

PROJECT WD7-2

**RT. 4035 AO LUK - PHRA SEANG**

**CHANGWAT: KRABI, THUNG SONG**

2) ROUTE MAP

3.12 Route No. 4035 Phra Saeng - Ao Luk (WD7-2)

1) Summary

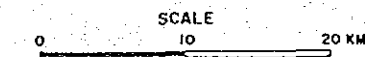
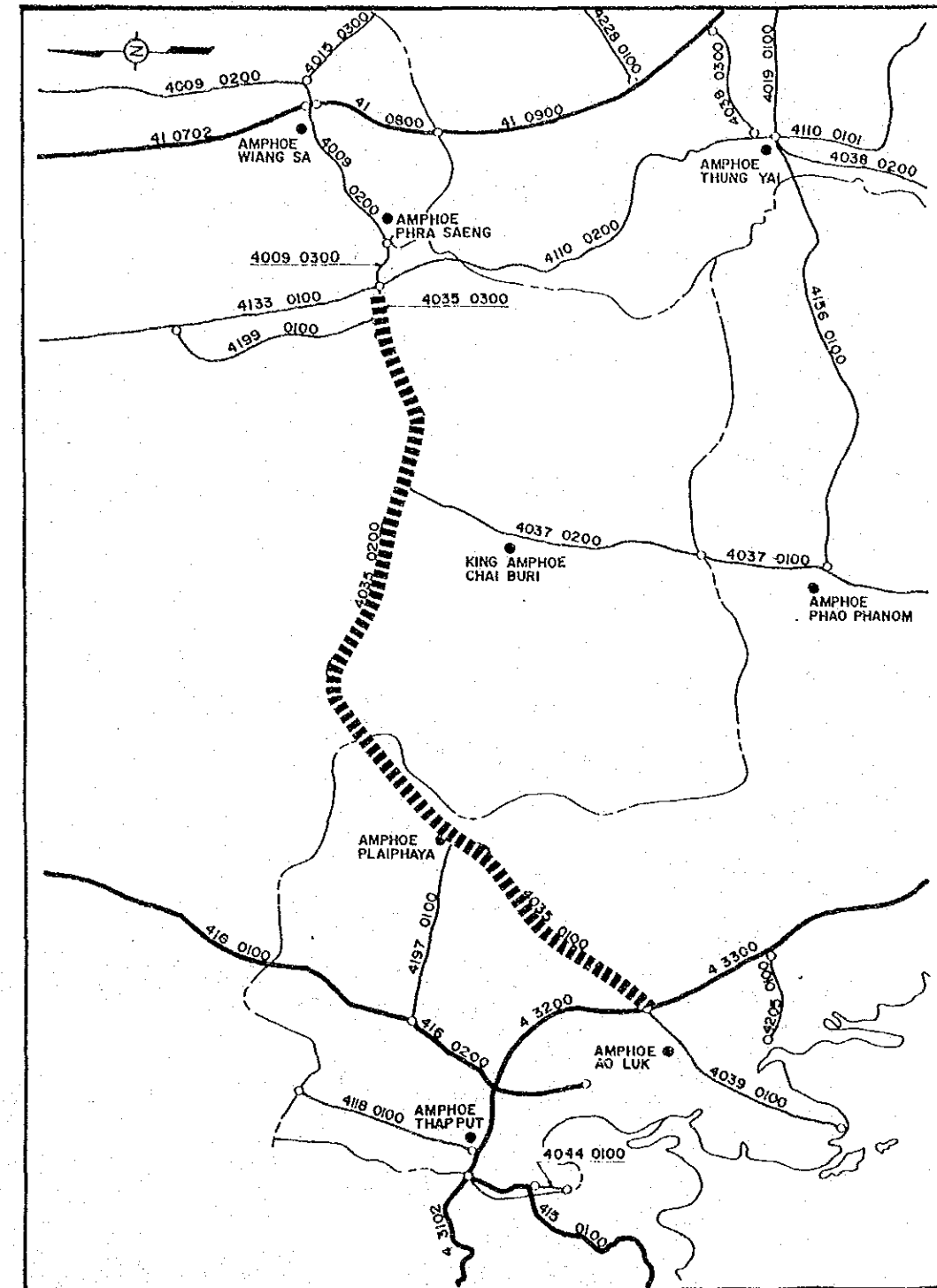
The aim of the project is to improve an east-west linkage, between Surat Thani and Krabi in particular. The highway will be an important access road to construct the Krabi - Khanom Highway Link as a part of the "Trans-Thai Land Bridge".

The existing highway is of "F4" standard with paved carriageway width of 5.0 meters. The carrigeway is not wide enough for vehicles to cross each other without intruding into shoulders. Surface conditions is judged "fair" with great damages on both edges of the carriageway. "F1" standard is to be applied with asphaltic concrete carriageway of 7.0 meter width and soil aggregate shoulder of 2.5 meters.

The project starts from the intersection with Route 4 in Amphoe Ao Luk and ends at the intersection with Route 4009, 4133 and 4112 in Amphoe Phra Saeng. The total length is 68.1 kilometers. The project lies mostly in hilly terrain with a number of ups and downs. Land use along the highway is mostly oil palm and rubber plantation.

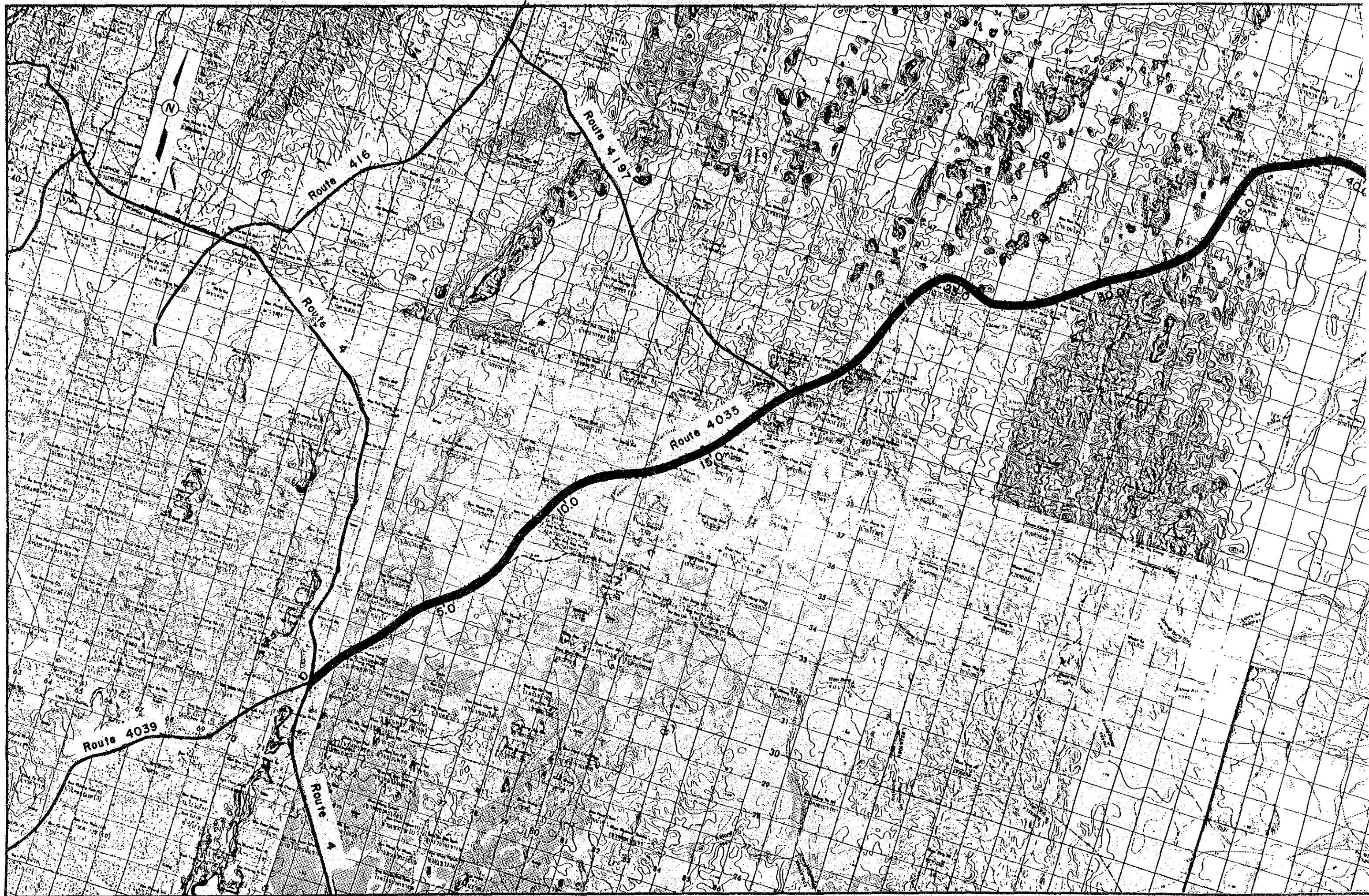
| WD7-2             | Description                            |
|-------------------|--|
| Changwat          | : Krabi and Thung Song                 |
| Name or Location  | : Rt.4035 Ao Luk - Phra Saeng          |
| Road Class        | : F1 (F4)                              |
| Cross Section (m) | : 2.50+7.00+2.50 (1.50+5.00+1.50)      |
| Surface Type      | : SA /ASC / SA ( SA/ DBST/ SA )        |
| Surface Condition | : ( F )                                |
| Length: Total     | : 68.1 km                              |
| DOH Road          | : 68.1 km                              |
| -----             |  |
| AADT<'96/'01/'06> | : 2,500 / 3,900 / 5,900                |
| -----             |  |
| Financial Cost    | : 200.2 million baht                   |
| NPV               | : 120 million baht (12% discount rate) |
| B/C               | : 2.3 (12% discount rate)              |
| EIRR              | : 21.8 %                               |

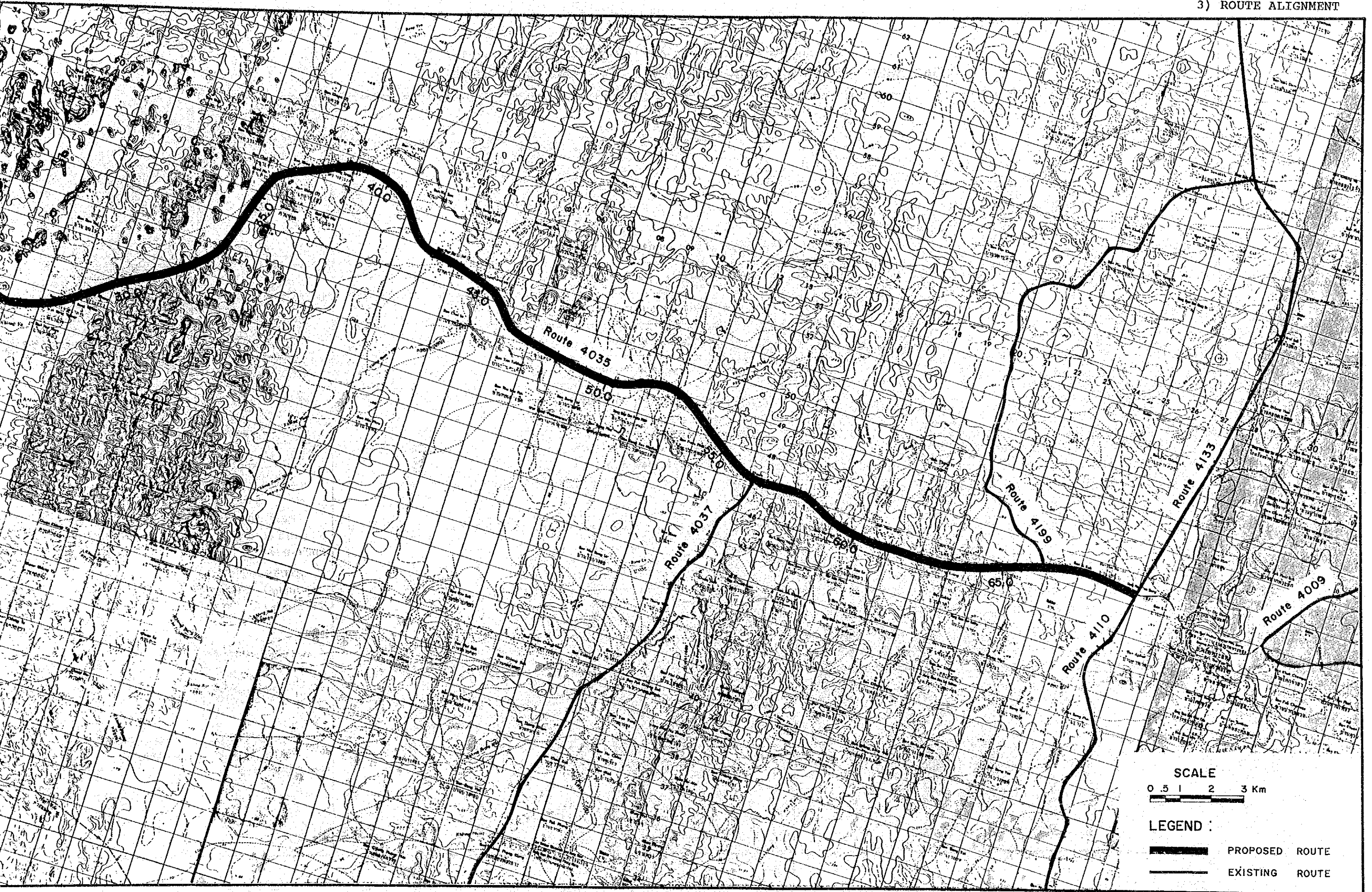
( ): Existing Condition or Value



LEGEND :

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





### 4) PROFILE OF PROJECT

PROJECT NO. WD 7-2    ROUTE NO. 4035    AO LUK - PHRA SAENG

(1/3)

| STATION (Km)                                     |   | 0                                   | 2                              | 4     | 6 | 8                 | 10                   | 12    | 14 | 16                | 18               | 20                                 | 22                             | 24                    | 26 | 28                | 30                |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
|--|---|-------------------------------------|--------------------------------|-------|---|-------------------|----------------------|-------|----|-------------------|------------------|------------------------------------|--------------------------------|-----------------------|----|-------------------|-------------------|---------------------------------|--|-----------------------|------------------|--------------------|------------------|--|------------------|------------------|--|--|------------------|-------------------|--|--------------------|------------------|--|-------------------|--|
| VILLAGE ROAD INTERSECTION                        |   | J. Rt. 4<br>AO LUK                  |                                |       |   |                   |                      |       |    |                   |                  |                                    |                                | BAN SIPHERA YA 13+400 |    | BAN PAK YA 16+000 |                   | J. Rt. 4197<br>PLAIPHAYA 20+812 |  | BAN BANG TH'EN 22+650 |                  | BAN TAD DUA 26+500 |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
| LAND USE   |   | RUBBER, RICE, FRUIT, 62% DEVELOPED  |                                |       |   |                   |                      |       |    |                   |                  | RUBBER, RICE, FRUIT, INDUSTRIAL    |                                |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
| TERRAIN  |   | FLAT 3.0 KM    ROLLING 17.8 KM      |                                |       |   |                   |                      |       |    |                   |                  | FLAT 5.0 KM    ROLLING 30.1 KM     |                                |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
| FLOODING LENGTH                                  |   | NO FLOODING REPORTED                |                                |       |   |                   |                      |       |    |                   |                  | NO FLOODING REPORTED               |                                |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
| EXISTING CONDITIONS                              | RIGHT OF WAY                                  | 40.00 M (20.00+20.00)               |                                |       |   |                   |                      |       |    |                   |                  | 40.00 M (20.00+20.00)              |                                |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
|  | ALIGNMENT                                     | HOR.                                | NUMBER OF HORIZONTAL CURVES 41 |       |   |                   |                      |       |    |                   |                  |                                    | NUMBER OF HORIZONTAL CURVES 71 |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
|  |   | VER.                                | NUMBER OF VERTICAL CURVES 106  |       |   |                   |                      |       |    |                   |                  |                                    | NUMBER OF VERTICAL CURVES 131  |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
|  | CROSS SECTION                                 | F 4    1.50 + 5.00 + 1.50 = 8.00 M  |                                |       |   |                   |                      |       |    |                   |                  | F 4    1.50 + 5.00 + 1.50 = 8.00 M |                                |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
|  | SURFACE                                       | SA + DBST (FAIR) + SA               |                                |       |   |                   |                      |       |    |                   |                  | SA + DBST (FAIR) + SA              |                                |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
|  | BRIDGES AND<br>(Type - Width<br>- Length (m)) |                                     |                                | 4+130 |   |                   |                      | 7+814 |    |                   |                  | 12+326                             |                                |                       |    | 16+039            |                   |                                 |  | 18+537                |                  | 19+080             |                  |  |                  | 20+524           |  |  |                  | 22+390            |  | 23+580             |                  |  |                   |  |
| BOX CULVERTS<br>(Width - Height<br>- Length (m)) |   |                                     | RC 7.0 x 3 x 5.0               |       |   |                   | BX2-2.7 x 2.4 x 14.0 |       |    |                   | RC 7.0 x 3 x 5.0 |                                    | BX3-2.1 x 1.8 x 14.0           |                       |    |                   | RC 7.0 x 4 x 10.0 |                                 |  |                       | RC 7.0 x 3 x 8.3 |                    | RC 7.0 x 3 x 5.0 |  | RC 7.0 x 7 x 8.9 |                  |  |  | RC 7.0 x 5 x 5.6 |                   |  |                    | RC 7.0 x 3 x 9.3 |  | RC 7.0 x 3 x 10.0 |  |
| PROPOSED CONDITIONS                              | CROSS SECTION                                 | F 1    2.50 + 7.00 + 2.50 = 12.00 M |                                |       |   |                   |                      |       |    |                   |                  |                                    |                                |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
|  | TYPE OF IMPROVEMENT                           |                                     |                                |       |   |                   |                      |       |    |                   |                  | WD 68,100 M                        |                                |                       |    |                   |                   |                                 |  |                       |                  |                    |                  |  |                  |                  |  |  |                  |                   |  |                    |                  |  |                   |  |
|  | BRIDGES<br>(Type - Width<br>- Length (m))     | 0+000                               |                                |       |   | RC 12.0 x 3 x 5.0 |                      |       |    | RC 12.0 x 3 x 5.0 |                  |                                    |                                | RC 12.0 x 4 x 10.0    |    |                   |                   | RC 12.0 x 3 x 8.3               |  | RC 12.0 x 3 x 5.0     |                  | RC 7.0 x 7 x 8.9   |                  |  |                  | RC 7.0 x 5 x 5.6 |  |  |                  | RC 12.0 x 3 x 9.3 |  | RC 12.0 x 3 x 10.0 |                  |  |                   |  |

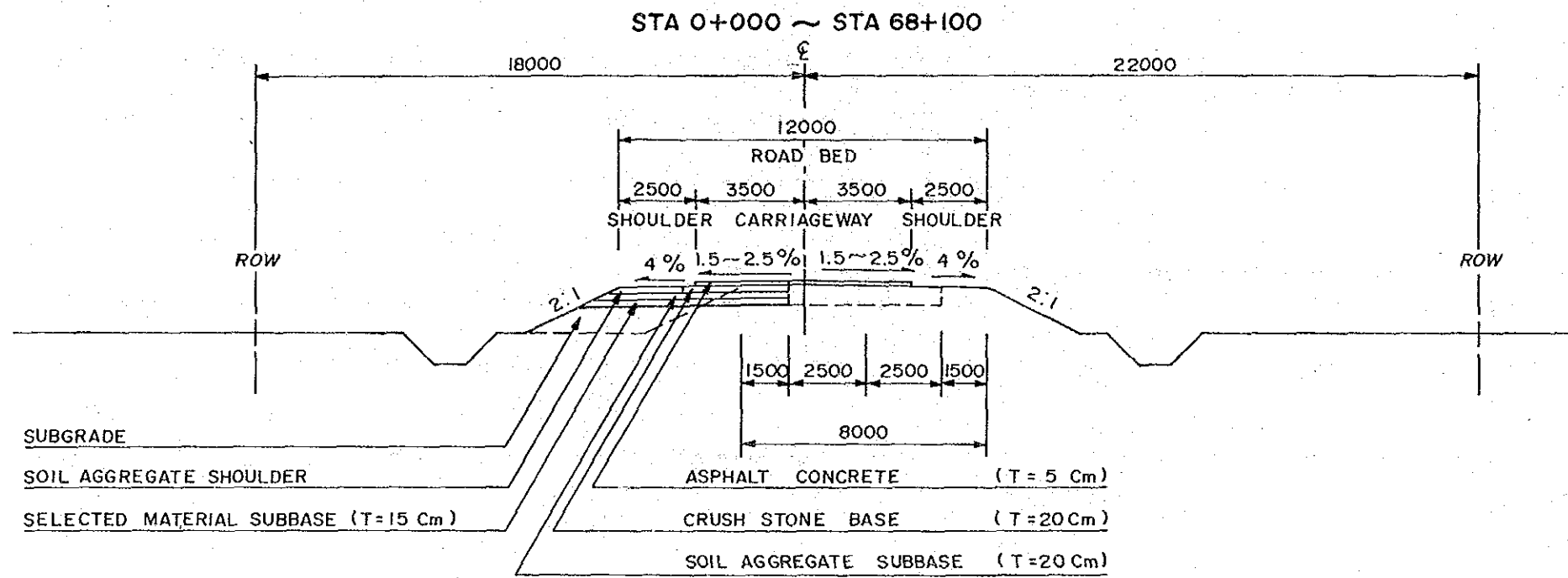
PROJECT NO. WD 7-2 ROUTE NO. 4035 AO LUK - PHRA SAENG

(2/3)

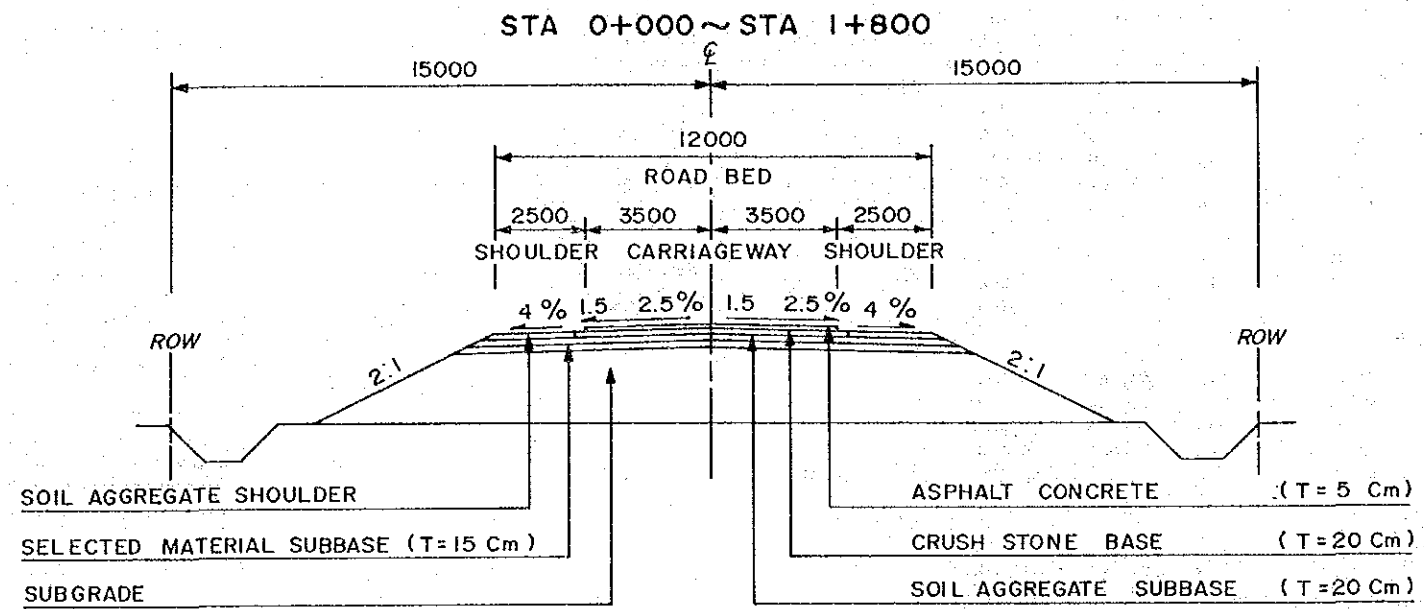
| STATION (Km)              |                             | 30   | 32                             | 34                | 36 | 38               | 40                | 42          | 44          | 46               | 48                | 50          | 52 | 54             | 56 | 58                          | 60                |  |  |
|---------------------------|-----------------------------|--|--------------------------------|-------------------|----|------------------|-------------------|-------------|-------------|------------------|-------------------|-------------|----|----------------|----|-----------------------------|-------------------|--|--|
| VILLAGE ROAD INTERSECTION |                             | DIST. BORDER                                   |                                |                   |    | BAN BANG SAWAN   |                   | BAN KO SARN | BAN NAI PHU | BAN KO NOI       |                   | BAN BANG PA |    | BAN PHATU PLIK |    | BAN KHUN SAWANG J. Rt. 4037 | BAN SAMPHAN       |  |  |
| LAND USE                  |                             | RUBBER, RICE, FRUIT, INDUSTRIAL, 78% DEVELOPED |                                |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
| TERRAIN                   |                             | FLAT 5.0 KM ROLLING 30.1 KM                    |                                |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
| FLOODING LENGTH           |                             | NO FLOODING REPORTED                           |                                |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
| EXISTING CONDITIONS       | RIGHT OF WAY                | 40.00 M (20.00+20.00)                          |                                |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
|                           | ALIGNMENT                   | HOR.   | NUMBER OF HORIZONTAL CURVES 71 |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
|                           |                             | VER.   | NUMBER OF VERTICAL CURVES 131  |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
|                           | CROSS SECTION               | F 4 1.50 + 5.00 + 1.50 = 8.00 M                |                                |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
|                           | SURFACE                     | SA + DBST (FAIR) + SA                          |                                |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
| BRIDGES AND BOX CULVERTS  | (Type - Width - Length (m)) | RC 7.0 x 4 x 10.0                              | RC 7.0 x 3 x 6.7               |                   |    | RC 7.0 x 5 x 6.6 |                   |             |             | RC 7.0 x 6 x 9.7 |                   |             |    |                |    | RC 7.0 x 3 x 7.3            |                   |  |  |
| PROPOSED CONDITIONS       | CROSS SECTION               | F 1 2.50 + 7.00 + 2.50 = 12.00 M               |                                |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
|                           | TYPE OF IMPROVEMENT         | WD   |                                |                   |    |                  |                   |             |             |                  |                   |             |    |                |    |                             |                   |  |  |
|                           | BRIDGES                     | (Type - Width - Length (m))                    | RC 12.0 x 4 x 10.0             | RC 12.0 x 3 x 6.7 |    |                  | RC 12.0 x 5 x 6.6 |             |             |                  | RC 12.0 x 6 x 9.7 |             |    |                |    |                             | RC 12.0 x 3 x 7.3 |  |  |

| STATION (Km)                               |                                     | 60                               | 62        | 64 | 65+500      | 66         | 66+500       | 68 | 68+100      | 70 |  |
|--|-------------------------------------|----------------------------------|-----------|----|-------------|------------|--------------|----|-------------|----|--|
| VILLAGE ROAD INTERSECTION                  |                                     |                                  | BAN SAKHU |    | J. Rt. 4199 |            | BAN BO PHARA |    | J. Rt. 4110 |    |  |
| LAND USE                                   |                                     |                                  |           |    |             |            |              |    |             |    |  |
| TERRAIN                                    |                                     |                                  |           |    |             |            |              |    |             |    |  |
| FLOODING LENGTH                            |                                     |                                  |           |    |             |            |              |    |             |    |  |
| EXISTING CONDITIONS                        | RIGHT OF WAY                        | 40.00 M ( 20.00+20.00 )          |           |    |             | 40.00 M    |              |    |             |    |  |
|  | ALIGNMENT                           | HOR.                             |           |    |             |            |              |    |             |    |  |
|  |                                     | VER.                             |           |    |             |            |              |    |             |    |  |
|  | CROSS SECTION                       | F 4 1.50 + 5.00 + 1.50 = 8.00 M  |           |    |             | F 4 8.00 M |              |    |             |    |  |
|  | SURFACE                             |                                  |           |    |             |            |              |    |             |    |  |
| BRIDGES AND (Type - Width - Length (m))    |                                     |                                  |           |    |             |            |              |    |             |    |  |
| BOX CULVERTS (Width - Height - Length (m)) |                                     |                                  |           |    |             |            |              |    |             |    |  |
| PROPOSED CONDITIONS                        | CROSS SECTION                       | F 1 2.50 + 7.00 + 2.50 = 12.00 M |           |    |             |            |              |    |             |    |  |
|  | TYPE OF IMPROVEMENT                 | WD                               |           |    |             |            |              |    |             |    |  |
|  | BRIDGES (Type - Width - Length (m)) | 68+100                           |           |    |             |            |              |    |             |    |  |

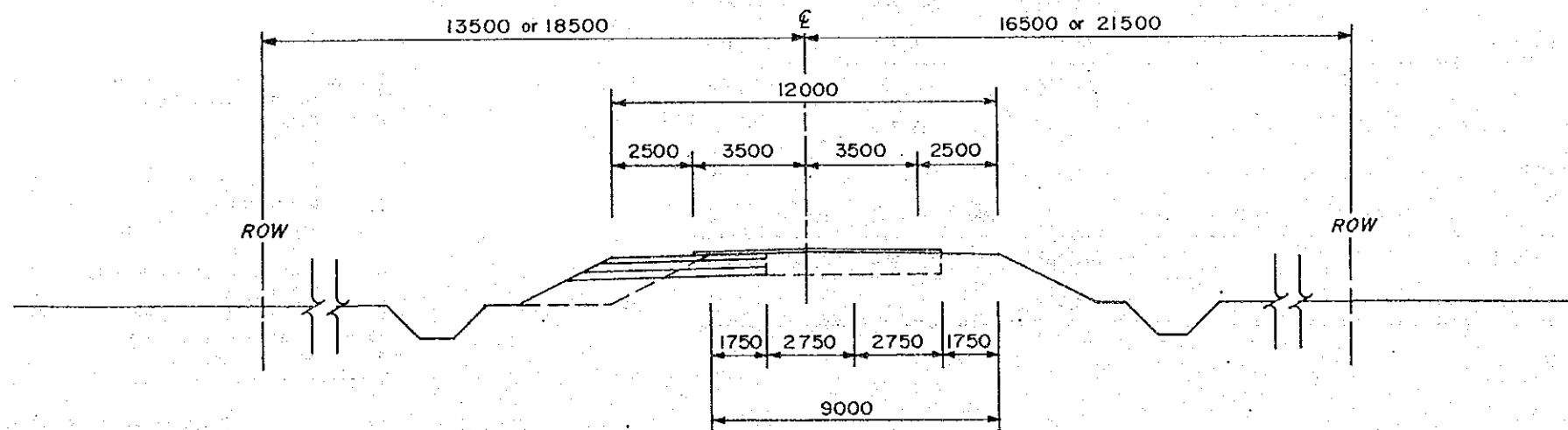
### 5) TYPICAL CROSS SECTION







**STA 1+800 ~ STA 4+500 , STA 20+700 ~ STA 29+329**  
**STA 7+500 ~ STA 18+100 , STA 30+529 ~ STA 49+051**  
**STA 19+000 ~ STA 19+700**



6) CONSTRUCTION QUANTITIES AND COSTS

CONSTRUCTION QUANTITIES AND COSTS  
(Project WD 7-2 Length = 68.100 Km)  
(Improved Length 68.100 Km)

| ITEM  | Unit | Financial |          | Financial  |            | Economic cost |     | Residual Value |   |
|---|------|-----------|----------|------------|------------|---------------|-----|----------------|---|
|   |      | Unit Cost | Quantity | Total cost | Total cost | %             | %   | %              | % |
|   |      | Baht      |          | 1000 Baht  | 1000 Baht  | %             | %   | %              | % |
| <b>EARTH WORK</b>                           |      |           |          |            |            |               |     |                |   |
| Clearing & Grubbing                         | SQ.M | 1         | 272,400  | 272        |            | 83            |     | 90             |   |
| Roadway Excavation(Unclassified)            | CU.M | 30        | 0        | 0          |            |               |     |                |   |
| Embankment(Borrowed Material)               | CU.M | 100       | 245,160  | 24,516     |            |               |     |                |   |
| Slope Protection(Stripe Sodding)            | SQ.M | 6         | 228,407  | 1,370      |            |               |     |                |   |
| Sand Mat (t=0.5m)                           | SQ.M | 50        | 0        | 0          |            |               |     |                |   |
| Excavate Existing Surface                   | SQ.M | 2         | 0        | 0          |            |               |     |                |   |
| Thickness Over 10Cm (2 Lay)                 | SQ.M | 14        | 143,010  | 2,002      |            |               |     |                |   |
| <b>SUB TOTAL</b>                            |      |           |          | 28,161     |            | 23,374        |     | 21,036         |   |
| <b>SUBBASE AND BASE</b>                     |      |           |          |            |            |               |     |                |   |
| Subbase(Selected Material)                  | CU.M | 190       | 68,441   | 13,004     |            | 83            |     | 50             |   |
| Subbase(Soil Aggregate)                     | CU.M | 190       | 91,254   | 17,338     |            |               |     |                |   |
| Base Coarses(Crush Stone)                   | CU.M | 280       | 44,946   | 12,585     |            |               |     |                |   |
| Shoulder(Soil Aggregate)                    | CU.M | 190       | 29,964   | 5,693      |            |               |     |                |   |
| <b>SUB TOTAL</b>                            |      |           |          | 48,620     |            | 40,355        |     | 20,177         |   |
| <b>SURFACE</b>                              |      |           |          |            |            |               |     |                |   |
| Asphaltic Prime coat                        | SQ.M | 13        | 204,300  | 2,656      |            | 83            |     | 50             |   |
| Asphaltic Tack coat                         | SQ.M | 7         | 272,400  | 1,907      |            |               |     |                |   |
| Asphalt concrete Surfacing                  | CU.M | 1,900     | 23,835   | 45,287     |            |               |     |                |   |
| <b>SUB TOTAL</b>                            |      |           |          | 49,849     |            | 41,375        |     | 20,687         |   |
| <b>STRUCTURES(Equivalent)</b>               |      |           |          |            |            |               |     |                |   |
| RC Pipe Culvert( D= 600 m)                  | M    | 1,380     | 88       | 121        |            | 83            |     | 50             |   |
| ( D= 800 m)                                 | M    | 1,950     | 136      | 265        |            |               |     |                |   |
| ( D=1000 m)                                 | M    | 2,640     | 212      | 560        |            |               |     |                |   |
| RC Box Culvert(3-2.10*2.10 m)               | M    | 15,000    | 8        | 120        |            |               |     |                |   |
| RC Bridge (W=15.0 m)                        | M    | 96,000    | 0        | 0          |            |               |     |                |   |
| RC Bridge Wideing                           | SQ.M | 9,600     | 2,803    | 26,909     |            |               |     |                |   |
| PC Bridge Wideing                           | SQ.M | 15,000    | 0        | 0          |            |               |     |                |   |
| <b>SUB TOTAL</b>                            |      |           |          | 27,975     |            | 23,219        |     | 11,610         |   |
| <b>TOTAL (a)</b>                            |      |           |          | 154,605    |            | 128,322       |     | 73,511         |   |
| Miscellaneous Works [(a)*7%]                | Ls   | 1         |          | 10,822     |            | 8,983         |     | 5,146          |   |
| <b>CONTRACT AMOUNT (b)</b>                  |      |           |          | 165,428    |            | 137,305       |     | 78,656         |   |
| PHYSICAL CONTINGENCIES [(b)*10%] (c)        | Ls   | 1         |          | 16,543     |            | 13,730        |     | 7,866          |   |
| ENGINEERING & SUPERVISION [(b)+(c)*10%] (d) | Ls   | 1         |          | 18,197     | 85         | 15,467        | 0   | 0              | 0 |
| LAND ACQUISITION(Average) (e)               | SQ.M | 25        | 0        | 0          | 100        | 0             | 100 | 0              | 0 |
| <b>PROJECT COST [(b)+(c)+(d)+(e)]</b>       |      |           |          | 200,167    |            | 166,503       |     | 86,522         |   |
| <b>AVERAGE COST PER KM</b>                  |      |           |          | 2,939      |            |               |     |                |   |

MAINTENANCE BUDGET CALCULATION

Project Road No, WD 7-2 Na= 9,300 Baht/Km/year  
(Existing Road) Km= 1.16  
Length = 68.100 Km

Laterite Surface

| ITEMS                                       | Existing Road |         |      |
|---|---------------|---------|------|
|   | Condition     | Factor  |      |
| 1. A.D.T                                    | A1            | 1,200   | 0.95 |
| 2. Width Of Embankment (Surface & Shoulder) | A3            | 8 m     | 0.33 |
| 3. R-O-W Width (m)                          | B1            | 40 m    | 0.13 |
| 4. Traffic Service Operation Topography     | B2            | 0 - 3 % | 0.05 |
| 5. Drainage Topography                      | B3            | 0 - 3 % | 0.00 |
| 6. Bridge Quantity (m/Km)                   | B4            | 6       | 0.02 |
| 7. NO. Of Lanes                             |               | 2       |      |

$Ks(Existing) = 1 + 0.7(A1+A3) + 0.3(B1+B2+B3+B4) = 1.96$   
 Maintenance cost + Overhead =  $Ks * Km * Na * 1.28 = 27,056$  Baht/Km/year  
 Total Cost(Existing) = Length \*(Baht/Km/year) = 1,842,532 Baht/year  
 Financial Cost = 1,843,000 Baht/year  
 Economic Cost = 1,530,000 Baht/year  
 ( 1,529,690 )Baht/year

Project Road No, WD 7-2 Na= 8,200 Baht/Km/year  
(Proposed Road) Km= 1.00  
Length = 68.100 Km

Asphalt Pavement

| ITEMS                                   | Proposed Road |         |      |
|---|---------------|---------|------|
|   | Condition     | Factor  |      |
| 1. Surface /Base Type                   | X1            | AC      | 0.00 |
| 2. Subgrade CBR                         | X2            | 4 %     | 0.50 |
| 3. A.D.T                                | X3            | 1,500   | 0.41 |
| 4. Service Life (year)                  | X4            | 10      | 1.40 |
| 5. Pavement Width (m)                   | X5            | 7 m     | 0.19 |
| 6. R-O-W Width (m)                      | Y1            | 40 m    | 0.00 |
| 7. Shoulder, Access, Median Width (m)   | Y2            | 2.50m   | 0.05 |
| 8. Traffic Service Operation Topography | Y3            | 0 - 3 % | 0.00 |
| 9. Drainage Topography                  | Y4            | 0 - 3 % | 0.00 |
| 10. Bridge Quantity (m/Km)              | Y5            | 6       | 0.00 |
| 11. NO. Of Lanes                        |               | 2       |      |

$Ka = 1 + 0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5) = 2.28$   
 Maintenance cost + Overhead =  $Ka * Km * Na * 1.28 = 23,902$  Baht/Km/year  
 Total Cost = Length \*(Baht/Km/year) = 1,627,745 Baht/year  
 Financial Cost = 1,628,000 Baht/year  
 Economic Cost = 1,351,000 Baht/year  
 ( 1,351,240 )Baht/year

7) Construction Schedule

Project WD7-2 Route No. 4035 Phra Saeng - Ao Luk

| year and Month                 | First Year |   |   |   |   |   |   |   |   |    |    |    | Second Year |   |   |   |   |   |   |   |   |    |    |    | Third Year |   |   |   |   |   |   |   |   |    |    |    |
|--------------------------------|------------|---|---|---|---|---|---|---|---|----|----|----|-------------|---|---|---|---|---|---|---|---|----|----|----|------------|---|---|---|---|---|---|---|---|----|----|----|
|                                | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Work Items                     |            |   |   |   |   |   |   |   |   |    |    |    |             |   |   |   |   |   |   |   |   |    |    |    |            |   |   |   |   |   |   |   |   |    |    |    |
| Land Acquisition               |            |   |   |   |   |   |   |   |   |    |    |    |             |   |   |   |   |   |   |   |   |    |    |    |            |   |   |   |   |   |   |   |   |    |    |    |
| Preparatory Works              | =====      |   |   |   |   |   |   |   |   |    |    |    |             |   |   |   |   |   |   |   |   |    |    |    |            |   |   |   |   |   |   |   |   |    |    |    |
| Earth Works                    | =====      |   |   |   |   |   |   |   |   |    |    |    |             |   |   |   |   |   |   |   |   |    |    |    |            |   |   |   |   |   |   |   |   |    |    |    |
| Pavement Works                 |            |   |   |   |   |   |   |   |   |    |    |    | =====       |   |   |   |   |   |   |   |   |    |    |    |            |   |   |   |   |   |   |   |   |    |    |    |
| Bridge Works                   | =====      |   |   |   |   |   |   |   |   |    |    |    |             |   |   |   |   |   |   |   |   |    |    |    |            |   |   |   |   |   |   |   |   |    |    |    |
| Miscellaneous Works            | =====      |   |   |   |   |   |   |   |   |    |    |    | =====       |   |   |   |   |   |   |   |   |    |    |    | =====      |   |   |   |   |   |   |   |   |    |    |    |
| Clearing -Up                   |            |   |   |   |   |   |   |   |   |    |    |    |             |   |   |   |   |   |   |   |   |    |    |    | =====      |   |   |   |   |   |   |   |   |    |    |    |
| Percentage Of Disbursement (%) | 32 %       |   |   |   |   |   |   |   |   |    |    |    | 45 %        |   |   |   |   |   |   |   |   |    |    |    | 23 %       |   |   |   |   |   |   |   |   |    |    |    |

8) Economic Evaluation

Project WD7-2 Route No. 4035 Phra Saeng - Ao Luk

(unit ; 1000 Baht)

| Year         | Const-<br>ruction<br>Cost | Mainte-<br>nance<br>Cost | Total<br>Cost  | VOC<br>Saving  | Time<br>Saving   | Balance           | Sensi.<br>Analysis |
|--------------|---------------------------|--------------------------|----------------|----------------|------------------|-------------------|--------------------|
|              |                           |                          |                |                |                  | Benefit=<br>Cost= | 0.8<br>1.2         |
| 1990         | 0                         | 0                        | 0              | 0              | 0                | 0                 | 0                  |
| 1991         | 0                         | 0                        | 0              | 0              | 0                | 0                 | 0                  |
| 1992         | 0                         | 0                        | 0              | 0              | 0                | 0                 | 0                  |
| 1993         | 53,237                    | 0                        | 53,237         | 0              | 0                | (53,237)          | (63,885)           |
| 1994         | 76,687                    | 0                        | 76,687         | 0              | 0                | (76,687)          | (92,025)           |
| 1995         | 36,579                    | 0                        | 36,579         | 0              | 0                | (36,579)          | (43,895)           |
| 1996         | 0                         | (476)                    | (476)          | 2,420          | 11,725           | 14,621            | 11,887             |
| 1997         | 0                         | (476)                    | (476)          | 2,818          | 16,831           | 20,125            | 16,291             |
| 1998         | 0                         | (476)                    | (476)          | 3,216          | 21,938           | 25,630            | 20,694             |
| 1999         | 0                         | (476)                    | (476)          | 3,614          | 27,044           | 31,134            | 25,098             |
| 2000         | 0                         | (476)                    | (476)          | 4,012          | 32,151           | 36,639            | 29,501             |
| 2001         | 0                         | (476)                    | (476)          | 4,410          | 37,257           | 42,143            | 33,905             |
| 2002         | 0                         | (476)                    | (476)          | 6,315          | 56,785           | 63,577            | 51,052             |
| 2003         | 0                         | (476)                    | (476)          | 8,221          | 76,313           | 85,010            | 68,199             |
| 2004         | 0                         | (476)                    | (476)          | 10,126         | 95,842           | 106,444           | 85,345             |
| 2005         | 0                         | (476)                    | (476)          | 12,032         | 115,370          | 127,877           | 102,492            |
| 2006         | 0                         | (476)                    | (476)          | 13,937         | 134,898          | 149,311           | 119,639            |
| 2007         | 0                         | (476)                    | (476)          | 13,937         | 134,898          | 149,311           | 119,639            |
| 2008         | 0                         | (476)                    | (476)          | 13,937         | 134,898          | 149,311           | 119,639            |
| 2009         | 0                         | (476)                    | (476)          | 13,937         | 134,898          | 149,311           | 119,639            |
| 2010         | 0                         | (476)                    | (476)          | 13,937         | 134,898          | 149,311           | 119,639            |
| <b>Total</b> | <b>166,504</b>            | <b>(7,140)</b>           | <b>159,364</b> | <b>126,869</b> | <b>1,165,746</b> | <b>1,133,251</b>  | <b>842,856</b>     |
|              |                           |                          |                |                |                  | IRR =             | 21.84%             |
|              |                           |                          |                |                |                  | NPV (i;12%) =     | 119,548            |
|              |                           |                          |                |                |                  | B/C (i;12%) =     | 2.27               |

PROJECT WD7-3

RT. 4046 TRANG - KHUAN KUN

CHANGWAT: TRANG

2) ROUTE MAP

3.13 Route No. 4046 to Trang (WD7-3)

1) Summary

The project forms a part of the highway network development along the west coast. The aim of the project is to stimulate economic interactions between the provinces on the west coast. The existing highway starts from the intersection with Route 4 at the Ban Khuankun and ends at Trang city. The total length amounts to 49.7 kilometers along the existing route.

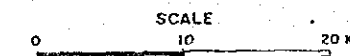
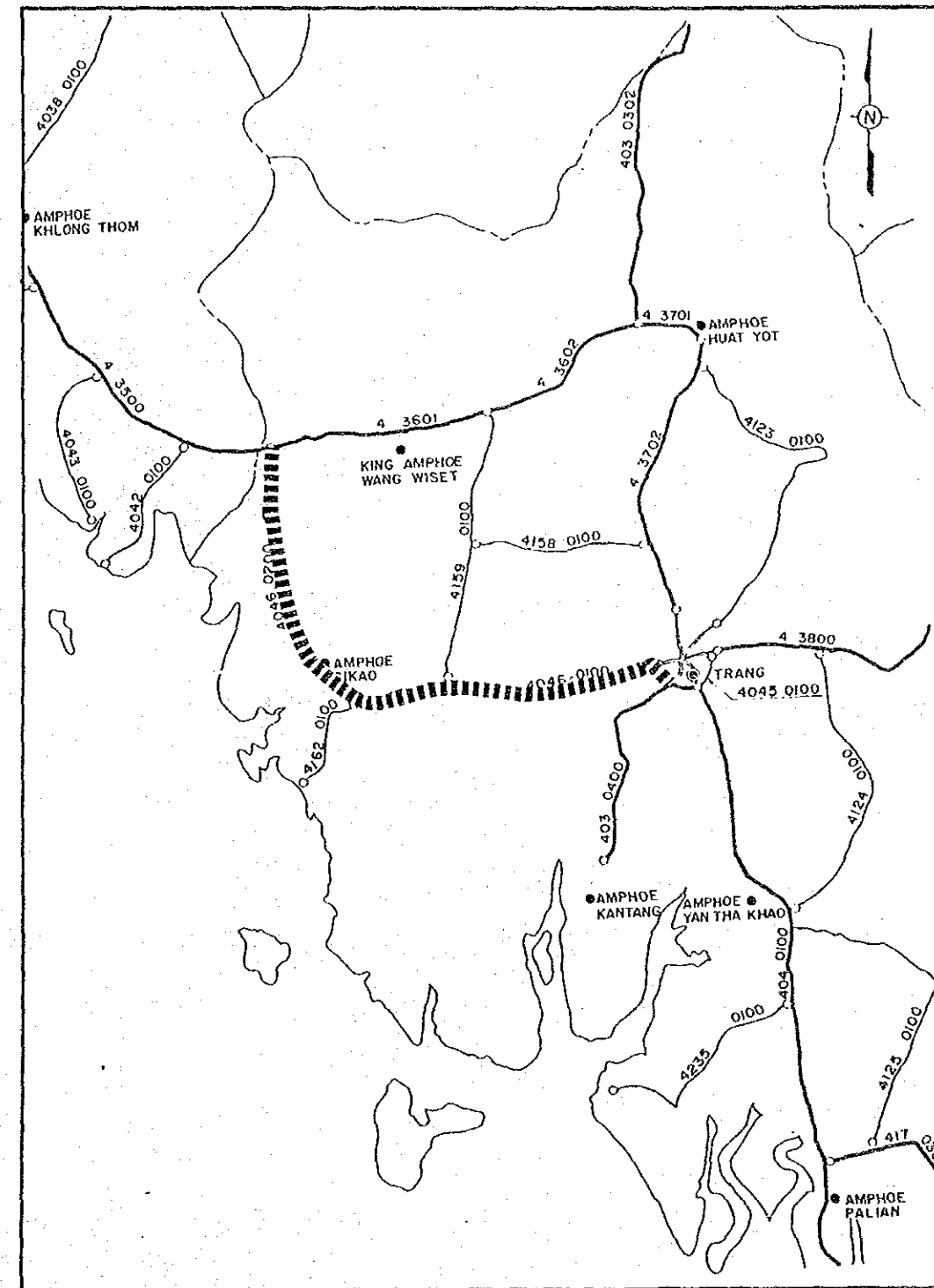
The existing highway is of "F4" standard with carriageway width of 5.5 meters. The surface condition is "good to fair". The project is to widen the existing carriageway to 7.0 meters, including following improvement works:

- improvement of horizontal alignment over a distance of 4.7 kilometers;
- improvement of embankment over a distance of 3.0 kilometers to avoid flooding damages; and
- new construction of a bypass to Sikao amphoe center.

The project lies in hilly terrain for a section between Trang and Sikao and in flat terrain for the remaining. The section between Amphoe Trang and Sikao belongs to flood prone area in the Trang river basin where flooding damages have been repeated every year. Measures to prevent flooding damages are very important in this project. The distance of the proposed project between Khuankun and Trang is shorter than Route 4 by 15 kilometers. It is expected that the improved highway will become a main link to connect Trang with Krabi after the completion.

| WD7-3             | Description                           |
|-------------------|---------------------------------------|
| Changwat          | : Trang                               |
| Name or Location  | : Rt.4046 Trang - Khuan Kun           |
| Road Class        | : F1 (F4)                             |
| Cross Section (m) | : 2.50+7.00+2.50 (1.75+5.50+1.75)     |
| Surface Type      | : SA /ASC / SA ( SA /SGST/ SA )       |
| Surface Condition | : ( F and G/F )                       |
| Length: Total     | : 49.7 km                             |
| DOH Road          | : 41.8 km + 7.9 km:New                |
| AADT<'96/'01/'06> | : 2,600 / 4,200 / 7,000               |
| Financial Cost    | : 168.7 million baht                  |
| NPV               | : 28 million baht (12% discount rate) |
| B/C               | : 1.4 (12% discount rate)             |
| EIRR              | : 16.0 %                              |

( ) : Existing Condition or Value



LEGEND :

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