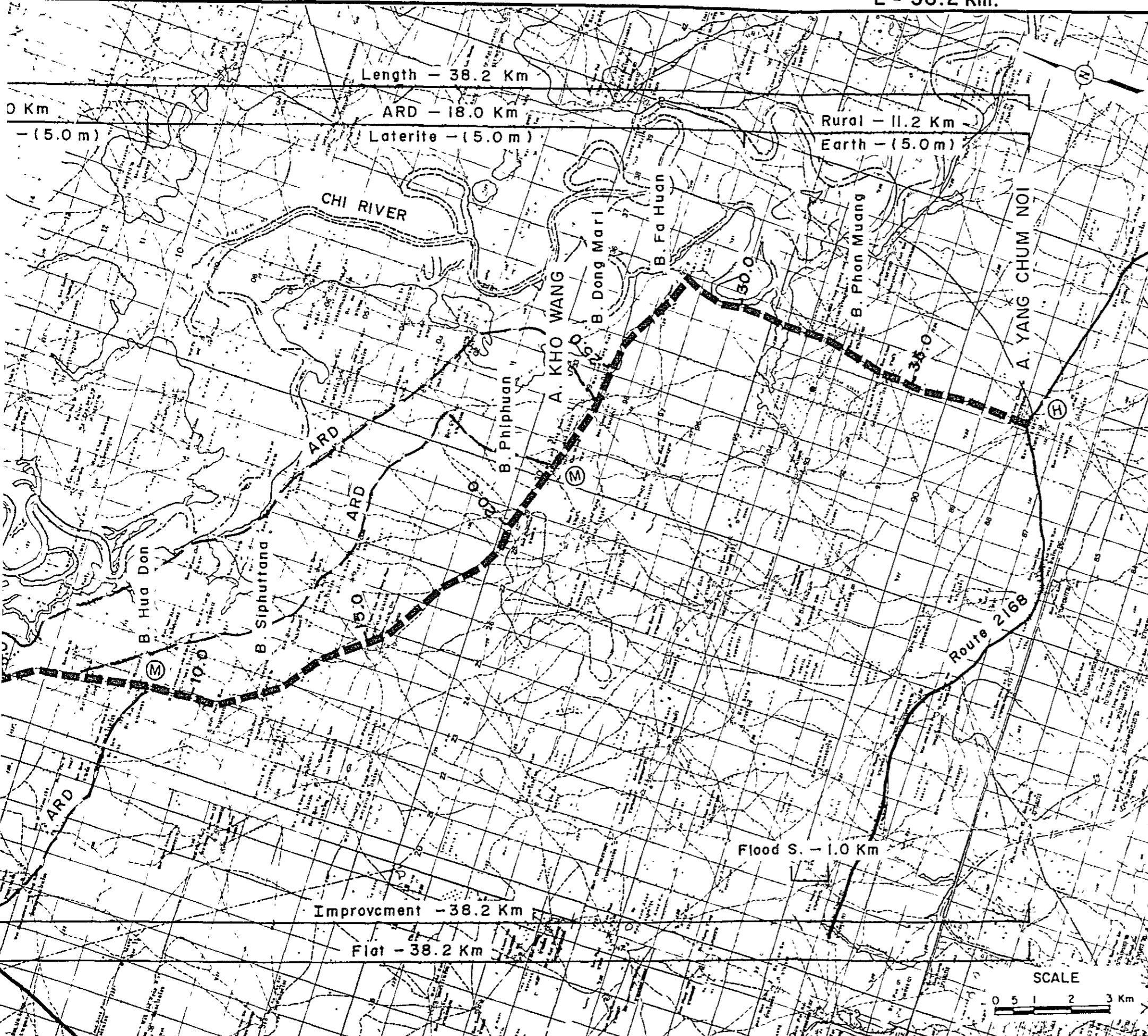


Table 25.5.1 CONSTRUCTION QUANTITIES AND COSTS IM-25 (38.2 km) (1)

Items	Unit of Q'ty	Financial Unit Rate ₪	(DBST)			(Soil Aggregate Surface)		
			Q'ty	Financial Cost (10 ³ ₪)	Economic Cost (10 ³ ₪)	Q'ty	Financial Cost (10 ³ ₪)	Economic Cost (10 ³ ₪)
DIRECT CONSTRUCTION COST								
Clearing and Grubbing	ha	15,000	96	1,440	1,310	96	1,440	1,310
Excavation - Soil	m ³	20	0	0	0	0	0	0
Excavation - Hard Rock	m ³	160	0	0	0	0	0	0
Embankment	m ³	45	118,800	5,346	4,864	118,800	5,346	4,864
Selected Material	m ³	80	81,000	6,480	5,767	81,000	6,480	5,767
Soil Aggregate Surface or Subbase	m ³	105	56,700	5,953	5,298	56,700	5,953	5,298
Crushed Stone Base	m ³	370	37,200	13,764	12,662	4,900	1,813	1,667
Soil Aggregate Shoulder	m ³	105	16,000	1,680	1,495	2,100	220	196
Prime Coat and DBST	m ²	55	210,100	11,556	10,400	27,500	1,512	1,361
Pipe Culvert	m	2,100	1,620	3,402	3,129	1,620	3,402	3,129
Box Culvert	m	16,000	20	320	298	0	0	0
Long Span Bridge	m	80,000	0	0	0	0	0	0
Short Span Bridge	m	40,000	8	320	294	8	320	294
Sub Total (a)				50,262	45,501	26,807	24,169	
Miscellaneous Works (a) x 7%				3,518	3,185	1,876	1,691	
Total (b)				53,780	48,686	28,684	25,861	
PHYSICAL CONTEGENCY (b) x 15%				8,067	7,303	4,302	3,879	
ENGINEERING AND ADMINISTRATION (b) x 10%								
Sub Total				13,445	12,172	7,170	6,465	
LAND ACQUISITION								
Highly Developed Land	ha	50,000	16	800	800	16	800	800
Less Developed Land	ha	15,000	0	0	0	0	0	0
Sub Total				800	800	800	800	
GRAND TOTAL				68,025	61,658	36,655	33,126	

CONSTRUCTION QUANTITIES AND COSTS (DBST + Soil Aggregate Surface) (2)

Items	Unit of Q'ty	Financial Unit Rate ₪	Route Number								
			IM-25 (1-2, 2-3, 3-4) (23.0 km)			IM-25 (4-5) (15.2 km)			IM-25 (T) (38.2 km)		
			Q'ty	Financial Cost (10 ³ ₪)	Economic Cost (10 ³ ₪)	Q'ty	Financial Cost (10 ³ ₪)	Economic Cost (10 ³ ₪)	Q'ty	Financial Cost (10 ³ ₪)	Economic Cost (10 ³ ₪)
DIRECT CONSTRUCTION COST											
Clearing and Grubbing	ha	15,000	58	870	791	38	570	518	96	1,440	1,310
Excavation - Soil	m ³	20	0	0	0	0	0	0	0	0	0
Excavation - Hard Rock	m ³	160	0	0	0	0	0	0	0	0	0
Embankment	m ³	45	53,400	2,403	2,186	65,400	2,943	2,678	118,800	5,346	4,864
Selected Material	m ³	80	48,800	3,904	3,474	32,200	2,576	2,292	81,000	6,480	5,767
Soil Aggregate Surface or Subbase	m ³	105	34,200	3,591	3,195	22,500	2,362	2,102	56,700	5,953	5,298
Crushed Stone Base	m ³	370	22,400	2,288	7,624	1,000	370	340	23,400	8,658	7,965
Soil Aggregate Shoulder	m ³	105	9,700	1,018	906	400	42	37	10,100	1,060	943
Prime Coat and DBST	m ²	55	126,500	6,958	6,262	5,500	303	273	132,000	7,260	6,534
Pipe Culvert	m	2,100	1,020	2,142	1,970	600	1,260	1,159	1,620	3,402	3,129
Box Culvert	m	16,000	5	80	72	15	240	216	20	320	288
Long Span Bridge	m	80,000	0	0	0	0	0	0	0	0	0
Short Span Bridge	m	40,000	0	0	0	80	3,200	2,848	80	3,200	2,848
Sub Total (a)				29,255	26,485		13,867	12,466		43,120	38,950
Miscellaneous Works (a) x 7%				2,048	1,854		971	873		3,018	2,727
Total (b)				31,303	28,339		14,838	13,339		46,138	41,677
PHYSICAL CONTENGENCY (b) x 15%				4,695	4,251		2,226	2,001		6,921	6,251
ENGINEERING AND				3,130	2,834		1,484	1,334		4,614	4,168
ADMINISTRATION (b) x 10%				3,130	2,834		1,484	1,334		4,614	4,168
Sub Total				7,825	7,085		3,710	3,335		11,535	10,419
LAND ACQUISITION											
Highly Developed Land	ha	50,000	16	800	800	0	0	0	16	800	800
Less Developed Land	ha	15,000	0	0	0	0	0	0	0	0	0
Sub Total				800	800		0	0		800	800
GRAND TOTAL				39,928	36,224		18,548	16,674		58,473	52,896

Table 25.6.1 COST AND BENEFITS
(F4 STANDARD)

YEAR	COST		BENEFITS			DISCOUNTED(12%)	
	CONST. COST	AGRI. BENEFIT	VOC SAVING	RMC SAVING	TOTAL	COST	BENEFIT
1984	12,332	0	0	0	0	17,326	0
1985	30,829	0	0	0	0	38,672	0
1986	18,497	0	0	0	0	20,717	0
1987	0	1,904	3,974	-178	5,700	0	5,089
1988	0	2,152	4,261	-163	6,250	0	4,982
1989	0	2,399	4,549	-148	6,799	0	4,840
1990	0	2,647	4,836	-133	7,349	0	4,670
1991	0	2,894	5,123	-118	7,899	0	4,482
1992	0	3,142	5,411	-104	8,449	0	4,280
1993	0	3,389	5,698	-89	8,998	0	4,070
1994	18,489	3,652	6,152	-66	9,738	8,363	3,933
1995	0	3,915	6,606	-43	10,479	0	3,779
1996	0	4,178	7,060	-20	11,219	0	3,612
1997	0	4,442	7,515	3	11,959	0	3,438
1998	0	4,705	7,969	26	12,699	0	3,260
1999	0	4,968	8,423	49	13,439	0	3,080
2000	0	5,231	8,877	72	14,180	0	2,901
2001	-28,794	5,494	9,331	95	14,920	-5,261	2,726
TOTAL	51,353	55,110	95,784	-818	150,077	79,817	59,143

DISCOUNTED ECONOMIC COSTS :	79,817
DISCOUNTED ECONOMIC BENEFITS :	59,143
AGRICULTURAL DEVELOPMENT BENEFIT	21,501
VOC SAVING	38,279
RMC SAVING	-636
NET PRESENT VALUE :	-20,674
BENEFIT COST RATIO :	0.74
INTERNAL RATE OF RETURN :	8.6 %

Table 25.6.2 COST AND BENEFITS
(F4&F5 COMBINED)

YEAR	COST		BENEFITS			DISCOUNTED(12%)	
	CONST. COST	AGRI. BENEFIT	VOC SAVING	RMC SAVING	TOTAL	COST	BENEFIT
1984	0	0	0	0	0	0	0
1985	21,158	0	0	0	0	26,541	0
1986	31,738	0	0	0	0	35,547	0
1987	0	1,904	3,553	-111	5,346	0	4,773
1988	0	2,152	3,813	-98	5,867	0	4,677
1989	0	2,399	4,073	-84	6,387	0	4,546
1990	0	2,647	4,333	-71	6,908	0	4,390
1991	0	2,894	4,592	-58	7,429	0	4,215
1992	0	3,142	4,852	-44	7,949	0	4,027
1993	0	3,389	5,112	-31	8,470	0	3,831
1994	11,616	3,652	5,524	-10	9,166	5,254	3,702
1995	0	3,915	5,935	11	9,861	0	3,556
1996	0	4,178	6,347	32	10,557	0	3,399
1997	0	4,442	6,758	53	11,252	0	3,235
1998	0	4,705	7,170	73	11,948	0	3,067
1999	0	4,968	7,581	94	12,643	0	2,897
2000	0	5,231	7,993	115	13,339	0	2,729
2001	-24,764	5,494	8,404	136	14,034	-4,524	2,564
TOTAL	39,748	55,110	86,038	7	141,154	62,817	55,609

DISCOUNTED ECONOMIC COSTS :	62,817
DISCOUNTED ECONOMIC BENEFITS :	55,609
AGRICULTURAL DEVELOPMENT BENEFIT	21,501
VOC SAVING	34,346
RMC SAVING	-237
NET PRESENT VALUE :	-7,208
BENEFIT COST RATIO :	0.89
INTERNAL RATE OF RETURN :	10.5 %

Table 25.6.3 COST AND BENEFITS
(F4,SECTION 1)

(1000 BAHT)							
YEAR	COST		BENEFITS			DISCOUNTED(12%)	
	CONST. COST	AGRI. BENEFIT	VOC SAVING	RMC SAVING	TOTAL	COST	BENEFIT
1984	0	0	0	0	0	0	0
1985	14,489	0	0	0	0	18,175	0
1986	21,735	0	0	0	0	24,343	0
1987	0	1,605	2,630	-46	4,189	0	3,740
1988	0	1,814	2,821	-37	4,598	0	3,665
1989	0	2,022	3,011	-27	5,006	0	3,563
1990	0	2,231	3,202	-18	5,415	0	3,441
1991	0	2,440	3,392	-8	5,824	0	3,305
1992	0	2,648	3,583	2	6,232	0	3,157
1993	0	2,857	3,773	11	6,641	0	3,004
1994	11,132	3,079	4,075	26	7,180	5,036	2,900
1995	0	3,301	4,377	41	7,719	0	2,783
1996	0	3,522	4,679	56	8,257	0	2,659
1997	0	3,744	4,982	71	8,796	0	2,529
1998	0	3,966	5,284	85	9,335	0	2,396
1999	0	4,188	5,586	100	9,874	0	2,263
2000	0	4,409	5,888	115	10,412	0	2,131
2001	-14,970	4,631	6,190	130	10,951	-2,735	2,001
TOTAL	32,386	46,456	63,471	501	110,428	44,819	43,537

DISCOUNTED ECONOMIC COSTS :	44,819
DISCOUNTED ECONOMIC BENEFITS :	43,537
AGRICULTURAL DEVELOPMENT BENEFIT	18,125
VOC SAVING	25,356
RMC SAVING	56
NET PRESENT VALUE :	-1,282
BENEFIT COST RATIO :	0.97
INTERNAL RATE OF RETURN :	11.6 %

Table 25.6.4 COST AND BENEFITS
(F5,SECTION 2)

(1000 BAHT)							
YEAR	COST		BENEFITS			DISCOUNTED(12%)	
	CONST. COST	AGRI. BENEFIT	VOC SAVING	RMC SAVING	TOTAL	COST	BENEFIT
1984	0	0	0	0	0	0	0
1985	6,670	0	0	0	0	8,367	0
1986	10,004	0	0	0	0	11,204	0
1987	0	299	923	-66	1,156	0	1,032
1988	0	338	992	-62	1,268	0	1,011
1989	0	377	1,062	-58	1,380	0	982
1990	0	416	1,131	-54	1,493	0	949
1991	0	454	1,200	-50	1,605	0	911
1992	0	493	1,270	-46	1,717	0	870
1993	0	532	1,339	-42	1,829	0	827
1994	484	573	1,448	-36	1,986	219	802
1995	0	615	1,558	-30	2,143	0	773
1996	0	656	1,667	-24	2,300	0	740
1997	0	698	1,777	-18	2,457	0	706
1998	0	739	1,886	-11	2,613	0	671
1999	0	780	1,995	-5	2,770	0	635
2000	0	822	2,105	1	2,927	0	599
2001	-10,322	863	2,214	7	3,084	-1,886	563
TOTAL	6,836	8,654	22,567	-494	30,727	17,904	12,071

DISCOUNTED ECONOMIC COSTS :	17,904
DISCOUNTED ECONOMIC BENEFITS :	12,071
AGRICULTURAL DEVELOPMENT BENEFIT	3,376
VOC SAVING	8,990
RMC SAVING	-295
NET PRESENT VALUE :	-5,833
BENEFIT COST RATIO :	0.67
INTERNAL RATE OF RETURN :	8.1 %

Table 25.7.1 SOCIAL INDICATORS
(Proposed Route IM-25)

Population (1,000)		Education	
1982	: 38.9	Access to Secondary School	
1993	: 44.4	Number of Student in 1993 (1,000) ^{2/}	: 9.8
Average travelling speed, without (kph)	: 40	Average distance to school (km)	: 9.5
Isolation		Per capita time savings (10 ⁻⁴)	: 0.108
Access to Amphoe		Score	: 58
Average distance to Amphoe (km) ^{1/}	: 10.6	Teacher Intensity	
Per capita time savings (10 ⁻⁴)	: 0.027	Number of teachers ^{3/}	
Score	: 79	University graduate	: -
Access to Artery Highway		Total	: 11
Average distance to highway (km) ^{1/}	: 11	Number of Student	: 218
Per capita time savings (10 ⁻⁴)	: 0.028	Indicators	
Score	: 61	E1 ^{4/}	: -
Impassability		E2 ^{5/}	: 50.5
Impassable week a year	: 4	E ^{6/}	: 50.5
Impassability per year	: 0.077	Degree of Improvement ^{7/}	: 1.35
Impassability per capita (10 ⁻⁴)	: 0.017	Score	: 86
Score	: 142	Disparity	
Health		G.P.V. in 1993 (Mn B) ^{8/}	
Access to Hospital		With project	: 83.1
Average distance to Hospital (km) ^{1/}	: 9.5	Without project	: 79.7
Per capita time savings (10 ⁻⁴)	: 0.024	Per capita G.P.V. in 1993 (B)	
Score	: 56	With project (W)	: 1,872
Access to Medical Facilities		Without project (w)	: 1,795
Average distance to facilities (km) ^{1/}	: 3.9	Degree of Disparity	
Per capita time savings (10 ⁻⁴)	: 0.010	(A/W) - (A/w) ^{9/}	: 0.07
Score	: 40	Score	: 125
		Total Score	: 647

Note:

- ^{1/} () shows the length or distance in without project case. Unless otherwise, lengths are same both in with project case and without project case.
- ^{2/} Number of secondary school student estimated based on the projected population of the areas of influence applying ratios of secondary school students to the total population in the sample area.
- ^{3/} Numbers of the sample areas
- ^{4/} (Number of University Graduate Teachers)/(Total Number of Student) x 1,000
- ^{5/} (Total of Teachers)/(Total Number of Student) x 1,000
- ^{6/} Sum of ^{4/} and ^{5/}
- ^{7/} Ratio of E value of each route to an average value of the same indicator E in case of the sample areas, 33 in number, along paved road near the proposed routes.
The average value of E in case of paved roads were calculated at 68.4 from the following data:
Number of university graduate teachers 438
Number of Teachers 1,285
Number of student 25,196
- ^{8/} Estimated gross value of crop production in the areas of influence
- ^{9/} "A" indicates an average per capita value of crop production in the Northeastern Region, which is estimated assuming that:
- GRP per capita of the Northeast is estimated at 11,897 Baht in 1993,
- Agricultural sector shares 40% of GRP, and
- Crop production shares 80% of agricultural production.