REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS

# THE FEASIBILITY STUDY OF THE LOCAL ROAD DEVELOPMENT IN THE REPUBLIC OF INDONESIA

## KABUPATEN REPORT 19

## KABUPATEN BANJAR

MARCH 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS

# THE FEASIBILITY STUDY
# OF
# THE LOCAL ROAD DEVELOPMENT
# IN THE REPUBLIC OF INDONESIA

## KABUPATEN REPORT 19

## KABUPATEN BANJAR

MARCH 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

**PREFACE**

This is the Kabupaten Report of the Feasibility Study of the Local Road Development in the Republic of Indonesia for Kabupaten Banjar in Kalimantan Selatan Province. The report has been prepared by the Study Team of the Japan International Cooperation Agency (hereinafter called JICA).

Based upon a request from the Government of Indonesia, the Government of Japan arranged for JICA to conduct the Study and JICA accordingly organized a Study Team. The study was carried out using data which were generally prepared by the Kabupaten, routed through the province, under the instructions of Bina Marga of the Ministry of Public Works and Bangda of the Ministry of Home Affairs.

Since the study period was limited, without cooperation of Bina Marga, Bangda and local governments of both province and Kabupaten in collecting the data, the study would not have been completed within the period.

The report consists of the results of the feasibility study and proposed implementation programme of the local road development in the Kabupaten.

The simplified economic feasibility evaluation methodology utilized for the study was established by the Study Team in Phase I Study through a pilot study of seven (7) model Kabupatens, and is described in the Main Report.

The purpose of the study for the Kabupaten is mainly to estimate the total Project Cost for the local road development but only limited data is available for study base. Therefore a detailed survey and design for the improvement of the Kabupaten roads should be carried out before commencing the Project together with a review of this report.

# LOCATION MAP OF THE PROJECT AREAS


LEGEND :

- ● CAPITAL CITY
- ○ PROVINCIAL CITY
- + + + + NATIONAL BOUNDARY
- – – – – PPOVINCIAL BOUNDARY
- LOCATION OF THE PROJECT AREA

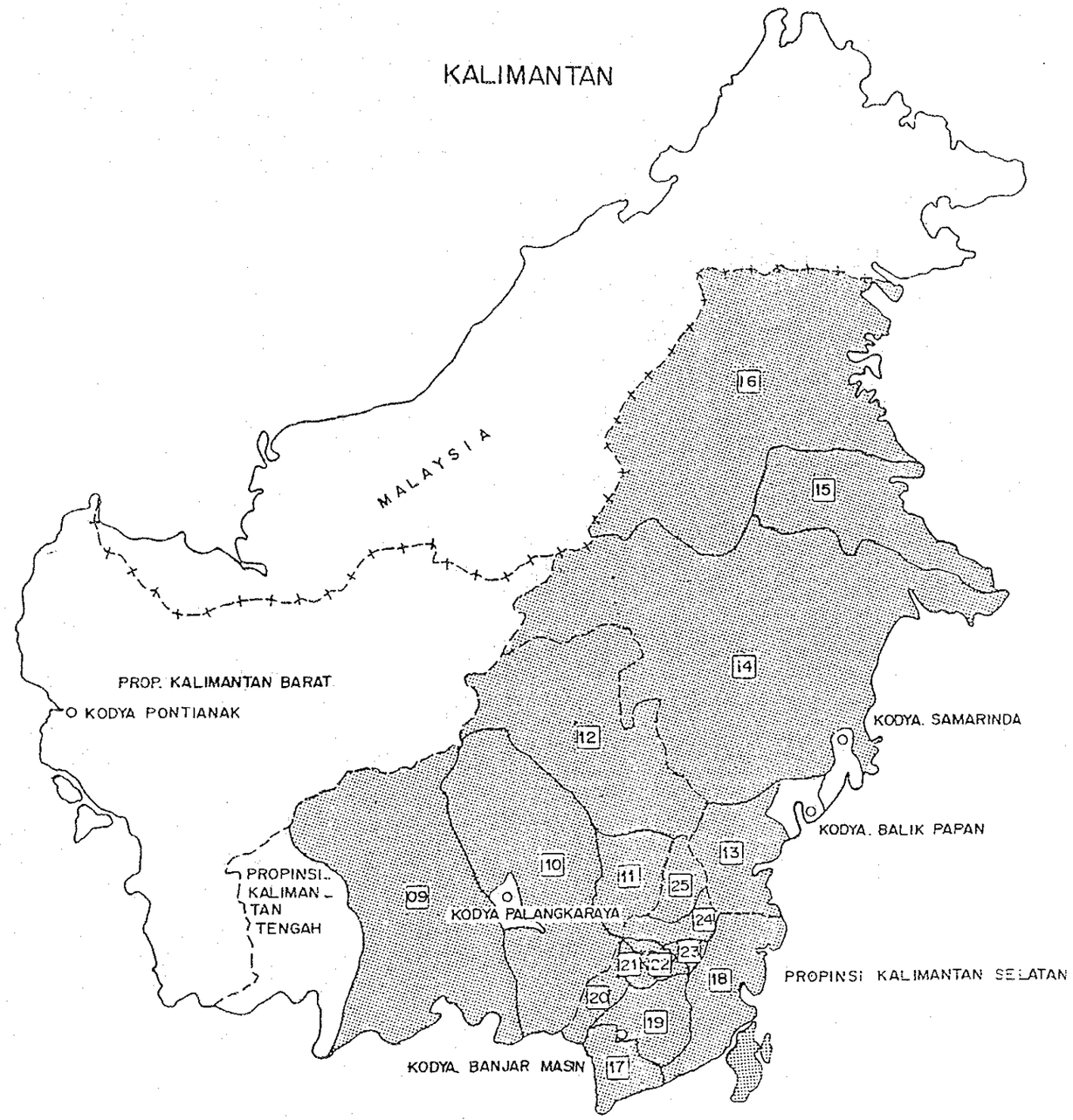
SCALE :

0 130 260 390 650 Km

IV · PROPINSI KALIMANTAN TENGAH
09 · KAB·KOTA WARINGIN TIMUR
10 · KAB·KAPUAS
11 · KAB·BARITO SELATAN
12 · KAB·BARITO UTARA

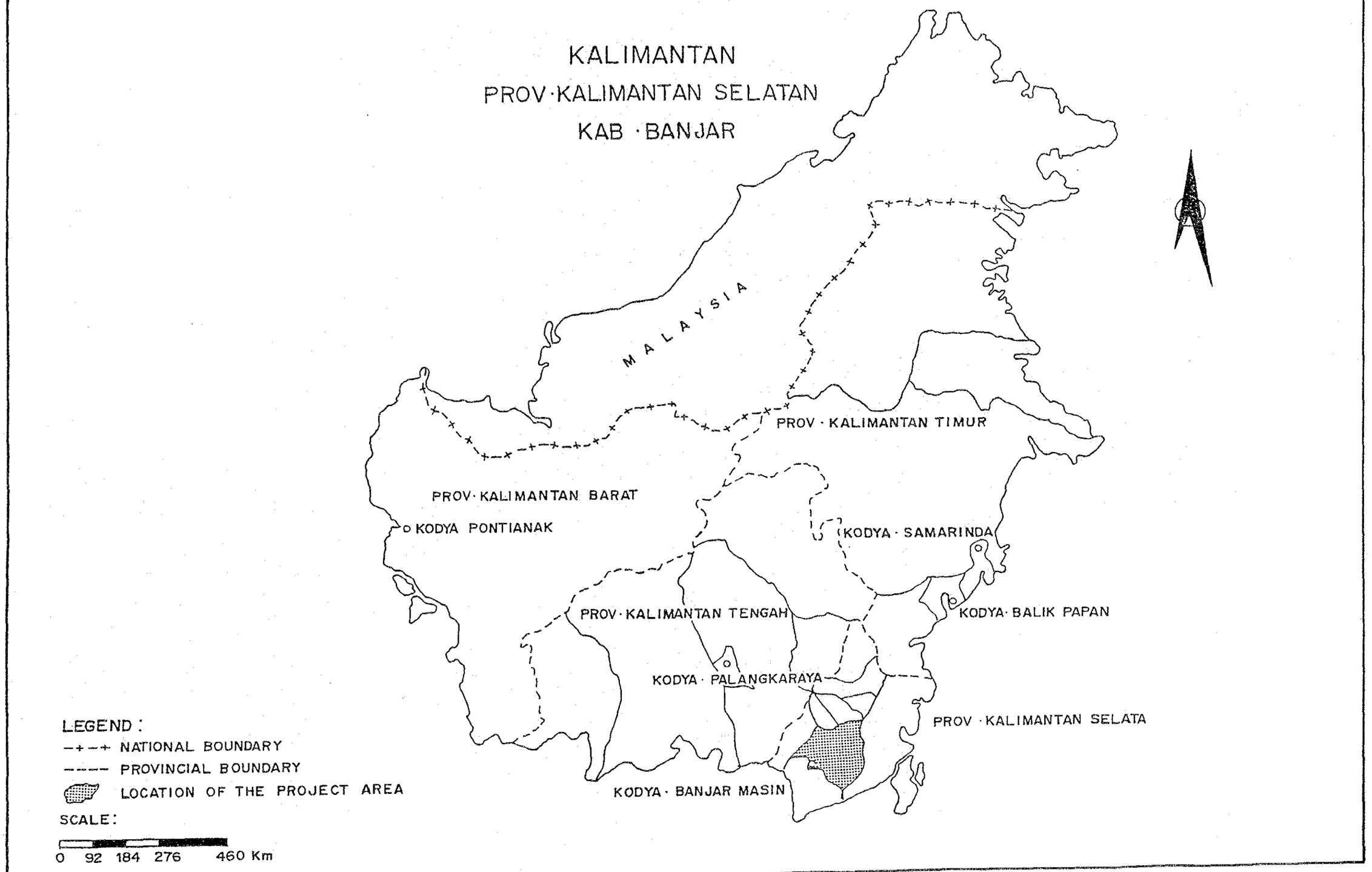
V · PROPINSI KALIMANTAN TIMUR
13 · KAB·PASIR
14 · KAB·KUTAI
15 · KAB·BERAU
16 · KAB·BULUNGAN

VI · PROPINSI KALIMANTAN SELATAN
17 · KAB·TANAH LAUT
18 · KAB·KOTA BARU
19 · KAB·BANJAR
20 · KAB·BARITO KUALA
21 · KAB·TAPIN
22 · KAB·HULU SUNGAI SELATAN
23 · KAB·HULU SUNGAI TENGAH
24 · KAB·HULU SUNGAI UTARA
25 · KAB·TABALONG

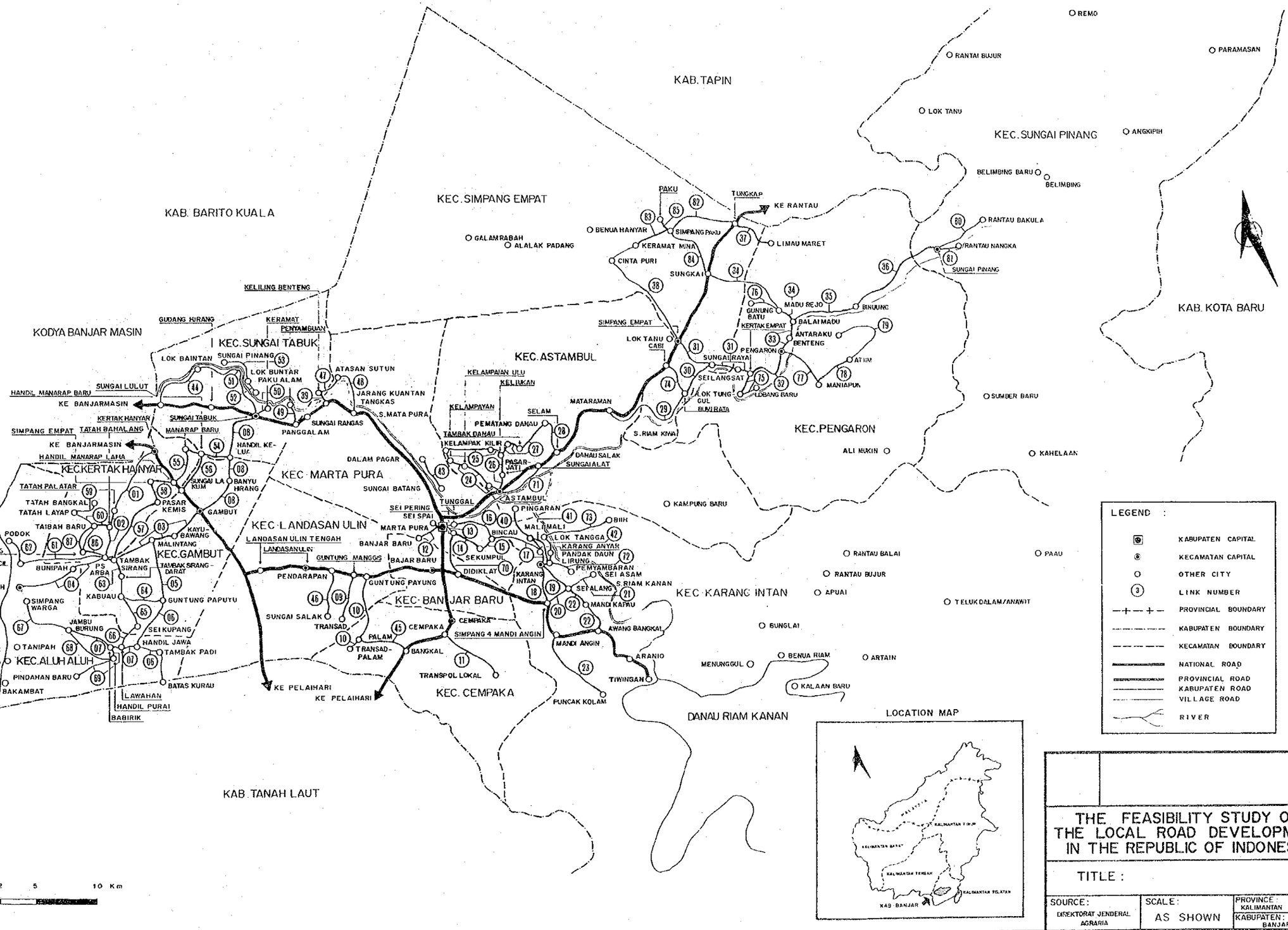



LEGEND :
−+−+ NATIONAL BOUNDARY
– – – – PROVINCIAL BOUNDARY
LOCATION OF THE PROPOSED AREA

SCALE :
0 92 184 276 460 Km.


KALIMANTAN
PROV·KALIMANTAN SELATAN
KAB ·BANJAR
MALAYSIA
PROV · KALIMANTAN TIMUR
PROV·KALIMANTAN BARAT
KODYA PONTIANAK
KODYA · SAMARINDA
PROV·KALIMANTAN TENGAH
KODYA·BALIK PAPAN
KODYA · PALANGKARAYA
PROV ·KALIMANTAN SELATA
KODYA · BANJAR MASIN
LEGEND :
NATIONAL BOUNDARY
PROVINCIAL BOUNDARY
LOCATION OF THE PROJECT AREA
SCALE:
0 92 184 276 460 Km

# KAB. BANJAR




SCALE

0 2 5 10 Km

LEGEND :

- KABUPATEN CAPITAL
- KECAMATAN CAPITAL
- OTHER CITY
- (3) LINK NUMBER
- PROVINCIAL BOUNDARY
- KABUPATEN BOUNDARY
- KECAMATAN BOUNDARY
- NATIONAL ROAD
- PROVINCIAL ROAD
- KABUPATEN ROAD
- VILLAGE ROAD
- RIVER

LOCATION MAP




THE FEASIBILITY STUDY OF THE LOCAL ROAD DEVELOPMENT IN THE REPUBLIC OF INDONESIA

TITLE :

| SOURCE: | SCALE: | PROVINCE: KALIMANTAN SELATAN |
|---|---|---|
| DIREKTORAT JENDERAL AGRARIA | AS SHOWN | KABUPATEN: BANJAR |

C O N T E N T S

# Chapter 1 BACKGROUND OF THE KABUPATEN

## 1.1 Topographic and Meteorological Conditions

### 1.1.1 Location and Topography

Kabupaten Banjar is an inland Kabupaten bordered on the west by Banjarmasin, the capital of Kalimantan Selatan Province.

The Martapura River flows from the east to the west in the Kabupaten, then finally meets the Barito River at Banjarmasin. The area in the west which borders on Banjarmasin and the area north of the Martapura River are mostly flat and swampy, however the southeast and the northeast areas of the Kabupaten are mostly mountianous.

The Kabupaten has an area of 5,040 square kilometers, approximately 13 percent of the total of the province. It consists administratively of 10 Kecamatans.

### 1.1.2 Meteorological Conditions

The average number of rainy days and the average amount of yearly rainfall in Kabupaten Banjar are 153 days and 2,543 mm respectively.

One year in the Kabupaten consists of a rainy season and a dry season. The dry season is in general from June through November. However this is variable as Table 1-1-1 shows.

The number of working days per year, which is necessary for planning the construction schedule in chapter 6, is estimated at 220 days using the following formula based upon the data shown in the table referred to above.

$$\text{Working Days} = 365 - \text{Holidays} - \text{Rainy Days} + \left(\text{Rainy Days} \times \frac{\text{Holiday}}{365}\right) + (0.10 \times \text{Rainy Days})$$

Where :

- Holidays consist of 52 Sundays and 13 national holidays; and
- 10% of rainy days are assumed to be workable days.

Table 1-1-1

METEOROLOGICAL CONDITIONS

PROVINCE : Kalimantan Selatan
KABUPATEN : Banjar STATION : Syamsudin Noor

| MONTH | 1980 | | 1981 | | 1982 | | 1983 | | 1984 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | RAINY DAYS | RAINFALL (mm) | RAINY DAYS | RAINFALL (mm) | RAINY DAYS | RAINFALL (mm) | RAINY DAYS | RAINFALL (mm) | RAINY DAYS | RAINFALL (mm) |
| January | | | | | 24 | 422 | | | | |
| February | | | | | 25 | 421 | | | | |
| March | | | | | 24 | 327 | | | | |
| April | | | | | 16 | 239 | | | | |
| May | | | | | 13 | 286 | | | | |
| June | | | | | 8 | 147 | | | | |
| July | | | | | 3 | 42 | | | | |
| August | | | | | 3 | 26 | | | | |
| September | | | | | 2 | 85 | | | | |
| October | | | | | 3 | 28 | | | | |
| November | | | | | 9 | 108 | | | | |
| December | | | | | 23 | 412 | | | | |
| Total | - | - | - | - | 153 | 2,543 | - | - | - | - |

## 1.2 Socio-Economic Conditions

### 1.2.1 Population

The population of Kabupaten Banjar in 1982 was 355,078 which was approximately 16.5% of the 2,155,700 total population of Kalimantan Selatan Province as shown in Table 1-2-1.

The population density was 0.70 persons per ha which was higher than the provincial density of 0.58.

The recent annual average growth rate of population of the Kabupaten is 3.0% which is higher than both the provincial rate of 2.1% and the national rate of 2.2%. This may be a result of the on-going transmigration programme in the Kabupaten and the inflow of population from other Kabupatens in the province.

The population of each Kecamatan and its proportion to the Kabupaten population is shown in Table 1-2-2.

Table 1-2-1 POPULATION BY KABUPATEN

| DESCRIPTION | POPULATION | AAGR (%) | AREA (ha) | POPULATION DENSITY (persons/ha) | SURVEY YEAR |
|---|---|---|---|---|---|
| KABUPATEN: | | | | | |
| TANAH LAUT | 148,708 | 3.5 | 347,682 | 0.43 | 1984 |
| KOTA BARU | 253,400 | 5·6 | 1,426,432 | 0.18 | 1984 |
| BANJAR | 355,078 | 3·0 | 503,980 | 0.70 | 1982 |
| BARITO KUALA | 198,282 | 4·0 | 299,696 | 0.66 | 1984 |
| TAPIN | 115,752 | 3·0 | 270,062 | 0.42 | 1983 |
| HULU SUNGAI SELATAN | 187,161 | 3·5 | 189,261 | 0.99 | 1984 |
| HULU SUNGAI TENGAH | 205,266 | 0·5 | 147,200 | 1.39 | 1983 |
| HULU SUNGAI UTARA | 248,860 | 1·5 | 359,178 | 0.69 | 1984 |
| TABALONG | 130,218 | 2·0 | 394,600 | 0.33 | 1984 |
| PROVINCE: | | | | | |
| KALIMANTAN SELATAN | 2,155,700 | | 3,766,000 | | 1982 |
| | 2,198,400 | 2.1 | 3,766,000 | 0·58 | 1983 |
| | 2,241,600 | | 3,766,000 | | 1984 |
| JAWA IS.(Excluding DKI JAKARTA) | 91,126,900 | 1·7 | 13,159,700 | 6·92 | - |
| INDONESIA | 161,579,500 | 2·2 | 191,944,300 | 0·84 | - |

Notes :

1. Sources:

   Kabupaten; Kabupaten concerned with the study

   Province ; Jawa and Indonesia:

   Statistical yearbook of Indonesia 1984, published by the Central statistics Bureau.

2. AAGR ; Average Annual Growth Rate.

Table 1-2-2 POPULATION BY KECAMATAN

Year : 1982

PROVINCE : KALIMANTAN SELATAN

KABUPATEN : BANJAR

| KECAMATAN | POPULATION | PROPORTION (%) |
|---|---|---|
| ALUH ALUH | 32,296 | 9.1 |
| KERTAK HANYAR | 24,141 | 6.8 |
| GAMBUT | 23,278 | 6.6 |
| SEI TABUK | 32,216 | 9.0 |
| MARTAPURA | 71,795 | 20.2 |
| BANJAR BARU | 25,507 | 7.2 |
| KARANG INTAN | 26,776 | 7.5 |
| ASTAMBUL | 41,807 | 11.8 |
| SIMPANG EMPAT | 18,397 | 5.2 |
| PENGARON | 18,522 | 5.2 |
| SEI PINANG | 7,684 | 2.2 |
| LANDASAN ULIN | 15,177 | 4.3 |
| CEMPAKA | 17,482 | 4.9 |
| TOTAL | 355,078 | 100 |

### 1.2.2 Land Use

In Kabupaten Banjar, 108,800 ha of the current available land use area, which is approximately 22.6% of the 503,980 ha total area of the Kabupaten, is used for living purposes and for industrial activity of the inhabitants of the Kabupaten. It is the total value of columns (1) through (6) in Table 1-2-3.

The current available land use area consists of 92,800 ha of agricultural harvest area and 16,000 ha of residential area which are 85.3% and 14.7% of the current available land use area respectively.

The agricultural harvest area consists of 52,360 ha of paddy field, 22,850 ha of plantation and 17,590 ha of other cultivated area which are 56.4%, 24.6% and 19.0% of the agricultural harvest area respectively.

It can be realized from the land use that the main industrial production in the Kabupaten is food crops, especially paddy.

Table 1-2-3

LAND USE

PROVINCE : KALIMANTAN SELATAN

(ha)

| KABUPATEN | WET PADDY FIELD | UPLAND PADDY FIELD | OTHER GULTIVATED AREA | PLANTATION AREA | RESIDENTIAL AREA | USABLE OPEN SPACE | RIVER & LAKE | FORESTRY AREA | OTHERS | TOTAL AREA | SURVEY YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TANAH LAUT | 53,787 (15.5) | 9,266 (2.7) | 6,890 (2.0) | 30,350 (8.7) | 13,839 (4.0) | 15,000 (4.3) | 300 (0.1) | 173,539 (49.9) | 44,712 (12.9) | 347,683 (100) | 1984 |
| KOTA BARU | 14,997 (1.1) | 37,331 (2.6) | 73,244 (5.1) | 27,050 (1.9) | 14,184 (1.0) | 92,450 (6.5) | - | 1,108,967 (77.7) | 58,524 (4.1) | 1,426,432 (100) | 1984 |
| BANJAR | | 52,360 (10.4) | 17,590 (3.5) | 22,850 (4.5) | 16,000 (3.2) | - | 12,500 (2.5) | 248,340 (49.3) | 134,340 (26.6) | 503,980 (100) | 1982 |
| BARITO KUALA | 76,493 (25.5) | - | - | 18,274 (6.1) | 6,006 (2.0) | 3,678 (1.2) | 1,408 (0.5) | 121,494 (40.6) | 72,343 (24.1) | 299,696 (100) | 1984 |
| TAPIN | 33,647 (12.5) | 17,385 (6.4) | 49,616 (18.4) | 20,694 (77) | 6,120 (2.3) | 4,525 (1.7) | 16,366 (6.1) | 63,819 (23.6) | 57,910 (21.4) | 270,082 (100) | 1983 |
| HULU SUNGAI SELATAN | 29,725 (15.7) | 414 (0.2) | 4,651 (2.5) | 21,544 (11.4) | 6,733 (0.9) | 37,451 (19.8) | 38,681 (20.4) | 47,956 (25.3) | 1,053 (0.6) | 189,261 (100) | 1984 |
| HULU SUNGAI TENGAH | 23,764 (16.1) | 2,100 (1.4) | - | 16,425 (11.2) | 1,329 (0.9) | 1,930 (1.3) | 11,060 (7.5) | 40,846 (27.7) | 49,733 (33.8) | 147,168 (100) | 1984 |
| HULU SUNGAI UTARA | 99,035 (27.6) | 7,828 (2.2) | 48,032 (13.4) | 66,068 (18.4) | 11,586 (3.2) | 15,000 (4.2) | 69,866 (19.4) | 33,482 (9.3) | 10,055 (2.8) | 359,178 (100) | 1984 |
| TABALONG | 13,085 (3.3) | 5,720 (1.4) | 7,676 (1.9) | 19,980 (5.1) | 7,300 (1.8) | 25,000 (6.3) | 12,215 (3.1) | 258,867 (65.7) | 44,759 (11.4) | 394,600 (100) | 1984 |

Notes :

1. The value in ( ) denotes the proportion
2. Source : Kabupaten concerned with the study

### 1.2.3 Agriculture

The cultivated area and food crop production in Kabupaten Banjar in 1983 were 79,021 ha and 197,289 ton respectively as shown in Table 1-2-4. Of food crops, the area and production of paddy, which consists of wet paddy and upland paddy, was 69,115 ha and 173,536 ton respectively which are 87.5% and 88.0% of the total food crops. The yield rate of paddy production is 2.51 ton per ha. Thus, paddy is the most predominant agricultural crop of the Kabupaten.

As the table shows, average annual growth rates of area and production of paddy in 1982 through 1983 were 13.0% and 14.3% respectively which indicate favorable development of the paddy production. It is desirable that productivity of paddy increases and this depends upon the future development of irrigation.

Production of commodity crops, of which rubber is major, has been storted by the plantations. Some changes will be expected considering the international balance of supply and demand in the future.

The population of the agricultural sector which is assumed from the employment in the Kabupaten is 88.0% of the total population as shown in Table 1-2-6. Thus this is an agricultural Kabupaten.

It is desirable to promote vegetable production which can supply the large market of Banjarmasin, the capital of the province, which is located in the neighbouring Kabupaten.

Table 1-2-4 AREA AND PRODUCTION OF FOOD CROPS

KABUPATEN : BANJAR

CULTIVATED AREA

(ha)

| ITEM | YEAR 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | AAGR (%) |
|---|---|---|---|---|---|---|---|
| PADDY | - | - | - | 61,213 | 69,115 | - | 13.0 |
| OTHERS | - | - | - | 6,646 | 9,906 | - | 49.1 |
| TOTAL | - | - | - | 67,859 | 79,021 | - | 16.4 |

PRODUCTION

(ton)

| ITEM | YEAR 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | AAGR (%) |
|---|---|---|---|---|---|---|---|
| PADDY | - | - | - | 151,891 | 173,536 | - | 14.3 |
| OTHERS | - | - | - | 23,306 | 21,753 | - | 6.7 |
| TOTAL | - | - | - | 175,197 | 197,289 | - | 12.6 |

YIELD RATE

(ton/ha)

| ITEM | YEAR 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | AAGR (%) |
|---|---|---|---|---|---|---|---|
| PADDY | - | - | - | 2.48 | 2.51 | - | 1.2 |

Notes :

1. AAGR : Average annual growth rate
2. Source : Kabupaten concerned with the study

Table 1-2-5 AREA AND PRODUCTION OF PLANTATION CROPS
Year : 1983

PROVINCE : KALIMANTAN SELATAN

| KABUPATEN | AREA (ha) | PRODUCTION (ton) | AAGR (%) AREA | AAGR (%) PRODUCTION |
|---|---|---|---|---|
| TANAH LAUT | 9,095 | 1,500 | 6.3 | 18.0 |
| KOTA BARU | 9,517 | 703 | 3.4 | 0 |
| BANJAR | - | - | - | - |
| BARITO KUALA | 13,021 | 9,013 | 4.0 | 11.0 |
| TAPIN | - | - | - | - |
| HULU SUNGAI SELATAN | 12,603 | 6,165 | 11.3 | 10.0 |
| HULU SUNGAI TENGAH | 18,000 | 6,400 | 1.9 | 11.7 |
| HULU SUNGAI UTARA | 19,721 | 7,176 | 3.5 | 0 |
| TABALONG | 27,107 | 10,073 | 5.0 | 12.6 |

Table 1-2-6 POPULATION OF AGRICULTURAL SECTOR

PROVINCE : KALIMANTAN SELATAN

| KABUPATEN | AGRICULTURAL SECTOR | TOTAL POPULATION | PROPORTION (%) | AAGR (%) | SURVEY YEAR |
|---|---|---|---|---|---|
| TANAH LAUT | 122,000 | 148,708 | 82.3 | 3.5 | 1984 |
| KOTA BARU | 161,000 | 253,400 | 63.7 | 4.0 | 1984 |
| BANJAR | 312,000 | 355,078 | 88.0 | 3.0 | 1982 |
| BARITO KUALA | 156,000 | 198,282 | 78.6 | 5.0 | 1984 |
| TAPIN | 71,000 | 115,752 | 61.5 | 3.0 | 1983 |
| HULU SUNGAI SELATAN | 114,000 | 187,161 | 61.0 | 3.0 | 1984 |
| HULU SUNGAI TENGAH | 125,000 | 202,370 | 61.9 | 0.3 | 1984 |
| HULU SUNGAI UTARA | 192,000 | 248,860 | 77.0 | 1.5 | 1984 |
| TABALONG | 106,000 | 130,218 | 81.5 | 3.0 | 1984 |

Notes :

1. AAGR : Average annual growth rate
2. Kabupaten concerned with the Study

### 1.2.4 Other Economic Activities

The major industrial activities in Kabupaten Banjar are of the primary industry consisting mainly of agricultural and forestry sectors. The proportions of employees of the primary, secondary and tertiary industries are 88.0%, 2.2% and 9.8% respectively as shown in the table below.

| Item | Workforce | Share(%) | (1982) Sector Share(%) |
|---|---|---|---|
| Agriculture | 255,490 | 88.00 | |
| Livestock | - | - | 88.00 |
| Fishery | - | - | |
| Industry | 4,539 | 1.56 | 2.17 |
| Mining | 1,753 | 0.61 | |
| Commerce | 23,000 | 7.92 | 9.83 |
| Service | 5,526 | 1.91 | |
| Total | 290,308 | 100 | |

Although Kabupaten Banjar relies to a large extent upon the primary industry as can be seen from the above employment ratios, the tertiary industry's employment ratio shows the relatively low rate of 9.8%. This is presumed to be because Kabupaten Banjar relies for many of the functions of its tertiary industry on neighbouring Banjarmasin, the capital of South Kalimantan Province.

The production of precious stones has been introduced as a special product in Kabupaten Banjar. However due to quality and quantity marketing is limited only to the neighbouring local markets such as the market located in Martapura. The workforce engaged in this business activity in only 0.6% of the total industrial employed population of Kabupaten Banjar.

## 1.3 Present Status of Kabupaten Roads

### 1.3.1 Outline of Road Networks

In Kabupaten Banjar there is a national road running from Banjarmasin, the provincial capital of Kalimantan Selatan, to Martapura the Kabupaten capital. From Martapura it crosses Martapura river and goes northwards to Kabupaten Tapin.

This national road is the trunk road of the Kabupaten. It is part of the trunk road of the south-east area of Kalimantan connecting to Samarinda, the provincial capital of east located to the north of the national road to Martapura.

From Banjar Baru, located south of Martapura, a provincial road runs to Kabupaten Tanah Laut towards the south and serves as a regional trunk road for the southern area of the Kabupaten. Another provincial road runs from Banjar Baru to the dam site of Lake Riam Kanan serving as a regional trunk road for the south-east of the Kabupaten.

The Kabupaten roads are divided into six road networks due to the topography and their connections to the trunk roads.

a. The first road network is in the west area of the Kabuapten where Gambut is located as a center, and in the large agricultural area enclosed by the national road and the provincial road. The regional trunk roads in this area are from Aluh Aluh to Gambut via Ps.Arba and from Gambut to Sungai Tabuk.

b. The second road network is in the east area of Martapura serving the area enclosed by Riam Kanan river to the north and the national road to the south. The road link runs from Martapura to the provincial road via Karang Intan and is a regional trunk road.

c. The third road network form a ladder pattern connecting to the national road at Astambul and at Selam east of Martapura.

d. The fourth road network is in the areas of Simpang Empat and Pengaron and is located to the east of the national road in the northern area of the Kabupaten serving the area connecting to the northern boundary north of Riam Kiri River. In this area the networks have not been developed.

e. The fifth road network is a ladder pattern network west of the national road and north of Simpang Empat. In this area rubber plantations have been developing.

f. The sixth road network is south of the national road between Landasan Ulin and Banjar Baru.

### 1.3.2 Road Inventory

From the road inventory data prepared by the Kabupaten, the number and total length of Kabupaten roads to be studied in Kabupaten Banjar are confirmed as 85 links and 403 Km respectively. These figures exclude Kabupaten roads with no data are not included.

According to the data the present status of the Kabupaten roads is as follows:

(1) Density of Kabupaten Roads

The density of the Kabupaten roads is 0.80 m per ha. This is higher than the national density of 0.48 m per ha but distinctly lower than 2.11 m per ha which is the density in Jawa Island, excluding DKI Jakarta, as shown in the following table. Thus, the Kabupaten lags behind in density of Kabupaten roads.

| | Total Length ( km ) | Area (ha) | Density (m/ha) |
|---|---|---|---|
| Kabupaten : Banjar | 403 | 503,980 | 0.80 |
| Province : Kalimantan Selatan | 3,029 | 3,938,091 | 0.77 |
| Jawa Is.(Excluding DKI Jakarta) | 27,715 | 13,159,700 | 2.11 |
| Indonesia | 92,038 | 191,944,300 | 0.48 |

Notes : 1. The value for the province is the total value for the Kabupatens included in the study.

2. The source of data are as follows:
Kabupaten and Province : Bina Marga Inventory
Jawa and Indonesia : Statistical Yearbook of Indonesia 1984, published by the Central Statistics Bureau

(2) Kabupaten Road Surface Type

The type of surface on the Kabupaten roads is shown in Table 1-3-1.

The legend used in the table is as follows:

ASP : Asphalt

Table 1-3-1 EXISTING ROAD LENGTH BY SURFACE TYPE

PROV : KALIMANTAN SELATAN KAB : BANJAR

(Km)

| NO ( %) | L.L | IND | ASP | BIB | KRK | TOTAL |
|---|---|---|---|---|---|---|
| LINK 1 | 1 | 4 | | | | 5 |
| LINK 2 | 8 | | | | 1 | 8 |
| LINK 3 | 10 | | | | | 10 |
| LINK 4 | 11 | | | | 1 | 11 |
| LINK 5 | 3 | | | | | 3 |
| LINK 6 | 7 | | | | | 7 |
| LINK 7 | 8 | | | | | 8 |
| LINK 8 | 4 | | 1 | 6 | 1 | 11 |
| LINK 9 | 5 | | | | 1 | 5 |
| LINK 10 | | | | 7 | 1 | 7 |
| LINK 11 | | | | 8 | 1 | 8 |
| LINK 12 | | | 2 | 1 | | 3 |
| LINK 13 | | | 3 | | 1 | 3 |
| LINK 14 | | | 2 | | | 2 |
| LINK 15 | | | 6 | | 1 | 6 |
| LINK 16 | | | 4 | | 1 | 4 |
| LINK 17 | | | 7 | | 1 | 7 |
| LINK 18 | 1 | | 5 | | 1 | 5 |
| LINK 19 | | 3 | | | 1 | 3 |
| LINK 20 | 5 | | | | 1 | 5 |
| LINK 21 | | 2 | | | 1 | 2 |
| LINK 22 | 4 | | | | 1 | 4 |
| LINK 23 | | | 1 | 8 | | 9 |
| LINK 24 | | | | 6 | 1 | 6 |
| LINK 25 | 2 | 1 | | 1 | 1 | 4 |
| LINK 26 | 3 | | | | 1 | 3 |
| LINK 27 | 4 | 2 | | | 1 | 6 |
| LINK 28 | 4 | | | | 1 | 4 |
| LINK 29 | 4 | 1 | | | 1 | 5 |
| LINK 30 | 2 | 3 | | | 1 | 5 |
| LINK 31 | | | 6 | | 1 | 6 |
| LINK 32 | | | 5 | | 1 | 5 |
| LINK 33 | | | 5 | | 1 | 5 |
| LINK 34 | | | 9 | | 1 | 9 |
| LINK 35 | 6 | | | | 1 | 6 |
| LINK 36 | 11 | 1 | | | 1 | 12 |
| LINK 37 | 4 | 2 | | | 1 | 6 |
| LINK 38 | | 1 | | | 10 | 11 |
| LINK 39 | | 1 | | | 1 | 1 |
| LINK 40 | | | | | 7 | 7 |
| LINK 41 | | | | | 1 | 1 |
| LINK 42 | | | | | 3 | 3 |
| LINK 43 | | | | | 3 | 3 |
| LINK 44 | | 4 | | | | 4 |
| LINK 45 | 1 | | | | 2 | 3 |
| LINK 46 | 3 | | | 1 | | 4 |
| LINK 47 | | 1 | | | 1 | 2 |
| LINK 48 | | 5 | | | 1 | 6 |
| LINK 49 | | 1 | | | | 1 |
| LINK 50 | | | | | 2 | 2 |
| LINK 51 | | 7 | | | 1 | 7 |
| LINK 52 | | 2 | | | | 2 |
| LINK 53 | | 2 | | | | 2 |
| LINK 54 | | 2 | | | | 2 |
| LINK 55 | 2 | 3 | | | | 5 |
| LINK 56 | | 3 | | | | 3 |
| LINK 57 | | 6 | | | | 6 |
| LINK 58 | 3 | | | | | 3 |
| LINK 59 | 4 | | | | | 4 |
| LINK 60 | 5 | | | | | 5 |
| LINK 61 | 10 | | | | | 10 |
| LINK 62 | 2 | | | | | 2 |
| LINK 63 | 1 | 2 | | | | 3 |
| LINK 64 | 1 | 1 | | | | 2 |
| LINK 65 | | | | | 5 | 5 |
| LINK 66 | | 1 | | | | 1 |
| LINK 67 | | | | | 6 | 6 |
| LINK 68 | | | | 4 | | 4 |
| LINK 69 | | | | | 2 | 2 |
| LINK 70 | | | | | 2 | 2 |
| LINK 71 | | | | | 4 | 4 |
| LINK 72 | | | | | 3 | 3 |
| LINK 73 | 1 | 8 | | | | 8 |
| LINK 74 | 3 | | | | | 3 |
| LINK 75 | 3 | | | | | 3 |
| LINK 76 | | 3 | | | | 3 |
| LINK 77 | | 3 | | | | 3 |
| LINK 78 | | 3 | | | | 3 |
| LINK 79 | | 7 | | | | 7 |
| LINK 80 | | 10 | | | | 10 |
| LINK 81 | | 2 | | | | 2 |
| LINK 82 | | 4 | | | | 4 |
| LINK 83 | | 3 | | | | 3 |
| LINK 84 | 3 | | | | | 3 |
| LINK 85 | 2 | | | | | 2 |
| TOTAL | 149 | 104 | 56 | 42 | 52 | 403 |
| RATIO | 37 | 26 | 14 | 10 | 13 | (%) |

KRK : Gravel/Stone/Telford/Water Bound Macadam

TNH : Earth

LL : Others

Comparison of the proportion of surface type in the Kabupaten with other regions is as follows:

| | ASP | KRK | TNH/LL |
|---|---|---|---|
| Kabupaten : Banjar | 13.9 | 23.3 | 62.8 |
| Province : Kalimantan Selatan | 10.5 | 41.1 | 48.4 |
| Jawa Is.(Excluding DKI Jakarta) | 56.2 | 25.0 | 18.8 |
| Indonesia | 26.0 | 26.6 | 47.4 |

Thus, in the Kabupaten the proportion of Kabupaten roads with asphalt surface is much lower than that of Indonesia and of Jawa Island. The proportion of low grade roads such as earth roads and others is distinctly high. This means that the road classification in the Kabupaten is low.

(3) Surface Condition of Kabupaten Roads

The surface condition of the Kabupaten roads classified as good, fair, poor and bad which are shown as BA, SD, RU and RB respectively, are summarized in Table 1-3-2.

Comparison of the proportions of the various surface conditions of the Kabupaten roads in the Kabupaten with other regions is as follows:

| | Good | Fair | Poor | Bad |
|---|---|---|---|---|
| Kabupaten : Banjar | 25.5 | 30.7 | 36.2 | 7.4 |
| Province : Kalimantan Selatan | 26.4 | 34.2 | 31.4 | 8.0 |
| Jawa Is.(Excluding DKI Jakarta) | 45.6 | 29.8 | 19.6 | 5.0 |
| Indonesia | 43.5 | 21.8 | 21.1 | 13.6 |

Table 1-3-2 (1) EXISTING ROAD CONDITION BY SURFACE TYPE

PROVINCE : KALIMANTAN SELATAN

KABUPATEN : BANJAR

(1)

| NO | | T.A | | | | TNH | | | | ASP | | | | BTB | | | | KRK | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NO | | BA | SD | RU | RB | BA | SD | RU | RB | BA | SD | RU | RB | BA | SD | RU | RB | BA | SD | RU | RB |
| 1 | LINK 1 | 50 | 30 | 20 | | | 10 | 23 | 68 | | | | | | | | | | | | |
| 2 | LINK 2 | 36 | 37 | 24 | | | | | | | | | | | | | | | | | |
| 3 | LINK 3 | 53 | 35 | 13 | | | | | | | | | | | | | | | | | |
| 4 | LINK 4 | 18 | 38 | 40 | 4 | | | | | | | | | | | | | | | | |
| 5 | LINK 5 | 28 | 33 | 38 | | | | | | | | | | | | | | | | | |
| 6 | LINK 6 | 63 | 17 | 20 | | | | | | | | | | | | | | | | | |
| 7 | LINK 7 | | 17 | 73 | 10 | | | | | | | | | | | | | | | | |
| 8 | LINK 8 | 94 | 6 | | | | | | | 90 | 10 | | | 32 | 33 | 35 | | | | | |
| 9 | LINK 9 | | 65 | 36 | 1 | | | | | | | | | | | | | | | | |
| 10 | LINK 10 | | | | | | | | | | | | | 53 | 38 | 9 | | | | | |
| 11 | LINK 11 | | | | | | | | | | | | | | 32 | 52 | 16 | | | | |
| 12 | LINK 12 | | | | | | | | | 95 | 5 | | | 95 | 5 | | | | | | |
| 13 | LINK 13 | | | | | | | | | 37 | 55 | 8 | | | | | | | | | |
| 14 | LINK 14 | | | | | | | | | 95 | 5 | | | | | | | | | | |
| 15 | LINK 15 | | | | | | | | | 95 | 5 | | | | | | | | | | |
| 16 | LINK 16 | | | | | | | | | 72 | 9 | 20 | | | | | | | | | |
| 17 | LINK 17 | | | | | | | | | 91 | 9 | | | | | | | | | | |
| 18 | LINK 18 | | | | | | | | | 95 | 5 | | | | | | | | | | |
| 19 | LINK 19 | | | | | | 5 | 60 | 35 | | | | | | | | | | | | |
| 20 | LINK 20 | | | 59 | 41 | | | | | | | | | | | | | | | | |
| 21 | LINK 21 | | | | | | 55 | 45 | | | | | | | | | | | | | |
| 22 | LINK 22 | | 25 | 52 | 23 | | | | | | | | | | | | | | | | |
| 23 | LINK 23 | | | | | | | | | | 20 | 80 | | 36 | 21 | 43 | | | | | |
| 24 | LINK 24 | | | | | | | | | | | | | 76 | | 24 | | | | | |
| 25 | LINK 25 | 85 | 15 | 3 | | 20 | 20 | 10 | | | | | | 60 | 25 | 15 | | | | | |
| 26 | LINK 26 | 57 | 30 | 13 | | | | | | | | | | | | | | | | | |
| 27 | LINK 27 | 80 | 16 | 4 | | 65 | 25 | 10 | | | | | | | | | | | | | |
| 28 | LINK 28 | 80 | | 20 | | | | | | | | | | | | | | | | | |
| 29 | LINK 29 | | 18 | 70 | 13 | | 30 | 65 | 5 | | | | | | | | | | | | |
| 30 | LINK 30 | | 30 | 45 | 25 | | 23 | 50 | 27 | | | | | | | | | | | | |
| 31 | LINK 31 | | | | | | | | | 84 | 11 | 5 | | | | | | | | | |
| 32 | LINK 32 | | | | | | | | | 84 | 11 | 5 | | | | | | | | | |
| 33 | LINK 33 | | | | | | | | | 73 | 17 | 8 | 2 | | | | | | | | |
| 34 | LINK 34 | | | | | | | | | | 30 | 40 | 30 | | | | | | | | |
| 35 | LINK 35 | | 83 | 13 | 3 | | | | | | | | | | | | | | | | |
| 36 | LINK 36 | | 89 | 11 | | | 90 | 10 | | | | | | | | | | | | | |
| 37 | LINK 37 | 6 | 50 | 44 | | | 33 | 50 | 18 | | | | | | | | | | | | |
| 38 | LINK 38 | | | | | | 90 | 10 | | | | | | | | | | | 40 | 52 | 8 |
| 39 | LINK 39 | | | | | | | 10 | 90 | | | | | | | | | | | | |
| 40 | LINK 40 | | | | | | | | | | | | | | | | | | 71 | 26 | 2 |
| 41 | LINK 41 | | | | | | | | | | | | | | | | | | 75 | 20 | 5 |
| 42 | LINK 42 | | | | | | | | | | | | | | | | | | 47 | 40 | 13 |
| 43 | LINK 43 | | | | | | | | | | | | | | | | | | 17 | 67 | 17 |
| 44 | LINK 44 | | | | | | | 80 | 20 | | | | | | | | | | | | |
| 45 | LINK 45 | | 10 | 70 | 20 | | | | | | | | | | | | | | 20 | 63 | 18 |
| 46 | LINK 46 | 8 | 22 | 70 | | | | | | | | | | 30 | 40 | 30 | | | | | |
| 47 | LINK 47 | | | | | | 95 | 5 | | | | | | | | | | | 80 | 10 | 10 |
| 48 | LINK 48 | | | | | | 40 | 52 | 8 | | | | | | | | | | 50 | 40 | 10 |
| 49 | LINK 49 | | | | | | 10 | 40 | 50 | | | | | | | | | | | | |
| 50 | LINK 50 | | | | | | | | | | | | | | | | | 10 | 93 | 5 | 3 |
| 51 | LINK 51 | | | | | | 29 | 59 | 12 | | | | | | | | | | | | |

Table 1-3-2 (2) EXISTING ROAD CONDITION BY SURFACE TYPE

PROVINCE : KALIMANTAN SELATAN

KABUPATEN : BANJAR

| NO | | L.L | | | | TANI | | | | ASP | | | | BTB | | | | KRK | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NO | | BA | SB | RU | RB | BA | SB | RU | RB | BA | SB | RU | RB | BA | SB | RU | RB | BA | SB | RU | RB |
| LINK | 52 | | | | | | | 85 | 15 | | | | | | | | | | | | |
| LINK | 53 | | | | | | 25 | 65 | 10 | | | | | | | | | | | | |
| LINK | 54 | | | | | 70 | | 30 | | | | | | | | | | | | | |
| LINK | 55 | 70 | 10 | 20 | | | 12 | 75 | 13 | | | | | | | | | | | | |
| LINK | 56 | | | | | 50 | 20 | 30 | | | | | | | | | | | | | |
| LINK | 57 | | | | | 23 | 35 | 42 | | | | | | | | | | | | | |
| LINK | 58 | | 60 | 40 | | | | | | | | | | | | | | | | | |
| LINK | 59 | | 28 | 65 | 8 | | | | | | | | | | | | | | | | |
| LINK | 60 | | 20 | 46 | 36 | | | | | | | | | | | | | | | | |
| LINK | 61 | 6 | 38 | 56 | | | | | | | | | | | | | | | | | |
| LINK | 62 | | | 20 | 80 | | | | | | | | | | | | | | | | |
| LINK | 63 | | | 60 | 40 | 33 | 35 | 18 | 15 | | | | | | | | | | | | |
| LINK | 64 | | 40 | 60 | | | 30 | 70 | | | | | | | | | | | | | |
| LINK | 65 | | | | | | | | | | | | | | | | | | 58 | 42 | |
| LINK | 66 | | | | | | 30 | 70 | | | | | | | | | | | | | |
| LINK | 67 | | | | | | | | | | | | | | | | | 3 | 68 | 10 | |
| LINK | 68 | | | | | | | | | | | | | | 14 | 86 | | | | | |
| LINK | 69 | | | | | | | | | | | | | | | | | 10 | 90 | | |
| LINK | 70 | | | | | | | | | | | | | | | | | 52 | 48 | | |
| LINK | 71 | | | | | | | | | | | | | | | | | 20 | 80 | | |
| LINK | 72 | | | | | | | | | | | | | | | | | 70 | 30 | | |
| LINK | 73 | | | | | | 25 | 75 | | | | | | | | | | | | | |
| LINK | 74 | | 50 | 50 | | | | | | | | | | | | | | | | | |
| LINK | 75 | 3 | 82 | 15 | | | | | | | | | | | | | | | | | |
| LINK | 76 | | | | | | 33 | 67 | | | | | | | | | | | | | |
| LINK | 77 | | | | | 8 | 58 | 33 | | | | | | | | | | | | | |
| LINK | 78 | | | | | | 47 | 53 | | | | | | | | | | | | | |
| LINK | 79 | | | | | 87 | 12 | 1 | | | | | | | | | | | | | |
| LINK | 80 | | | | | 4 | 50 | 37 | 09 | | | | | | | | | | | | |
| LINK | 81 | | | | | | 95 | 5 | | | | | | | | | | | | | |
| LINK | 82 | | | | | | 56 | 44 | | | | | | | | | | | | | |
| LINK | 83 | | | | | | 50 | 50 | | | | | | | | | | | | | |
| LINK | 84 | | 38 | 62 | | | | | | | | | | | | | | | | | |
| LINK | 85 | | 50 | 50 | | | | | | | | | | | | | | | | | |
| AVERAGE | | 22 | 32 | 38 | 9 | 12 | 31 | 42 | 12 | 70 | 15 | 13 | 2 | 42 | 23 | 33 | 2 | 1 | 46 | 47 | 6 |
| LENGTH | | | 149 Ke | | | | 104 Ke | | | | 56 Ke | | | | 42 Ke | | | | 92 Ke | | |
| Total | | 33 | 48 | 57 | 13 | 12 | 35 | 44 | 12 | 39 | 8 | 7 | 1 | 18 | 10 | 14 | 1 | 1 | 25 | 25 | 3 |

The surface condition level of the Kabupaten roads in the Kabupaten is lower than that of Indonesia and of Jawa Island. The proportion in good condition is relatively low.
Therefore improvement of Kabupaten roads in poor or bad condition is desirable.

(4) Terrain Conditions of Kabupaten Roads

The difficulty of road improvement is mainly dependent upon the terrain conditions.

The terrain conditions of the Kabupaten roads, classified as flat, hilly, mountainous and swampy which are shown as DT, BK, GN and RW, are summarized in Table 1-3-3.

The proportions of terrain conditions in the Kabupaten are 56.0% flat, 13.0% hilly, 9% mountainous and 22.0% swampy. Road construction is anticipated to be difficult because of the large proportion of swamp.

1.3.3 Bridge Inventory

A bridge inventory showing the existing condition of bridges on the Kabupaten roads in Kabupaten Banjar was prepared by the Kabupaten.

The bridges types are classfied as timber, concrete, steel and others which are shown in the inventory as KY, BT, BJ and LL respectively.

The inventory shown in Table 1-3-5 indicates a total of 335 bridges with a total length of 2499 m of which 316 or 94.3% are timber, 2 or 0.6% are concrete and 15 or 4.5% are others. Steel bridges account for only 2 or 0.6% of the total. On the other hand, 23 bridges with a total length of 293 m are required to be newly constructed.

Table 1-3-3 EXISTING ROAD LENGTH BY TERRAIN CONDITION

PROV : KALIMANTAN SELATAN KAB : BANJAR

(Km)

| 102 ( 3) | DT | RN | BK | GN | TOTAL |
|---|---|---|---|---|---|
| LINK 1 | 1 | 4 | | | 5 |
| LINK 2 | 8 | | | | 8 |
| LINK 3 | 10 | | | | 10 |
| LINK 4 | 1 | 11 | | | 11 |
| LINK 5 | | 3 | | | 3 |
| LINK 6 | | 7 | | | 7 |
| LINK 7 | 2 | 6 | | | 8 |
| LINK 8 | 11 | | | | 11 |
| LINK 9 | 3 | | 2 | | 5 |
| LINK 10 | 7 | | | | 7 |
| LINK 11 | 5 | | 3 | | 8 |
| LINK 12 | 1 | 2 | | 1 | 3 |
| LINK 13 | 3 | | | | 3 |
| LINK 14 | 2 | | | | 2 |
| LINK 15 | 6 | | | | 6 |
| LINK 16 | 4 | | | | 4 |
| LINK 17 | 7 | | | | 7 |
| LINK 18 | 2 | | 3 | | 5 |
| LINK 19 | 3 | | | | 3 |
| LINK 20 | 5 | | | | 5 |
| LINK 21 | | | 2 | | 2 |
| LINK 22 | 4 | | | | 4 |
| LINK 23 | 2 | | 2 | 5 | 9 |
| LINK 24 | 6 | | | | 6 |
| LINK 25 | 4 | | | | 4 |
| LINK 26 | 3 | | | | 3 |
| LINK 27 | 6 | | | | 6 |
| LINK 28 | 4 | | | | 4 |
| LINK 29 | 5 | | | | 5 |
| LINK 30 | 2 | | 3 | | 5 |
| LINK 31 | 5 | | 1 | | 6 |
| LINK 32 | 5 | | | | 5 |
| LINK 33 | 4 | | | 1 | 5 |
| LINK 34 | 2 | | | 7 | 9 |
| LINK 35 | | | 6 | | 6 |
| LINK 36 | 2 | | 10 | | 12 |
| LINK 37 | 2 | | 4 | | 6 |
| LINK 38 | 4 | | 7 | | 11 |
| LINK 39 | | 1 | | | 1 |
| LINK 40 | 7 | | | | 7 |
| LINK 41 | 1 | | | | 1 |
| LINK 42 | 2 | | 1 | | 3 |
| LINK 43 | 3 | | | | 3 |
| LINK 44 | | 4 | | | 4 |
| LINK 45 | 1 | | 2 | | 3 |
| LINK 46 | | | 4 | | 4 |
| LINK 47 | 2 | | | | 2 |
| LINK 48 | 4 | 2 | | | 6 |
| LINK 49 | | 1 | | | 1 |
| LINK 50 | 2 | | | | 2 |
| LINK 51 | 2 | 5 | | | 7 |
| LINK 52 | | 2 | | | 2 |
| LINK 53 | | 2 | | | 2 |
| LINK 54 | | 2 | | | 2 |
| LINK 55 | 5 | | | | 5 |
| LINK 56 | 3 | | | | 3 |
| LINK 57 | 6 | | | | 6 |
| LINK 58 | 2 | | 1 | | 3 |
| LINK 59 | 4 | | | | 4 |
| LINK 60 | | 5 | | | 5 |
| LINK 61 | 1 | 9 | | | 10 |
| LINK 62 | | 2 | | | 2 |
| LINK 63 | 3 | | | | 3 |
| LINK 64 | | 2 | | | 2 |
| LINK 65 | | 5 | | | 5 |
| LINK 66 | | 1 | | | 1 |
| LINK 67 | | 6 | | | 6 |
| LINK 68 | | 4 | | | 4 |
| LINK 69 | | 2 | | | 2 |
| LINK 70 | 2 | | | | 2 |
| LINK 71 | 4 | | | | 4 |
| LINK 72 | 2 | | 1 | | 3 |
| LINK 73 | | | | 8 | 8 |
| LINK 74 | 1 | | | 2 | 3 |
| LINK 75 | 3 | | | | 3 |
| LINK 76 | 1 | | | 2 | 3 |
| LINK 77 | 2 | | | 1 | 3 |
| LINK 78 | 1 | | | 2 | 3 |
| LINK 79 | 3 | | | 4 | 7 |
| LINK 80 | 7 | | 1 | 2 | 10 |
| LINK 81 | 2 | | | | 2 |
| LINK 82 | 3 | | | 1 | 4 |
| LINK 83 | 3 | | | | 3 |
| LINK 84 | 2 | | | 1 | 3 |
| LINK 85 | 2 | | | | 2 |
| TOTAL | 226 | 88 | 53 | 36 | 403 |
| RATIO | 56 | 22 | 13 | 9 | (%) |

Table 1-3-4 NUMBER AND LENGTH OF BRIDGES

PROV : KALIMANTAN SELATAN KAB : BANJAR

| LINK NO | EXISTING NO. | EXISTING LENGTH | NOT EXIST NO. | NOT EXIST LENGTH | TOTAL NO. | TOTAL LENGTH | UNIT: m |
|---|---|---|---|---|---|---|---|
| 1 | 10 | 85.00 | 1 | 4.00 | 11 | 89.00 | |
| 2 | 4 | 21.00 | | | 4 | 21.00 | |
| 3 | 10 | 52.00 | | | 10 | 52.00 | |
| 4 | 18 | 150.50 | | | 18 | 150.50 | |
| 5 | 6 | 20.00 | | | 6 | 20.00 | |
| 6 | 7 | 28.00 | | | 7 | 28.00 | |
| 7 | 7 | 60.00 | | | 7 | 60.00 | |
| 8 | 4 | 18.00 | | | 4 | 18.00 | |
| 10 | 1 | 8.00 | | | 1 | 8.00 | |
| 11 | 3 | 14.00 | | | 3 | 14.00 | |
| 12 | 3 | 14.00 | | | 3 | 14.00 | |
| 15 | 1 | 6.00 | | | 1 | 6.00 | |
| 16 | 1 | 4.00 | | | 1 | 4.00 | |
| 17 | 5 | 32.00 | | | 5 | 32.00 | |
| 18 | 2 | 7.50 | | | 2 | 7.50 | |
| 19 | 4 | 17.00 | | | 4 | 17.00 | |
| 20 | 1 | 12.00 | | | 1 | 12.00 | |
| 21 | 1 | 7.00 | | | 1 | 7.00 | |
| 22 | 4 | 37.00 | | | 4 | 37.00 | |
| 23 | 4 | 28.00 | | | 4 | 28.00 | |
| 24 | 8 | 86.00 | | | 8 | 86.00 | |
| 25 | 3 | 46.00 | | | 3 | 46.00 | |
| 26 | 6 | 33.00 | | | 6 | 33.00 | |
| 27 | 5 | 50.00 | | | 5 | 50.00 | |
| 28 | 2 | 8.00 | | | 2 | 8.00 | |
| 29 | 3 | 29.00 | | | 3 | 29.00 | |
| 31 | 5 | 46.00 | | | 5 | 46.00 | |
| 32 | 3 | 33.00 | | | 3 | 33.00 | |
| 33 | 4 | 31.00 | | | 4 | 31.00 | |
| 34 | 7 | 54.00 | | | 7 | 54.00 | |
| 35 | 8 | 67.50 | 1 | 8.00 | 9 | 75.50 | |
| 36 | 13 | 71.00 | | | 13 | 71.00 | |
| 37 | 5 | 20.00 | | | 5 | 20.00 | |
| 39 | 1 | 6.00 | | | 1 | 6.00 | |
| 40 | 7 | 33.00 | | | 7 | 33.00 | |
| 41 | 1 | 6.00 | | | 1 | 6.00 | |
| 42 | 3 | 31.00 | | | 3 | 31.00 | |
| 43 | 2 | 6.70 | 1 | 2.00 | 3 | 8.70 | |
| 44 | 27 | 236.00 | | | 27 | 236.00 | |
| 46 | 1 | 7.00 | | | 1 | 7.00 | |
| 47 | 2 | 20.30 | | | 2 | 20.30 | |
| 48 | 9 | 37.80 | | | 9 | 37.80 | |
| 49 | 2 | 10.00 | | | 2 | 10.00 | |
| 50 | 2 | 22.00 | | | 2 | 22.00 | |
| 51 | 13 | 146.00 | | | 13 | 146.00 | |
| 52 | 10 | 62.00 | | | 10 | 62.00 | |
| 53 | 17 | 148.00 | | | 17 | 148.00 | |
| 55 | 8 | 36.00 | | | 8 | 36.00 | |
| 56 | 4 | 15.00 | | | 4 | 15.00 | |
| 57 | 5 | 34.00 | | | 5 | 34.00 | |
| 58 | 3 | 22.00 | | | 3 | 22.00 | |
| 59 | 3 | 21.00 | | | 3 | 21.00 | |
| 60 | 2 | 13.00 | | | 2 | 13.00 | |
| 61 | 7 | 90.00 | | | 7 | 90.00 | |
| 62 | | | 5 | 125.00 | 5 | 125.00 | |
| 63 | 2 | 8.00 | | | 2 | 8.00 | |
| 64 | 2 | 8.00 | | | 2 | 8.00 | |
| 65 | 3 | 31.00 | | | 3 | 31.00 | |
| 66 | 1 | 6.00 | | | 1 | 6.00 | |
| 67 | | | 9 | 103.00 | 9 | 103.00 | |
| 69 | 1 | 7.00 | | | 1 | 7.00 | |
| 70 | | | 1 | 5.00 | 1 | 5.00 | |
| 72 | 2 | 18.00 | | | 2 | 18.00 | |
| 73 | 6 | 46.00 | | | 6 | 46.00 | |
| 75 | 2 | 14.00 | | | 2 | 14.00 | |
| 79 | 9 | 44.00 | | | 9 | 44.00 | |
| 80 | 3 | 25.00 | 5 | 46.00 | 8 | 71.00 | |
| 81 | 2 | 12.00 | | | 2 | 12.00 | |
| 83 | 3 | 43.00 | | | 3 | 43.00 | |
| 84 | 1 | 3.00 | | | 1 | 3.00 | |
| 85 | 1 | 20.00 | | | 1 | 20.00 | |
| TOTAL | 335 | 2499.30 | 23 | 293.00 | 358 | 2792.30 | |

Table 1-3-5 NUMBER OF EXISTING BRIDGES BY BRIDGE TYPE

PROV : KALIMANTAN SELATAN KAB : BANJAR

| 103 (18) | KY | BT | LL | BJ | TOTAL (No) |
|---|---|---|---|---|---|
| LINK 1 | 9 | 1 | | | 10 |
| LINK 2 | 4 | | | | 4 |
| LINK 3 | 10 | | | | 10 |
| LINK 4 | 17 | | 1 | | 18 |
| LINK 5 | 6 | | | | 6 |
| LINK 6 | 7 | | | | 7 |
| LINK 7 | 6 | | 1 | | 7 |
| LINK 8 | 4 | | | | 4 |
| LINK 10 | 1 | | 1 | | 1 |
| LINK 11 | 2 | | | 1 | 3 |
| LINK 12 | 2 | | 1 | | 3 |
| LINK 15 | 1 | | 1 | | 1 |
| LINK 16 | 1 | | 1 | | 1 |
| LINK 17 | 4 | | 1 | | 5 |
| LINK 18 | 2 | | 1 | | 2 |
| LINK 19 | 2 | | 2 | | 4 |
| LINK 20 | 1 | | 1 | | 1 |
| LINK 21 | 1 | | | | 1 |
| LINK 22 | 3 | | 1 | | 4 |
| LINK 23 | 4 | | 1 | | 4 |
| LINK 24 | 8 | | 1 | | 8 |
| LINK 25 | 3 | | 1 | | 3 |
| LINK 26 | 6 | | 1 | | 6 |
| LINK 27 | 5 | | 1 | | 5 |
| LINK 28 | 2 | | 1 | | 2 |
| LINK 29 | 2 | | 1 | | 3 |
| LINK 31 | 3 | | 1 | 1 | 5 |
| LINK 32 | 3 | | 1 | | 3 |
| LINK 33 | 4 | | 1 | | 4 |
| LINK 34 | 7 | | 1 | | 7 |
| LINK 35 | 7 | | 1 | | 8 |
| LINK 36 | 13 | | 1 | | 13 |
| LINK 37 | 5 | | 1 | | 5 |
| LINK 39 | 1 | | 1 | | 1 |
| LINK 40 | 7 | | 1 | | 7 |

| 103 (18) | KY | BT | LL | BJ | TOTAL (No) |
|---|---|---|---|---|---|
| LINK 41 | 1 | | 1 | | 1 |
| LINK 42 | 3 | | 1 | | 3 |
| LINK 43 | 2 | | 1 | | 2 |
| LINK 44 | 27 | | 1 | | 27 |
| LINK 46 | 1 | | 1 | | 1 |
| LINK 47 | 2 | | 1 | | 2 |
| LINK 48 | 9 | | 1 | | 9 |
| LINK 49 | 2 | | 1 | | 2 |
| LINK 50 | 2 | | 1 | | 2 |
| LINK 51 | 13 | | 1 | | 13 |
| LINK 52 | 10 | | 1 | | 10 |
| LINK 53 | 16 | | 1 | | 17 |
| LINK 55 | 8 | | 1 | | 8 |
| LINK 56 | 4 | | 1 | | 4 |
| LINK 57 | 5 | | 1 | | 5 |
| LINK 58 | 3 | | 1 | | 3 |
| LINK 59 | 3 | | 1 | | 3 |
| LINK 60 | 2 | | 1 | | 2 |
| LINK 61 | 5 | | 1 | | 7 |
| LINK 62 | | | 1 | | |
| LINK 63 | 2 | | 1 | | 2 |
| LINK 64 | 2 | | 1 | | 2 |
| LINK 65 | 3 | | 1 | | 3 |
| LINK 66 | 1 | | 1 | | 1 |
| LINK 67 | | | 1 | | |
| LINK 69 | 1 | | 1 | | 1 |
| LINK 70 | | | 1 | | |
| LINK 72 | 2 | | 1 | | 2 |
| LINK 73 | 6 | | 1 | | 6 |
| LINK 75 | 2 | | 1 | | 2 |
| LINK 79 | 9 | | 1 | | 9 |
| LINK 80 | 3 | | 1 | | 3 |
| LINK 81 | 2 | | 1 | | 2 |
| LINK 83 | 2 | 1 | 1 | | 3 |
| LINK 84 | 1 | | 1 | | 1 |
| LINK 85 | 1 | | 1 | | 1 |
| TOTAL | 316 | 2 | 15 | 2 | 335 |
| RATIO | 94 | 1 | 4 | 1 | (%) |

The number of existing bridges by span length is as follows:

| Bridges Type | Span Length (m) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 〈3 | 〈5 | 〈8 | 〈10 | 〈12 | 〈14 | 〈16 | 〈18 | 〈20 | 〈99 | Total |
| Timber | 128 | 159 | 28 | 1 | - | - | - | - | - | - | 316 |
| Concrete | 1 | 1 | - | - | - | - | - | - | - | - | 2 |
| Steel | - | 1 | - | - | - | 1 | - | - | - | - | 2 |
| Others | 6 | 6 | 2 | - | 1 | - | - | - | - | - | 15 |
| Total | 135 | 167 | 30 | 1 | 1 | 1 | - | - | - | - | 335 |

Thus, most of the existing bridges on the Kabupaten roads are timber and the majority of spanlengths is within the range of 3 m to 5 m.

### 1.3.4 Traffic

Inventories of the average daily traffic (ADT) on the Kabupaten roads in Kabupaten Banjar were prepared by the Kabupaten and are shown in Chapter 2.

From the inventories, total value of average daily trips by vehicle type and their proportions in the Kabupaten in 1984 are summarized as follows:

| | SEDAN | BUS | TRUCK | MOTOR-CYCLE | TOTAL |
|---|---|---|---|---|---|
| Total Trips | 328 | 1,794 | 679 | 9,121 | 7,380 |
| Proportion (%) | 2.75 | 15.05 | 5.70 | 76.50 | 100.00 |

Source : Bina Marga Inventory

The proportions of registered vehicles by vehicle type are as follows:

| | SEDAN | BUS | TRUCK | MOTOR-CYCLE | TOTAL |
|---|---|---|---|---|---|
| Proportion (%) | 78.51 | 0.00 | 21.49 | - | 100.00 |

Source : Kabupaten.

Thus, the proportion of motorcyles in the Kabupaten is by far the highest.

From the above tables the following can be observed:

- Number of total trips might be underestimated
- Proportions are probably reasonable.

Essentially, for estimation of future traffic volumes past and present traffic data together with the trend in the number of registered vehicles are important basic data. However the data obtained for the study was traffic count data for each road link in 1985 and of low reliability.

Therefore the future traffic volumes are estimated by the calculation process recommended in chapter 3 of the Main Report.

## Chapter 2 ESTIMATIONS OF FUTURE TRAFFIC VOLUME AND BENEFIT

### 2.1 Future Traffic Volume

#### 2.1.1 Traffic Growth Rate

The traffic growth rate used for estimation of the future traffic volume on the Kabupaten roads was estimated by the following calculation process.

Growth of Production Basis "A":

$$\sqrt{\text{Annual Population Growth of the Kabupaten} \times \text{Growth of the Total Cultivated Area}}$$

Growth of Productivity "B" :

$$\sqrt{\text{Growth of the Total Paddy Field Area} \times \text{Growth of the Paddy Production per ha}}$$

Traffic Growth Rate: Initial estimated figure:

$$\overline{GR'} = \sqrt{A \times B}$$

Traffic Growth Rate GR =Final adjusted figure:

$$\sqrt{GR' \times \text{Trend of GDP/Capita of the Province Concerned}}$$

Results of the estimation are shown in Table 2-1-1.

Table 2-1-1 TRAFFIC GROWTH RATE ESTIMATION

PROV : KALIMANTAN SELATAN KAB : BANJAR

| | | | |
|---|---|---|---|
| A) | Growth Rate of Population | : | 2.20 (%) |
| B) | Growth Rate of Cultivated Area | : | 13.50 (%) |
| C) | Growth Rate of Rice field | : | 13.00 (%) |
| D) | Growth Rate of Rice yield rate | : | 1.20 (%) |
| E) | Growth Rate of GDP / capita | : | 6.60 (%) |
| a) | Geometrical Mean ( A x B ) | : | 7.70 (%) |
| b) | Geometrical Mean ( C x D ) | : | 6.94 (%) |
| c) | Geometrical Mean ( a x b ) | : | 7.32 (%) |
| d) | Geometrical Mean ( c x E ) | : | 6.96 (%) |
| | TRAFFIC GROWTH RATE | : | 6.96 (%) |

### 2.1.2 Present and Future Traffic Volume

The future traffic volumes on the Kabupaten roads in 1998 for the Project life time of ten years were estimated by the following formula :

$$Tn = Te\ (1 + r)^n$$

Where :

Tn : Future traffic volume n years later
Te : Traffic volume in 1984
r : Traffic growth rate

The results are shown in Table 2-1-2 together with the traffic volume in 1984.

Table 2-1-2 (1) EXISTING AND FUTURE TRAFFIC VOLUME

PROV : KALIMANTAN SELATAN KAB : BANJAR

( SPD : 1/2 )

| | INVENTORY (1984) | | | | | RATE | AFTER 14 YEARS (1998) | | | | | CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LINK NO | MBL | BUS | TRUK | SPD | TOTAL | | MBL | BUS | TRUK | SPD | TOTAL | |
| 1 | 2 | 13 | 4 | 375 | 207 | 7.0% | 5 | 33 | 10 | 962 | 531 | IIIA |
| 2 | 4 | 5 | 14 | 125 | 86 | 7.0% | 10 | 13 | 36 | 321 | 221 | IIIB-1 |
| 3 | 8 | 19 | 40 | 500 | 317 | 7.0% | 21 | 49 | 103 | 1283 | 813 | IIIA |
| 4 | 0 | 0 | 0 | 250 | 125 | 7.0% | 0 | 0 | 0 | 641 | 321 | IIIB-1 |
| 5 | 10 | 15 | 0 | 375 | 213 | 7.0% | 26 | 38 | 0 | 962 | 546 | IIIA |
| 6 | 2 | 9 | 0 | 250 | 136 | 7.0% | 5 | 23 | 0 | 641 | 349 | IIIB-1 |
| 7 | 1 | 5 | 0 | 125 | 69 | 7.0% | 3 | 13 | 0 | 321 | 177 | IIIB-2 |
| 8 | 4 | 9 | 30 | 250 | 168 | 7.0% | 10 | 23 | 77 | 641 | 431 | IIIB-1 |
| 9 | 5 | 10 | 10 | 250 | 150 | 7.0% | 13 | 26 | 26 | 641 | 385 | IIIB-1 |
| 10 | 8 | 6 | 20 | 175 | 122 | 7.0% | 21 | 15 | 51 | 449 | 313 | IIIB-1 |
| 11 | 0 | 0 | 4 | 25 | 17 | 7.0% | 0 | 0 | 10 | 64 | 44 | IIIC |
| 12 | 8 | 9 | 7 | 75 | 62 | 7.0% | 21 | 23 | 18 | 192 | 159 | IIIB-2 |
| 13 | 15 | 15 | 7 | 125 | 100 | 7.0% | 38 | 38 | 18 | 321 | 257 | IIIB-1 |
| 14 | 5 | 15 | 9 | 125 | 92 | 7.0% | 13 | 38 | 23 | 321 | 236 | IIIB-1 |
| 15 | 3 | 18 | 15 | 150 | 111 | 7.0% | 8 | 46 | 38 | 385 | 285 | IIIB-1 |
| 16 | 15 | 12 | 15 | 100 | 92 | 7.0% | 38 | 31 | 38 | 257 | 236 | IIIB-1 |
| 17 | 8 | 34 | 30 | 60 | 102 | 7.0% | 21 | 87 | 77 | 154 | 262 | IIIB-1 |
| 18 | 9 | 35 | 20 | 60 | 94 | 7.0% | 23 | 90 | 51 | 154 | 241 | IIIB-1 |
| 19 | 0 | 0 | 0 | 6 | 3 | 7.0% | 0 | 0 | 0 | 15 | 8 | IIIC |
| 20 | 5 | 26 | 10 | 45 | 64 | 7.0% | 13 | 67 | 26 | 115 | 164 | IIIB-2 |
| 21 | 5 | 43 | 8 | 75 | 94 | 7.0% | 13 | 110 | 21 | 192 | 241 | IIIB-1 |
| 22 | 1 | 9 | 12 | 15 | 30 | 7.0% | 3 | 23 | 31 | 38 | 77 | IIIB-2 |
| 23 | 1 | 9 | 6 | 15 | 24 | 7.0% | 3 | 23 | 15 | 38 | 62 | IIIB-2 |
| 24 | 30 | 171 | 8 | 300 | 359 | 7.0% | 77 | 439 | 21 | 770 | 921 | IIIA |
| 25 | 7 | 27 | 12 | 48 | 70 | 7.0% | 18 | 69 | 31 | 123 | 180 | IIIB-2 |
| 26 | 6 | 43 | 16 | 75 | 103 | 7.0% | 15 | 110 | 41 | 192 | 264 | IIIB-1 |
| 27 | 3 | 17 | 4 | 30 | 39 | 7.0% | 8 | 44 | 10 | 77 | 100 | IIIB-2 |
| 28 | 5 | 35 | 20 | 75 | 98 | 7.0% | 13 | 90 | 51 | 192 | 251 | IIIB-1 |
| 29 | 1 | 10 | 4 | 24 | 27 | 7.0% | 3 | 26 | 10 | 62 | 69 | IIIB-2 |
| 30 | 0 | 0 | 0 | 24 | 12 | 7.0% | 0 | 0 | 0 | 62 | 31 | IIIC |
| 31 | 22 | 150 | 60 | 330 | 397 | 7.0% | 56 | 385 | 154 | 846 | 1018 | IIIA |
| 32 | 20 | 150 | 40 | 330 | 375 | 7.0% | 51 | 385 | 103 | 846 | 962 | IIIA |
| 33 | 15 | 140 | 40 | 300 | 345 | 7.0% | 38 | 359 | 103 | 770 | 885 | IIIA |
| 34 | 3 | 30 | 12 | 60 | 75 | 7.0% | 8 | 77 | 31 | 154 | 192 | IIIB-2 |
| 35 | 7 | 90 | 16 | 225 | 226 | 7.0% | 18 | 231 | 41 | 577 | 580 | IIIA |
| 36 | 7 | 85 | 20 | 210 | 217 | 7.0% | 18 | 218 | 51 | 539 | 557 | IIIA |
| 37 | 2 | 10 | 4 | 18 | 25 | 7.0% | 5 | 26 | 10 | 46 | 64 | IIIB-2 |
| 38 | 2 | 12 | 0 | 30 | 29 | 7.0% | 5 | 31 | 0 | 77 | 74 | IIIB-2 |
| 39 | 1 | 3 | 0 | 25 | 17 | 7.0% | 3 | 8 | 0 | 64 | 44 | IIIC |
| 40 | 0 | 0 | 4 | 30 | 19 | 7.0% | 0 | 0 | 10 | 77 | 49 | IIIC |
| 41 | 1 | 12 | 2 | 30 | 30 | 7.0% | 3 | 31 | 5 | 77 | 77 | IIIB-2 |
| 42 | 0 | 0 | 0 | 21 | 11 | 7.0% | 0 | 0 | 0 | 54 | 28 | IIIC |
| 43 | 0 | 0 | 0 | 75 | 38 | 7.0% | 0 | 0 | 0 | 192 | 97 | IIIB-2 |
| 44 | 0 | 0 | 0 | 35 | 18 | 7.0% | 0 | 0 | 0 | 90 | 46 | IIIC |
| 45 | 0 | 0 | 12 | 30 | 27 | 7.0% | 0 | 0 | 31 | 77 | 69 | IIIB-2 |
| 46 | 2 | 68 | 14 | 120 | 144 | 7.0% | 5 | 174 | 36 | 308 | 369 | IIIB-1 |
| 47 | 0 | 0 | 0 | 35 | 18 | 7.0% | 0 | 0 | 0 | 90 | 46 | IIIC |
| 48 | 0 | 0 | 0 | 50 | 25 | 7.0% | 0 | 0 | 0 | 128 | 64 | IIIB-2 |
| 49 | 0 | 0 | 0 | 25 | 13 | 7.0% | 0 | 0 | 0 | 64 | 33 | IIIC |
| 50 | 1 | 2 | 0 | 50 | 28 | 7.0% | 3 | 5 | 0 | 128 | 72 | IIIB-2 |

Table 2-1-2 (2) EXISTING AND FUTURE TRAFFIC VOLUME

PROV : KALIMANTAN SELATAN KAB : BANJAR

( SPD : 1/2 )

| | INVENTORY (1984) | | | | | RATE | AFTER 14 YEARS (1998) | | | | | CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LINK NO | MBL | BUS | TRUK | SPD | TOTAL | | MBL | BUS | TRUK | SPD | TOTAL | |
| 51 | 0 | 0 | 0 | 35 | 18 | 7.0% | 0 | 0 | 0 | 90 | 46 | IIIC |
| 52 | 0 | 0 | 0 | 25 | 13 | 7.0% | 0 | 0 | 0 | 64 | 33 | IIIC |
| 53 | 0 | 0 | 0 | 20 | 10 | 7.0% | 0 | 0 | 0 | 51 | 26 | IIIC |
| 54 | 0 | 0 | 0 | 75 | 38 | 7.0% | 0 | 0 | 0 | 192 | 97 | IIIB-2 |
| 55 | 2 | 6 | 0 | 170 | 93 | 7.0% | 5 | 15 | 0 | 436 | 239 | IIIB-1 |
| 56 | 1 | 4 | 2 | 125 | 70 | 7.0% | 3 | 10 | 5 | 321 | 180 | IIIB-2 |
| 57 | 0 | 0 | 0 | 200 | 100 | 7.0% | 0 | 0 | 0 | 513 | 257 | IIIB-1 |
| 58 | 2 | 3 | 0 | 125 | 68 | 7.0% | 5 | 8 | 0 | 321 | 174 | IIIB-2 |
| 59 | 5 | 3 | 4 | 75 | 50 | 7.0% | 13 | 8 | 10 | 192 | 128 | IIIB-2 |
| 60 | 3 | 3 | 2 | 75 | 46 | 7.0% | 8 | 8 | 5 | 192 | 118 | IIIB-2 |
| 61 | 0 | 0 | 0 | 75 | 38 | 7.0% | 0 | 0 | 0 | 192 | 97 | IIIB-2 |
| 62 | 0 | 0 | 0 | 0 | 0 | 7.0% | 0 | 0 | 0 | 0 | 0 | IIIC |
| 63 | 0 | 0 | 0 | 50 | 25 | 7.0% | 0 | 0 | 0 | 128 | 64 | IIIB-2 |
| 64 | 0 | 0 | 0 | 100 | 50 | 7.0% | 0 | 0 | 0 | 257 | 128 | IIIB-2 |
| 65 | 0 | 0 | 0 | 100 | 50 | 7.0% | 0 | 0 | 0 | 257 | 128 | IIIB-2 |
| 66 | 0 | 0 | 0 | 125 | 63 | 7.0% | 0 | 0 | 0 | 321 | 162 | IIIB-2 |
| 67 | 0 | 0 | 0 | 75 | 38 | 7.0% | 0 | 0 | 0 | 192 | 97 | IIIB-2 |
| 68 | 0 | 0 | 0 | 150 | 75 | 7.0% | 0 | 0 | 0 | 385 | 192 | IIIB-2 |
| 69 | 0 | 0 | 0 | 150 | 75 | 7.0% | 0 | 0 | 0 | 385 | 192 | IIIB-2 |
| 70 | 10 | 36 | 4 | 300 | 200 | 7.0% | 26 | 92 | 10 | 770 | 513 | IIIA |
| 71 | 2 | 43 | 0 | 75 | 83 | 7.0% | 5 | 110 | 0 | 192 | 213 | IIIB-1 |
| 72 | 0 | 0 | 0 | 60 | 30 | 7.0% | 0 | 0 | 0 | 154 | 77 | IIIB-2 |
| 73 | 1 | 0 | 0 | 60 | 31 | 7.0% | 3 | 0 | 0 | 154 | 80 | IIIB-2 |
| 74 | 5 | 30 | 10 | 60 | 75 | 7.0% | 13 | 77 | 26 | 154 | 192 | IIIB-2 |
| 75 | 5 | 32 | 10 | 75 | 85 | 7.0% | 13 | 82 | 26 | 192 | 218 | IIIB-1 |
| 76 | 2 | 15 | 6 | 30 | 38 | 7.0% | 5 | 38 | 15 | 77 | 97 | IIIB-2 |
| 77 | 2 | 14 | 4 | 30 | 35 | 7.0% | 5 | 36 | 10 | 77 | 90 | IIIB-2 |
| 78 | 2 | 10 | 4 | 30 | 31 | 7.0% | 5 | 26 | 10 | 77 | 80 | IIIB-2 |
| 79 | 0 | 0 | 0 | 30 | 15 | 7.0% | 0 | 0 | 0 | 77 | 38 | IIIC |
| 80 | 5 | 51 | 10 | 90 | 111 | 7.0% | 13 | 131 | 26 | 231 | 285 | IIIB-1 |
| 81 | 2 | 10 | 4 | 30 | 31 | 7.0% | 5 | 26 | 10 | 77 | 80 | IIIB-2 |
| 82 | 5 | 43 | 10 | 75 | 96 | 7.0% | 13 | 110 | 26 | 192 | 246 | IIIB-1 |
| 83 | 0 | 0 | 0 | 60 | 30 | 7.0% | 0 | 0 | 0 | 154 | 77 | IIIB-2 |
| 84 | 10 | 60 | 30 | 105 | 153 | 7.0% | 26 | 154 | 77 | 269 | 392 | IIIB-1 |
| 85 | 10 | 60 | 30 | 105 | 153 | 7.0% | 26 | 154 | 77 | 269 | 392 | IIIB-1 |
| PERCENT | 2.75 | 15.05 | 5.70 | 76.51 | | | 2.75 | 15.05 | 5.70 | 76.51 | | |

## 2.2 Benefit

### 2.2.1 Benefit Estimation Method

Generally, estimation of the benefit on each Kabupaten road due to the Project was made by analyzing the direct benefit i.e. the VOC reduction benefit, which was estimated by comparing "with project" and "without project" based upon the future traffic volume on the road. However for the following road links it was decided to estimate the indirect benefit through the producer's surplus benefit.

a) Road links with present traffic volume (ADT) less than 60 equivalent 4-wheel vehicles.

b) Road links with no 4-wheel vehicle operation at present.

The indirect benefit was changed into the future traffic volume and the VOC reduction benefit was estimated.

The VOC adopted for the estimation is shown in Table 2-2-1.

Table 2-2-1 VEHICLE OPERATION COST ON KABUPATEN ROADS

(KM)

| SURFACE | CONDITION | SEDAN | BUS | TRUCK | MOTORCYCLE |
|---|---|---|---|---|---|
| ASPHALT | GOOD | 104.7 | 86.2 | 85.4 | 15.9 |
| | Fair | 125.5 | 101.0 | 98.0 | 18.2 |
| | Poor | 164.1 | 135.2 | 138.5 | 22.8 |
| | Bad | 222.1 | 202.0 | 205.0 | 29.1 |
| GRAVEL | Good | 125.7 | 101.4 | 102.5 | 18.5 |
| | Fair | 145.0 | 124.6 | 127.1 | 21.1 |
| | Poor | 198.6 | 172.6 | 178.4 | 27.1 |
| | Bad | 242.7 | 228.9 | 231.2 | 31.8 |
| EARTH | Fair | 201.8 | 180.0 | 185.1 | 28.0 |
| | Poor | 240.7 | 218.2 | 225.8 | 31.8 |
| | Bad | 264.9 | 278.0 | 281.7 | 35.5 |

Source : Bina Marga

Table 2-2-2 FUTURE TRAFFIC VOLUME ESTIMATED BY THE PRODUCER'S SURPLUS

PROV : KALIMANTAN SELATAN KAB : BANJAR

( 1998 )

| LINK NO | CLASS | SURFACE | MOBIL | BUS | TRUCK | SEPEDA | TOTAL |
|---|---|---|---|---|---|---|---|
| 4 | IIIA | ASP | 62 | 334 | 127 | 1702 | 1374 |
| 11 | IIIB-1 | ASP | 11 | 61 | 23 | 309 | 250 |
| 19 | IIIB-2 | KRK | 5 | 24 | 9 | 124 | 100 |
| 22 | IIIB-2 | KRK | 6 | 33 | 12 | 166 | 134 |
| 23 | IIIB-1 | ASP | 15 | 82 | 31 | 418 | 337 |
| 27 | IIIA | ASP | 27 | 143 | 54 | 727 | 588 |
| 29 | IIIB-1 | ASP | 12 | 62 | 24 | 318 | 257 |
| 30 | IIIB-2 | KRK | 8 | 42 | 16 | 215 | 174 |
| 37 | IIIB-2 | KRK | 6 | 34 | 13 | 172 | 139 |
| 38 | IIIB-1 | ASP | 19 | 100 | 38 | 510 | 412 |
| 40 | IIIB-1 | ASP | 21 | 110 | 42 | 563 | 455 |
| 42 | IIIB-2 | KRK | 7 | 36 | 14 | 185 | 150 |
| 44 | IIIA | ASP | 32 | 169 | 64 | 862 | 696 |
| 45 | IIIB-2 | KRK | 4 | 23 | 9 | 116 | 94 |
| 51 | IIIA | ASP | 49 | 263 | 100 | 1343 | 1084 |
| 52 | IIIB-1 | ASP | 15 | 79 | 30 | 401 | 325 |
| 53 | IIIA | ASP | 26 | 138 | 52 | 702 | 567 |
| 54 | IIIB-2 | KRK | 7 | 39 | 15 | 201 | 162 |
| 57 | IIIB-1 | ASP | 19 | 104 | 40 | 530 | 428 |
| 59 | IIIB-1 | ASP | 11 | 59 | 22 | 301 | 243 |
| 60 | IIIB-2 | KRK | 6 | 35 | 13 | 177 | 143 |
| 61 | IIIA | ASP | 36 | 193 | 73 | 986 | 795 |
| 62 | IIIB-1 | ASP | 14 | 75 | 28 | 382 | 308 |
| 63 | IIIB-1 | ASP | 10 | 53 | 20 | 272 | 219 |
| 64 | IIIB-2 | KRK | 7 | 39 | 15 | 201 | 162 |
| 67 | IIIA | ASP | 42 | 225 | 85 | 1145 | 925 |
| 69 | IIIB-1 | ASP | 14 | 75 | 28 | 382 | 308 |
| 72 | IIIB-2 | KRK | 5 | 28 | 11 | 143 | 116 |
| 73 | IIIB-1 | ASP | 14 | 75 | 28 | 380 | 307 |
| 76 | IIIB-2 | KRK | 2 | 12 | 5 | 62 | 50 |
| 77 | IIIB-2 | KRK | 3 | 15 | 6 | 75 | 62 |
| 78 | IIIB-2 | KRK | 3 | 15 | 6 | 75 | 62 |
| 79 | IIIB-2 | KRK | 6 | 34 | 13 | 175 | 141 |
| 81 | IIIB-2 | KRK | 4 | 23 | 9 | 116 | 94 |
| 83 | IIIB-2 | KRK | 6 | 30 | 12 | 155 | 126 |

## 2.2.2 Benefit

The benefit estimation was carried out for each Kabupaten road. Table 2-2-3 shows a sample of the result of benefit estimation. In the table "surplus" and "VOC" show the estimation method utilized and III A, III B-1, III B-2 and III C show the road classification.

Table 2-2-3

RESULTS OF BENEFIT ESTIMATION

KABUPATEN : BANJAR

( 1000Rupiah )

| | LINK 1 | LINK 2 | LINK 3 | LINK 4 | LINK 5 | LINK 6 | LINK 7 | LINK 8 | LINK 9 | LINK 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| | 5 Km | 8 Km | 10 Km | 11 Km | 3 Km | 7 Km | 8 Km | 11 Km | 5 Km | 7 Km |
| | IIIA | IIIB-1 | IIIA | IIIA | IIIA | IIIB-1 | IIIB-2 | IIIB-1 | IIIB-1 | IIIB-1 |
| YEAR | VOC | VOC | VOC | Surplus | VOC | VOC | VOC | VOC | VOC | VOC |
| 1988 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1989 | 21763 | 7232 | 23491 | 84967 | 5892 | 5670 | 5722 | 14918 | 8557 | 6748 |
| 1990 | 23065 | 7565 | 25072 | 92402 | 6282 | 5962 | 6004 | 15781 | 9099 | 7278 |
| 1991 | 24682 | 8036 | 26821 | 99896 | 6741 | 6364 | 6710 | 16811 | 9779 | 7818 |
| 1992 | 26365 | 8791 | 28881 | 108348 | 7215 | 6790 | 7240 | 18026 | 10486 | 8303 |
| 1993 | 28383 | 9306 | 30746 | 117945 | 7664 | 7340 | 7593 | 19269 | 11110 | 8962 |
| 1994 | 30263 | 9963 | 32823 | 127505 | 8251 | 7901 | 8170 | 20828 | 12087 | 9547 |
| 1995 | 32218 | 10511 | 35211 | 138565 | 8799 | 8400 | 8570 | 22145 | 12746 | 10240 |
| 1996 | 34555 | 11334 | 37684 | 150070 | 9432 | 8936 | 9194 | 23666 | 13596 | 10866 |
| 1997 | 37208 | 12322 | 40239 | 162622 | 10093 | 9681 | 9865 | 25495 | 14668 | 11604 |
| 1998 | 39501 | 13059 | 43157 | 176412 | 10791 | 10266 | 10759 | 27081 | 15768 | 12443 |
| SUM | 298003 | 98119 | 324125 | 1258732 | 81160 | 77310 | 79827 | 204020 | 117916 | 93809 |
| COST | 146608 | 13758 | 134607 | 666219 | 31018 | 7039 | 17689 | 59175 | 41564 | 16668 |
| /Km | 29322 | 1720 | 13461 | 60565 | 10339 | 1006 | 2211 | 5380 | 8313 | 2381 |

## Chapter 3 ENGINEERING

### 3.1 Design Criteria and Specification

#### 3.1.1 Geometric Design Criteria

Currently a technical standard for improvement of Kabupaten roads i.e. PETUNJUK TEKNIS INPRES PENUNJANGAN JALAN KABUPATEN, TAHUN 1984-1985 is established by Bina Marga.

The geometric design criteria in the above standard are recommended to be adopted in general for the Project. Following discussions with Bina Marga, exceptions to this are allowed for Pavement width and pavement type to minimize the construction cost of the Kabupaten road improvement, if necessary. The geometric design criteria adopted for the Project are shown in Table 3-1-1. The typical cross sections of Kabupaten roads are shown in Fig. 3-1-1.

#### 3.1.2 Loading Specification

The LOADING SPECIFICATIONS FOR HIGHWAY BRIDGES BY DIRECTORATE GENERAL BINA MARGA is used in principle as the basic specification of loading and the TECHNICAL STANDARD FOR KABUPATEN ROADS compiled by Bina Marga shows that the design live load for bridges on Kabupaten roads is 70% of the Bina Marga live road. However, after discussions with Bina Marga the following loads were decided as the design live loads for the standard bridges of Kabupaten roads:

a. 50% of Bina Marga live load (hereinafter BM 50) is applied for concrete and timber bridges on roads of III A classification.

b. 10-ton truck load is applied for timber bridges on roads of III B-1, III B-2 and III C classification.

Table 3-1-1

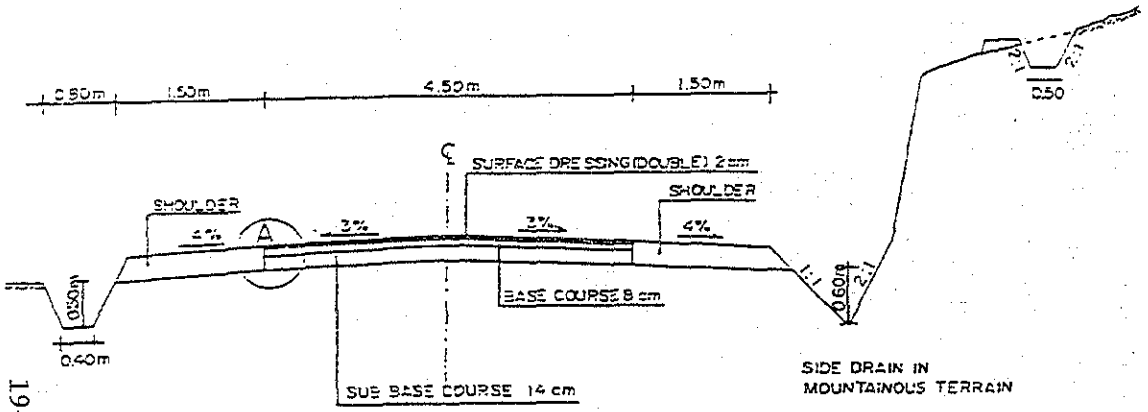
DESIGN CRITERIA FOR KABUPATEN ROADS

| ROAD CLASSIFICATION | | CLASS III A | | | CLASS III B-1 | | | CLASS III B-2 | | | CLASS III C | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SURFACE TYPE | | ASPHALT SEAL (DOUBLE) | | | ASPHALT SEAL (SINGLE) | | | GRAVEL | | | GRAVEL | | |
| TRAFFIC VOLUME : ADT (Forecast 10 th year average per day) | | 3000 - 500 | | | 500 - 200 | | | 200 - 50 | | | 50 | | |
| T E R R A I N | | FLAT TO ROLLING | HILLY | MOUNT-AINOUS | FLAT TO ROLLING | HILLY | MOUNT-AINOUS | FLAT TO ROLLING | HILLY | MOUNT-AINOUS | FLAT TO ROLLING | HILLY | MOUNT-AINOUS |
| TRAFFIC LANES | | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1 | 1 | 1 |
| DESIGN SPEED (Km/hr) | DESIRABLE | 70 | 60 | 40 | 70 | 40 | 30 | 60 | 40 | 30 | 50 | 30 | AS PRACTI-CABLE |
| | MINIMUM | 30 | 30 | 30 | 30 | 30 | AS PRACTI-CABLE | 30 | 30 | AS PRACTI-CABLE | 30 | AS PRACTICABLE | |
| GRADIENT (LIMITING) (%) | DESIRABLE | 4 | 5 | 8 | 4 | 6 | 8 | 4 | 7 | 8 | 5 | 8 | 12 |
| | MAXIMUM | 7 | 7 | 10 | 7 | 8 | 10 | 7 | 9 | 12 | 7 | 12 | 16 |
| PAVEMENT WIDTH (M) | DESIRABLE | 6.0 | 6.0 | 6.0 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 |
| | MINIMUM | 4.5 | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 | 3.0 | 3.0 |
| SHOULDER WIDTH (M) | DESIRABLE | 2.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.0 | 1.0 | 1.0 | 1.0 | 0.75 |
| | MINIMUM | 1.5 | 1.0 | 0.75 | 1.0 | 1.0 | 0.75 | 1.0 | 0.75 | 0.5 | 0.75 | 0.5 | 0.5 |
| ROAD BED WIDTH (M) | DESIRABLE | 10.0 | 9.0 | 9.0 | 8.0 | 7.5 | 6.5 | 7.5 | 6.5 | 6.5 | 5.5 | 5.5 | 5.0 |
| | MINIMUM | 6.0 | 6.0 | 6.0 | 5.5 | 5.5 | 5.0 | 5.5 | 5.0 | 4.5 | 4.5 | 4.0 | 4.0 |
| RIGHT OF WAY (M) | DESIRABLE | 16 | | | 12 | | | 12 | | | 12 | | |
| | MINIMUM | 12 | | | 10 | | | 10 | | | 8 | | |
| ROAD CAMBER (%) | PAVEMENT | 3 | | | 3 | | | 4 | | | 4 | | |
| | SHOULDER | 4 | | | 4 | | | 5 | | | 5 | | |

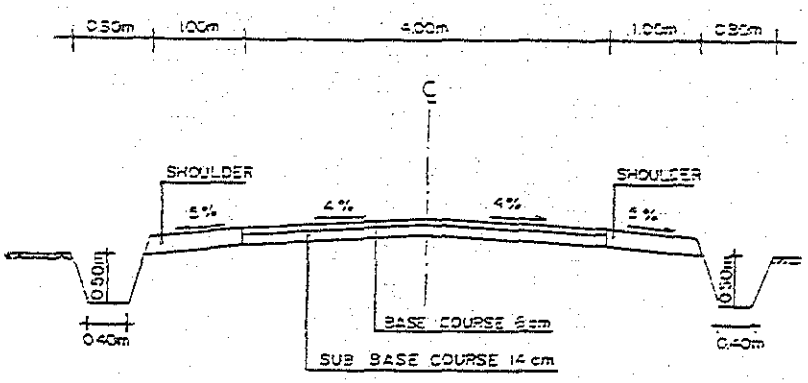
Fig. 3-1-1

# STANDARD ROAD CROSS SECTIONS

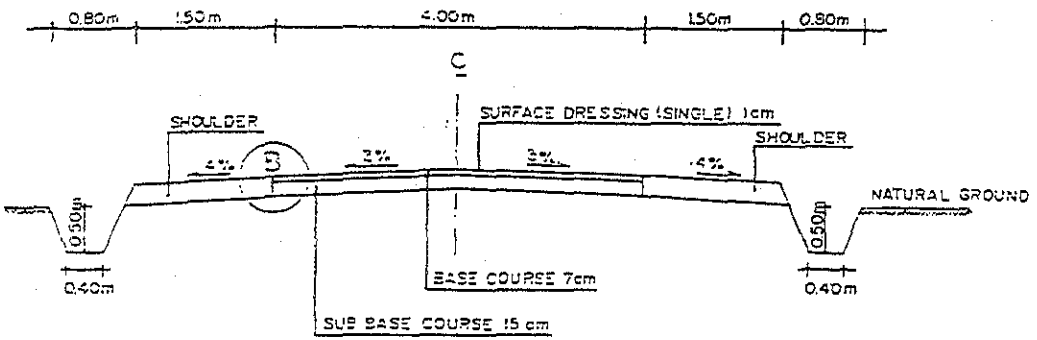
## CLASS III A



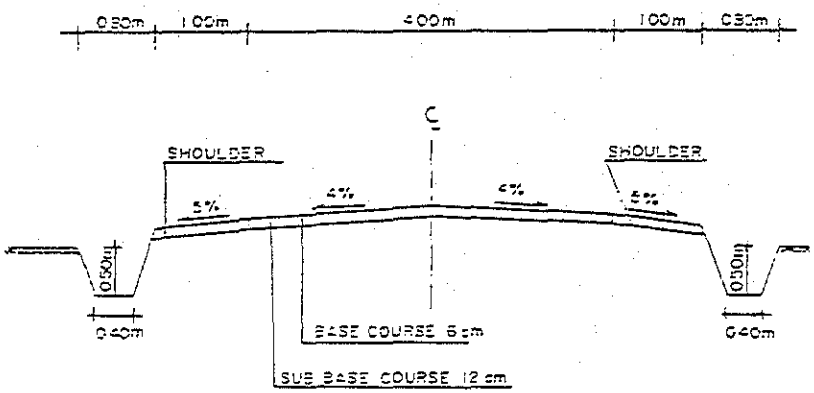

## CLASS III B-2




## CLASS III B-1




## CLASS III C



## 3.2 Pavement Design

### 3.2.1 Design Conditions

From the engineering data prepared by the Kabupaten it is noted that the pavement structure of the Kabupaten roads seems to have been determined without adequate designs, therefore the Kabupaten roads generally have insufficient capacity. The standards generally used for highway pavement design such as Road Note 29, Road Note 31 and AASHTO are not suitable for Kabupaten roads with small traffic volumes and loads.

Therefore formulae suitable for the pavement design of Kabupaten roads are recommended as described in Chapter 5 of the Main Report.

The following are important factors for the design of pavement thickness.

1) Design Traffic Volume

As the pavement thickness is designed for each road classification the design traffic volume of which the target year is 1998, is adopted for each classification as follows:

| Road Classification | Design Traffic Volume (vpd) |
|---|---|
| III A | 1,000 |
| III B-1 | 500 |
| III B-2 | 200 |
| III C | 50 |

2) Strength of Roadbed

The CBR value of the existing roadbed is a very important factor for the pavement design but no results are available from CBR tests on the Kabupaten roads.

CBR of the laterite is generally in the range of CBR 4 to 10. However site CBR tests should be conducted before construction to finally decide the pavement thickness.

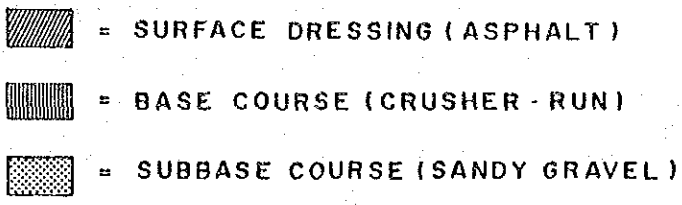
### 3.2.2 Pavement Structure

Fig. 3-2-1 shows the standard pavement structure adopted for the Kabupaten roads.

Fig. 3-2-1 PAVEMENT STRUCTURE

(cm)

| CBR | ROAD CLASSIFICATION | | | |
|---|---|---|---|---|
| | III A | III B-1 | III B-2 | III C |
| 6 | 14 \| 8 \| 24 | 14 \| 7 \| 22 | 14 \| 6 \| 20 | 16 |



## 3.3 Design of Bridges and Other Structures

### 3.3.1 Standard Bridge

There are so many bridges to be improved or to be newly constructed on the Kabupaten roads in the Project Area that it is very difficult to prepare an individual design for each bridge. Therefore, standardization is recommended as being necessary for the bridge design with conclusions as deseribed below.

(1) Bridge Type

1) Superstructure

A timber beam bridge (hereinafter timber bridge has been finally selected regardless of road classification by the agreement of Bina Marga after studying the actual rurall condition of bridge construction. Fig. 3-3-1 shows the cross section of the standard type.

2) Substructure

Taking account of the actual combinations of super and substructure types noted from the field survey, timber pile barts are recommended as standard because of ease of construction and economy.

3) Foundation

There is no information of subsoil conditions in the inventory data. However, timber piles of 20 cm diamenter are generally recommended as piles of this type are in common use.

The pile length is suggested to be a minimum of 3 meters under the bottom of the foundation or river bed.

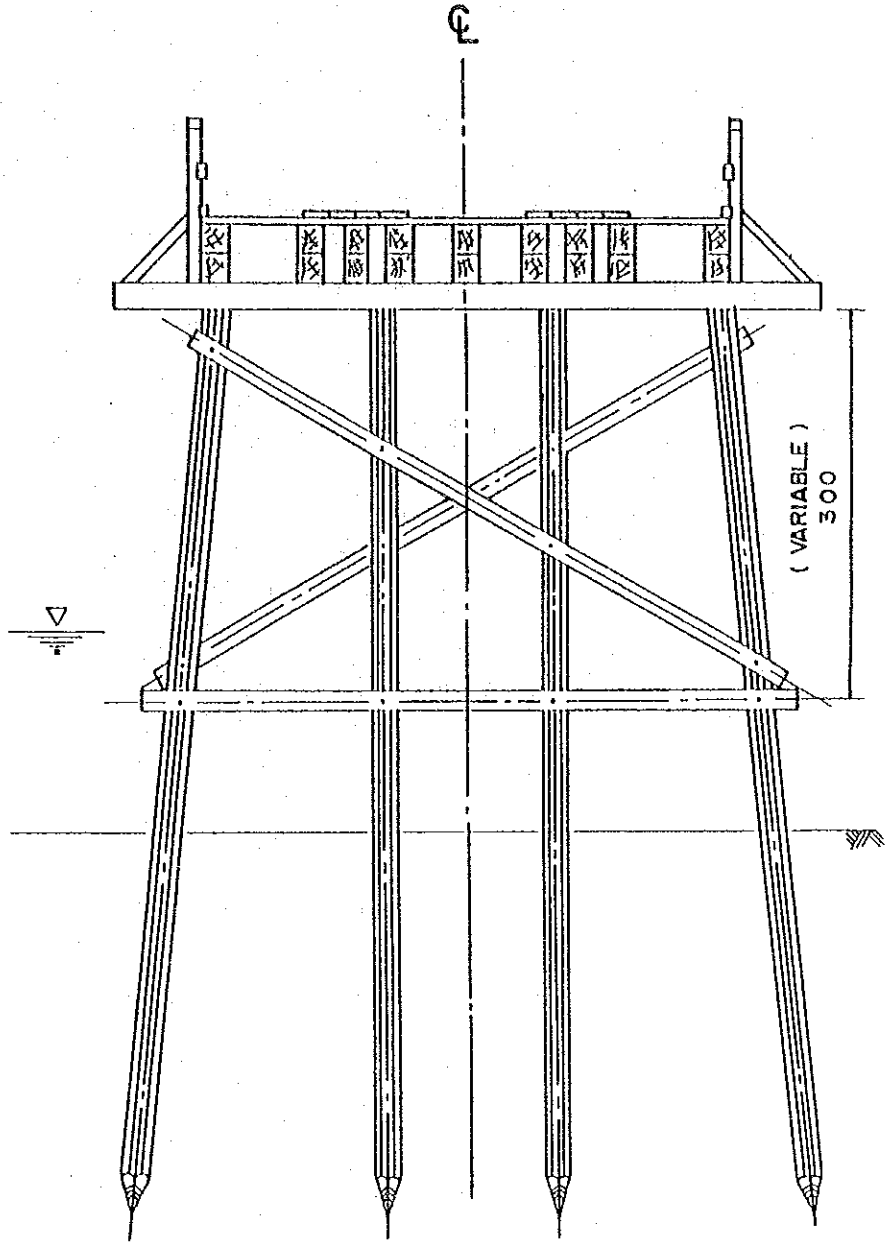
The length and number of piles should be decided in order to be adequate for the condition of the foundation materials.

(2) Bridge Width

The effective bridge width for the standard bridge has been generally decided as 4.0 m through discussions with Bina Marga and considering the actual width of Kabupaten roads.

Fig. 3-3-1 CROSS SECTION OF STANDARD BRIDGE

TIMBER BRIDGE



(3) Span Length

The range of span lengths are determined as:

Timber bridge: 3.0, 5.0 and 8.0 m

3.3.2 Other Structures

Culverts and retaining walls shown in Fig. 3-3-2 and Fig. 3-3-3 are recommended as standard structures.

(1) Culvert

The following two culvert types have been adopted for the tranverse drainage.

a) Reinforced concrete pipe culvert Ø 80 cm m
b) Rubble in mortar box culvert with RC slab 80 cm X 80 cm

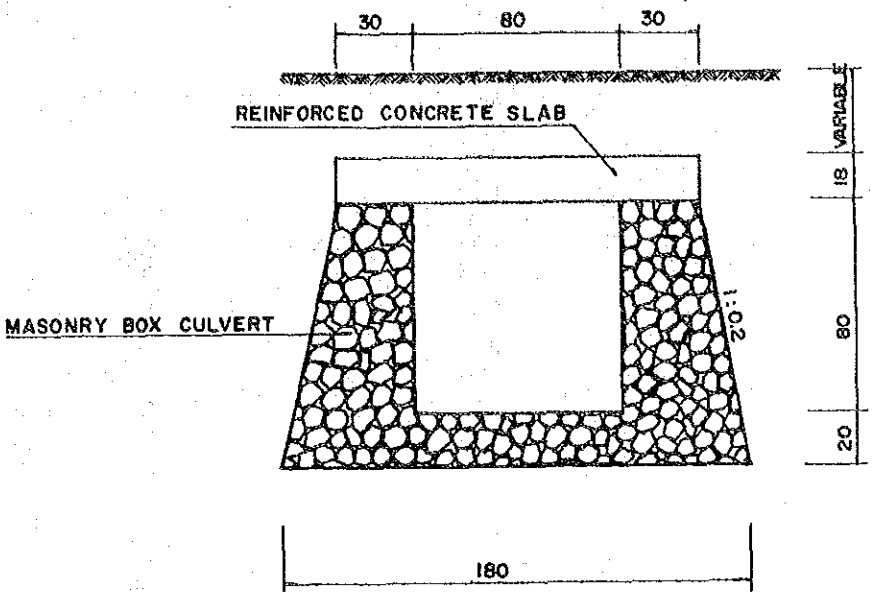
(2) Retaining Wall

The following two types of retaining walls have been adopted because of ease of construction, economy and familiarity in Indonesia.

a) Rubble in mortar retaining wall
b) Timber retaining wall

Fig. 3-3-2 STANDARD CULVERTS

80 x 80 RUBBLE IN MORTAR BOX CULVERTS




Ø 80 RENFORCED CONCRETE PIPE CULVERT

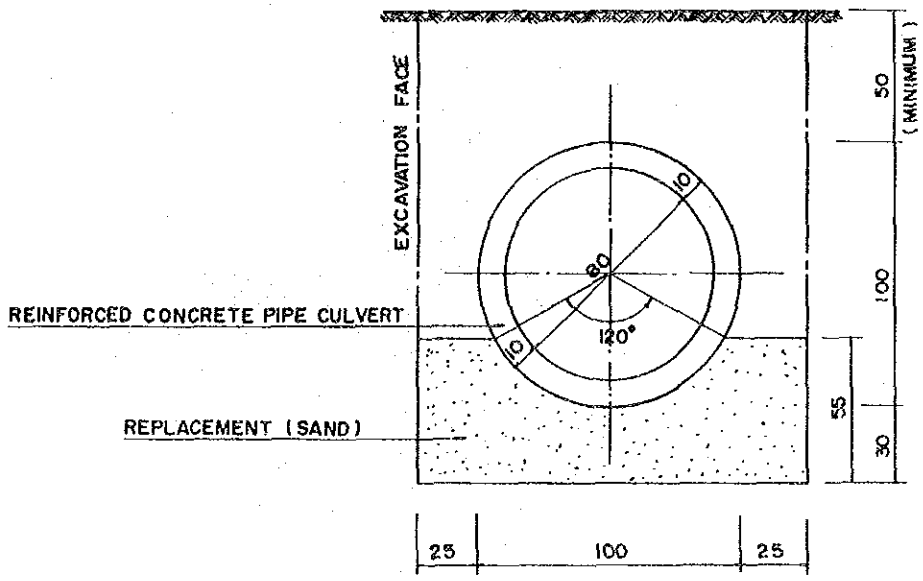
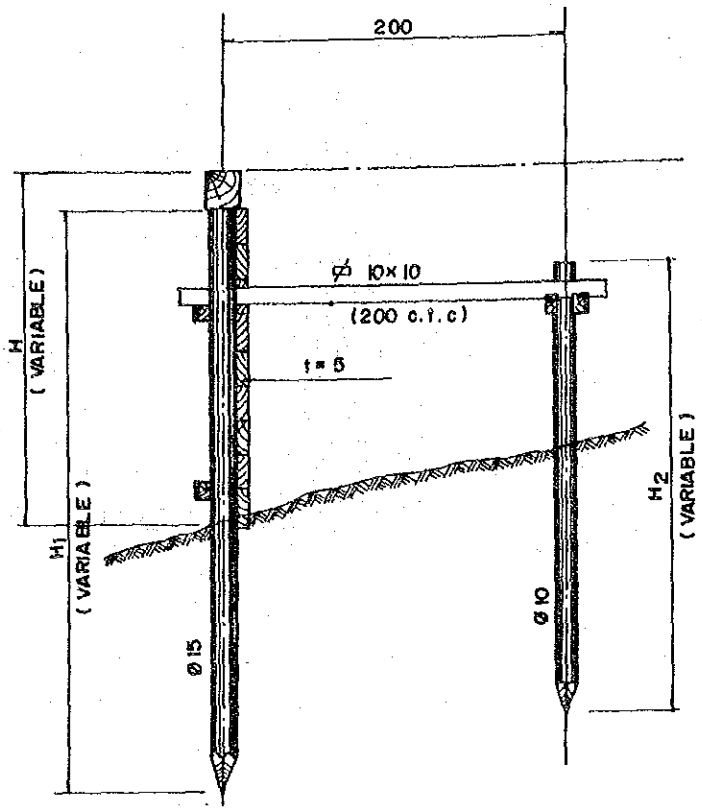
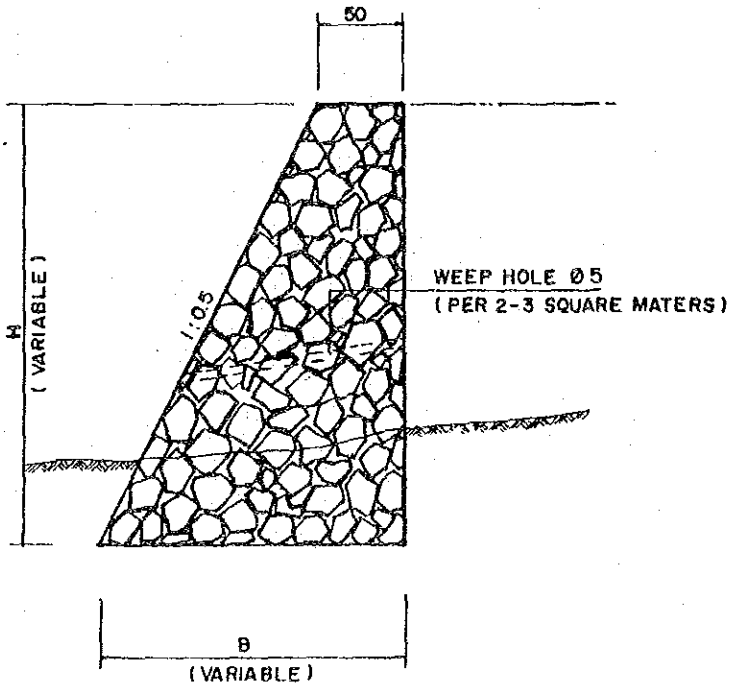


Fig. 3-3-3 STANDARD RETAINING WALLS

TIMBER RETAINING WALL




RUBBLE IN MORTAR WALL



## 3.4 Selection of Equipment Types

From the results of comparison of two types of Kabupaten road construction methods, i.e. equipment intensive method and labour intensive method construction methods for major works were basically decided as shown in Table 3-4-1.

Table 3-4-1 CONSTRUCTION METHODS FOR MAJOR WORKS

| METHOD | WORK TYPE |
|---|---|
| Equipment Intensive | Earthwork, Base Course and Subbase Course |
| Labour Intensive | Surface Dressing, Drainage, Bridge and Other Structures. |

### 3.4.1 Points to be Considered for the Selection

Full consideration was given to the following points in studying the selection of equipment type.

a. Most of the construction in the Project is pavement works for road improvement.

b. The pavement width adopted is equal to or less than 4.5 m and therefore large sized equipment is omitted from the selection process.

c. Equipment should be capable of with standing the heavy rainfall and poor soil quality. Equipment for construction in swampy areas is considered if necessary.

d. Uniformity of equipment types with existing equipment is considered to facilitate repair of the equipment in the provincial work shop.

e. Since the scale of the construction is small and transportation of equipment will frequently be necessary, wheel type equipment has been selected as much as possible as this can move by itself or by being towed.

f. The road like to be improved are scattered all over the Kabupatens and therefore a low bed truck or equivalent is necessary for transportation of crawler type equipment. It is desirable to protect the existing pavement from damage caused by the movement of crawler type equipment on the existing roads.

g. The capacity of the equipment has been decided taking into consideration the construction volume and the combination of equipment in the main work.

### 3.4.2 Combinations of Equipment for Major Works and Maintenance

The combinations of equipment for major works and maintenance are listed in Table 3-4-2 and 3-4-3 respectively.

Table 3-4-2 EQUIPMENT OF ONE WORK GANG FOR MAJOR TYPES OF WORK

| TYPE OF WORK | EQUIPMENT REQUIRED | |
|---|---|---|
| 1. Site Clearing in Light Bush | 1- Bulldozer 90 HP<br>2- Dump Truck 3.0 Ton | 1- Wheel Loader 1.2 $m^3$ |
| 2. Excavation & Embankment | | |
| i) Normal Fill | 1- Bulldozer 90 HP<br>1- Vibratory Roller 4.0 Ton (D&T) | 1- Water Tank Truck 4,000 Ltr |
| ii) Fill by Borrow Material | 1- Bulldozer 90 HP<br>3- Dump Truck 3.0 Ton | 1- Wheel Loader 1.2 $m^3$ |
| iii) Fill in Swamp | 1- Swamp Bulldozer 90 HP<br>1- Water Tank Truck 4,000 Ltr | 1- Vibratory Roller 4.0 Ton (D&T) |
| iv) Excavation to Spoil | 1- Bulldozer 90 HP<br>1- Wheel Loader 1.2 $m^3$ | 4- Dump Truck 3.0 Ton |
| 3. Subgrade Preparation | 1- Motor Grader 75 HP<br>1- Vibratory Roller 4.0 Ton (D&T) | 1- Water Tank Truck 4,000 Ltr |
| 4. Subbase Course | 1- Motor Grader 75 HP<br>1- Vibratory Roller 4.0 Ton (D&T) | 1- Water Tank Truck 4,000 Ltr |
| 5. Base Course | 1- Motor Grader 75 HP<br>1- Vibratory Roller 4.0 Ton<br>1- Portable Crusher/Screens 30-40 Ton/H | 1- Water Tank Truck 4,000 Ltr |
| 6. Cement Stabilizing | 1- Motor Grader 70 HP<br>1- Bulldozer 90 HP<br>1- Wheel Loader 1.2 $m^3$<br>1- Flat Bed Truck 3.0 Ton | 1- Vibratory Roller 4.0 Ton (D&T)<br>1- Road Stabilizer<br>1- Water Tank Truck 4,000 Ltr |
| 7. Surface Course | 1- Asphalt Sprayer 850 Ltr<br>1- Tyre Roller 8-15 Ton<br>1- Portable Crusher/Screens 30-40 Ton/H | 1- Flat Bed Truck 3.0 Ton |
| 8. Concrete | 1- Concrete Mixer 0.5 $m^3$<br>1- Water Pump 200 Ltr/Min<br>1- Concrete Vibrator 3.3 HP | 1- Flat Bed Truck 3.0 Ton<br>1- Hand-Guided Vibratory Roller 1000 Kg |

Table 3-4-3 EQUIPMENT OF ONE WORK GANG FOR MAINTENANCE

| TYPE OF WORK | EQUIPMENT REQUIRED |
|---|---|
| Road | 1- Motor Grader |
| | 1- Tyre Roller 8-15 Ton |
| | 1- Hand-Guided Vibratory Roller 1000 Kg |
| | 1- Flat Bed Truck 3.0 Ton |
| | 1- Dump Truck 3.0 Ton |
| Bridge and Other Structure | 1- Flat Bed Truck With Crane 3.0 Ton |

## 3.5 Workshop and Laboratory

### 3.5.1 Policy of the Kabupaten Workshop

A workshop will be provided for each Kabupaten. The function of the workshop is to cope with requests from the construction site. The main service will be routine maintenance while the secondary service will be light repairs which can be carried out by changing parts. Dismantling and assembling of units which need setting or adjustment using special equipment or facilities will not be carried out in the Kabupaten workshop. Such repairs are planned to be carried out by the provincial workshop or the regional Workshop of Bina Marga.

Accordingly the main tasks of the Kabupaten workshop are as follows:

1) Administration for and storage of equipment
2) Routine maintenance and light repair of equipment
3) Storage and supply of spare parts
4) Operation of equipment including crushing plant.

### 3.5.2 Workshop Equipment and Tools

Equipment and tools for the workshop are recommended as shown in Table 3-5-1.

Table 3-5-1 WORKSHOP EQUIPMENT AND TOOLS

| DESCRIPTION | QUANTITY |
|---|---|
| Upright Drilling Machine | 1 Set |
| Electric Hand Drill | 1 |
| Electric Portable Grinder | 1 |
| Disc Grinder | 1 |
| Bench Electric Grinder | 1 |
| Engineer's Vice | 1 |
| DC Electric Welder with Engine | 1 Set |
| Portable Hydraulic Jack, Screw Head | 1 |
| Hydraulic Jack | 1 |
| Grease Gun | 2 |
| Suction Pump for Oil Recovery | 2 |
| High Pressure Grease Pump | 1 |

continued

| DESCRIPTION | QUANTITY |
|---|---|
| Drum Opening Spanner | 1 |
| Silicon Normal Charger | 1 |
| Tyre Changer Air Operated | 1 |
| Tyre Service Tool Set | 1 |
| Tyre Pressure Gauge | 1 |
| Automatic Tyre Inflator | 1 |
| Plug Cleaner and Tester | 1 |
| Mechanics Tool Set, Heavy Equipment | 1 |
| Mechanics Tool Set, Large Vehicle | 1 |
| Portable Air Compressor | 1 |
| Electric Cord Reel, 15 A, 50 m | 1 |
| Oil Measure, Polyethylene | 1 |
| Funnel 200 mm, Steel | 3 |
| Hand Truck (Cart), 4-Wheel | 1 |
| Nylon Sling, 10 ton | 2 |
| Chain Block, 1 ton | 2 |
| Wire Rope (for sling), 1.8 ton | 2 |
| Wire Rope (for sling) 3.2 ton | 2 |
| Generator | 1 |

### 3.5.3 Laboratory

For quality control of construction in the Project it is recommended that a laboratory is provided for each Kabupaten. For each laboratory, provision of laboratory test equipment for the following tests is recommended:

- Physical characteristic, compaction and strength tests for the road bed and pavement materials.
- Slump and strength tests for the bridge concrete.

In the laboratory a fixed water tank should be provided for CBR tests and curing of concrete specimens.

The proposed laboratory equipment is listed in Table 3-5-2.

Table 3-5-2 LABORATORY TEST EQUIPMENT

| DESCRIPTION | QUANTITY |
|---|---|
| Soil Moisture Test Set (JIS A1203) | 1 |
| Liquid Limit Set (JIS A1205) | 1 |
| Plastic Limit Set (JIS A1206) | 1 |
| Compaction Set (JIS A1210) | 1 |
| CBR Laboratory Set, Mechanical (JIS A1211) | 1 |
| Sand Density Apparatus (JIS A1214) | 1 |
| Aggregate Test Sieve Set | 1 |
| Portable Cone Penetrometer | 1 |
| Compression & Bending Test Machine | 1 |
| Cylinder Mould (JIS A1132, 1108) | 9 |
| Slump Test Apparatus (JIS A1101) | 2 |

To conduct the surveys necessary for road and structure construction such as centering, profile leveling, cross section leveling etc., the surveying equipment listed in Table 3-5-3 recommended.

Table 3-5-3 SURVEYING EQUIPMENT

| DESCRIPTION | QUANTITY |
|---|---|
| Transit | 1 |
| Level | 1 |
| Staff | 3 |

## Chapter 4 CONSTRUCTION AND MAINTENANCE COST ESTIMATIONS

### 4.1 Unit Price

With regard to the unit prices of materials and labor, the data were collected from each Kabupaten through Bina Marga. The collected data were compared with those of Jakarta using BAHAN BANGUNAN DKI-JAKARTA MAY & JUNE 1985 compiled by PUSAT INFORMASI TEHNIK PEMBANGUNAN, and then finalized.

#### 4.1.1 Unit Labour Price

The unit labour prices of Kabupaten Banjar and other Kabupatens in Kalimantan Selatan Province are shown in Table 4-1-1.

Table 4-1-1 UNIT LABOUR PRICE

(Rp)

| KABUPATEN | MAN | SKL LAB | CAP | MAS | LAB | DRIV | OPE |
|---|---|---|---|---|---|---|---|
| Tanah Laut | 2,500 | 2,250 | 2,500 | 2,500 | 1,750 | 2,500 | 4,000 |
| Kota Baru | 2,750 | 2,750 | 3,500 | 3,500 | 2,500 | 2,500 | 4,000 |
| Banjar | 2,750 | 2,200 | 2,750 | 2,750 | 1,750 | 2,750 | 3,850 |
| Barito Kuala | 3,000 | 3,000 | 3,000 | 3,000 | 2,000 | 3,000 | 3,500 |
| Tapin | 3,000 | 2,500 | 3,250 | 3,250 | 2,000 | 3,000 | 4,000 |
| Hulu Sungai Selatan | 2,000 | 2,250 | 2,500 | 1,500 | 1,750 | 2,500 | 3,000 |
| Hulu Sungai Tengah | 2,000 | 1,750 | 2,500 | 1,500 | 1,250 | 2,500 | 3,000 |
| Hulu Sungai Utara | 3,500 | 2,500 | 3,000 | 3,000 | 2,000 | 3,000 | 2,000 |
| Tabalong | 2,500 | 2,500 | 3,000 | 3,000 | 2,000 | 3,000 | 3,500 |
| Average | 2,333 | 2,078 | 2,556 | 2,444 | 1,667 | 2,417 | 3,039 |

Notes :

MAN : Mandur
SKL LAB : Skilled Labour
CAP : Carpenter
MAS : Mason
LAB : Labourer
DRIV : Driver
OPE : Operater

### 4.1.2 Unit Price of Materials

Table 4-1-2 shows the unit price of materials for Kabupaten Banjar together with for other Kabupatens in Kalimantan Selatan Province.

Table 4-1-2 UNIT PRICE OF MATERIALS

(Rp)

| MATERIAL | UNIT | TANAH LAUT | KOTA BARU | BANJAR KUALA | BARITO | TAPIN |
|---|---|---|---|---|---|---|
| Bitumen | L | 275 | 375 | 300 | 300 | 275 |
| Asphalt oil | L | 700 | 750 | 700 | 750 | 700 |
| Gasoline | L | 250 | 250 | 250 | 250 | 250 |
| Sand | $M^3$ | 5,000 | 12,500 | 6,000 | 12,500 | 4,500 |
| Cement | bag | 4,000 | 5,300 | 4,500 | 5,000 | 5,000 |
| River Stone | $M^3$ | 5,000 | 12,500 | 7,000 | 17,500 | 10,000 |
| Steel moulds | Set | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 |
| Timber | $M^3$ | 60,000 | 150,000 | 80,000 | 200,000 | 80,000 |
| Paint | L | 4,000 | 3,500 | 3,000 | 2,000 | 2,500 |
| Reinforcing Steel | Kg | 750 | 1,000 | 750 | 1,000 | 1,000 |
| Tying Wire | Kg | 1,000 | 1,200 | 1,000 | 1,200 | 1,200 |
| Equivalent Royalty | $M^3$ | 250 | 250 | 250 | 250 | 250 |

Table 4-1-2 UNIT PRICE OF MATERIALS

(Rp)

| MATERIAL | UNIT | HULU SUNGAI SELATAN | HULU SUNGAI TENGAH | SUNGAI UTARA | TABALONG | AVERAGE |
|---|---|---|---|---|---|---|
| Bitumen | L | 450 | 300 | 300 | 300 | 385 |
| asphalt oil | L | 800 | 700 | 700 | 700 | 925 |
| Gasoline | L | 250 | 250 | 250 | 250 | 250 |
| Sand | $M^3$ | 5,000 | 5,000 | 5,000 | 6,000 | 5,745 |
| Cement | bag | 4,350 | 5,000 | 5,000 | 5,000 | 4,687 |
| River Stone | $M^3$ | 7,750 | 7,000 | 9,000 | 7,500 | 11,165 |
| Steel moulds | Set | 8,000 | 8,000 | 8,000 | 8,000 | 7,865 |
| Timber | $M^3$ | 75,000 | 75,000 | 80,000 | 90,000 | 132,758 |
| Paint | L | 2,100 | 2,000 | 2,750 | 2,500 | 2,573 |
| Reinforcing Steel | Kg | 1,000 | 1,000 | 750 | 1,000 | 940 |
| Tying Wire | Kg | 1,200 | 1,200 | 1,100 | 1,200 | 1,897 |
| Equivalent Royalty | $M^3$ | 250 | 250 | 250 | 250 | - |

### 4.1.3 Hourly Equipment Cost

The hourly equipment cost for Kabupaten is shown in Table 4-1-3.

Table 4-1-3

HOURLY EQUIPMENT COST

PROVINCE : KALIMANTAN SELATAN
KABUPATEN : BANJAR

( UNIT : Rp ) ( 6'85 )

| CODE NO | EQUIPMENT NAME | CLASS | LOCAL COST OWNERSHIP | LOCAL COST OPERATION | LOCAL COST SUB-TOTAL | FOREIGN COST OWNERSHIP | FOREIGN COST OPERATION | FOREIGN COST SUB-TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|---|---|
| | Bulldozer | 120 HP | 234 | 14,127 | 14,361 | 7,769 | 1,024 | 8,793 | 23,154 |
| | Bulldozer/Ripper | 120 HP | 255 | 15,137 | 15,392 | 8,500 | 1,575 | 10,075 | 25,467 |
| | Swamp Bulldozer | 120 HP | 267 | 15,380 | 15,647 | 8,879 | 1,646 | 10,525 | 26,172 |
| | Bulldozer | 90 HP | 148 | 9,598 | 9,746 | 4,914 | 647 | 5,561 | 15,307 |
| | Bulldozer/Ripper | 90 HP | 159 | 10,188 | 10,347 | 5,300 | 982 | 6,282 | 16,629 |
| | Bulldozer | 65 HP | 105 | 6,980 | 7,085 | 3,500 | 461 | 3,961 | 11,046 |
| | Bulldozer/Ripper | 65 HP | 115 | 7,428 | 7,543 | 3,819 | 708 | 4,527 | 12,070 |
| | Swamp Bulldozer | 90 HP | 159 | 10,178 | 10,337 | 5,284 | 979 | 6,263 | 16,600 |
| | Swamp Bulldozer | 65 HP | 122 | 7,284 | 7,406 | 4,049 | 750 | 4,799 | 12,205 |
| | Motor Grader | 110 HP | 208 | 12,141 | 12,349 | 6,919 | 1,282 | 8,201 | 20,550 |
| | Motor Grader | 75 HP | 144 | 8,317 | 8,461 | 4,779 | 885 | 5,664 | 14,125 |
| | Motor Grader | 65 HP | 129 | 7,308 | 7,437 | 4,300 | 797 | 5,097 | 12,534 |
| | Road Stabilizer | W=1850 mm | 258 | 3,381 | 3,639 | 8,594 | 424 | 9,018 | 12,657 |
| | Vibratory Roller | 4 ton | 87 | 3,654 | 3,741 | 2,900 | 382 | 3,282 | 7,023 |
| | Hand-guide Vib. Roller | 1000 Kg | 68 | 650 | 718 | 850 | 29 | 879 | 1,597 |
| | Tire Roller | 8-15 ton | 94 | 8,326 | 8,420 | 3,106 | 102 | 3,208 | 11,628 |
| | Vibratory Roller (D&T) | 4 ton | 87 | 3,654 | 3,741 | 2,900 | 382 | 3,282 | 7,023 |
| | Hand-guide Vib. Roller | 600 Kg | 48 | 444 | 492 | 600 | 20 | 620 | 1,112 |
| | Rough Terrain Crane | 10 ton | 302 | 14,172 | 14,474 | 10,039 | 744 | 10,783 | 25,257 |
| | Hydraulic Excavator; Wheel | 0.3 m3 | 124 | 8,655 | 8,779 | 4,109 | 541 | 4,650 | 13,429 |
| | Wheel Loader | 1.2 m3 | 211 | 9,115 | 9,326 | 7,019 | 925 | 7,944 | 17,270 |
| | Wheel Loader | 0.3 m3 | 69 | 3,198 | 3,267 | 2,269 | 299 | 2,568 | 5,835 |
| | Water Tank Truck | 4000 ltr. | 70 | 3,217 | 3,287 | 868 | 120 | 988 | 4,275 |
| | Fuel Tank Truck | 4000 ltr. | 71 | 3,224 | 3,295 | 882 | 121 | 1,003 | 4,298 |
| | Dump Truck | 3.0 ton | 118 | 3,965 | 4,083 | 1,469 | 202 | 1,671 | 5,754 |
| | Flat Bed Truck with Crane | 3.0 ton | 52 | 3,464 | 3,516 | 1,717 | 127 | 1,844 | 5,360 |
| | Dump Loader Truck | 12 ton | 116 | 21,730 | 21,846 | 3,837 | 126 | 3,963 | 25,809 |
| | Dump Truck | 5.0 ton | 176 | 6,570 | 6,746 | 2,189 | 302 | 2,491 | 9,237 |
| | Flat Bed Truck | 3.0 ton | 17 | 3,039 | 3,056 | 563 | 41 | 604 | 3,660 |
| | Portable Crusher/Screening | 30-40 t/h | 564 | 23,768 | 24,332 | 18,800 | 2,478 | 21,278 | 45,610 |
| | Concrete Mixer | 0.5 m3 | 432 | 2,445 | 2,877 | 5,400 | 419 | 5,819 | 8,696 |
| | Water Pump | 200 l/min | 16 | 294 | 310 | 188 | 6 | 194 | 504 |
| | Concrete Vibrator | 3.3 HP | 6 | 258 | 264 | 73 | 2 | 75 | 339 |
| | Asphalt Sprayer | 850 ltr. | 82 | 811 | 893 | 1,019 | 140 | 1,159 | 2,052 |

## 4.2 Unit Construction Cost by Work Type

### 4.2.1 All Works Except Bridges

The unit construction costs by work type, excluding bridge construction costs, have been estimated using the combination of equipment described in Clause 3.4 and the unit prices already listed. The results are summarized in Table 4-2-1.

Table 4-2-1 UNIT COST BY WORK TYPE EXCEPT BRIDGE WORK

PROV : KALIMANTAN SELATAN KAB : BANJAR

(Rp)

| ITEM | UNIT | LOCAL | FOREIGN | TOTAL |
|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 173 | 91 | 264 |
| Subgrade Preparation | m2 | 22 | 11 | 33 |
| Normal Fill | m3 | 1,792 | 863 | 2,655 |
| Fill in Swamp | m3 | 2,637 | 1,052 | 3,689 |
| Normal Excavation to Spoil | m3 | 1,047 | 522 | 1,569 |
| Sub Base Course | m3 | 3,363 | 1,347 | 4,710 |
| Base Course | m3 | 4,622 | 2,299 | 6,921 |
| Shoulder | m2 | 313 | 146 | 459 |
| Asphalt Patching | m2 | 3,728 | 1,377 | 5,105 |
| Surface Dressing (Single) | m2 | 616 | 595 | 1,211 |
| Surface Dressing (Double) | m2 | 771 | 936 | 1,707 |
| Earth Drain | m | 870 | 119 | 989 |
| Earth Drain in Swamp (by machine) | m3 | 1,256 | 474 | 1,730 |
| Pipe Culvert D80cm | m | 44,520 | 42,161 | 86,681 |
| Masonry Culvert (80x80cm) | m | 60,401 | 36,609 | 97,010 |
| Retaining Wall and Wing Wall (Timber) | m2 | 9,691 | 246 | 9,937 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 44,050 | 11,678 | 55,728 |
| Gabion Protection | m3 | 11,979 | 120 | 12,099 |
| Manual routine maintenance of road | Km | 140,672 | 7,248 | 147,920 |
| Routine maintenance of earth road | Km | 100,214 | 37,904 | 138,118 |
| Routine maintenance of gravel road | Km | 202,224 | 88,047 | 290,271 |
| Routine maintenance of asphalt road | Km | 372,800 | 137,700 | 510,500 |

### 4.2.2 Bridges

The unit construction costs by bridge type including the cost of demolition of existing bridges are shown in Table 4-2-2.

Table 4-2-2 BRIDGE COST

PROV : KALIMANTAN SELATAN KAB : BANJAR

(Rp)

| ITEM | UNIT | LOCAL | FOREIGN | TOTAL |
|---|---|---|---|---|
| Superstructure (Timber;Span 3m;10T) | m2 | 36,412 | 4,083 | 40,495 |
| Superstructure (Timber;Span 5m;10T) | m2 | 40,332 | 4,508 | 44,840 |
| Superstructure (Timber;Span 8m;10T) | m2 | 53,420 | 5,921 | 59,341 |
| Superstructure (Timber;Span 3m;BM50) | m2 | 45,149 | 5,048 | 50,197 |
| Superstructure (Timber;Span 5m;BM50) | m2 | 49,290 | 5,469 | 54,759 |
| Superstructure (Timber;Span 8m;BM50) | m2 | 62,512 | 6,923 | 69,435 |
| Superstructure (Concrete;Span 3m;BM50) | m2 | 43,442 | 85,218 | 128,660 |
| Superstructure (Concrete;Span 5m;BM50) | m2 | 44,766 | 95,130 | 139,896 |
| Superstructure (Concrete;Span 8m;BM50) | m2 | 46,228 | 103,557 | 149,785 |
| Superstructure (Concrete;Span10m;BM50) | m2 | 50,653 | 117,519 | 168,172 |
| Superstructure (Concrete;Span15m;BM50) | m2 | 54,835 | 138,305 | 193,140 |
| Substructure (Pier;for Timber;10T) | NO | 317,235 | 37,989 | 355,224 |
| Substructure (Abut;for Timber;10T) | NO | 913,669 | 171,942 | 1,085,611 |
| Substructure (Pier;for Timber;BM50) | NO | 466,567 | 56,232 | 522,799 |
| Substructure (Abut;for Timber;BM50) | NO | 1,026,452 | 192,037 | 1,218,489 |
| Substructure (Pier;for Concrete;BM50) | NO | 1,647,543 | 467,119 | 2,114,662 |
| Substructure (Abut;for Concrete;BM50) | NO | 3,478,338 | 982,678 | 4,461,016 |
| Demolition of Bridge (Timber->Timber) | m2 | 10,350 | 1,551 | 11,901 |
| Demolition of Bridge (Timber->Concrete) | m2 | 10,350 | 1,551 | 11,901 |
| Demolition of Bridge (Concrete) | m2 | 77,433 | 67,135 | 144,568 |
| Maintenance of Timber Bridge (New) | m2 | 6,882 | 1,232 | 8,114 |
| Maintenance of Concrete Bridge (New) | m2 | 1,759 | 2,656 | 4,415 |
| Maintenance of Timber Bridge (Exist) | m2 | 7,507 | 2,460 | 9,967 |
| Maintenance of Concrete Bridge (Exist) | m2 | 4,417 | 2,375 | 6,792 |

## Chapter 5 RESULTS OF ECONOMIC FEASIBILITY EVALUATION

### 5.1 Preliminary Screening

The road links to be improved should be effective for development of the Project Area. The road links where improvements were assumed to be inefficient for development of the Project Area were generally screened out using the following cut-off criteria.

(1) Very short roads, less than 2 Km long, which have no connection with the trunk road network.

(2) Roads not connected to the network at any point

(3) Unpreferred roads, due to poor suitability for transportation compared to other existing alternative roads serving the same purpose.

(4) Road in good condition according to the Bina Marga road inventory which lists improvement projects carried out in the last two or three years

(5) Roads with asphalt surface in good condition

(6) Urban roads, except those forming part of a longer route

(7) Roads serving single large organizations rather than the general public

(8) Roads with no inventory data

(9) Kabupaten roads also assigned as provincial roads

The road links to be screened out in Kabupaten Banjar are shown in Table 5-1-1.

Table 5-1-1 ROAD LINKS TO BE SCREENED OUT

KABUPATEN : BANJAR

| CRITERIA NO | ROAD LINK NO |
|---|---|
| (1) | 14,39,41,49,50,81,85 |
| (2) | 43,47,48,51,52,53,77,78,79 |
| (3) | 65,66,68,74 |
| (4) | 15,17,18 |

## 5.2 Evaluation

### 5.2.1 Primary Analysis

The Kabupaten roads were classified by using the future traffic volume on the road links in 1998. The primary analysis of the IRR was carried out using the construction and maintenance costs. Road links where IRRs were more than 10% were defined as feasible links.

Results of primary analysis are shown in Table 5-2-1.

### 5.2.2 Secondary Analysis

From the infeasible road links evaluated by the primary analysis, road links where the IRRs were between 1% and 10%, i.e. road links which could become feasible if down graded by one rank, in classification were down graded and the costs re-estimated. Using these costs, a secondary analysis of IRR was carried out. Road links where these IRRs were then more than 10% were also defined as feasible links. This reflected that even though the road classification was rather low the road link should be improved.

Results of secondary analysis are shown in Table 5-2-2.

### 5.2.3 Ranking of Feasible Road Links

From the results of the primary and secondary analysis, road links where the IRRs were more than 10% were selected and their NPVs and B/Cs were estimated. The ranking of feasible road links from the economic evaluation are decided in the order of the NPVs, i.e. the larger the NPV the higher the road link priority as shown in Table 5-2-3.

Table 5-2-1 (1) RESULTS OF PRIMARY ANALYSIS

PROVINCE : KALIMANTAN SELATAN KABUPATEN : BANJAR

| LINK NO | LENGTH | CLASS | IRR(%) | REMARK |
|---|---|---|---|---|
| 51 | 7 Km | IIIA | 55.569 | Surplus |
| 4 | 11 Km | IIIA | 43.413 | Surplus |
| 20 | 5 Km | IIIB-2 | 37.308 | VOC |
| 34 | 9 Km | IIIB-2 | 36.061 | VOC |
| 84 | 3 Km | IIIB-1 | 31.080 | VOC |
| 85 | 2 Km | IIIB-1 | 27.740 | VOC |
| 24 | 6 Km | IIIA | 27.582 | VOC |
| 21 | 2 Km | IIIB-1 | 25.151 | VOC |
| 46 | 4 Km | IIIB-1 | 24.892 | VOC |
| 80 | 10 Km | IIIB-1 | 24.283 | VOC |
| 82 | 4 Km | IIIB-1 | 23.611 | VOC |
| 67 | 6 Km | IIIA | 21.922 | Surplus |
| 36 | 12 Km | IIIA | 19.492 | VOC |
| 44 | 4 Km | IIIA | 17.812 | Surplus |
| 73 | 8 Km | IIIB-1 | 17.471 | Surplus |
| 38 | 11 Km | IIIB-1 | 17.201 | Surplus |
| 35 | 6 Km | IIIA | 16.956 | VOC |
| 30 | 5 Km | IIIB-2 | 15.779 | Surplus |
| 61 | 10 Km | IIIA | 15.216 | Surplus |
| 1 | 5 Km | IIIA | 14.421 | VOC |
| 40 | 7 Km | IIIB-1 | 13.274 | Surplus |
| 69 | 2 Km | IIIB-1 | 13.217 | Surplus |
| 27 | 6 Km | IIIA | 13.158 | Surplus |
| 11 | 8 Km | IIIB-1 | 11.297 | Surplus |
| 70 | 2 Km | IIIA | 9.975 | VOC |
| 29 | 5 Km | IIIB-1 | 8.983 | Surplus |
| 71 | 4 Km | IIIB-1 | 8.524 | VOC |
| 19 | 3 Km | IIIB-2 | 8.475 | Surplus |
| 3 | 10 Km | IIIA | 7.411 | VOC |
| 63 | 3 Km | IIIB-1 | 6.792 | Surplus |
| 57 | 6 Km | IIIB-1 | 6.516 | Surplus |
| 52 | 2 Km | IIIB-1 | 5.746 | Surplus |
| 53 | 2 Km | IIIA | 5.380 | Surplus |
| 23 | 9 Km | IIIB-1 | 5.212 | Surplus |
| 5 | 3 Km | IIIA | 4.963 | VOC |
| 37 | 6 Km | IIIB-2 | 4.953 | Surplus |
| 9 | 5 Km | IIIB-1 | 4.588 | VOC |
| 64 | 2 Km | IIIB-2 | 3.480 | Surplus |
| 8 | 11 Km | IIIB-1 | 2.290 | VOC |
| 83 | 3 Km | IIIB-2 | 1.715 | Surplus |
| 59 | 4 Km | IIIB-1 | 0.636 | Surplus |
| 75 | 3 Km | IIIB-1 | 0.210 | VOC |
| 54 | 2 Km | IIIB-2 | 0.078 | Surplus |
| 55 | 5 Km | IIIB-1 | 0.078 | VOC |
| 56 | 3 Km | IIIB-2 | 0.078 | VOC |
| 31 | 6 Km | IIIA | 0.078 | VOC |
| 58 | 3 Km | IIIB-2 | 0.078 | VOC |
| 32 | 5 Km | IIIA | 0.078 | VOC |
| 60 | 5 Km | IIIB-2 | 0.078 | Surplus |
| 33 | 5 Km | IIIA | 0.078 | VOC |

Table 5-2-1 (2) RESULTS OF PRIMARY ANALYSIS

PROVINCE : KALIMANTAN SELATAN KABUPATEN : BANJAR

| LINK NO | LENGTH | CLASS | IRR(%) | REMARK |
|---|---|---|---|---|
| 62 | 2 Km | IIIB-1 | 0.078 | Surplus |
| 6 | 7 Km | IIIB-1 | 0.078 | VOC |
| 10 | 7 Km | IIIB-1 | 0.078 | VOC |
| 22 | 4 Km | IIIB-2 | 0.078 | Surplus |
| 7 | 8 Km | IIIB-2 | 0.078 | VOC |
| 12 | 3 Km | IIIB-2 | 0.078 | VOC |
| 25 | 4 Km | IIIB-2 | 0.078 | VOC |
| 72 | 3 Km | IIIB-2 | 0.078 | Surplus |
| 42 | 3 Km | IIIB-2 | 0.078 | Surplus |
| 26 | 3 Km | IIIB-1 | 0.078 | VOC |
| 76 | 3 Km | IIIB-2 | 0.078 | Surplus |
| 77 | 3 Km | IIIB-2 | 0.078 | Surplus |
| 78 | 3 Km | IIIB-2 | 0.078 | Surplus |
| 79 | 7 Km | IIIB-2 | 0.078 | Surplus |
| 45 | 3 Km | IIIB-2 | 0.078 | Surplus |
| 81 | 2 Km | IIIB-2 | 0.078 | Surplus |
| 13 | 3 Km | IIIB-1 | 0.078 | VOC |
| 28 | 4 Km | IIIB-1 | 0.078 | VOC |
| 16 | 4 Km | IIIB-1 | 0.078 | VOC |
| 2 | 8 Km | IIIB-1 | 0.078 | VOC |

Table 5-2-2 RESULTS OF SECONDARY ANALYSIS

PROVINCE : KALIMANTAN SELATAN KABUPATEN : BANJAR

| LINK NO | LENGTH | CLASS | IRR(%) | REMARK |
|---|---|---|---|---|
| 70 | 2 Km | IIIB-1 | 15.866 | VOC |
| 3 | 10 Km | IIIB-1 | 15.003 | VOC |
| 29 | 5 Km | IIIB-2 | 14.941 | Surplus |
| 71 | 4 Km | IIIB-2 | 14.706 | VOC |
| 19 | 3 Km | IIIC | 12.453 | Surplus |
| 63 | 3 Km | IIIB-2 | 10.955 | Surplus |
| 23 | 9 Km | IIIB-2 | 9.438 | Surplus |
| 53 | 2 Km | IIIB-1 | 9.143 | Surplus |
| 5 | 3 Km | IIIB-1 | 8.661 | VOC |
| 37 | 6 Km | IIIC | 7.573 | Surplus |
| 9 | 5 Km | IIIB-2 | 7.209 | VOC |
| 52 | 2 Km | IIIB-2 | 6.466 | Surplus |
| 57 | 6 Km | IIIB-2 | 6.391 | Surplus |
| 64 | 2 Km | IIIC | 6.049 | Surplus |
| 83 | 3 Km | IIIC | 5.212 | Surplus |
| 8 | 11 Km | IIIB-2 | 1.222 | VOC |

Table 5-2-3 RANKING OF FEASIBILITY ROAD LINKS

PROVINCE : KALIMANTAN SELATAN KABUPATEN : BANJAR

| LINK NO | LENGTH | CLASS | NPV (1000Rp) | B/C | IRR (%) | REMARK |
|---|---|---|---|---|---|---|
| 51 | 7 Km | IIIA | 561066 | 3.522 | 55.569 | Surplus |
| 4 | 11 Km | IIIA | 453398 | 2.616 | 43.413 | Surplus |
| 67 | 6 Km | IIIA | 158170 | 1.599 | 21.922 | Surplus |
| 80 | 10 Km | IIIB-1 | 151097 | 1.653 | 24.283 | VOC |
| 36 | 12 Km | IIIA | 98951 | 1.396 | 19.492 | VOC |
| 61 | 10 Km | IIIA | 85309 | 1.243 | 15.216 | Surplus |
| 24 | 6 Km | IIIA | 84875 | 1.683 | 27.582 | VOC |
| 44 | 4 Km | IIIA | 82809 | 1.348 | 17.812 | Surplus |
| 38 | 11 Km | IIIB-1 | 67691 | 1.321 | 17.201 | Surplus |
| 73 | 8 Km | IIIB-1 | 62361 | 1.338 | 17.471 | Surplus |
| 34 | 9 Km | IIIB-2 | 49529 | 1.746 | 36.061 | VOC |
| 82 | 4 Km | IIIB-1 | 48988 | 1.628 | 23.611 | VOC |
| 84 | 3 Km | IIIB-1 | 48754 | 1.961 | 31.080 | VOC |
| 20 | 5 Km | IIIB-2 | 47532 | 2.097 | 37.308 | VOC |
| 46 | 4 Km | IIIB-1 | 41996 | 1.638 | 24.892 | VOC |
| 35 | 6 Km | IIIA | 37461 | 1.270 | 16.956 | VOC |
| 3 | 10 Km | IIIB-1 | 30269 | 1.185 | 15.003 | VOC |
| 1 | 5 Km | IIIA | 26867 | 1.177 | 14.421 | VOC |
| 85 | 2 Km | IIIB-1 | 25482 | 1.718 | 27.740 | VOC |
| 21 | 2 Km | IIIB-1 | 24713 | 1.665 | 25.151 | VOC |
| 40 | 7 Km | IIIB-1 | 16461 | 1.130 | 13.274 | Surplus |
| 27 | 6 Km | IIIA | 15599 | 1.124 | 13.158 | Surplus |
| 30 | 5 Km | IIIB-2 | 14035 | 1.248 | 15.779 | Surplus |
| 29 | 5 Km | IIIB-2 | 12943 | 1.195 | 14.941 | Surplus |
| 70 | 2 Km | IIIB-1 | 9119 | 1.244 | 15.866 | VOC |
| 71 | 4 Km | IIIB-2 | 8978 | 1.192 | 14.706 | VOC |
| 11 | 8 Km | IIIB-1 | 6034 | 1.050 | 11.297 | Surplus |
| 69 | 2 Km | IIIB-1 | 5039 | 1.133 | 13.217 | Surplus |
| 19 | 3 Km | IIIC | 2481 | 1.084 | 12.453 | Surplus |
| 63 | 3 Km | IIIB-2 | 2024 | 1.041 | 10.955 | Surplus |
| SUM | 180 Km | | 2280031 | | | |

## Chapter 6 IMPLEMENTATION PROGRAMME

### 6.1 Implementation Schedule

#### 6.1.1 Project Cost

The total Project Cost for the Kabupaten is composed of the cost of construction and maintenance, supplementation as described later, and workshop, laboratory and survey equipment. The total Project Cost for the Kabupaten is summarized in Table 6-1-1.

Table 6-1-1 TOTAL PROJECT COST (1)

KABUPATEN: Banjar

($Rpx10^6$)

| COST | FOREIGN CURRENCY | LOCAL CURRENCY | TOTAL |
|---|---|---|---|
| CONSTRUCTION | 1,064 | 2,016 | 3,080 |
| MAINTENANCE | 162 | 562 | 724 |
| SUPPLEMENTATION | 508 | - | 508 |
| WORKSHOP EQUIPMENT & TOOLS | 28 | - | 28 |
| LABORATORY EQUIPMENT | 12 | - | 12 |
| SURVEY EQUIPMENT | 5 | - | 5 |
| TOTAL | 1,779 | 2,578 | 4,357 |

The total Project Cost can be divided into costs as shown in Table 6-1-2.

Table 6-1-2 TOTAL PROJECT COST (2)

($Rpx10^6$)

| COST | FOREIGN CURRENCY | LOCAL CURRENCY | TOTAL |
|---|---|---|---|
| CIVIL WORK | 638 | 2,560 | 3,198 |
| CONSTRUCTION & MAINTENANCE EQUIPMENT | 1,023 | - | 1,023 |
| SPARE PARTS | 73 | 18 | 91 |
| WORKSHOP/LABORATORY/SURVEY EQUIPMENT | 45 | - | 45 |
| TOTAL | 1,779 | 2,578 | 4,357 |

The cost for civil work is composed of the cost of labour and materials, operation cost excluding spare parts, indirect cost and transportation cost of equipment, and ownership cost for existing equipment.

### 6.1.2 Proposed Road Links

#### (1) Road Link to be Improved

The road links to be improved were generally selected taking into consideration the following criteria:

(1) Feasible road links
- Feasible road links from the primary evaluation
- Feasible road links from the secondary evaluation

(2) Road links selected from the engineering points of view

(3) Road links selected because of basic human needs.

The road links finally proposed to be improved in the Kabupaten are the 35 links with the total length of 205 km which is 51% of the 403 km total length of Kabupaten roads studied. The proposed road links are shown in Table 6-1-3.

Table 6-1-3 ROAD LINKS TO BE IMPROVED

KABUPATEN : BANJAR

| REASON FOR SELECTION | ROAD LINK NO |
|---|---|
| Feasible | |
| - Primary | 1,4,11,20,21,24,27,30,34,35,36, 38,40,44,46,51,61,67,69,73,80, 82,84,85 |
| - Secondary | 3,19,29,63,70,71 |
| Engineering Point of View | 5,6,7,26,28 |
| Basic Human Needs | - |

As the table shows all feasible road links are proposed to be improved.

Five key road links which are located at the strategic point to complete the local road network consisting of feasible road links, are selected from the engineering points of view.

The order of proceeding with the improvement of the proposed road links are decided as shown in Table 6-1-4.

Table 6-1-4 ROAD LINKS TO BE IMPROVED BY YEAR

PROV : KALIMANTAN SELATAN KAB : BANJAR

| YEAR | LINK NO ( ) : rate |
|---|---|
| 1988 | 24, 26, 34, 51 |
| 1989 | 3, 20, 21, 35, 38, 44 |
| 1990 | 4, 5, 6, 36, 70, 73, 82 |
| 1991 | 1, 7, 19, 28, 40, 46, 67, 80, 84, 85 |
| 1992 | 11, 27, 29, 30, 61, 63, 69, 71 |

# KAB. BANJAR

## CONSTRUCTION PROGRAMME

| ROAD LINK NUMBER | FISCAL YEAR 1988/89 | 1989/90 | 1990/91 | 1991/92 | 1992/93 |
|---|---|---|---|---|---|
| 24,25,26,51 | 253 | | | | |
| 05,20,21 | | 518 | | | |
| 38,39,44 | | | | | |
| 04,03,06 | | | 380 | | |
| 69,70,79,82 | | | | | |
| 01,07,19,28,40 | | | | | |
| 45,67,80,84,86 | | | | 814 | |
| 11,27,29,30 | | | | | |
| 31,33,69,71 | | | | | 688 |
| TOTAL COST ($10^6$ Rp.) | 305 | 618 | 685 | 814 | 688 |

KAB. TAPIN
KAB BARITO KUALA
KEC. SIMPANG EMPAT
KAB KOTA BARU
KEC. SUNGAI PINANG
KODYA BANJAR MASIN
KEC. SUNGAI TABUK
KEC. ASTAMBUL
KEC. PENGARON
KEC. KERTAK HANYAR
KEC. MARTA PURA
KEC. LANDASAN ULIN
KEC. GAMBUT
KEC. BANJAR BARU
KEC. ALUH ALUH
KEC. CEMPAKA
KEC. KARANG INTAN
KAB. TANAH LAUT
DANAU RIAM KANAN

REMO, RANTAU BUJUR, PARAMASAN, LOK TANU, ANGKIPIH, BELIMBING BARU, BELIMBING, RANTAU BAKULA, RANTAU NANGKA, SUNGAI PINANG, KE RANTAU, PAKU, TUNGKAP, BENUA HANYAR, GALAMBABAH, ALALAK PADANG, KERAMAT MINA, CINTA PURI, SUNGKAI, LIMAU MARET, SIMPANG PAKU, GUNUNG BATU, MADU REJO, BINUANG, BALAIMADU, KERTAK EMPAT, ANTARAKU, BENTENG, PENGARON, SUNGAIRAYA, SEILANGSAT, LOK TUNG GUL, LOBANG BARU, MANIAPUN, ATIIM, SUMBER BARU, ALI MUKIN, KAHELAAN, KAMPUNG BARU, RANTAU BALAI, RANTAU BUJUR, PAAU, APUAI, TELUK DALAM/ANAWIT, BUNGLAI, BENUA RIAM, ARTAIN, KALAAN BARU, MENUNGGUL, TIWINGAN, ARANIO, PUNCAK KOLAM, AWANG BANGKAL, MANDI ANGIN, SIMPANG 4 MANDI ANGIN, CEMPAKA, BANGKAL, TRANSPOL LOKAL, TRANSAD-PALAM, PALAM, SUNGAI SALAK, TRANSAD, PENDARAPAN, GUNTUNG MANGGIS, GUNTUNG PAYUNG, BAJAR BARU, BANJAR BARU, MARTA PURA, SEI PERING SEI SPAI, TUNGGAL, ASTAMBUL, PINGARAN, BINCAU, MALIMALI, SEKUMPUL, DIDIKLAT, KARANG INTAN, PENAMBARAN SEI ASAM, S. RIAM KANAN, SEILANG, MANDI KARU, LOK TANGGA, KARANG ANYAR, PANDAK DAUN, LIRUNG, BIIH, S. RIAM KIWA, SUNGAI BATANG, DALAM PAGAR, DANAU SALAK, SUNGAI ALAT, PASAR-JAYA, KELAMPAYAN, KELAMPAYAN ULU, KELIKIAN, PEMATANG DANAU, TAMBAK DANAU, KELAMPAK KILIR, SELAM, MATARAMAN, S. MATA PURA, JARANG KUANTAN TANGKAS, SUNGAI RANGAS, FANGGALAM, KELILING BENTENG, GUDANG HIKANG, KERAMAT PENYAMBUAN, LOK BAINTAN, SUNGAI PINANG, LOK BUNTAR PAKU ALAM, ATASAN SUTUN, HANDIL, MANARAP BARU, SUNGAI LULUT, KE BANJARMASIN, KERTAK HANYAR, SUNGAI TABUK, MANARAP BARU, HANDIL KE-LUA, SIMPANG EMPAT, TATAH PAKALANG, KE BANJARMASIN, HANDIL MANARAP LAMA, TATAH PALATAR, TATAH BANGKAL, TATAH LAYAP, TAIBAH BARU, PASAR KEMIS, SUNGAI LA KUM, BANYU HIRANG, GAMBUT, KAYU-BAWANG, MALINTANG, PODOK, TAMPANG AWANG, ALUH ALUH KEC., BUNIPAN, PS ARBA, TAMBAK SIRANG, TAMBAK SIRANG-DARAT, ALUH ALUH, SIMPANG WARGA, KABUAU, GUNTUNG PAPUYU, JAMBU BUNUNG, SEI KUPANG, HANDIL JAWA, TAMBAK PADI, YANIPAH, LABAT MUARA, KEC. ALUH ALUH, PINDAHAN BARU, BAKAMBAT, BATAS KURAU, LAWAHAN, HANDIL PURAI, BABIRIK, KE PELAIHARI, KE PELAIHARI

SCALE : 0 2 5 10 Km

LOCATION MAP

LEGEND :
- KABUPATEN CAPITAL
- KECAMATAN CAPITAL
- OTHER CITY
- LINK NUMBER
- PROVINCIAL BOUNDARY
- KABUPATEN BOUNDARY
- KECAMATAH BOUNDARY
- NATIONAL ROAD
- PROVINCIAL ROAD
- KABUPATEN ROAD
- VILLAGE ROAD
- RIVER

THE FEASIBILITY STUDY OF THE LOCAL ROAD DEVELOPMENT IN THE REPUBLIC OF INDONESIA

TITLE : CONSTRUCTION PROGRAMME

SOURCE: DIREKTORAT JENDERAL AGRARIA
SCALE: AS SHOWN
PROVINCE: KALIMANTAN SELATAN
KABUPATEN: BANJAR

(2) Road Links to Be Maintained

It is desirable that all Kabupaten roads are maintained. However, because of the limited budget it is inevitable that some road links in the Kabupatens will be left without maintenance for the time being. The budget should be used for those which are effective in producing more useful development of the Kabupaten through the road development project. The road links to be maintained are finally proposed as shown in Table 6-1-5.

Table 6-1-5 ROAD LINKS TO BE MAINTAINED

PROV : KALIMANTAN SELATAN KAB : BANJAR

( 1000Rp )

| LINK NO | LENGTH (Km) | BA (%) | BO (%) | RU (%) | RB (%) | ASPHAL (Km) | GRAVEL (Km) | EARTH (Km) | TH NO | AREA (m2) | RC NO | AREA (m2) | BRIDGE COST | LOCAL COST | FOREIGN COST | TOTAL COST |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 8 | 36.3 | 39.4 | 24.4 | 0.0 | 0 | 8 | 0 | 4 | 84.00 | 0 | 0.00 | 837 | 3,374 | 969 | 4,343 |
| 3 | 10 | 53.0 | 34.5 | 12.5 | 0.0 | 0 | 10 | 0 | 10 | 201.00 | 0 | 0.00 | 2,003 | 4,938 | 1,447 | 6,385 |
| 4 | 11 | 17.7 | 38.2 | 40.0 | 4.1 | 0 | 11 | 0 | 18 | 602.00 | 0 | 0.00 | 6,000 | 8,291 | 2,529 | 10,820 |
| 5 | 3 | 28.3 | 33.3 | 38.3 | 0.0 | 0 | 3 | 0 | 6 | 112.00 | 0 | 0.00 | 1,116 | 1,869 | 561 | 2,430 |
| 6 | 7 | 62.9 | 17.1 | 20.0 | 0.0 | 0 | 7 | 0 | 7 | 106.00 | 0 | 0.00 | 1,057 | 3,196 | 928 | 4,124 |
| 8 | 11 | 59.5 | 21.4 | 19.1 | 0.0 | 1 | 10 | 0 | 4 | 72.00 | 0 | 0.00 | 718 | 4,483 | 1,275 | 5,758 |
| 9 | 5 | 0.0 | 63.0 | 36.0 | 1.0 | 0 | 5 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 1,714 | 476 | 2,190 |
| 10 | 7 | 52.9 | 37.9 | 9.3 | 0.0 | 0 | 7 | 0 | 1 | 32.00 | 0 | 0.00 | 319 | 2,640 | 746 | 3,386 |
| 12 | 3 | 95.0 | 5.0 | 0.0 | 0.0 | 2 | 1 | 0 | 3 | 56.00 | 0 | 0.00 | 558 | 1,790 | 523 | 2,313 |
| 13 | 3 | 36.7 | 55.0 | 8.3 | 0.0 | 3 | 0 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 1,540 | 435 | 1,975 |
| 14 | 2 | 95.0 | 5.0 | 0.0 | 0.0 | 2 | 0 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 1,027 | 290 | 1,317 |
| 15 | 6 | 95.0 | 5.0 | 0.0 | 0.0 | 6 | 0 | 0 | 1 | 24.00 | 0 | 0.00 | 239 | 3,261 | 929 | 4,190 |
| 16 | 4 | 71.5 | 8.5 | 20.0 | 0.0 | 4 | 0 | 0 | 1 | 16.00 | 0 | 0.00 | 159 | 2,174 | 619 | 2,793 |
| 17 | 7 | 91.4 | 8.6 | 0.0 | 0.0 | 7 | 0 | 0 | 5 | 128.00 | 0 | 0.00 | 1,276 | 4,555 | 1,330 | 5,885 |
| 18 | 5 | 95.2 | 4.8 | 0.0 | 0.0 | 5 | 0 | 0 | 2 | 28.25 | 0 | 0.00 | 282 | 2,779 | 791 | 3,573 |
| 21 | 2 | 0.0 | 55.0 | 45.0 | 0.0 | 0 | 0 | 2 | 1 | 28.00 | 0 | 0.00 | 279 | 692 | 159 | 851 |
| 23 | 9 | 32.2 | 21.1 | 46.7 | 0.0 | 1 | 8 | 0 | 4 | 112.00 | 0 | 0.00 | 1,116 | 4,097 | 1,183 | 5,280 |
| 24 | 6 | 75.8 | 0.0 | 24.2 | 0.0 | 0 | 6 | 0 | 7 | 296.00 | 1 | 48.00 | 3,276 | 4,491 | 1,414 | 5,905 |
| 25 | 4 | 73.8 | 18.8 | 7.5 | 0.0 | 0 | 3 | 1 | 3 | 184.00 | 0 | 0.00 | 1,834 | 2,651 | 784 | 3,435 |
| 26 | 3 | 56.7 | 30.0 | 13.3 | 0.0 | 0 | 3 | 0 | 6 | 132.00 | 0 | 0.00 | 1,316 | 2,020 | 611 | 2,631 |
| 27 | 6 | 75.0 | 19.2 | 5.8 | 0.0 | 0 | 4 | 2 | 5 | 194.00 | 0 | 0.00 | 1,934 | 3,310 | 949 | 4,259 |
| 28 | 4 | 80.0 | 0.0 | 20.0 | 0.0 | 0 | 4 | 0 | 2 | 32.00 | 0 | 0.00 | 319 | 1,612 | 460 | 2,072 |
| 31 | 6 | 84.2 | 10.8 | 5.0 | 0.0 | 6 | 0 | 0 | 5 | 184.00 | 0 | 0.00 | 1,834 | 4,462 | 1,322 | 5,784 |
| 32 | 5 | 84.0 | 11.0 | 5.0 | 0.0 | 5 | 0 | 0 | 3 | 132.00 | 0 | 0.00 | 1,316 | 3,558 | 1,049 | 4,607 |
| 33 | 5 | 73.0 | 17.0 | 8.0 | 2.0 | 5 | 0 | 0 | 4 | 124.00 | 0 | 0.00 | 1,236 | 3,498 | 1,030 | 4,528 |
| 40 | 7 | 0.0 | 71.4 | 26.4 | 2.1 | 0 | 7 | 0 | 7 | 107.00 | 0 | 0.00 | 1,066 | 3,204 | 930 | 4,134 |
| 41 | 1 | 0.0 | 75.0 | 20.0 | 5.0 | 0 | 1 | 0 | 1 | 18.00 | 0 | 0.00 | 179 | 478 | 140 | 618 |
| 50 | 2 | 10.0 | 82.5 | 5.0 | 2.5 | 0 | 2 | 0 | 2 | 66.00 | 0 | 0.00 | 658 | 1,181 | 353 | 1,534 |
| 54 | 2 | 70.0 | 0.0 | 30.0 | 0.0 | 0 | 0 | 2 | 0 | 0.00 | 0 | 0.00 | 0 | 482 | 90 | 572 |
| 56 | 3 | 50.0 | 20.0 | 30.0 | 0.0 | 0 | 0 | 3 | 4 | 45.00 | 0 | 0.00 | 449 | 1,060 | 246 | 1,306 |
| 58 | 3 | 0.0 | 60.0 | 40.0 | 0.0 | 0 | 3 | 0 | 3 | 66.00 | 0 | 0.00 | 658 | 1,524 | 448 | 1,972 |
| 72 | 3 | 0.0 | 70.0 | 30.0 | 0.0 | 0 | 3 | 0 | 2 | 36.00 | 0 | 0.00 | 359 | 1,299 | 374 | 1,673 |
| 75 | 3 | 3.3 | 81.7 | 15.0 | 0.0 | 0 | 3 | 0 | 2 | 56.00 | 0 | 0.00 | 558 | 1,449 | 424 | 1,873 |
| 77 | 3 | 8.3 | 58.3 | 33.3 | 0.0 | 0 | 0 | 3 | 0 | 0.00 | 0 | 0.00 | 0 | 723 | 135 | 858 |
| 82 | 4 | 0.0 | 56.3 | 43.8 | 0.0 | 0 | 0 | 4 | 0 | 0.00 | 0 | 0.00 | 0 | 964 | 181 | 1,145 |
| SUM | 173 | | | | | 47 | 109 | 17 | 123 | 3273.25 | 1 | 48.00 | 32,951 | 90,386 | 26,133 | 116,519 |

### 6.1.3 Annual Construction and Maintenance Cost

The annual allocation of the total construction and maintenance cost in the five years programme for Kabupaten Banjar is finally recommended as shown in Tables 6-1-6 (1), (2) and (3) for the construction, maintenance and total respectively.

The proposed construction cost is Rp 3,080 x $10^6$ and maintenance cost is Rp 724 x $10^6$ which is approximately 19% of the total expenditure.

Table 6-1-6 (1) CONSTRUCTION AND MAINTENANCE COST
(CONSTRUCTION)

PROV : KALIMANTAN SELATAN KAB : BANJAR

( UNIT : 1000Rp )

| ITEM | ( 1988 ) | ( 1989 ) | ( 1990 ) | ( 1991 ) | ( 1992 ) | ( TOTAL ) | |
|---|---|---|---|---|---|---|---|
| LOCAL CURRENCY : | 185,727 | 406,134 | 410,901 | 536,629 | 426,973 | 1,966,364 | (63.8%) |
| Ownership Cost | 1,869 | 3,780 | 4,788 | 5,815 | 5,250 | 21,502 | ( 1.1%) |
| Operation Cost | 75,238 | 153,383 | 194,850 | 240,287 | 216,984 | 880,742 | (44.8%) |
| Material Cost | 42,291 | 98,510 | 87,128 | 105,008 | 68,405 | 401,342 | (20.4%) |
| Labour Cost | 42,104 | 97,487 | 70,539 | 115,524 | 80,642 | 406,296 | (20.7%) |
| Contingency | 24,225 | 52,974 | 53,596 | 69,995 | 55,692 | 256,482 | (13.0%) |
| FOREIGN CURRENCY : | 109,160 | 212,448 | 274,114 | 278,182 | 240,011 | 1,113,915 | (36.2%) |
| Ownership Cost | 38,170 | 77,430 | 98,508 | 120,245 | 108,043 | 442,396 | (39.7%) |
| Operation Cost | 5,085 | 10,294 | 13,305 | 16,401 | 14,816 | 59,901 | ( 5.4%) |
| Material Cost | 51,667 | 97,013 | 126,547 | 105,251 | 85,846 | 466,324 | (41.9%) |
| Labour Cost | 0 | 0 | 0 | 0 | 0 | 0 | ( 0.0%) |
| Contingency | 14,238 | 27,711 | 35,754 | 36,285 | 31,306 | 145,294 | (13.0%) |
| TOTAL COST : | 294,888 | 618,582 | 685,015 | 814,811 | 666,984 | 3,080,280 | |
| Ownership Cost | 40,039 | 81,210 | 103,296 | 126,060 | 113,293 | 463,898 | (15.1%) |
| Operation Cost | 80,323 | 163,677 | 208,155 | 256,688 | 231,800 | 940,643 | (30.5%) |
| Material Cost | 93,958 | 195,523 | 213,675 | 210,259 | 154,251 | 867,666 | (28.2%) |
| Labour Cost | 42,104 | 97,487 | 70,539 | 115,524 | 80,642 | 406,296 | (13.2%) |
| Contingency | 38,464 | 80,685 | 89,350 | 106,280 | 86,998 | 401,777 | (13.0%) |

( Contingency : 15% )

Table 6-1-6 (2) CONSTRUCTION AND MAINTENANCE COST

(MAINTENANCE)

PROV : KALIMANTAN SELATAN KAB : BANJAR

( UNIT : 1000Rp )

| ITEM | ( 1988 ) | ( 1989 ) | ( 1990 ) | ( 1991 ) | ( 1992 ) | ( TOTAL ) | |
|---|---|---|---|---|---|---|---|
| LOCAL CURRENCY : | 43,553 | 98,447 | 115,574 | 139,712 | 164,512 | 561,798 | (77.6%) |
| Ownership Cost | 417 | 957 | 1,146 | 1,408 | 1,692 | 5,620 | ( 1.0%) |
| Operation Cost | 22,498 | 50,389 | 56,773 | 66,507 | 78,211 | 274,378 | (48.8%) |
| Material Cost | 2,742 | 6,446 | 8,309 | 10,781 | 12,022 | 40,300 | ( 7.2%) |
| Labour Cost | 17,896 | 40,655 | 49,346 | 61,016 | 72,587 | 241,500 | (43.0%) |
| FOREIGN CURRENCY : | 12,553 | 28,545 | 33,353 | 40,236 | 47,581 | 162,268 | (22.4%) |
| Ownership Cost | 10,019 | 22,514 | 25,376 | 29,763 | 34,951 | 122,623 | (75.6%) |
| Operation Cost | 1,069 | 2,385 | 2,683 | 3,129 | 3,694 | 12,960 | ( 8.0%) |
| Material Cost | 1,465 | 3,646 | 5,294 | 7,344 | 8,936 | 26,685 | (16.4%) |
| Labour Cost | 0 | 0 | 0 | 0 | 0 | 0 | ( 0.0%) |
| TOTAL COST : | 56,106 | 126,992 | 148,927 | 179,948 | 212,093 | 724,066 | |
| Ownership Cost | 10,436 | 23,471 | 26,522 | 31,171 | 36,643 | 128,243 | (17.7%) |
| Operation Cost | 23,567 | 52,774 | 59,456 | 69,636 | 81,905 | 287,338 | (39.7%) |
| Material Cost | 4,207 | 10,092 | 13,603 | 18,125 | 20,958 | 66,985 | ( 9.3%) |
| Labour Cost | 17,896 | 40,655 | 49,346 | 61,016 | 72,587 | 241,500 | (33.4%) |

Table 6-1-6 (3) CONSTRUCTION AND MAINTENANCE COST

(TOTAL)

PROV : KALIMANTAN SELATAN KAB : BANJAR

( UNIT : 1000Rp )

| ITEM | ( 1988 ) | ( 1989 ) | ( 1990 ) | ( 1991 ) | ( 1992 ) | ( TOTAL ) | |
|---|---|---|---|---|---|---|---|
| LOCAL CURRENCY : | 229,280 | 504,581 | 526,475 | 676,341 | 591,485 | 2,528,162 | (66.5%) |
| Ownership Cost | 2,286 | 4,737 | 5,934 | 7,223 | 6,942 | 27,122 | ( 1.1%) |
| Operation Cost | 97,736 | 203,772 | 251,623 | 306,794 | 295,195 | 1,155,120 | (45.7%) |
| Material Cost | 45,033 | 104,956 | 95,437 | 115,789 | 80,427 | 441,642 | (17.5%) |
| Labour Cost | 60,000 | 138,142 | 119,885 | 176,540 | 153,229 | 647,796 | (25.6%) |
| Contingency | 24,225 | 52,974 | 53,596 | 69,995 | 55,692 | 256,482 | (10.1%) |
| FOREIGN CURRENCY : | 121,713 | 240,993 | 307,467 | 318,418 | 287,592 | 1,276,183 | (33.5%) |
| Ownership Cost | 48,189 | 99,944 | 123,884 | 150,008 | 142,994 | 565,019 | (44.3%) |
| Operation Cost | 6,154 | 12,679 | 15,988 | 19,530 | 18,510 | 72,861 | ( 5.7%) |
| Material Cost | 53,132 | 100,659 | 131,841 | 112,595 | 94,782 | 493,009 | (38.6%) |
| Labour Cost | 0 | 0 | 0 | 0 | 0 | 0 | ( 0.0%) |
| Contingency | 14,238 | 27,711 | 35,754 | 36,285 | 31,306 | 145,294 | (11.4%) |
| TOTAL COST : | 350,994 | 745,574 | 833,942 | 994,759 | 879,077 | 3,804,346 | |
| Ownership Cost | 50,475 | 104,681 | 129,818 | 157,231 | 149,936 | 592,141 | (15.6%) |
| Operation Cost | 103,890 | 216,451 | 267,611 | 326,324 | 313,705 | 1,227,981 | (32.3%) |
| Material Cost | 98,165 | 205,615 | 227,278 | 228,384 | 175,209 | 934,651 | (24.6%) |
| Labour Cost | 60,000 | 138,142 | 119,885 | 176,540 | 153,229 | 647,796 | (17.0%) |
| Contingency | 38,464 | 80,685 | 89,350 | 106,280 | 86,998 | 401,777 | (10.6%) |

( Contingency : 15% )

### 6.1.4 Construction and Maintenance Equipment Cost

#### (1) Required Number of Equipment

The required numbers of construction equipment for Kabupaten Banjar are estimated from the annual proposed construction quantities as shown in Table 6-1-7.

The proposed numbers of equipment to be purchased are finally decided considering the following number of existing equipment in the Kabupaten which are available for the Project.

- 1-Steel Roller
- 2-Hand-guided Vibratory Roller
- 1-Asphalt Sprayer
- 2-Dump Truck

The proposed numbers of maintenance equipment have been decided as shown below from the proposed annual maintenance volume taking into account the capacity of the proposed maintenance gangs.

a. Equipment for Road Maintenance

- 1-Motor Grader 75 HP
- 1-Tire Roller 8-15 Ton
- 1-Dump Truck 3 Ton
- 1-Hand Guided Vibratory Roller 1000 Kg
- 1-Flat Bed Truck 3 Ton

b. Equipment for Bridge Maintenance

- 1-Flat Bed Truck with Grane 3 Ton

#### (2) Equipment Cost

The proposed construction and maintenance equipment and their purchase costs are shown in Table 6-1-8. In the Project the supplementation cost or equipment cost supplemented is the difference between the purchase cost for newly supplied equipment and the depreciated value.

This comes would not be completed within the Project Period of 5 years.

Table 6-1-7 REQUIRED NUMBER OF EQUIPMENT

PROV : KALIMANTAN SELATAN KAB : BANJAR

| EQUIPMENT NAME | WORKABLE | EXISTING | ( 1988 ) | ( 1989 ) | ( 1990 ) | ( 1991 ) | ( 1992 ) |
|---|---|---|---|---|---|---|---|
| Bulldozer/Ripper | 220 | 0 | 0.31 | 0.63 | 0.86 | 1.19 | 0.87 |
| Swamp Bulldozer | 220 | 0 | 0.00 | 0.00 | 0.00 | 0.09 | 0.17 |
| Motor Grader | 240 | 0 | 0.52 | 1.01 | 1.31 | 1.50 | 1.31 |
| Hand-guide Vib. Roller | 240 | 2 | 0.46 | 0.83 | 0.27 | 0.75 | 0.38 |
| Tire Roller | 220 | 0 | 0.47 | 0.96 | 1.31 | 1.06 | 0.84 |
| Vibratory Roller (D&T) | 240 | 0 | 0.38 | 0.73 | 0.95 | 1.18 | 1.10 |
| Hydraulic Excavator; Wheel | 220 | 0 | 0.00 | 0.00 | 0.00 | 1.30 | 1.68 |
| Wheel Loader | 240 | 0 | 0.81 | 1.68 | 2.21 | 2.59 | 2.25 |
| Water Tank Truck | 240 | 0 | 0.23 | 0.48 | 0.64 | 0.75 | 0.72 |
| Dump Truck | 240 | 0 | 6.03 | 12.21 | 15.67 | 19.01 | 17.50 |
| Flat Bed Truck with Crane | 240 | 0 | 0.33 | 0.79 | 0.23 | 0.76 | 0.34 |
| Flat Bed Truck | 240 | 0 | 0.60 | 1.34 | 1.53 | 1.41 | 1.05 |
| Portable Crusher/Screening | 240 | 1 | 0.20 | 0.39 | 0.52 | 0.45 | 0.41 |
| Concrete Mixer | 220 | 0 | 0.02 | 0.03 | 0.04 | 0.04 | 0.05 |
| Water Pump | 220 | 0 | 0.02 | 0.02 | 0.04 | 0.04 | 0.04 |
| Concrete Vibrator | 220 | 0 | 0.01 | 0.02 | 0.03 | 0.02 | 0.03 |
| Asphalt Sprayer | 220 | 1 | 0.47 | 0.96 | 1.31 | 1.06 | 0.84 |

NOTE WORKABLE : workable days in a year

EXISTING : number of existing equipment

Table 6-1-8 EQUIPMENT PURCHASE COST

PROV : KALIMANTAN SELATAN KAB : BANJAR

( 1000 Rp )

| EQUIPMENT NAME | CLASS | CIF (JAKARTA) | PURCHASE NO. | PURCHASE COST |
|---|---|---|---|---|
| Bulldozer | 90 HP | 49,150 | - | - |
| Bulldozer/Ripper | 90 HP | 53,000 | 1 | 53,000 |
| Swamp Bulldozer | 90 HP | 52,850 | - | - |
| Swamp Bulldozer | 65 HP | 40,500 | - | - |
| Motor Grader | 75 HP | 47,800 | 3 | 143,400 |
| Road Stabilizer | W=1850 mm | 85,950 | - | - |
| Hand-guide Vib. Roller | 1000 Kg | 8,500 | - | - |
| Tire Roller | 8-15 ton | 31,070 | 3 | 93,210 |
| Vibratory Roller (D&T) | 4 ton | 29,000 | - | - |
| Vibratory Roller | 4 ton | 29,000 | - | - |
| Rough Terrain Crane | 10 ton | 100,400 | - | - |
| Hydraulic Excavator; Wheel | 0.3 m3 | 41,100 | 1 | 41,100 |
| Wheel Loader | 1.2 m3 | 70,200 | 2 | 140,400 |
| Water Tank Truck | 4000 ltr. | 12,750 | 1 | 12,750 |
| Dump Truck | 3.0 ton | 14,700 | 16 | 235,200 |
| Dump Loader Truck | 12 ton | 56,300 | - | - |
| Flat Bed Truck with Crane | 3.0 ton | 25,190 | 2 | 50,380 |
| Flat Bed Truck | 3.0 ton | 11,275 | 2 | 22,550 |
| Portable Crusher/Screening | 30-40 t/h | 188,000 | 1 | 188,000 |
| Concrete Mixer | 0.5 m3 | 18,000 | - | - |
| Water Pump | 200 l/min | 630 | - | - |
| Concrete Vibrator | 3.3 HP | 740 | - | - |
| Asphalt Sprayer | 850 ltr. | 10,200 | 1 | 10,200 |
| Service Car | 3 ton | 11,600 | 1 | 11,600 |
| 4 Wheel Drive Vehicle | 70 HP | 17,500 | 1 | 17,500 |
| Motorcycle | 100 cc | 1,100 | 3 | 3,300 |

| | |
|---|---|
| PURCHASE COST TOTAL | 1,022,590 |
| OWNERSHIP COST (FOREIGN) | 514,616 |
| EQUIPMENT COST SUPPLEMENTED | 507,974 |

NOTE : OWNERSHIP COST (FOREIGN) for Existing Equipment

| | |
|---|---|
| Hand-guide Vib. Roller | 9,370 |
| Vibratory Roller (D&T) | 18,008 |
| Dump Truck | 19,923 |
| Asphalt Sprayer | 3,102 |
| TOTAL | 50,403 |

### 6.1.5 Other Costs

Cost other items includes the costs of workshop equipment and tools, laboratory test equipment and survey equipment which are recommended in Sub-Clause 3.5. These total costs are summarized in Table 6-1-1.

### 6.1.6 Quantities by Work Type

The annual construction and maintenance quantities for all proposed road links are shown in Table 6-1-9.

Table 6-1-9 CONSTRUCTION QUANTITIES FOR ALL PROPOSED LINKS

PROV : KALIMANTAN SELATAN KAB : BANJAR

| ITEM | UNIT | ( 1988 ) | ( 1989 ) | ( 1990 ) | ( 1991 ) | ( 1992 ) | ( TOTAL ) |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 8000.00 | 30000.00 | 23500.00 | 54000.00 | 46000.00 | 161500.00 |
| Subgrade Preparation | m2 | 52500.00 | 51000.00 | 87000.00 | 144780.00 | 99690.00 | 434970.00 |
| Normal Fill | m3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fill in Swamp | m3 | 0.00 | 0.00 | 0.00 | 3306.00 | 6519.00 | 9825.00 |
| Normal Excavation to Spoil | m3 | 5049.00 | 10083.00 | 19821.00 | 26099.00 | 14877.00 | 75929.00 |
| Sub Base Course | m3 | 5674.00 | 13008.50 | 16790.00 | 19453.00 | 17823.00 | 72748.50 |
| Base Course | m3 | 5160.00 | 11240.00 | 14720.00 | 13440.00 | 12400.00 | 56960.00 |
| Shoulder | m2 | 57000.00 | 101000.00 | 124500.00 | 155000.00 | 131000.00 | 568500.00 |
| Asphalt Patching | m2 | 2205.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2205.00 |
| Surface Dressing (Single) | m2 | 0.00 | 92000.00 | 68000.00 | 104000.00 | 40000.00 | 304000.00 |
| Surface Dressing (Double) | m2 | 55500.00 | 45000.00 | 103500.00 | 47000.00 | 69000.00 | 320000.00 |
| Earth Drain | m | 4200.00 | 22400.00 | 23900.00 | 23400.00 | 20100.00 | 94000.00 |
| Earth Drain in Swamp (by machine) | m3 | 0.00 | 0.00 | 0.00 | 22800.00 | 29400.00 | 52200.00 |
| Pipe Culvert D80cm | m | 62.00 | 98.00 | 170.00 | 144.00 | 179.00 | 653.00 |
| Masonry Culvert (80x80cm) | m | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 19.20 | 22.40 | 38.40 | 38.40 | 41.20 | 159.60 |
| Gabion Protection | m3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Superstructure (Timber;Span 3m;10T) | m2 | 0.00 | 0.00 | 12.00 | 0.00 | 12.00 | 24.00 |
| Superstructure (Timber;Span 5m;10T) | m2 | 0.00 | 0.00 | 128.00 | 228.00 | 32.00 | 388.00 |
| Superstructure (Timber;Span 8m;10T) | m2 | 0.00 | 0.00 | 0.00 | 52.00 | 28.00 | 80.00 |
| Superstructure (Timber;Span 3m;BM50) | m2 | 0.00 | 532.00 | 0.00 | 0.00 | 80.00 | 612.00 |
| Superstructure (Timber;Span 5m;BM50) | m2 | 308.00 | 52.00 | 0.00 | 108.00 | 60.00 | 528.00 |
| Superstructure (Timber;Span 8m;BM50) | m2 | 0.00 | 32.00 | 0.00 | 368.00 | 0.00 | 400.00 |
| Superstructure (Concrete;Span 3m;BM50) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Superstructure (Concrete;Span 5m;BM50) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Superstructure (Concrete;Span 8m;BM50) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Superstructure (Concrete;Span10m;BM50) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Superstructure (Concrete;Span15m;BM50) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Substructure (Pier;for Timber;10T) | NO | 0.00 | 0.00 | 5.00 | 8.00 | 1.00 | 14.00 |
| Substructure (Abut;for Timber;10T) | NO | 0.00 | 0.00 | 8.00 | 14.00 | 6.00 | 28.00 |
| Substructure (Pier;for Timber;BM50) | NO | 16.00 | 33.00 | 0.00 | 7.00 | 6.00 | 62.00 |
| Substructure (Abut;for Timber;BM50) | NO | 10.00 | 44.00 | 0.00 | 24.00 | 8.00 | 86.00 |
| Substructure (Pier;for Concrete;BM50) | NO | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Substructure (Abut;for Concrete;BM50) | NO | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Demolition of Bridge (Timber->Timber) | m2 | 159.70 | 334.50 | 60.00 | 77.60 | 122.00 | 753.80 |
| Demolition of Bridge (Timber->Concrete) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Demolition of Bridge (Concrete) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Manual routine maintenance of road | Km | 84.25 | 183.00 | 202.50 | 231.50 | 275.00 | 976.25 |
| Routine maintenance of earth road | Km | 8.50 | 16.00 | 13.00 | 11.00 | 10.00 | 58.50 |
| Routine maintenance of gravel road | Km | 52.25 | 107.00 | 96.50 | 87.50 | 95.00 | 438.25 |
| Routine maintenance of asphalt road | Km | 23.50 | 60.00 | 93.00 | 133.00 | 170.00 | 479.50 |
| Maintenance of Timber Bridge (New) | m2 | 0.00 | 0.00 | 308.00 | 616.00 | 448.00 | 1372.00 |
| Maintenance of Concrete Bridge (New) | m2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maintenance of Timber Bridge (Exist) | m2 | 1529.63 | 3583.75 | 3901.25 | 4573.75 | 5188.85 | 18777.23 |
| Maintenance of Concrete Bridge (Exist) | m2 | 12.00 | 48.00 | 48.00 | 48.00 | 48.00 | 204.00 |

## 6.2 Organization and Construction System

### 6.2.1 Organization

The Bupati as head of the Kabupaten has been authorized by Law No. 13, 1980 as an official responsible for the Local Road Development Project implementation. This means that the DPUK is considered as a responsible agency for the actual execution of the Project.

According to instruction letter dated June 24, 1982 Ref. No. 620/975-/BANGDA, the Project Manager appointed by the Bupati will be responsible for the operation and maintenance of the equipment. Accordingly the Equipment Coordinator appointed from the staff of the Regional Public Works (Kantor Wilayah) by Bina Marga as a coordinator between the Governor and the Bupati will be responsible for delivery, effectual utilization and maintenance of the equipment.

The standard organization of DPUK consists of a minimum of four sections, i.e. Road Section, Housing and City Planning Section, Irrigation Section and Administration Section. For execution of the Project it is strongly recommended that the structural organization of DPUK is established. It will be necessary not only to organize new sections but also to reorganize the current structure through a review of the roles and responsibilities of each inter-related section.

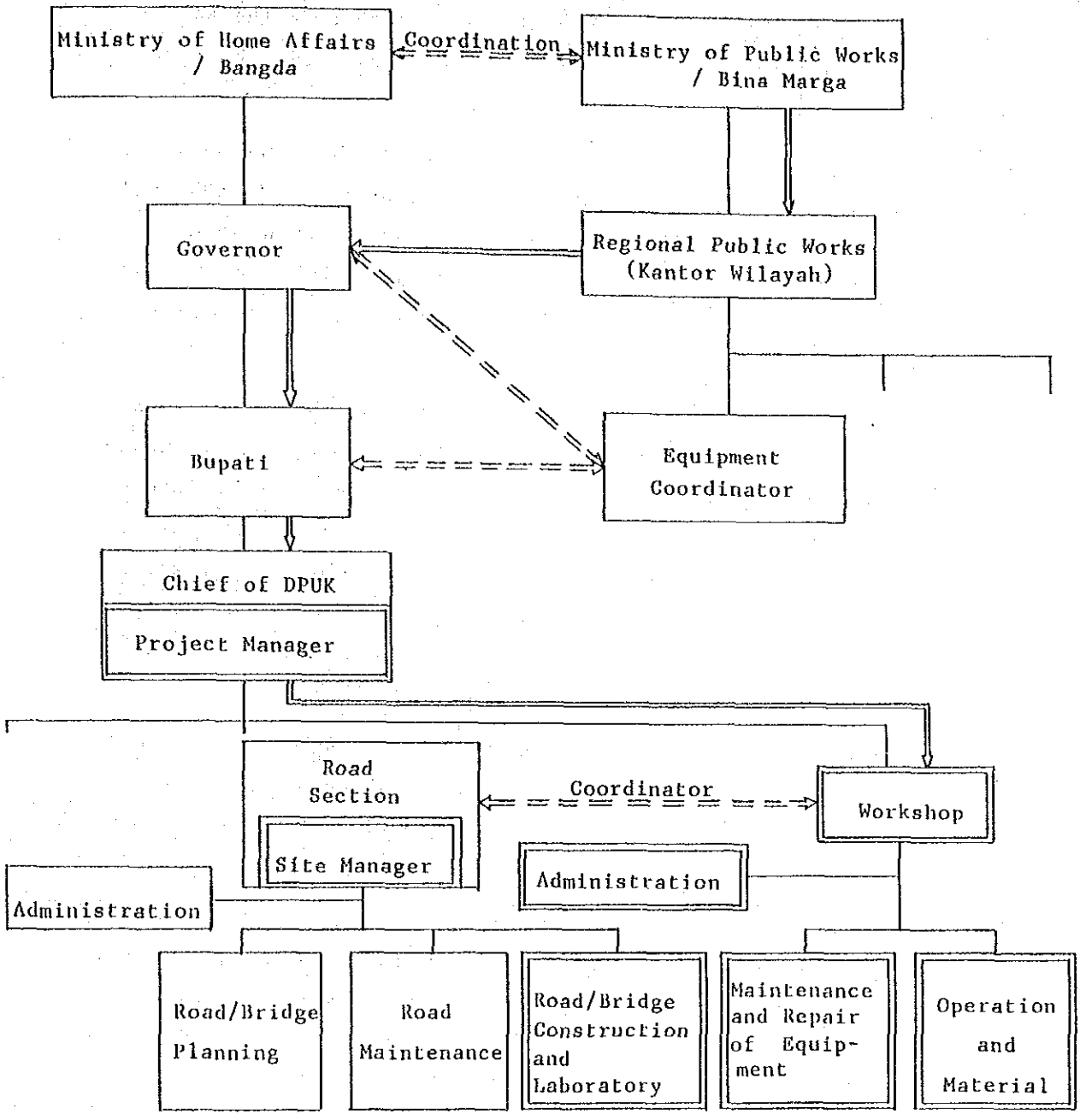
It is recommended that the workshop is newly organized to consist of three sub-sections, i.e. maintenance and repair of equipment, operation and materials, and administration to execute the main tasks described in Clause 3.5.

The sub-section of laboratory would be under the relevant Road Section. The proposed organization is shown in Fig. 6-2-1.

### 6.2.2 Construction System

For the construction of Kabupaten roads with a ten year effective design life, it has been recommended in Clause 3.4 that the equipment intensive method should be adopted for earth work and pavement work with the exception of surface dressing.

Fig. 6-2-1 PROPOSED ORGANIZATION




⇓ : Equipment delivery flow

▭ : New position/subsection

Current road construction in the Kabupatens is obliged to rely upon the traditional labour intensive method. It is therefore assumed that both the DPUK and the local contractors in the Kabupatens do not have sufficient experience and technique for the equipment intensive method of road construction.

For realization of the Local Road Development Project the GOI has ensured availability of the required human resources of DPUK and intends to conduct training programmes for those human resources as described in Clause 8.3 of the Main Report. This means that the GOI intends the Kabupatens to have the ability to execute the Project by force account (Swakelola).

It should be recognized from the experiences in the first local road project, which was assisted by OECF, ADB and IBRD, that because of their poor construction management and traditional labour intensive methods most of the road construction by local contractors could not be completed within the contract periods. Therefore execution of the road improvement by force account is desirable as recommended from their experience by the consultants for the first local road project.

It is strongly recommended that except for labourers the staff of the force account team should not be hired by the day as it would then not be able to consolidate the foundations for development of self reliability.

However, it will be very difficult to execute all the Projects by force account because of the need for many Kabupaten staff. The GOI has emphasized the need to promote the employment of local weak contractors in order to up-grade their capability in the road project schemes within the Fourth Five-Year Plan (REPELITA)

Taking into consideration the conditions mentioned above it is strongly recommended that the DPUK is obliged to lend some equipment with skilled operators to the local contractors in the Kabupatens for the execution of a part of the road improvement works.

The types of work executed only by force account are recommended as follows:

- Routine maintenance work for the Kabupaten roads
- Laboratory tests
- Production of crushed stone
- Technical service for the equipment

# APPENDIX

INPUT DATA

Appendix A-1 FOR ESTIMATION OF THE PRODUCER'S SURPLUS BENEFIT

PRV. : KALIMANTAN SELATAN KAB. : BANJAR SURVEY YEAR : 1983

| Code No. | KECAMATAN NAME | CULTIVATED AREA : (PA) | YIELD RATE : (Y) | FARMER'S POPULATION : (AP) | CIRCULATED COMMODITY : (PG) |
|---|---|---|---|---|---|
| 01 | ALUH ALUH | 3,800 | 1.93 | 12,590 | 0 |
| 02 | KERTAK HANYAR | 2,416 | 1.85 | 5,510 | 0 |
| 03 | GAMBUT | 4,267 | 2.54 | 14,330 | 0 |
| 04 | SUNGAI TABUK | 6,344 | 3.10 | 29,850 | 0 |
| 05 | MARTAPURA | 5,634 | 2.29 | 19,800 | 0 |
| 06 | BANJAR BARU | 6,574 | 2.33 | 51,560 | 0 |
| 07 | KARANG INTAN | 7,243 | 2.79 | 16,790 | 0 |
| 08 | ASTAMBUL | 7,075 | 2.59 | 17,490 | 0 |
| 09 | SIMPANG EMPAT | 9,990 | 2.49 | 24,020 | 0 |
| 10 | PENGARON | 12,860 | 2.57 | 23,320 | 0 |
| 11 | SUNGAI PINANG | 86 | 1.59 | 17,480 | 0 |
| 12 | LANDASAN ULIN | 1,514 | 2.04 | 11,560 | 0 |
| 13 | CEMPAKA | 1,317 | 2.51 | 11,220 | 0 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| | $r_1$ | $r_2$ | $r_3$ | $r_4$ |
|---|---|---|---|---|
| ANNUAL AVERAGE GROWTH RATE % | 5.0 | 3.0 | 3.0 | 7.0 |

| FARMER'S CONSUMPTION : (Cp) | NON-AGRO REQUIRMENT : (NG) |
|---|---|
| 0.13 Ton/head/year | 0.071 Ton/ton |

| | SEDAN | BUS | TRUCK | MOTOR CYCLE |
|---|---|---|---|---|
| RATE OF EACH VEHICLE TYPE % | 2.75 | 15.05 | 5.70 | 76.51 |

| AVERAGE FREIGHT TONAGE | 0.6 Ton/Truck |
|---|---|

Appendix A-2 Engineering Data

ROAD LINK DATA

PROVINCE : KALIMANTAN SELATAN

KABUPATEN: BANJAR

| LINK NO. | BEGINNING POINT (DESA NAME) | END POINT (DESA NAME) | LENGTH (KM) | THROUGH THE KEC. NAME & LENGTH | | REMARKS |
|---|---|---|---|---|---|---|
| | | | | KEC. NAME | LENGTH (KM) | |
| 1 | Kertak Hanyar | Tatah Palatar | 5 | Kertak Hanyar | 5 | |
| 2 | Pasar Arba | Tatah Palatar | 8 | Kertak Hanyar | 8 | |
| 3 | Gambut | Pasar Arba | 10 | Gambut | 10 | |
| 4 | Pasar Arba | Aluh-Aluh | 11 | Kertak Hanyar<br>Aluh-aluh | 4<br>7 | 5 |
| 5 | Malintang | Guntung Papuyu | 3 | Gambut | 3 | |
| 6 | Guntung Papuyu | Batas Kurau | 7 | Gambut<br>Aluh-aluh | 3<br>4 | |
| 7 | Handil Jawa | Jambu Burung | 8 | Aluh-aluh | 8 | |
| 8 | Gambut | Sungai Tabuk | 11 | Gambut<br>Sungai Tabuk | 6<br>5 | |
| 9 | Guntung Manggis | Transad | 5 | Landasan Ulin | 5 | |
| 10 | Guntung Payung | Transad Palam | 7 | Landasan Ulin<br>Cempaka | 3.5<br>3.5 | |
| 11 | Cempaka | Transpol Lokal | 8 | Cempaka | 8 | |
| 12 | Martapura Seispai | Banjar Baru | 3 | Martapura | 3 | |
| 13 | Sei Pering | Martapura | 3 | Martapura | 3 | |
| 14 | Sei.Piring | Sekumpul | 2 | Martapura | 2 | |
| 15 | Sekumpul | Bincau | 6 | Martapura | 6 | |
| 16 | Martapura | Bincau | 4 | Martapura | 4 | |
| 17 | Bincau | Karang Intan | 7 | Martapura<br>Karang Intan | 2<br>5 | |
| 18 | Karang Intan | Simp. 4 Mandi Angin | 5 | Karang Intan | 5 | |
| 19 | Karang Intan | Sei Alang | 3 | Karang Intan | 3 | |
| 20 | Simp. 4 Mandi Angin | Sei Alang | 5 | Karang Intan | 5 | |
| 21 | Sei Alang | Sei Asam | 2 | Karang Intan | 2 | |
| 22 | Sei Alang | Awang Bangkal | 4 | Karang Intan | 4 | |
| 23 | Mandi Angin | Puncak Kolam | 9 | Karang Intan | 9 | 7 |
| 24 | Astambul | Kelampaian | 6 | Astambul | 6 | |

Please note the priority No. in the Remarks of this list for each links No. according to the each Kabupaten's development plan.

ROAD LINK DATA

PROVINCE : KALIMANTAN SELATAN

KABUPATEN: BANJAR

| LINK NO. | BEGINNING POINT (DESA NAME) | END POINT (DESA NAME) | LENGTH (KM) | THROUGH THE KEC. NAME & LENGTH | | REMARKS |
|---|---|---|---|---|---|---|
| | | | | KEC. NAME | LENGTH (KM) | |
| 25 | Kelampaian | Keliukan | 4 | Astambul | 4 | |
| 26 | Astambul | Keliukan | 3 | Astambul | 3 | |
| 27 | Keliukan | Pematang Danau | 6 | Astambul | 6 | |
| 28 | Pematang Danau | S e l a m | 4 | Astambul | 4 | |
| 29 | Mataraman | Bumi Rata | 5 | Astambul<br>Simpang Empat | 2<br>3 | 8 |
| 30 | Bumi Rata | Sungai Raya | 5 | Simpang Empat | 5 | |
| 31 | Simpang Empat | Kertak Empat | 6 | Simpang Empat | 6 | |
| 32 | Sei Langsat | Pengaron | 5 | Pengaron | 5 | |
| 33 | Pengaron | Balaimadu | 5 | Pengaron | 5 | |
| 34 | Balaimadu | Sungkai | 9 | Simpang Empat<br>Pengaron | 2<br>7 | |
| 35 | Balaimadu | Binuung | 6 | Pengaron | 6 | 1 |
| 36 | Binuung | Sungai Pinang | 12 | Pengaron<br>Sungai Pinang | 10<br>2 | 2 |
| 37 | Tungkap | Limau Maret | 6 | Pengaron<br>Simpang Empat | 1<br>5 | 9 |
| 38 | Simpang Empat | Cinta Puri | 11 | Simpang Empat | 11 | 6 |
| 39 | Jarang Kuatan | Keliling Benteng | 1 | Martapura<br>Sungai Tabuk | 0.5<br>0.5 | |
| 40 | Pingaran | Mali-Mali | 7 | Astambul<br>Karang Intan | 3<br>4 | |
| 41 | Karang Intan | Karang Anyar | 1 | Karang Intan | 1 | |
| 42 | Lirung | Lok Tangga | 3 | Karang Intan | 3 | |
| 43 | Dalam Pagar | Sungai Batang | 3 | Martapura | 3 | |
| 44 | Lok Baintan | Sungai Lulut | 4 | Sungai Tabuk | 4 | |
| 45 | Bangkal | Palam | 3 | Cempaka | 3 | |
| 46 | Sungai Salak | Pendarapan | 4 | Landasan Ulin | 4 | |
| 47 | Keliling Benteng | Antasan Sutun | 2 | Martapura<br>Sungai Tabuk | 1.5<br>0.5 | |
| 48 | Sungai Rangas | Antasan Sutun | 6 | Martapura | 6 | |

Please note the priority No. in the Remarks of this list for each links No. according to the each Kabupaten's development plan.

ROAD LINK DATA

PROVINCE : KALIMANTAN SELATAN

KABUPATEN: BANJAR

| LINK NO. | BEGINNING POINT (DESA NAME) | END POINT (DESA NAME) | LENGTH (KM) | THROUGH THE KEC. NAME & LENGTH | | REMARKS |
|---|---|---|---|---|---|---|
| | | | | KEC. NAME | LENGTH (KM) | |
| 49 | Penggalaman | Penyembuan | 1 | Sungai Tabuk | 1 | |
| 50 | Keramat | Sungai tabuk | 2 | Sungai Tabuk | 2 | |
| 51 | Sungai Tabuk | Lok Baintan | 7 | Sungai Tabuk | 7 | |
| 52 | Paku Alam | Lok Buntar | 2 | Sungai Tabuk | 2 | |
| 53 | Sungai Pinang | Lok Buntar | 2 | Sungai Tabuk | 2 | |
| 54 | Handil Kelua | Manarap Baru | 2 | Kertak Hanyar<br>Sungai Tabuk | 0.5<br>1.5 | 3 |
| 55 | Handil Ma - narap Lama | Manarap Baru | 5 | Kertak Hanyar | 5 | 4 |
| 56 | Handil Ma-narap Baru | Sungai Lakum | 3 | Gambut | 3 | |
| 57 | Pasar Kemis | Tambak Sirang | 6 | Kertak Hanyar | 6 | |
| 58 | Pasar Kemis | Handil Mana-raplama | 3 | Kertak Hanyar | 3 | |
| 59 | Tatah Layap | Tatah Bangkal | 4 | Kertak Hanyar | 4 | |
| 60 | Tatah Bahalang | Tatah Layap | 5 | Kertak Hanyar | 5 | |
| 61 | Pasar Arba | Aluh-Aluh Kecil | 10 | Kertak Hanyar<br>Aluh-aluh | 8<br>2 | |
| 62 | Aluh-Aluh Kecil | Podok | 2 | Aluh-aluh | 2 | |
| 63 | Tambak Sirang | Tambak Sirang Darat | 3 | Gambut | 3 | |
| 64 | Gantung Papuyu | Kabuau | 2 | Gambut | 2 | |
| 65 | Kabuau | Sei Kupang | 5 | Gambut | 5 | |
| 66 | Sei Kupang | Lawahan | 1 | Gambut<br>Aluh-aluh | 0.5<br>0.5 | |
| 67 | Jambu Burung | S.Warga Aluh-aluh | 6 | Aluh-aluh | 6 | |
| 68 | Jambu Burung | Handil Purai | 4 | Aluh-aluh | 4 | |
| 69 | Babirik | Pindahan Baru | 2 | Aluh-aluh | 2 | |
| 70 | Sei Pering | Didiklat | 2 | Martapura<br>Banjar Baru | 1<br>1 | |
| 71 | Astambul | Pasar Jati | 4 | Astambul | 4 | |
| 72 | Lirung | Penyambaran | 3 | Karang Intan | 3 | |

Please note the priority No. in the Remarks of this list for each links No. according to the each Kabupaten's development plan.

ROAD LINK DATA

PROVINCE : KALIMANTAN SELATAN

KABUPATEN: BANJAR

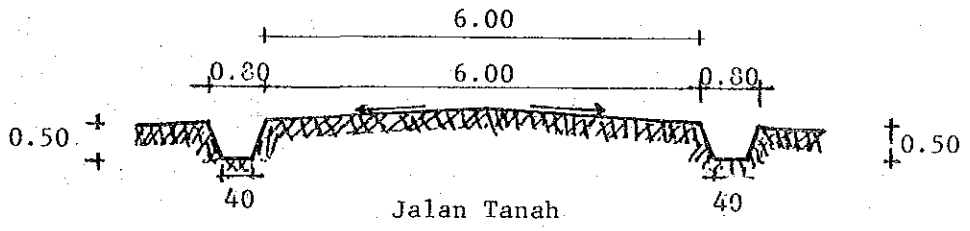
| LINK NO. | BEGINNING POINT (DESA NAME) | END POINT (DESA NAME) | LENGTH (KM) | THROUGH THE KEC. NAME & LENGTH | | REMARKS |
|---|---|---|---|---|---|---|
| | | | | KEC. NAME | LENGTH (KM) | |
| 73 | Lok Tangga | Biih | 8 | Karang Intan | 8 | |
| 74 | Cabi | Bumi Rata | 3 | Simpang Empat | 3 | |
| 75 | Kertak Empat | Lobang Baru | 3 | Pengaron | 3 | |
| 76 | Madurejo | Gunung Batu | 3 | Pengaron | 3 | |
| 77 | Pengaron | Maniapun | 3 | Pengaron | 3 | |
| 78 | Maniapun | Atiim | 3 | Pengaron | 3 | |
| 79 | Atiim | Antaraku | 7 | Pengaron | 7 | |
| 80 | Sungai Pinang | Rantau Bakula | 10 | Sungai Pinang | 10 | |
| 81 | Sungai Pinang | Rantau Nangka | 2 | Sungai Pinang | 2 | |
| 82 | Tungkap | Simpang Paku | 4 | Simpang Empat | 4 | |
| 83 | Simpang Paku | Keramat Mina | 3 | Simpang Empat | 3 | |
| 84 | Sungkai | Simpang Paku | 3 | Simpang Empat | 3 | |
| 85 | Simpang Paku | Paku | 2 | Simpang Empat | 2 | |
| 86 | Tampang Awang | Pasar Arba | 5 | Kertak Hanyar | 5 | |
| 87 | Taibah Baru | Tampang Awang | 3 | Kertak Hanyar | 3 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Please note the priority No. in the Remarks of this list for each links No. according to the each Kabupaten's development plan.

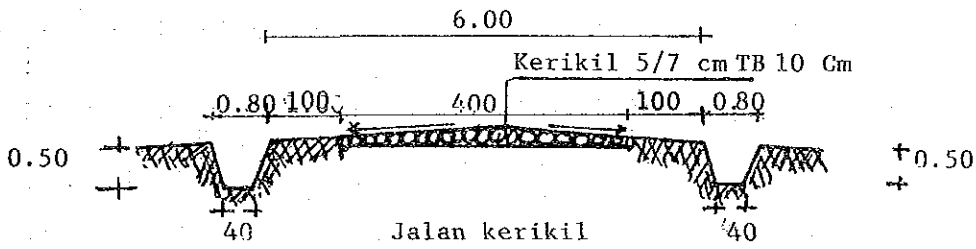
What Kind of Design Criteria has being applied for the new road construction and the improvement for the Kabupaten Road ?
Kriteria Perencanaan yang dipakai pada program penanganan jalan Kabupaten, baik untuk jalan lama maupun pembangunan baru.

Please draw the Typical Cross Section of the Kabupaten Road.
Buat gambar dan penjelasan dari: Typical cross section yang dipakai pada program penanganan jalan selama ini (baik untuk jalan lama, maupun pembangunan baru)

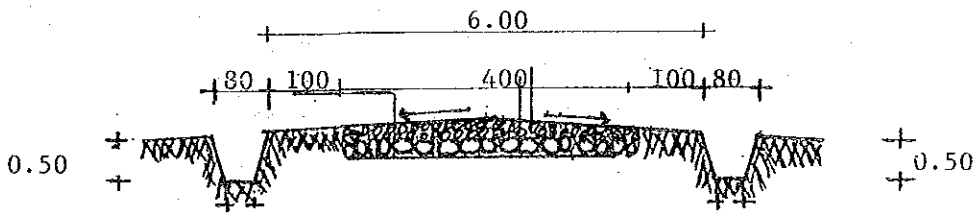
TYPICAL CROSS SECTION.




Jalan Tanah




Jalan kerikil




Jalan Asphalt

PROPINSI : KALIMANTAN SELATAN

KABUPATEN : BANJAR

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1980/1981

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1980/1981

| LINK NO : Nomor Ruas | LOCATION From - To (dari - ke) | Lebar perkerasan(m) / Lebar Jembatan | Type perkerasan / Type Jembatan | LENGTH Panjang ( KM ) | COSTS Harga (Rp $10^6$) | REMARKS Keterangan |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN SELATAN

E-03-(2)

KABUPATEN: BANJAR

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1981/1982

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1981/1982

| LINK NO.: Nomor Ruas | LOCATION From - To (dari - ke) | Lebar perkerasan(m) / Lebar Jembatan | Type perkerasan / Type Jembatan | LENGTH Panjang ( KM ) | COSTS Harga (Rp $10^6$) | REMARKS Keterangan |
|---|---|---|---|---|---|---|
| | I INPRES DATI II | | | | | |
| 4+5 | Melintang-Pasar Arba<br>Aluh-aluh | 4<br>4 | Laterit<br>Ulin | 14.8 | 84.477 | |
| 36 | Rebab. Jalan<br>Binuung-Sei Pinang | 4<br>4 | Laterit<br>Ulin | 11.2 | 60.900 | |
| | PEMELIHARAAN | | | | | |
| 18 | Karang Intan-Simp.Empat Mandi Angin | 4 | Laterit | 4.6 | 4.400 | |
| | Pengaspalan jalan dalam kota | 4 | Aspal | 3.1 | 11.203 | Jalan dlm Kota |
| | II. INPRES P. JALAN | | | | | |
| 10 | Perkerasan Jalan Guntung Payung-Transad Palm | 4 | Batu | 6.9 | 34.727 | |
| 11 | Perkerasan Jalan Cempaka Traspol Lokal | 4 | Batu | 6.0 | 38.630 | |
| 12 | Perkerasan Jl. Martapura Sei.Sipai-Banjarbaru | 4<br>4 | Batu<br>Ulin | 3.4 | 21.990 | |
| 16+17 | Pengaspalan/perkerasan jl Martapura-Bineau-Kr.Intan | 4<br>4 | Aspal/Batu<br>Ulin | 12.0 | 87.172 | |
| 11 | Penimbunan jalan/Jembatan Cempaka-Transpol lokal | 4<br>4 | Laterit<br>Ulin | 0.3 | 9.214 | Sisa tender |
| | | | | | | |
| | III. INPRES DATI I | | | | | Tidak ada |
| | | | | | | |
| | | | | | | |
| | | | | | | |

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN SELATAN E-03-(3)

KABUPATEN: BANJAR

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1982/1983

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1982/1983

| LINK NO : Nomor Ruas | L O C A T I O N From - To (dari - ke) | Lebar perkerasan(m) / Lebar Jembatan | Type perkerasan / Type Jembatan | LENGTH Panjang ( KM ) | COSTS Harga (Rp $10^6$) | REMARKS Keterangan |
|---|---|---|---|---|---|---|
| | I. INPRES DATI II | | | | | |
| 5 | Rebab jalan Melintang-Gt.Papuyu | 4<br>4 | Laterit<br>Ulin | 3.3 | 64.000 | |
| 6 | Rebab Jalan Guntung Papuyu-Kampung Baru | 4<br>4 | Laterit<br>Ulin | 3.5 | 61.200 | |
| 6 | Rebab Jalan Kampung Garu-Batas Kurau | 4<br>4 | Laterit<br>Ulin | 2.6 | 62.400 | |
| | Pengaspalan Jalan Dalam Kota Martapura | 4 | Aspal | 2.6 | 45.900 | Jl.Dalam Kota |
| 14 | Pengaspalan jalan Tanjung Rema-Sekumpul | 4 | Aspal | 2.3 | 57.600 | |
| 33 | Pengaspalan Jalan Pengaron Balai Madu | 4 | Aspal | 5.0 | 21.154 | |
| | PEMELIHARAAN | | | | | |
| 35 | Pemeliharaan jalan. Balai Madu-Binuung | 4 | Laterit | 5.9 | 13.868 | |
| | II. INPRES P.JALAN | | | | | |
| 15 | Rehab jalan-sekumpul Bineau | 4 | Batu<br>Ulin | 4.7 | 42.370 | |
| 24+25 | Rebab Jalan-Astambul Kelampayan-Keliukan | 4<br>4 | Laterit<br>Ulin | 9.4 | 56.050 | |
| 31 | Pengaspalan Jalan Simp.Empat-Sei.Langsat | 4 | Aspal | 4.3 | 56.335 | |
| 32 | Pengaspalan jalan Sei.Langsat-Pengaron | 4 | Aspal | 4.0 | 55.575 | |
| 24+25 | Rebab.Jembatan Ulin-Astambul-Kelampayan-Keliukan | 4 | Ulin | | 11.900 | Sisa tender |
| | Membuat jalan aspal Jl. Damang Lehman-Sukaramai | 4<br>4 | AspaL | 160 M | | Sisa tender dl kt |
| | III. INPRES DATI I | | | | | tidak ada |

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN SELATAN

E-03-(4)

KABUPATEN: BANJAR

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1983/1984

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1983/1984

| LINK NO Nomor Ruas | LOCATION From - To (dari - ke) | Lebar perkerasan(m) / Lebar Jembatan | Type perkerasan / Type Jembatan | LENGTH Panjang ( KM ) | COSTS Harga ($Rp\ 10^6$) | REMARKS Keterangan |
|---|---|---|---|---|---|---|
| | I. INPRES DATI II | | | | | |
| 18 | Pengaspalan jalan Karang Intan-Simp.4-Mandi angin | 4<br>4 | Aspal<br>Ulin | 4.4 | 47.500 | |
| 26+27 | Rehab Jalan Astambul Keliukan-Pematang Danau | 4<br>4 | Laterit<br>Ulin | 6.0 | 69.500 | |
| 28 | Rebab.jalan jurusan Pmt. Hambawang-Pmt.Danau Selan | 4<br>4 | Laterit<br>Ulin | 5.0 | 45.800 | |
| 22 | Pembuatan jembatan Sei. Alang-Awang Bangkal | 4 | Ulin | 69 M | 32.100 | |
| | | | | | | |
| | INPRES P.JALAN | | | | | |
| 16 | Pengaspalan jalan Martapura-Bincau | 4<br>4 | Aspal<br>Ulin | 5.1 | 59.850 | |
| 17 | Pengaspalan jalan Bincau-Karang Intan | 4<br>4 | Aspal<br>Ulin | 5.1<br>5.1 | 59.850<br>59.850 | |
| 12 | Pengaspalan jalan jurusan Martapura-SeiSipai-B.Baru | 4<br>4 | Aspal<br>Ulin | 3.4 | 44.650 | |
| 15 | Pengaspalan jalan sekumpul-Bincau | 4 | Aspal | 4.7 | 59.850 | |
| | | | | | | |
| | III. INPRES DATI I | | | | | tidak ada |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AMCAS / kerikil / japat

PROPINSI: KALIMANTAN SELATAN E-03-(5)

KABUPATEN: BANJAR LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1984/1985

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1984/1985

| LINK NO Nomor Ruas | LOCATION From - To (dari - ke) | Lebar perkerasan(m) / Lebar Jembatan | Type perkerasan / Type Jembatan | LENGTH Panjang ( KM ) | COSTS Harga (Rp $10^6$) | REMARKS Keterangan |
|---|---|---|---|---|---|---|
| | I. INPRES DATI II | | | | | |
| | Peninbunan jl. keramat Tatah Bahalang, T.Awang | 5<br>4 | Tanah<br>Ulin | 9.3 | 55.212 | Belum ada No. Ruas |
| | PEMELIHARAAN | | | | | |
| 31+32 +33 | Simpang 4,Pengaron Balai Madu | 4<br>4 | Aspal<br>Ulin | 15.6 | | |
| 35+36 | Balai Madu-Binuung Sei.Pinang | 4 | Aspal | 17.5 | | |
| | Pengaspalan jalan dalam kota | 4 | Tanah | 1.5 | | |
| 3 | Gambut-Pasar Arba | 4 | Tanah | 9.7 | | |
| | | | Jumlah | | 110.500 | |
| | II. INPRES P.JALAN | | | | | |
| 34 | Pengaspalan jalan Balai Madu-Sungkai | 4<br>4 | Aspal<br>Ulin | 4.0 | 74.429 | |
| 34 | Pengaspalan jalan balai Madu-Sungkai | 4<br>4 | Aspal<br>Ulin | 5.3 | 97.022 | |
| 33 | Pengaspalan jalan Pengaron Balai Madu | 4 | Aspal<br>Ulin | 1.8 | 33.048 | |
| 24+26 | Pengaspalan Jl.Astambul Kelampayan-Astambul-Keliukan | 4<br>4 | Aspal<br>Ulin | 5.8 | 127.991 | |
| | | | | | | |
| | III. INPRES DATI I | | | | | Tidak ada |
| | | | | | | |
| | | | | | | |

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI : KALIMANTAN SELATAN

E-04

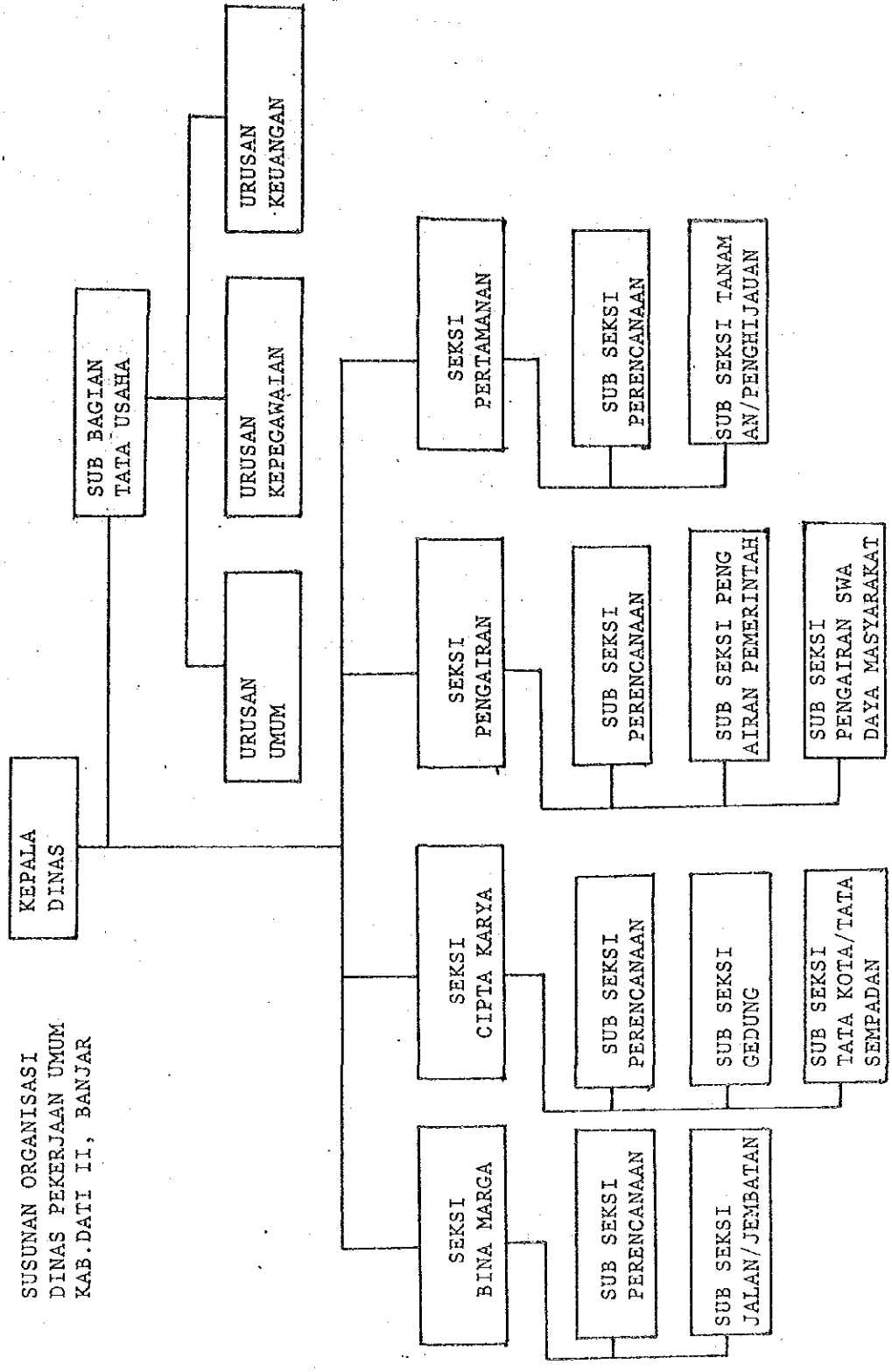
KABUPATEN: BANJAR

## EXISTING ORGANIZATION IN KABUPATEN

### Structur Organisasi yang ada dari P.U Kabupaten

Please draw the Cart of the Existing Organization in the Kabupaten.

Harap digambar bagan organisasi dari DPUK.



## EXISTING STAFF RESOURCES OF BINA MARGA OF PU KABUPATEN

Tenaga Dinas PUK yang ada

PROPINSI:KALIMANTAN SELATAN

KABUPATEN: BANJAR

| DESCRIPTION /Uraian | NUMBER / Jumlah | REMARKS Keterangan |
|---|---|---|
| CONTROLING STAFF<br>Staff teknis PUK | ——— | ——— |
| DPUK ENGINEED<br>Sarjana Teknik | | |
| ASSISTANT ENGINEER<br>Sarjana Muda Teknik | 1 | |
| TECHNICIAN STAFF<br>Staff Teknik (STM) | 4 | |
| ADMINISTRATION<br>Tenaga Administrasi | 5 | |
| SUPERVISOR<br>Tenaga Pengawas | 8 | |
| | | |
| WORKING FORCE<br>Tenaga Pelaksana Lapangan | ——— | ——— |
| OPERATORS<br>Operators | 6 | |
| DRIVERS<br>Supir | - | |
| MECHANICS<br>Mechanic | 6 | |
| TRADESMAN<br>Tukang | - | |
| L A B O U R<br>Buruh / Pekerja | - | |
| OTHERS<br>Lain-lain | - | |
| TOTAL / JUMLAH | 30 | |

Catatan ; Untuk kolom keterangan harap diisi berapa orang yang telah mendapat Training.

## LOCATION AND AREA OF DPUK WORKSHOP

E-06

Lokasi Workshop DPUK

PROPINSI : KALIMANTAN SELATAN

KABUPATEN: BANJAR

| LOCATION<br>Lokasi | AREA (m2)<br>Luas | NUMBER<br>Jumlah | REMARKS<br>Keterangan |
|---|---|---|---|
| | | | |
| Desa Bincau<br>Kec.Martapura | 20.000 | 1 | Lokasi yg disiapkan |

PROPINSI: KALIMANTAN SELATAN

KABUPATEN: BANJAR

E-07

## LAND ACQUISITION COST

Daftar harga pembebasan tanah

| DESCRIPTION<br>Uraian | UNIT<br>Satuan | RATE (RP)<br>Harga | REMARKS<br>Keterangan |
|---|---|---|---|
| CITY/kota | M2 | 14.000 | |
| VILLAGE / desa | M2 | 2.000 | |
| RICE FIELD/sawah | M2 | 1.500 | |
| DRY FIELD/ladang | M2 | 1.000 | |
| MIX CROPS/panen | M2 | | |
| FOREST/hutan | M2 | | |
| SWAMP / rawa | M2 | | |
| OTHERS / lain-lain | M2 | | |

PROPINSI: KALIMANTAN SELATAN

E-08

KABUPATEN: BANJAR

Classification of local contractors at Kabupaten level.

Klasifikasi kontraktor di Kabupaten

| COMPANY NAME<br>Nama Kontraktor | CLASS<br>Kelas | CAPITAL<br>Modal (Rp) | NUMBER OF EMPLOYEE<br>Jumlah pegawai | REMARKS<br>Keterangan |
|---|---|---|---|---|
| | A1 | 500 - juta | 38 | |
| | A2 | 200 -500juta | 34 | |
| | B1 | 100 -200juta | 24 | |
| 16 | B2 | 50 -100juta | 14 | |
| 22 | C1 | 20 - 50juta | 8 | |
| 111 | C2 | 0 - 20juta | 4 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

NOTE: DATI II

PROPINSI: KALIMANTAN SELATAN

KABUPATEN: BANJAR

E-09

## LIST OF EXISTING EQUIPMENT OF LOCAL CONTRACTOR

Name of contractor

| NAME OF EQUIPMENT<br>Jenis peralatan | EXISTING CONDITION/ Kondisi Peralatan | | | | | | REQUIRE - MENT / Kebutuhan peralatan baru |
|---|---|---|---|---|---|---|---|
| | TYPE/ Tipe | P.Y | NUMBER / Jumlah | | | REASON OF BAD CONDITION/Sebab Kerusakan | |
| | | | GOOD Baik | BAD Rusak | TOTAL Jumlah | | |
| Bulldozer | | | | | | | |
| Motor Grader | | | | | | | |
| Tyre Roller | | | | | | | |
| Steel Whell Roller | | | | | | | |
| Vibration Roller | | | | | | | |
| Wheel Loader | | | | | | | |
| Front End Loader and Backhoe | | | | | | | |
| Mobile Crane | | | | | | | |
| Concrete Mixer | | | | | | | |
| Stone Crusher | | | | | | | |
| Portable Compressor | | | | | | | |
| Hydraulic Excavator | | | | | | | |
| Asphalt Paving Machine | | | | | | | |
| Asphalt Sprayer | | | | | | | |
| Asphalt Mixing Machine | | | | | | | |
| Mobile Workshop | | | | | | | |
| Mechanic Rammer | | | | | | | |
| Plate Tamper | | | | | | | |
| Pile Driver | | | | | | | |
| Leg Drill | | | | | | | |
| Hand Hammer | | | | | | | |
| Farm Tractor | | | | | | | |
| Dump Truck | | | | | | | |
| Water Tank Truck | | | | | | | |
| Fuel Tank Truck | | | | | | | |
| Pick Up | | | | | | | |
| Jeep | | | | | | | |
| Motorcycle | | | | | | | |
| Generator | | | | | | | |
| Water Pump | | | | | | | |
| Others | | | | | | | |
| - | | | | | | | |

PROPINSI: KALIMANTAN SELATAN

KABUPATEN: BANJAR



## LIST OF EXISTING EQUIPMENT OF P.U KABUPATEN

| NAME OF EQUIPMENT<br>Jenis peralatan | EXISTING CONDITION/ Kondisi Peralatan | | | | | | REQUIRE - MENT / Ke-butuhan peralatan baru |
|---|---|---|---|---|---|---|---|
| | TYPE/ Tipe | P.Y | NUMBER / Jumlah | | | REASON OF BAD CONDITION/Sebab Kerusakan | |
| | | | GOOD Baik | BAD Rusak | TOTAL Jumlah | | |
| Bulldozer | | | | | | | |
| Motor Grader | | | | | | | |
| Tyre Roller | | | | | | | |
| Steel Whell Roller | RR 6 | | 3 | 2 | 5 | | |
| Vibration Roller | MGB I | | 2 | 1 | 3 | | |
| Wheel Loader | | | | | | | |
| Front End Loader and Backhoe | | | | | | | |
| Mobile Crane | | | | | | | |
| Concrete Mixer | | | | | | | |
| Stone Crusher | 11.01 | | 1 | | 1 | | |
| Portable Compressor | | | | | | | |
| Hydraulic Excavator | | | | | | | |
| Asphalt Paving Machine | | | | | | | |
| Asphalt Sprayer | EY-18-3D 3B | | 1 | | 1 | | |
| Asphalt Mixing Machine | | | | | | | |
| Mobile Workshop | | | | | | | |
| Mechanic Rammer | | | | | | | |
| Plate Tamper | | | | | | | |
| Pile Driver | | | | | | | |
| Leg Drill | | | | | | | |
| Hand Hammer | YANMAR GE 360 | | 4 | | 4 | | |
| Farm Tractor | | | | | | | |
| Dump Truck | | | | | | | |
| Water Tank Truck | | | | | | | |
| Fuel Tank Truck | | | | | | | |
| Pick Up | | | | | | | |
| Jeep | | | | | | | |
| Motorcycle | | | | | | | |
| Generator | | | | | | | |
| Water Pump | | | | | | | |
| Others | | | | | | | |
| | | | | | | | |

Appendix A-3 CONSTRUCTION AND MAINTENANCE COST FOR PROPOSED ROAD LINKS

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : B5 (111B-1) LENGTH : 2 Km

UPGRADE : 7.0m road bed, 4.0m road with surface Dressing (1)

(Rp)

| ITEM | UNIT | QUANTITY | <<< UNIT COST >>> LOCAL | FOREIGN | <<<<<< COST LOCAL | FOREIGN | >>>>>> TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 4000.0 | 173 | 91 | 692,000 | 364,000 | 1,056,000 |
| Subgrade Preparation | m2 | 0.0 | 22 | 11 | 0 | 0 | 0 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 430.0 | 1,047 | 522 | 450,210 | 224,460 | 674,670 |
| Sub Base Course | m3 | 550.0 | 3,363 | 1,347 | 1,849,650 | 740,850 | 2,590,500 |
| Base Course | m3 | 560.0 | 4,622 | 2,299 | 2,588,320 | 1,287,440 | 3,875,760 |
| Shoulder | m2 | 6000.0 | 313 | 146 | 1,878,000 | 876,000 | 2,754,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 8000.0 | 616 | 595 | 4,928,000 | 4,760,000 | 9,688,000 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 0.0 | 870 | 119 | 0 | 0 | 0 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 0.0 | 44,520 | 42,161 | 0 | 0 | 0 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 0.0 | 44,050 | 11,678 | 0 | 0 | 0 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 12,386,180 | 8,252,750 | 20,638,930 |
| Overhead ( 15% ) | | | | | 1,857,927 | 1,237,912 | 3,095,839 |
| | | | TOTAL COST | | 14,244,107 | 9,490,662 | 23,734,769 |
| Manual routine maintenance of road | Km | 2.0 | 140,672 | 7,248 | 281,344 | 14,496 | 295,840 |
| Routine maintenance of asphalt road | Km | 2.0 | 372,800 | 137,700 | 745,600 | 275,400 | 1,021,000 |
| | | | Sub Total | | 1,026,944 | 289,896 | 1,316,840 |
| Maintenance of Timber Bridge (New) | m2 | 0.0 | 6,882 | 1,232 | 0 | 0 | 0 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 60.0 | 7,507 | 2,460 | 450,420 | 147,600 | 598,020 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Earthwork & Pavement | Unit Cost | (Rp/Km) | : | 11,867,385 |
| Timber Bridge | Unit Cost | (Rp/m2) | : | |
| Concrete Bridge | Unit Cost | (Rp/m2) | : | |
| Survived Value | | (Rp) | : | 2,588,502 |
| Maintenance Rate without Bridge | | (%) | : | 5.55 |
| New Bridge Cost Rate | | (%) | : | |

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : 82 (IIIB-1) LENGTH : 4 Km

UPGRADE : 6.0m road bed, 4.0m road with surface Dressing (1)

(Rp)

| ITEM | UNIT | QUANTITY | <<< UNIT COST >>> LOCAL | FOREIGN | <<<<<< COST LOCAL | FOREIGN | >>>>>> TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 3000.0 | 173 | 91 | 519,000 | 273,000 | 792,000 |
| Subgrade Preparation | m2 | 24000.0 | 22 | 11 | 528,000 | 264,000 | 792,000 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 1085.0 | 1,047 | 522 | 1,135,995 | 566,370 | 1,702,365 |
| Sub Base Course | m3 | 2240.0 | 3,363 | 1,347 | 7,533,120 | 3,017,280 | 10,550,400 |
| Base Course | m3 | 1120.0 | 4,622 | 2,299 | 5,176,640 | 2,574,880 | 7,751,520 |
| Shoulder | m2 | 8000.0 | 313 | 146 | 2,504,000 | 1,168,000 | 3,672,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 16000.0 | 616 | 595 | 9,856,000 | 9,520,000 | 19,376,000 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 7900.0 | 870 | 119 | 6,873,000 | 940,100 | 7,813,100 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 15.0 | 44,520 | 42,161 | 667,800 | 632,415 | 1,300,215 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 0.0 | 44,050 | 11,678 | 0 | 0 | 0 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 34,793,355 | 18,956,045 | 53,749,600 |
| Overhead ( 15% ) | | | | | 5,219,033 | 2,843,406 | 8,062,439 |
| | | | TOTAL COST | | 40,012,588 | 21,799,451 | 61,812,039 |
| Manual routine maintenance of road | Km | 4.0 | 140,672 | 7,248 | 562,688 | 28,992 | 591,680 |
| Routine maintenance of asphalt road | Km | 4.0 | 372,800 | 137,700 | 1,491,200 | 550,800 | 2,042,000 |
| | | | Sub Total | | 2,053,888 | 579,792 | 2,633,680 |
| Maintenance of Timber Bridge (New) | m2 | 0.0 | 6,882 | 1,232 | 0 | 0 | 0 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 0.0 | 7,507 | 2,460 | 0 | 0 | 0 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Earthwork & Pavement Unit Cost | | (Rp/Km) | : | 15,453,010 |
| Timber Bridge Unit Cost | | (Rp/m2) | : | |
| Concrete Bridge Unit Cost | | (Rp/m2) | : | |
| Survived Value | | (Rp) | : | 8,935,584 |
| Maintenance Rate without Bridge | | (%) | : | 4.26 |
| New Bridge Cost Rate | | (%) | : | |

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : B4 (IIIB-1) LENGTH : 3 Km

UPGRADE : 7.0m road bed, 4.0m road with surface Dressing (1)

(Rp)

| ITEM | UNIT | QUANTITY | UNIT COST LOCAL | UNIT COST FOREIGN | COST LOCAL | COST FOREIGN | TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 6000.0 | 173 | 91 | 1,038,000 | 546,000 | 1,584,000 |
| Subgrade Preparation | m2 | 0.0 | 22 | 11 | 0 | 0 | 0 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 620.0 | 1,047 | 522 | 649,140 | 323,640 | 972,780 |
| Sub Base Course | m3 | 835.5 | 3,363 | 1,347 | 2,809,786 | 1,125,418 | 3,935,204 |
| Base Course | m3 | 840.0 | 4,622 | 2,299 | 3,882,480 | 1,931,160 | 5,813,640 |
| Shoulder | m2 | 9000.0 | 313 | 146 | 2,817,000 | 1,314,000 | 4,131,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 12000.0 | 616 | 595 | 7,392,000 | 7,140,000 | 14,532,000 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 2000.0 | 870 | 119 | 1,740,000 | 238,000 | 1,978,000 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 0.0 | 44,520 | 42,161 | 0 | 0 | 0 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 0.0 | 44,050 | 11,678 | 0 | 0 | 0 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 20,328,406 | 12,618,218 | 32,946,624 |
| Overhead ( 15% ) | | | | | 3,049,260 | 1,892,732 | 4,941,992 |
| | | | TOTAL COST | | 23,377,666 | 14,510,950 | 37,888,616 |
| Manual routine maintenance of road | Km | 3.0 | 140,672 | 7,248 | 422,016 | 21,744 | 443,760 |
| Routine maintenance of asphalt road | Km | 3.0 | 372,800 | 137,700 | 1,118,400 | 413,100 | 1,531,500 |
| | | | Sub Total | | 1,540,416 | 434,844 | 1,975,260 |
| Maintenance of Timber Bridge (New) | m2 | 0.0 | 6,882 | 1,232 | 0 | 0 | 0 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 12.0 | 7,507 | 2,460 | 90,084 | 29,520 | 119,604 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Earthwork & Pavement | Unit Cost | (Rp/Km) | : | 12,629,539 |
| Timber Bridge | Unit Cost | (Rp/m2) | : | |
| Concrete Bridge | Unit Cost | (Rp/m2) | : | |
| Survived | Value | (Rp) | : | 3,917,370 |
| Maintenance Rate without Bridge | | (%) | : | 5.21 |
| New Bridge Cost Rate | | (%) | : | |

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : 73 (IIIB-1) LENGTH : 8 Km

UPGRADE : 7.0m road bed, 4.0m road with surface Dressing (1)

(Rp)

| ITEM | UNIT | QUANTITY | <<< UNIT COST >>> LOCAL | FOREIGN | <<<<<< COST LOCAL | FOREIGN | >>>>>> TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 16000.0 | 173 | 91 | 2,768,000 | 1,456,000 | 4,224,000 |
| Subgrade Preparation | m2 | 56000.0 | 22 | 11 | 1,232,000 | 616,000 | 1,848,000 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 840.0 | 1,047 | 522 | 879,480 | 438,480 | 1,317,960 |
| Sub Base Course | m3 | 4480.0 | 3,363 | 1,347 | 15,066,240 | 6,034,560 | 21,100,800 |
| Base Course | m3 | 2240.0 | 4,622 | 2,299 | 10,353,280 | 5,149,760 | 15,503,040 |
| Shoulder | m2 | 24000.0 | 313 | 146 | 7,512,000 | 3,504,000 | 11,016,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 32000.0 | 616 | 595 | 19,712,000 | 19,040,000 | 38,752,000 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 16000.0 | 870 | 119 | 13,920,000 | 1,904,000 | 15,824,000 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 35.0 | 44,520 | 42,161 | 1,558,200 | 1,475,635 | 3,033,835 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 6.4 | 44,050 | 11,678 | 281,920 | 74,739 | 356,659 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 12,481,989 | 1,850,517 | 14,332,506 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 85,765,109 | 41,543,691 | 127,308,800 |
| Overhead ( 15% ) | | | | | 12,864,766 | 6,231,553 | 19,096,319 |
| | | | TOTAL COST | | 98,629,875 | 47,775,244 | 146,405,119 |
| Manual routine maintenance of road | Km | 8.0 | 140,672 | 7,248 | 1,125,376 | 57,984 | 1,183,360 |
| Routine maintenance of asphalt road | Km | 8.0 | 372,800 | 137,700 | 2,982,400 | 1,101,600 | 4,084,000 |
| | | | Sub Total | | 4,107,776 | 1,159,584 | 5,267,360 |
| Maintenance of Timber Bridge (New) | m2 | 120.0 | 6,882 | 1,232 | 825,840 | 147,840 | 973,680 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 48.0 | 7,507 | 2,460 | 360,336 | 118,080 | 478,416 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Earthwork & Pavement | Unit Cost | (Rp/Km) | : | 16,240,342 |
| Timber Bridge | Unit Cost | (Rp/m2) | : | 137,353 |
| Concrete Bridge | Unit Cost | (Rp/m2) | : | |
| Survived Value | | (Rp) | : | 17,871,168 |
| Maintenance Rate without Bridge | | (%) | : | 4.05 |
| New Bridge Cost Rate | | (%) | : | 11.26 |

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : 80 (IIIB-1) LENGTH : 10 Km

UPGRADE : 6.5m road bed, 4.0m road with surface Dressing (1)

(Rp)

| ITEM | UNIT | QUANTITY | UNIT COST LOCAL | UNIT COST FOREIGN | COST LOCAL | COST FOREIGN | COST TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 23000.0 | 173 | 91 | 3,979,000 | 2,093,000 | 6,072,000 |
| Subgrade Preparation | m2 | 65000.0 | 22 | 11 | 1,430,000 | 715,000 | 2,145,000 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 3634.0 | 1,047 | 522 | 3,804,798 | 1,896,948 | 5,701,746 |
| Sub Base Course | m3 | 5600.0 | 3,363 | 1,347 | 18,832,800 | 7,543,200 | 26,376,000 |
| Base Course | m3 | 2800.0 | 4,622 | 2,299 | 12,941,600 | 6,437,200 | 19,378,800 |
| Shoulder | m2 | 25000.0 | 313 | 146 | 7,825,000 | 3,650,000 | 11,475,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 40000.0 | 616 | 595 | 24,640,000 | 23,800,000 | 48,440,000 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 14000.0 | 870 | 119 | 12,180,000 | 1,666,000 | 13,846,000 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 32.0 | 44,520 | 42,161 | 1,424,640 | 1,349,152 | 2,773,792 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 9.6 | 44,050 | 11,678 | 422,880 | 112,108 | 534,988 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 18,507,294 | 2,774,324 | 21,281,618 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 105,988,012 | 52,036,932 | 158,024,944 |
| Overhead ( 15% ) | | | | | 15,898,201 | 7,805,539 | 23,703,740 |
| | | | TOTAL COST | | 121,886,213 | 59,842,471 | 181,728,684 |
| Manual routine maintenance of road | Km | 10.0 | 140,672 | 7,248 | 1,406,720 | 72,480 | 1,479,200 |
| Routine maintenance of asphalt road | Km | 10.0 | 372,800 | 137,700 | 3,728,000 | 1,377,000 | 5,105,000 |
| | | | Sub Total | | 5,134,720 | 1,449,480 | 6,584,200 |
| Maintenance of Timber Bridge (New) | m2 | 184.0 | 6,882 | 1,232 | 1,266,288 | 226,688 | 1,492,976 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 81.6 | 7,507 | 2,460 | 612,571 | 200,736 | 813,307 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Earthwork & Pavement | Unit Cost | (Rp/Km) | : | 15,725,482 |
| Timber Bridge | Unit Cost | (Rp/m2) | : | 133,010 |
| Concrete Bridge | Unit Cost | (Rp/m2) | : | |
| Survived Value | | (Rp) | : | 22,338,960 |
| Maintenance Rate without Bridge | | (%) | : | 4.19 |
| New Bridge Cost Rate | | (%) | : | 13.47 |

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : 80 (IIIB-1) LENGTH : 10 Km

UPGRADE : 6.5m road bed, 4.0m road with surface Dressing (1)

(Rp)

| ITEM | UNIT | QUANTITY | UNIT COST LOCAL | UNIT COST FOREIGN | COST LOCAL | COST FOREIGN | TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 23000.0 | 173 | 91 | 3,979,000 | 2,093,000 | 6,072,000 |
| Subgrade Preparation | m2 | 65000.0 | 22 | 11 | 1,430,000 | 715,000 | 2,145,000 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 3634.0 | 1,047 | 522 | 3,804,798 | 1,896,948 | 5,701,746 |
| Sub Base Course | m3 | 5600.0 | 3,363 | 1,347 | 18,832,800 | 7,543,200 | 26,376,000 |
| Base Course | m3 | 2800.0 | 4,622 | 2,299 | 12,941,600 | 6,437,200 | 19,378,800 |
| Shoulder | m2 | 25000.0 | 313 | 146 | 7,825,000 | 3,650,000 | 11,475,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 40000.0 | 616 | 595 | 24,640,000 | 23,800,000 | 48,440,000 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 14000.0 | 870 | 119 | 12,180,000 | 1,666,000 | 13,846,000 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 32.0 | 44,520 | 42,161 | 1,424,640 | 1,349,152 | 2,773,792 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 9.6 | 44,050 | 11,678 | 422,880 | 112,108 | 534,988 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 18,507,294 | 2,774,324 | 21,281,618 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 105,988,012 | 52,036,932 | 158,024,944 |
| Overhead ( 15% ) | | | | | 15,898,201 | 7,805,539 | 23,703,740 |
| | | | TOTAL COST | | 121,886,213 | 59,842,471 | 181,728,684 |
| Manual routine maintenance of road | Km | 10.0 | 140,672 | 7,248 | 1,406,720 | 72,480 | 1,479,200 |
| Routine maintenance of asphalt road | Km | 10.0 | 372,800 | 137,700 | 3,728,000 | 1,377,000 | 5,105,000 |
| | | | Sub Total | | 5,134,720 | 1,449,480 | 6,584,200 |
| Maintenance of Timber Bridge (New) | m2 | 184.0 | 6,882 | 1,232 | 1,266,288 | 226,688 | 1,492,976 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 81.6 | 7,507 | 2,460 | 612,571 | 200,736 | 813,307 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Earthwork & Pavement | Unit Cost | (Rp/Km) | : | 15,725,482 |
| Timber Bridge | Unit Cost | (Rp/m2) | : | 133,010 |
| Concrete Bridge | Unit Cost | (Rp/m2) | : | |
| Survived Value | | (Rp) | : | 22,338,960 |
| Maintenance Rate without Bridge | | (%) | : | 4.19 |
| New Bridge Cost Rate | | (%) | : | 13.47 |

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : 71 (IIIB-2) LENGTH : 4 Km

UPGRADE : 7.0m road bed, 4.0m road with surface Base Cource

(Rp)

| ITEM | UNIT | QUANTITY | UNIT COST LOCAL | UNIT COST FOREIGN | COST LOCAL | COST FOREIGN | TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 12000.0 | 173 | 91 | 2,076,000 | 1,092,000 | 3,168,000 |
| Subgrade Preparation | m2 | 0.0 | 22 | 11 | 0 | 0 | 0 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 560.0 | 1,047 | 522 | 586,320 | 292,320 | 878,640 |
| Sub Base Course | m3 | 1136.0 | 3,363 | 1,347 | 3,820,368 | 1,530,192 | 5,350,560 |
| Base Course | m3 | 960.0 | 4,622 | 2,299 | 4,437,120 | 2,207,040 | 6,644,160 |
| Shoulder | m2 | 12000.0 | 313 | 146 | 3,756,000 | 1,752,000 | 5,508,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 0.0 | 616 | 595 | 0 | 0 | 0 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 8000.0 | 870 | 119 | 6,960,000 | 952,000 | 7,912,000 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 16.0 | 44,520 | 42,161 | 712,320 | 674,576 | 1,386,896 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 6.4 | 44,050 | 11,670 | 281,920 | 74,739 | 356,659 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 22,630,048 | 8,574,867 | 31,204,915 |
| Overhead ( 15% ) | | | | | 3,394,507 | 1,286,230 | 4,680,737 |
| | | | TOTAL COST | | 26,024,555 | 9,861,097 | 35,885,652 |
| Manual routine maintenance of road | Km | 4.0 | 140,672 | 7,248 | 562,688 | 28,992 | 591,680 |
| Routine maintenance of gravel road | Km | 4.0 | 202,224 | 88,047 | 808,896 | 352,188 | 1,161,084 |
| | | | Sub Total | | 1,371,584 | 381,180 | 1,752,764 |
| Maintenance of Timber Bridge (New) | m2 | 0.0 | 6,882 | 1,232 | 0 | 0 | 0 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 0.0 | 7,507 | 2,460 | 0 | 0 | 0 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Earthwork & Pavement | Unit Cost | (Rp/Km) | : | 8,971,413 |
| Timber Bridge | Unit Cost | (Rp/m2) | : | |
| Concrete Bridge | Unit Cost | (Rp/m2) | : | |
| Survived Value | | (Rp) | : | 2,675,280 |
| Maintenance Rate without Bridge | | (%) | : | 4.88 |
| New Bridge Cost Rate | | (%) | : | |

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : 70 (IIIB-1) LENGTH : 2 Km

UPGRADE : 7.0m road bed, 4.0m road with surface Dressing (1)

(Rp)

| ITEM | UNIT | QUANTITY | UNIT COST LOCAL | UNIT COST FOREIGN | COST LOCAL | COST FOREIGN | TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 4500.0 | 173 | 91 | 778,500 | 409,500 | 1,188,000 |
| Subgrade Preparation | m2 | 0.0 | 22 | 11 | 0 | 0 | 0 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 280.0 | 1,047 | 522 | 293,160 | 146,160 | 439,320 |
| Sub Base Course | m3 | 548.5 | 3,363 | 1,347 | 1,844,605 | 738,829 | 2,583,434 |
| Base Course | m3 | 560.0 | 4,622 | 2,299 | 2,588,320 | 1,287,440 | 3,875,760 |
| Shoulder | m2 | 6000.0 | 313 | 146 | 1,878,000 | 876,000 | 2,754,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 8000.0 | 616 | 595 | 4,928,000 | 4,760,000 | 9,688,000 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 0.0 | 870 | 119 | 0 | 0 | 0 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 15.0 | 44,520 | 42,161 | 667,800 | 632,415 | 1,300,215 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 3.2 | 44,050 | 11,678 | 140,960 | 37,369 | 178,329 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 2,633,978 | 434,044 | 3,068,022 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 15,753,323 | 9,321,757 | 25,075,080 |
| Overhead ( 15% ) | | | | | 2,362,998 | 1,398,263 | 3,761,261 |
| | | | TOTAL COST | | 18,116,321 | 10,720,020 | 28,836,341 |
| Manual routine maintenance of road | Km | 2.0 | 140,672 | 7,248 | 281,344 | 14,496 | 295,840 |
| Routine maintenance of asphalt road | Km | 2.0 | 372,800 | 137,700 | 745,600 | 275,400 | 1,021,000 |
| | | | Sub Total | | 1,026,944 | 289,896 | 1,316,840 |
| Maintenance of Timber Bridge (New) | m2 | 20.0 | 6,882 | 1,232 | 137,640 | 24,640 | 162,280 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 0.0 | 7,507 | 2,460 | 0 | 0 | 0 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Earthwork & Pavement | Unit Cost | (Rp/Km) | : | 12,654,058 |
| Timber Bridge | Unit Cost | (Rp/m2) | : | 176,411 |
| Concrete Bridge | Unit Cost | (Rp/m2) | : | |
| Survived Value | | (Rp) | : | 2,583,555 |
| Maintenance Rate without Bridge | | (%) | : | 5.20 |
| New Bridge Cost Rate | | (%) | : | 12.24 |

PROV : KALIMANTAN SELATAN KAB : BANJAR

LINK NO : 69 (IIIB-1) LENGTH : 2 Km

UPGRADE : 7.0m road bed, 4.0m road with surface Dressing (1)

(Rp)

| ITEM | UNIT | QUANTITY | <<< UNIT COST >>> LOCAL | FOREIGN | <<<<<< COST LOCAL | FOREIGN | >>>>>> TOTAL |
|---|---|---|---|---|---|---|---|
| Site Clearance in Light Bush | m2 | 0.0 | 173 | 91 | 0 | 0 | 0 |
| Subgrade Preparation | m2 | 0.0 | 22 | 11 | 0 | 0 | 0 |
| Normal Fill | m3 | 0.0 | 1,792 | 863 | 0 | 0 | 0 |
| Fill in Swamp | m3 | 0.0 | 2,637 | 1,052 | 0 | 0 | 0 |
| Normal Excavation to Spoil | m3 | 1180.0 | 1,047 | 522 | 1,235,460 | 615,960 | 1,851,420 |
| Sub Base Course | m3 | 574.0 | 3,363 | 1,347 | 1,930,362 | 773,178 | 2,703,540 |
| Base Course | m3 | 560.0 | 4,622 | 2,299 | 2,588,320 | 1,287,440 | 3,875,760 |
| Shoulder | m2 | 6000.0 | 313 | 146 | 1,878,000 | 876,000 | 2,754,000 |
| Asphalt Patching | m2 | 0.0 | 3,728 | 1,377 | 0 | 0 | 0 |
| Surface Dressing (Single) | m2 | 8000.0 | 616 | 595 | 4,928,000 | 4,760,000 | 9,688,000 |
| Surface Dressing (Double) | m2 | 0.0 | 771 | 936 | 0 | 0 | 0 |
| Earth Drain | m | 0.0 | 870 | 119 | 0 | 0 | 0 |
| Earth Drain in Swamp (by machine) | m3 | 0.0 | 1,256 | 474 | 0 | 0 | 0 |
| Pipe Culvert D80cm | m | 4.0 | 44,520 | 42,161 | 178,080 | 168,644 | 346,724 |
| Masonry Culvert (80x80cm) | m | 0.0 | 60,401 | 36,609 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Timber) | m2 | 0.0 | 9,691 | 246 | 0 | 0 | 0 |
| Retaining Wall and Wing Wall (Masonry) | m3 | 0.0 | 44,050 | 11,678 | 0 | 0 | 0 |
| Gabion Protection | m3 | 0.0 | 11,979 | 120 | 0 | 0 | 0 |
| New Bridge (Timber) | SET | 1.0 | -- | -- | 3,467,998 | 531,386 | 3,999,384 |
| New Bridge (Concrete) | SET | 1.0 | -- | -- | 0 | 0 | 0 |
| | | | Sub Total | | 16,206,220 | 9,012,608 | 25,218,828 |
| Overhead ( 15% ) | | | | | 2,430,933 | 1,351,891 | 3,782,824 |
| | | | TOTAL COST | | 18,637,153 | 10,364,499 | 29,001,652 |
| Manual routine maintenance of road | Km | 2.0 | 140,672 | 7,248 | 281,344 | 14,496 | 295,840 |
| Routine maintenance of asphalt road | Km | 2.0 | 372,800 | 137,700 | 745,600 | 275,400 | 1,021,000 |
| | | | Sub Total | | 1,026,944 | 289,896 | 1,316,840 |
| Maintenance of Timber Bridge (New) | m2 | 28.0 | 6,882 | 1,232 | 192,696 | 34,496 | 227,192 |
| Maintenance of Concrete Bridge (New) | m2 | 0.0 | 1,759 | 2,656 | 0 | 0 | 0 |
| Maintenance of Timber Bridge (Exist) | m2 | 0.0 | 7,507 | 2,460 | 0 | 0 | 0 |
| Maintenance of Concrete Bridge (Exist) | m2 | 0.0 | 4,417 | 2,375 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Earthwork & Pavement | Unit Cost | (Rp/Km) | : | 12,201,180 |
| Timber Bridge | Unit Cost | (Rp/m2) | : | 164,260 |
| Concrete Bridge | Unit Cost | (Rp/m2) | : | |
| Survived Value | | (Rp) | : | 2,667,630 |
| Maintenance Rate without Bridge | | (%) | : | 5.40 |
| New Bridge Cost Rate | | (%) | : | 15.86 |