

Table 2.8 Summary of Irrigation Water Requirement

Seasonal water requirement in depth
(Unit: mm)

| Year | Wet Season Paddy | | Dry Season Paddy | |
|---------|------------------|-----|------------------|-------|
| | ND | DR | ND | DR |
| 1973 | 326 | 509 | 677 | 1,058 |
| 1974 | 400 | 625 | 693 | 1,083 |
| 1975 | 344 | 538 | 698 | 1,091 |
| 1976 | 416 | 650 | 618 | 966 |
| 1977 | 531 | 830 | 633 | 989 |
| 1978 | 345 | 539 | 692 | 1,081 |
| 1979 | 451 | 705 | 688 | 1,075 |
| 1980 | 411 | 642 | 658 | 1,028 |
| Average | | 630 | | 1,046 |

Maximum unit diversion water requirement

(Unit: ℓ /sec/ha)

| <u>Dry Season Paddy</u> | | | |
|--------------------------|------|---|---------------|
| Occurrence | | | Maximum Value |
| 1973 | Dec. | F | 1.65 |
| 1974 | Dec. | M | 1.59 |
| 1975 | Dec. | F | 1.54 |
| 1976 | Dec. | M | 1.61 |
| 1977 | Dec. | F | 1.47 |
| 1978 | Dec. | F | 1.51 |
| 1979 | Dec. | F | 1.77 |
| 1980 | Dec. | F | 1.68 |
| 80 % dependable capacity | | | 1.65 |

(Unit: ℓ /sec/ha)

| <u>Wet Season Paddy</u> | | | |
|-------------------------|------|---|---------------|
| Occurrence | | | Maximum Value |
| 1973 | May | F | 1.06 |
| 1974 | Jun. | F | 1.46 |
| 1975 | Jun. | L | 1.01 |
| 1976 | May | M | 1.27 |
| 1977 | Jun. | F | 1.23 |
| 1978 | May | L | 1.01 |
| 1979 | May | M | 1.44 |
| 1980 | May | L | 1.22 |
| | | | 1.35 |

Table 3.1 Irrigation Area in Critical Low Flow Periods (1/2)
(Wet season paddy)

| Year | First Lowest | | | Second Lowest | | | Year | First Lowest | | | Second Lowest | | | | |
|------|--------------|------|-----------------------------|------------------|-------|-----------------------------|------|--------------|--------|-----------------------------|------------------|------|-----------------------------|--------|--|
| | Month | Date | Irriga- ble Area (ha) | Month | Date | Irriga- ble Area (ha) | | Month | Date | Irriga- ble Area (ha) | Month | Date | Irriga- ble Area (ha) | | |
| 1973 | Jun. | 12 | 21,730 | more than 20,000 | | | 1977 | Jul. | 5 | 8,700 | Jun. | 21 | 11,800 | | |
| | | 13 | 24,570 | | | | | | 6 | 7,600 | | 22 | 10,300 | | |
| | | 14 | 20,000 | | | | | | 7 | 8,700 | | 23 | 8,300 | | |
| | | 15 | 17,400 | | | | | | 8 | 6,800 | | 24 | 7,000 | | |
| | | 16 | 15,800 | | | | | | 9 | 6,400 | | 25 | 7,000 | | |
| | | 17 | 15,100 | | | | | | 10 | 6,000 | | 26 | 8,700 | | |
| | | 18 | 16,700 | | | | | | 11 | 5,300 | | 27 | 7,800 | | |
| | | 19 | 15,100 | | | | | | 12 | 7,700 | | 28 | 7,800 | | |
| | | 20 | 12,840 | | | | | | 13 | 7,700 | | 29 | 7,800 | | |
| | | 21 | 16,600 | | | | | | 14 | 11,200 | | 30 | 7,400 | | |
| | | mean | | | | | | | 17,580 | mean | | | 7,610 | mean | |
| 1974 | Jun. | 1 | 7,900 | Apr. | 21 | 12,700 | 1978 | May | 20 | 21,100 | more than 20,000 | | | | |
| | | 2 | 6,800 | | 22 | 11,500 | | | 21 | 14,000 | | | | | |
| | | 3 | 6,000 | | 23 | 10,950 | | | 22 | 12,100 | | | | | |
| | | 4 | 5,700 | | 24 | 6,700 | | | 23 | 10,900 | | | | | |
| | | 5 | 5,700 | | 25 | 5,000 | | | 24 | 10,900 | | | | | |
| | | 6 | 5,300 | | 26 | 4,600 | | | 25 | 23,760 | | | | | |
| | | 7 | 6,800 | | 27 | 4,600 | | | 26 | 14,500 | | | | | |
| | | 8 | 8,400 | | 28 | 4,300 | | | 27 | 10,300 | | | | | |
| | | 9 | 5,700 | | 29 | 4,000 | | | 28 | 9,200 | | | | | |
| | | 10 | 5,200 | | 30 | 5,000 | | | 29 | 10,300 | | | | | |
| | | mean | | | 6,350 | mean | | | 6,930 | mean | | | | 13,700 | |
| 1975 | Apr. | 17 | 4,500 | Jun. | 21 | 22,100 | 1979 | May | 20 | 6,900 | Aug. | 1 | 7,500 | | |
| | | 18 | 4,300 | | 22 | 18,100 | | | 21 | 8,600 | | 2 | 7,500 | | |
| | | 19 | 8,200 | | 23 | 17,450 | | | 22 | 7,700 | | 3 | 7,300 | | |
| | | 20 | 4,900 | | 24 | 16,000 | | | 23 | 7,700 | | 4 | 7,300 | | |
| | | 21 | 2,400 | | 25 | 14,700 | | | 24 | 7,700 | | 5 | 7,000 | | |
| | | 22 | 2,200 | | 26 | 17,400 | | | 25 | 7,700 | | 6 | 7,000 | | |
| | | 23 | 2,100 | | 27 | 17,400 | | | 26 | 7,700 | | 7 | 7,000 | | |
| | | 24 | 2,200 | | 28 | 18,900 | | | 27 | 5,900 | | 8 | 7,000 | | |
| | | 25 | 2,000 | | 29 | 18,900 | | | 28 | 5,200 | | 9 | 11,000 | | |
| | | 26 | 2,000 | | 30 | 17,400 | | | 29 | 4,800 | | 10 | 7,000 | | |
| | | mean | | | 3,480 | mean | | | 17,830 | mean | | | 6,990 | mean | |
| 1976 | May | 16 | 5,400 | Jul. | 16 | 4,700 | 1980 | Jul. | 22 | 8,800 | Jul. | 3 | 9,700 | | |
| | | 17 | 5,000 | | 17 | 4,500 | | | 23 | 11,000 | | 4 | 9,100 | | |
| | | 18 | 4,700 | | 18 | 4,500 | | | 24 | 8,100 | | 5 | 14,500 | | |
| | | 19 | 4,300 | | 19 | 4,400 | | | 25 | 8,100 | | 6 | 12,000 | | |
| | | 20 | 2,200 | | 20 | 4,200 | | | 26 | 8,100 | | 7 | 17,300 | | |
| | | 21 | 2,600 | | 21 | 4,600 | | | 27 | 8,100 | | 8 | 9,700 | | |
| | | 22 | 2,700 | | 22 | 4,600 | | | 28 | 8,100 | | 9 | 8,100 | | |
| | | 23 | 5,900 | | 23 | 4,600 | | | 29 | 6,900 | | 10 | 7,200 | | |
| | | 24 | 2,600 | | 24 | 5,200 | | | 30 | 6,900 | | 11 | 8,800 | | |
| | | 25 | 2,500 | | 25 | 5,200 | | | 31 | 6,400 | | 12 | 8,200 | | |
| | | mean | | | 3,790 | mean | | | 4,650 | mean | | | 8,050 | mean | |

Table 3.1 Irrigation Area in Critical Low Flow Periods (2/2)
(Wet season paddy)

| Year | First Lowest | | | Second Lowest | | | Year | First Lowest | | | Second Lowest | | |
|------|--------------|-------|-----------------------------|---------------|--------|-----------------------------|------|--------------|------|-----------------------------|---------------|------|-----------------------------|
| | Month | Date | Irriga- ble Area (ha) | Month | Date | Irriga- ble Area (ha) | | Month | Date | Irriga- ble Area (ha) | Month | Date | Irriga- ble Area (ha) |
| 1973 | Nov. | 16 | 10,100 | Oct. | 11 | 18,400 | 1977 | Nov. | 9 | 2,100 | Oct. | 21 | 3,000 |
| | | 17 | 8,700 | | 12 | 15,700 | | | 10 | 2,100 | | 22 | 3,000 |
| | | 18 | 8,200 | | 13 | 13,200 | | | 11 | 2,000 | | 23 | 3,000 |
| | | 19 | 7,800 | | 14 | 12,400 | | | 12 | 2,000 | | 24 | 2,900 |
| | | 20 | 7,300 | | 15 | 11,600 | | | 13 | 2,000 | | 25 | 2,900 |
| | | 21 | 6,500 | | 16 | 10,800 | | | 14 | 2,000 | | 26 | 2,900 |
| | | 22 | 5,700 | | 17 | 10,800 | | | 15 | 2,000 | | 27 | 2,900 |
| | | 23 | 5,700 | | 18 | 13,200 | | | 16 | 2,000 | | 28 | 2,900 |
| | | 24 | 6,800 | | 19 | 10,800 | | | 17 | 2,000 | | 29 | 3,000 |
| | | 25 | 8,500 | | 20 | 15,700 | | | 18 | 2,100 | | 30 | 3,000 |
| | mean | 7,530 | | mean | 13,260 | | mean | 2,030 | | mean | 2,950 | | |
| 1974 | Dec. | 13 | 5,400 | Jan. | 9 | 6,900 | 1978 | Dec. | 4 | 6,900 | Nov. | 21 | 6,100 |
| | | 14 | 4,700 | | 10 | 5,400 | | | 5 | 7,700 | | 22 | 4,000 |
| | | 15 | 4,400 | | 11 | 5,700 | | | 6 | 5,500 | | 23 | 3,400 |
| | | 16 | 4,400 | | 12 | 6,100 | | | 7 | 4,500 | | 24 | 3,700 |
| | | 17 | 6,800 | | 13 | 6,100 | | | 8 | 4,000 | | 25 | 4,000 |
| | | 18 | 7,100 | | 14 | 6,100 | | | 9 | 4,500 | | 26 | 7,600 |
| | | 19 | 5,100 | | 15 | 6,500 | | | 10 | 4,200 | | 27 | 7,200 |
| | | 20 | 4,200 | | 16 | 6,500 | | | 11 | 4,300 | | 28 | 7,200 |
| | | 21 | 6,700 | | 17 | 6,500 | | | 12 | 3,700 | | 29 | 5,000 |
| | | 22 | 6,300 | | 18 | 7,000 | | | 13 | 9,700 | | 30 | 7,200 |
| | mean | 5,510 | | mean | 6,280 | | mean | 5,500 | | mean | 5,540 | | |
| 1975 | Dec. | 22 | 4,600 | Jan. | 8 | 6,400 | 1979 | Dec. | 6 | 1,900 | Nov. | 20 | 6,100 |
| | | 23 | 8,000 | | 9 | 7,600 | | | 7 | 2,100 | | 21 | 3,900 |
| | | 24 | 8,900 | | 10 | 6,000 | | | 8 | 2,100 | | 22 | 3,100 |
| | | 25 | 3,600 | | 11 | 6,500 | | | 9 | 2,700 | | 23 | 3,400 |
| | | 26 | 3,600 | | 12 | 6,100 | | | 10 | 2,100 | | 24 | 3,600 |
| | | 27 | 3,600 | | 13 | 6,500 | | | 11 | 2,000 | | 25 | 3,900 |
| | | 28 | 3,600 | | 14 | 6,500 | | | 12 | 2,000 | | 26 | 3,100 |
| | | 29 | 3,600 | | 15 | 6,500 | | | 13 | 2,000 | | 27 | 4,600 |
| | | 30 | 3,600 | | 16 | 5,700 | | | 14 | 2,000 | | 28 | 3,400 |
| | | 31 | 3,600 | | 17 | 6,500 | | | 15 | 2,000 | | 29 | 2,600 |
| | mean | 4,670 | | mean | 6,390 | | mean | 2,020 | | mean | 3,790 | | |
| 1976 | Dec. | 7 | 5,000 | Jan. | 11 | 5,100 | 1980 | Nov. | 11 | 3,100 | Dec. | 1 | 2,000 |
| | | 8 | 3,200 | | 12 | 5,600 | | | 12 | 2,900 | | 2 | 1,800 |
| | | 9 | 3,500 | | 13 | 4,800 | | | 13 | 2,900 | | 3 | 1,800 |
| | | 10 | 2,800 | | 14 | 6,800 | | | 14 | 2,900 | | 4 | 2,200 |
| | | 11 | 2,400 | | 15 | 5,600 | | | 15 | 2,900 | | 5 | 4,300 |
| | | 12 | 2,600 | | 16 | 4,800 | | | 16 | 3,100 | | 6 | 3,300 |
| | | 13 | 1,900 | | 17 | 4,400 | | | 17 | 3,500 | | 7 | 4,300 |
| | | 14 | 1,900 | | 18 | 3,700 | | | 18 | 3,000 | | 8 | 3,800 |
| | | 15 | 1,900 | | 19 | 3,700 | | | 19 | 3,000 | | 9 | 4,000 |
| | | 16 | 3,300 | | 20 | 3,700 | | | 20 | 3,900 | | 10 | 6,200 |
| | mean | 2,850 | | mean | 4,820 | | mean | 3,160 | | mean | 3,370 | | |

Table 4.1 General Features of Existing Plans

| Description | | DOI Plan | Master Plan |
|--|-----------------------|--|--|
| 1. Name of project | | Bila Irrigation Project | Bila Irrigation Project |
| 2. Source of irrigation water | | Bila river | Bila river |
| 3. Net irrigation area | (ha) | 9,288 (Final design 1980) | 10,500 |
| 4. Maximum diversion water requirement | (m ³ /sec) | 14.6 | 13.8 |
| 5. Project facilities | | | |
| (1) <u>Bila intake structure</u> | | | |
| Location | | 3 Km downstream of confluence with the Betau river | 1 Km upstream of the DOI site |
| Catchment area | (km ²) | 370 | 376 |
| Riverbed EL. | (EL.m) | | |
| Geology | | Conglomerate | Conglomerate |
| Design flood | (m ³ /sec) | 1,135 | 1,200 |
| Weir type | | Cascade type | Concrete gravity type |
| Crest EL. | (EL.m) | 30.3 | 35.0 |
| Weir height | (m) | 8.3 | 13.5 |
| Crest length | (m) | 70 m includ. scouring sluices | 86 m with width of piers |
| Scouring sluice | | 2.0 m width x 2 nos. | 8 m width x 2 nos. |
| Intake gate | | Left bank; 2.0 m width x 3 nos. Right bank; 1.3 m width x 1 no. | Left bank; 2.0 m width x 6 nos. |
| Earth embankment | | Crest EL. 36.15 m | Crest EL. 40.3 m |
| (2) <u>Irrigation canal</u> | | | |
| Main canal | | | |
| Type | | Trapezoidal earth canal | Trapezoidal earth canal |
| Length | (km) | Left ; 21.0 Right; 2.3 | Left ; 42.0 Right; 1.0 |
| Discharge | (m ³ /sec) | Left ; 12.1 to 5.8 Right; 2.5 | Left ; 12.2 to 1.9 Right; 1.6 |
| Secondary canal | | | |
| Type | | Trapezoidal earth canal | Trapezoidal earth canal |
| Length | (km) | 81.3 | 91 |
| Number | (Nos.) | 65 | 11 |
| (3) <u>Drainage canal</u> | | | |
| Canal type | | - | Trapezoidal earth canal |
| Length | (km) | - | 63 |
| (4) <u>Tertiary system</u> | | | |
| Area to be served | | (under designing) | 10,500 |
| Tertiary unit | | | Average 150 ha |
| Facilities | | | Tertiary and quaternary canal, tertiary and quaternary drain and farm road |
| (5) <u>Land preparation</u> | | - | 200 ha |

Table 4.2 Water Balance Study in Master Plan

| Month | 1973/1974 | | | 1974/1975 | | | 1975/1976 | | |
|-------|-----------|------|------|-----------|------|-------|-----------|------|------|
| | Qr | Ud | Is | Qr | Ud | Is | Qr | Ud | Is |
| Apr. | 34.0 | 0.03 | NL | 15.1 | 0.11 | 137 | 10.1 | 0.14 | 72.1 |
| May | 45.2 | 0.39 | 116 | 18.5 | 0.28 | 66.1 | 33.7 | 0 | NL |
| Jun. | 26.6 | 0 | NL | 16.8 | 0.46 | 36.5 | 25.4 | 0.06 | 42.3 |
| Jul. | 50.7 | 0.84 | 60.4 | 31.9 | 0.53 | 60.2 | 36.1 | 0.53 | 68.1 |
| Aug. | 28.2 | 0 | NL | 12.2 | 0.63 | 18.8 | 33.3 | 0.20 | 166 |
| Sep. | 36.1 | 0 | NL | 54.2 | 0 | NL | 47.2 | 0 | NL |
| Oct. | 19.5 | 0.15 | 130 | 28.2 | 0.14 | 201.0 | 28.9 | 0.09 | 321 |
| Nov. | 14.6 | 0.26 | 56.2 | 18.3 | 0.77 | 23.8 | 14.8 | 0.93 | 15.9 |
| Dec. | 28.1 | 0.78 | 36.0 | 13.1 | 1.01 | 13.0 | 11.0 | 1.03 | 10.7 |
| Jan. | 7.7 | 1.17 | 6.6 | 9.8 | 1.31 | 7.5 | 5.6 | 1.16 | 4.8 |
| Feb. | 8.8 | 0.59 | 14.9 | 28.7 | 0.55 | 52.2 | 3.5 | 0.64 | 5.5 |
| Mar. | 3.7 | 0 | NL | 23.3 | 0 | NL | 10.0 | 0 | NL |

| Month | 1976/1977 | | | 1977/1978 | | | Summary | | |
|-------|-----------|------|------|-----------|------|------|---------|--------------|------------|
| | Qr | Ud | Is | Qr | Ud | Is | Year | Rainy Season | Dry Season |
| Apr. | 7.8 | 0.14 | 55.7 | 29.5 | 0.13 | 227 | 1973/74 | 10,500 | 6,600 |
| May | 21.6 | 0.56 | 38.6 | 17.2 | 0.38 | 45.3 | 1974/75 | 10,500 | 7,500 |
| Jun. | 14.5 | 0 | NL | 25.8 | 0 | NL | 1975/76 | 10,500 | 4,800 |
| Jul. | 10.9 | 0.43 | 25.3 | 10.6 | 0.84 | 12.6 | 1976/77 | 10,500 | 9,000 |
| Aug. | 11.8 | 0.48 | 24.6 | 17.2 | 0.54 | 31.9 | 1977/78 | 10,500 | 6,300 |
| Sep. | 2.9 | 0 | NL | 2.5 | 0 | NL | Average | 10,500 | 6,800 |
| Oct. | 4.9 | 0.17 | 28.8 | 2.4 | 0.25 | 9.6 | Minimum | 10,500 | 4,800 |
| Nov. | 11.5 | 0.54 | 21.3 | 2.5 | 0.40 | 6.3 | | | |
| Dec. | 9.5 | 1.05 | 9.0 | 31.0 | 0.94 | 33.0 | | | |
| Jan. | 9.2 | 1.02 | 9.0 | 18.3 | 0.66 | 27.7 | | | |
| Feb. | 13.2 | 0.60 | 22.0 | 11.7 | 0.65 | 18.0 | | | |
| Mar. | 7.7 | 0 | NL | - | - | - | | | |

(unit: ha)

Remark: Qr: Monthly mean discharge of the Bila river (m³/sec) Ud: Unit water requirement (lit/sec/ha)
 Ia: Irrigable area by the river flow, Qr/Ud (1,000 ha) Is: Seasonal irrigable area (ha)

Table 4.3 Past Activities made by DOI

| Work Items | Descriptions |
|-----------------------------------|--|
| 1. Topographic mapping and survey | <p>: Topographic mapping on a scale of 1:5,000 covering 13,000 ha with contour interval of 1 m by P.T. TRICON in 1976.</p> <p>Longitudinal and cross section survey of main and secondary canals by P.T. TRICON in 1979.</p> |
| 2. Geological investigation | <p>: Geological investigation on coupure/intake site by P.T. TRICON in 1976 and 1978</p> <p>(a) Test pitting, 2 to 3 m in depth of 20 sites</p> <p>(b) Hand augering, 1.8 to 3.5 m in depth of 7 sites</p> <p>(c) Standard penetration testing, 15 m in depth of 1 site</p> <p>: Geological investigation on canal route and structure sites by P.T. TRICON in 1976 to 1978; by means of Deutch cone penetration testing, 2.0 to 4.5 m in depth of 26 sites.</p> |
| 3. Soil mechanical investigation | <p>: Soil mechanical investigation on intake site, canal route and structure sites by P.T. TRICON</p> <p>(a) Intake site by Deutch cone penetration testing, 2.9 to 7.8 m in depth of 7 sites.</p> <p>(b) Canal route and structure sites by Deutch cone penetration testing, 1.8 to 16.0 m in depth of 27 sites.</p> |
| 4. Hydraulic model test | <p>: Hydraulic model test of the preliminary design of intake structure by DPMA in 1977.</p> |
| 5. Detailed design | <p>: Detailed design of intake structure, main and secondary irrigation canals and related structures by P.T. WECOM.</p> |

Table 4.4 List of Reports and Drawings prepared by DOI

| No. | Description |
|--------------|--|
| 1. | Bila Irrigation Project in South Sulawesi, Design and Drawings by P.T. WECOM. |
| Volume I: | Bila Weir |
| Volume II: | A. Design of Bila Kanan main canal, Palabulu secondary canal section 1 and 2, Bila Barat secondary canal B. Design of division structures/turnout and crossing structures for the above canal |
| Volume III: | A. Design of Palabulu secondary canal from section 3 to section 9 B. Design of division structures/turnout and crossing structures for the above canal |
| Volume IV: | A. Design of Bila Kiri main canal from BSKR. 10 B. Design of division structures/turnout and crossing structures for the above canal |
| Volume V: | A. Design of Bila Kiri main canal from BSKR. 10 to BSKR. 18 and Jombang secondary canal from BSKR. 18 to B.J.2 B. Design of division structures/turnout and crossing structures for the above canal |
| Volume VI: | A. Design of Jombang secondary canal from section 3 to section 10 and Lonjong secondary canal B. Design of division structures/turnout and crossing structures for the above canal |
| Volume VII: | A. Design of Jombang secondary canal from section 11 to section 17 and Bolog secondary canal B. Design of division structures/turnout and crossing structures for the above canal |
| Volume VIII: | A. Design of Febiah secondary canal B. Design of division structures/turnout and crossing structures for the above canal |
| Volume IX: | A. Design of Kalosi secondary canal and Logong secondary canal B. Design of division structures/turnout and crossing structures for the above canal |
| Volume X: | A. Design of Falae secondary canal from BSKR. 10 to B.P.11 B. Design of division structures/turnout and crossing structures for the above canal |
| Volume XI: | A. Design of Falae secondary canal from B.P.11 to S.M.F.14 TG. Ubul and Londra secondary canal B. Design of division structures/turnout and crossing structures for the above canal |
| 2. | Bila Irrigation Project in South Sulawesi, design and drawings. Layout of tertiary block of Bila Irrigation Project by P.T. WECOM. |
| 3. | Bila Irrigation Project in South Sulawesi. Final design of Bila weir by P.T. WECOM. |
| 4. | Report on model test for hydraulic characteristic of Bila weir. No. P.434 by Directorate of Hydraulic Engineering. |
| 5. | Geological and soil mechanical investigations on embankment material for the proposed Bila weir, main canal and related structures from structures BB.0 to BB.P.17, by P.T. TRICOM. |
| 6. | Geological and soil mechanical investigations on the proposed Bila weir site by P.T. TRICOM. |
| 7. | Topographic maps on a scale of 1:5,000. |
| 8. | General layout of irrigation canal system on a scale of 1:25,000. |

**Table 4.5 Basic Values for Estimate of the
Irrigation Water Requirement**

| Description | DOI. Plan | Master Plan |
|----------------------------------|---|---|
| 1. Method | Empirical prediction method by modified penman method | Prediction method by the product of with crop coefficient |
| 2. Crop coefficient | | |
| 1st month | 1.10 | 0.85, 1.10 (half month) |
| 2nd month | 1.35 | 1.20, 1.32 (half month) |
| 3rd month | 1.30 | 1.30, 1.12 (half month) |
| 4th month | 1.05 | 0.85 - (half month) |
| 3. Puddling water requirement | 180 mm | 120 mm |
| 4. Percolation rate | 6, 5, 4 and 2 mm/day for 1st, 2nd, 3rd and 4th months | 1 mm/day |
| 5. Irrigation efficiency | | |
| Conveyance loss | 10 % | 20 % |
| Application loss | 20 % | 15 % |
| Total irrigation efficiency | 72 % | 68 % |
| 6. Maximum diversion requirement | 1.80 lit/sec/ha | 1.31 lit/sec/ha |

Table 4.6 Revised General Features of Master Plan and DOI Plan

| Description | DOI Plan | Master Plan |
|---|--|---------------------------|
| 1. Project Area | | |
| Guarantee irrigation area (ha) | 8,500 | 10,000 |
| (1) Wet Season Cropping (ha) | 4,600 | 4,600 |
| (2) Dry Season Cropping (ha) | 2,600 | 2,600 |
| 2. Water Source | | |
| | Bila river | Bila river |
| 3. Irrigation Water Requirement (l/sec/ha) | | |
| | 2.0 x α | 1.65 |
| 4. Project Facilities | | |
| (1) Bila intake | | |
| - Intake structure site | 3 km downstream of confluence with Betau river | 1 km upstream of DOI Site |
| - Type | Masonry Cascade | Concrete gravity |
| - Diversion method | Coupure method | Multiple stage method |
| - Intake water level (EL.m) | 30.0 | 35.0 |
| - Weir height (m) | 8.3 | 17.2 |
| (2) Irrigation canals | | |
| - Main canal (km) | 22.4 | 45.7 |
| - Secondary canal (km) | 103.3 | 74.2 |
| - Tertiary system (ha) | 8,500 | 10,000 |
| (3) Drainage canals (km) | | |
| | 81.0 | 92.5 |
| (4) Road system (km) | | |
| | 28.0 | 29.0 |
| 5. Extent of Irrigation Area | | |
| From: | (EL.m) | 30.0 |
| To : | (EL.m) | 10.0 |

Table 4.7 Revised Work Quantities of Master Plan and DOI Plan

| Description | Unit | DOI Plan | Master Plan | Description | Unit | DOI Plan | Master Plan |
|-----------------------------|-------------------|----------|----------------------|---------------------------------|-------------------|-----------|-------------|
| 1. Billa Intake Weir | | | | | | | |
| (1) Diversion work | | | | (1) Main canal | | | |
| Excavation | (m ³) | 476,000 | 4,500 | Excavation | (m ³) | 631,000 | 1,323,000 |
| Earthfill | (m ³) | - | 2,700 | Earthfill | (m ³) | 542,000 | 1,041,000 |
| Plain concrete | (m ³) | - | 800 | Sod facing | (m ²) | 329,000 | 635,000 |
| (2) Intake weir | | | | Canal lining | (m ²) | - | 114,100 |
| Excavation | (m ³) | - | 126,000 | Asphalt pavement | (m ²) | 67,200 | 236,200 |
| Backfill | (m ³) | 8,600 | 2,000 | Reinforced concrete | (m ³) | 1,200 | 1,200 |
| Plain concrete | (m ³) | - | 55,000 | Wet stone masonry | (m ³) | 14,600 | 18,900 |
| Reinforced concrete | (m ³) | 100 | 1,000 | Metal works | (ton) | 2 | 5 |
| Wet stone masonry | (m ³) | 36,200 | - | (2) Secondary canal | | | |
| Curtain grouting | (m) | - | 3,500 | Excavation | (m ³) | 484,000 | 284,000 |
| Cabion | (m ³) | 2,000 | 2,600 | Earthfill | (m ³) | 923,000 | 671,000 |
| Gate | (m ²) | 32 | 18 | Sod facing | (m ²) | 905,000 | 334,000 |
| (3) Inspection bridge | | | | Asphalt pavement | (m ²) | 218,700 | 222,600 |
| Reinforced concrete | (m ³) | 400 | included in item (2) | Reinforced concrete | (m ³) | 900 | 1,400 |
| (4) Earth embankment | | | | Wet stone masonry | (m ³) | 14,800 | 17,400 |
| Excavation | (m ³) | 11,000 | 26,300 | Metal works | (ton) | 11 | 12 |
| Earthfill | (m ³) | 88,000 | 78,400 | 3. Drainage Canal System | | | |
| Curtain grouting | (m) | - | 4,800 | Excavation | (m ³) | 1,024,000 | 1,148,000 |
| (5) Intake | | | | Earthfill | (m ³) | 199,000 | 227,000 |
| Excavation | (m ³) | 6,000 | 10,000 | Cabion | (m ³) | 9,500 | 13,000 |
| Backfill | (m ³) | 2,400 | 2,000 | Reinforced concrete | (m ³) | 40 | 60 |
| Plain concrete | (m ³) | - | 4,200 | Wet stone masonry | (m ³) | 580 | 820 |
| Reinforced concrete | (m ³) | 250 | 3,800 | 4. Farm Road Network | | | |
| Wet stone masonry | (m ³) | 5,300 | - | Excavation | (m ³) | 59,000 | 61,000 |
| Cabion | (m ³) | - | 500 | Earthfill | (m ³) | 188,000 | 162,000 |
| Grouting | (m) | - | 1,800 | Sod facing | (m ²) | 71,000 | 73,000 |
| Gate | (m ²) | 35 | 28 | Asphalt pavement | (m ²) | 84,000 | 87,000 |
| Metal works | (ton) | - | 4 | Concrete pipe (ø 300) | (m) | 450 | 470 |
| 5. Tertiary System | | | | | | | |
| | | | | | | 8,500 | 10,000 |

Table 4.8 Revised Cost Estimate of Master Plan and DOI Plan

| Item | (Unit: 10 ⁶ Rp.) Cost | |
|--|-------------------------------------|---------------|
| | DOI Plan | Master Plan |
| 1. Civil Works | | |
| (1) Preparatory works | <u>1,066</u> | <u>1,398</u> |
| (2) Bila intake weir | <u>2,665</u> | <u>5,262</u> |
| Intake weir | 1,123 | 4,396 |
| Intake structure | 203 | 866 |
| Diversion channel | 1,215 | - |
| Closure embankment | 61 | - |
| Bridge | 63 | - |
| (3) Canal and road system | <u>8,571</u> | <u>9,964</u> |
| Main canal system | 2,003 | 4,263 |
| Secondary canal system | 4,565 | 3,480 |
| Draiang system | 1,223 | 1,418 |
| Road system | 780 | 803 |
| (4) Tertiary system | <u>3,892</u> | <u>4,578</u> |
| (5) Office and quarters | <u>448</u> | <u>448</u> |
| Total - 1 | <u>16,642</u> | <u>21,650</u> |
| 2. Land Acquisition | 1,372 | 1,600 |
| 3. O & M Equipment | 992 | 992 |
| 4. Administration Expenses | 612 | 612 |
| 5. Engineering Services | 2,879 | 3,346 |
| 6. Physical Contingency | 3,376 | 4,230 |
| 7. Price Contingency | 16,186 | 18,845 |
| GRAND TOTAL | 42,059 | 51,275 |
| Economic Construction Cost (1+3+4+5) x 1.15 x 0.9 | 21,864 | 27,531 |

Table 4.9 Anticipated Benefits of Master Plan and DOI Plan

| Description | Master Plan (10,000 ha) | | | DOI Plan (9,500 ha) | | |
|---|-------------------------|--------|----------------|---------------------|--------|----------------|
| | Without | With | Incre- ment | Without | With | Incre- ment |
| 1. Planted/Harvested Area (ha) | | | | | | |
| Wet season paddy | 4,420 | 4,600 | 180 | 4,420 | 4,600 | 180 |
| Dry season paddy | 280 | 2,600 | 2,320 | 280 | 2,600 | 2,320 |
| Polowijo crops | 1,270 | - | -1,270 | 1,270 | - | -1,270 |
| 2. Unit Yield (ton/ha) | | | | | | |
| Wet season paddy | 2.97 | 5 | 2.03 | 2.97 | 5 | 2.03 |
| Dry season paddy | 2.84 | 5 | 2.16 | 2.84 | 5 | 2.16 |
| Polowijo crops | 0.73 | - | - | 0.73 | - | - |
| 3. Unit Prices (x10³Rp./ton) | | | | | | |
| Paddy (dried) | 200 | 200 | - | 200 | 200 | - |
| Polowijo crops | 275 | 275 | - | 275 | 275 | - |
| 4. Unit Production Cost (x10³Rp.) | | | | | | |
| Wet season paddy | 224.54 | 224.54 | - | 224.54 | 224.54 | - |
| Dry season paddy | 205.41 | 205.41 | 99.25 | 205.41 | 205.41 | 99.25 |
| Polowijo crops | 90.87 | 90.87 | -90.87 | 90.87 | 90.87 | -90.87 |
| 5. Gross Production Value (x10⁶Rp.) | | | | | | |
| Wet season paddy | 3,039 | 7,200 | 4,161 | 3,039 | 7,200 | 4,161 |
| Dry season paddy | 2,625 | 4,600 | 1,975 | 2,625 | 4,600 | 1,975 |
| Dry season paddy | 159 | 2,600 | 2,441 | 159 | 2,600 | 2,441 |
| Polowijo crops | 255 | - | -255 | 255 | - | -255 |
| 6. Total Production Cost (x10⁶Rp.) | | | | | | |
| Wet season paddy | 1,165 | 1,567 | 402 | 1,165 | 1,567 | 402 |
| Dry season paddy | 992 | 1,033 | 41 | 992 | 1,033 | 41 |
| Dry season paddy | 58 | 534 | 476 | 58 | 534 | 476 |
| Polowijo crops | 115 | - | -115 | 115 | - | -115 |
| 7. Net Production Value (x10⁶Rp.) | | | | | | |
| Wet season paddy | 1,874 | 5,633 | 3,759 | 1,874 | 5,633 | 3,759 |
| Dry season paddy | 1,633 | 3,567 | 1,934 | 1,633 | 3,567 | 1,934 |
| Dry season paddy | 101 | 2,066 | 1,965 | 101 | 2,066 | 1,965 |
| Polowijo crops | 140 | - | -140 | 140 | - | -140 |

Remarks: To be referred ANNEX-V.

Table 5.1 Maintenance Flow in Bila River

| Year | Oct. | Nov. | Dec. | Jan. | Feb. | (Unit: 10^6m^3) | |
|---------|-------|-------|-------|-------|-------|----------------------------|-----------------------------|
| | | | | | | Total | (m^3/sec) |
| 1973/74 | 43.60 | 10.66 | 43.42 | 1.05 | 13.46 | 112.19 | (8.60) |
| 1974/75 | 69.38 | 21.34 | 8.12 | 6.83 | 74.60 | 180.29 | (13.82) |
| 1975/76 | 71.03 | 10.85 | 2.08 | 0 | 2.33 | 86.29 | (6.61) |
| 1976/77 | 4.46 | 12.06 | 3.68 | 23.91 | 7.98 | 52.09 | (3.99) |
| 1977/78 | 2.13 | 0 | 51.81 | 32.44 | 18.41 | 104.79 | (8.03) |
| 1978/79 | 17.32 | 0.64 | 27.36 | 2.60 | 24.21 | 72.13 | (5.53) |
| 1979/80 | 2.26 | 0 | 4.61 | 11.72 | 7.11 | 25.70 | (1.97) |
| 1980/81 | 3.12 | 0.08 | 0 | 0 | 1.60 | 4.80 | (0.37) |
| | | | | | Av. | 79.79 | (6.12) |
| | | | | | Min. | 4.80 | (0.37) |
| | | | | | Max. | 180.29 | (13.82) |

Table 5.2 Required Storage Capacity of Alternative Bila Dam (1/8)

| Year Month | | 1973 | | | | | 1974 | | | | | 1975 | | | | |
|------------|--|-------|------|------|-------|-------|------------|-------|------|------|-------|-----------|-------|------|------|-------|
| Five Days | | Q1 | Q2 | Q3 | Q4 | Q5 | Year Month | | | | | Five Days | | | | |
| | | Aug. | | | | | Jan. | | | | | Feb. | | | | |
| 1 | | 24.41 | 0 | 0.17 | 24.24 | 5.70 | 1 | 5.70 | 5.14 | 0.17 | 0.39 | 1 | 5.70 | 5.14 | 0.17 | 0.39 |
| 2 | | 19.22 | 0 | 0.17 | 19.05 | 4.06 | 2 | 4.06 | 5.14 | 0.17 | -1.25 | 2 | 4.06 | 5.14 | 0.17 | -1.25 |
| 3 | | 6.44 | 0.17 | 0.17 | 6.10 | 2.94 | 3 | 2.94 | 4.84 | 0.17 | -2.07 | 3 | 2.94 | 4.84 | 0.17 | -2.07 |
| 4 | | 7.78 | 0.17 | 0.17 | 7.44 | 3.33 | 4 | 3.33 | 4.84 | 0.17 | -1.68 | 4 | 3.33 | 4.84 | 0.17 | -1.68 |
| 5 | | 7.65 | - | 0.17 | 7.48 | 3.20 | 5 | 3.20 | 2.81 | 0.17 | 0.22 | 5 | 3.20 | 2.81 | 0.17 | 0.22 |
| 6 | | 10.06 | - | 0.21 | 9.85 | 3.47 | 6 | 3.47 | 3.37 | 0.21 | -0.11 | 6 | 3.47 | 3.37 | 0.21 | -0.11 |
| APR. | | | | | | | | | | | | | | | | |
| 1 | | 10.80 | - | 0.17 | 10.63 | 2.46 | 1 | 2.46 | 2.72 | 0.17 | -0.43 | 1 | 2.46 | 2.72 | 0.17 | -0.43 |
| 2 | | 10.07 | - | 0.17 | 9.90 | 2.81 | 2 | 2.81 | 2.72 | 0.17 | -0.08 | 2 | 2.81 | 2.72 | 0.17 | -0.08 |
| 3 | | 22.64 | - | 0.17 | 22.47 | 5.10 | 3 | 5.10 | 1.25 | 0.17 | 3.68 | 3 | 5.10 | 1.25 | 0.17 | 3.68 |
| 4 | | 18.84 | - | 0.17 | 18.67 | 5.49 | 4 | 5.49 | 1.25 | 0.17 | 4.07 | 4 | 5.49 | 1.25 | 0.17 | 4.07 |
| 5 | | 15.38 | - | 0.17 | 15.21 | 4.29 | 5 | 4.29 | 0.39 | 0.17 | 3.63 | 5 | 4.29 | 0.39 | 0.17 | 3.63 |
| 6 | | 15.90 | - | 0.17 | 15.73 | 1.71 | 6 | 1.71 | 0.23 | 0.10 | 1.38 | 6 | 1.71 | 0.23 | 0.10 | 1.38 |
| MAY | | | | | | | | | | | | | | | | |
| 1 | | 11.79 | 4.58 | 0.17 | 7.04 | 8.16 | 1 | 8.16 | 0.04 | 0.17 | 7.95 | 1 | 8.16 | 0.04 | 0.17 | 7.95 |
| 2 | | 16.76 | 4.58 | 0.17 | 12.01 | 4.54 | 2 | 4.54 | 0.04 | 0.17 | 4.33 | 2 | 4.54 | 0.04 | 0.17 | 4.33 |
| 3 | | 19.01 | 3.84 | 0.17 | 15.00 | 3.89 | 3 | 3.89 | 2.72 | 0.17 | 1.00 | 3 | 3.89 | 2.72 | 0.17 | 1.00 |
| 4 | | 24.80 | 3.84 | 0.17 | 20.79 | 3.33 | 4 | 3.33 | 2.72 | 0.17 | 0.44 | 4 | 3.33 | 2.72 | 0.17 | 0.44 |
| 5 | | 27.39 | 2.03 | 0.17 | 25.19 | 10.97 | 5 | 10.97 | 1.42 | 0.17 | 9.38 | 5 | 10.97 | 1.42 | 0.17 | 9.38 |
| 6 | | 19.70 | 2.44 | 0.21 | 17.05 | 21.36 | 6 | 21.36 | 1.71 | 0.21 | 19.44 | 6 | 21.36 | 1.71 | 0.21 | 19.44 |
| JUN. | | | | | | | | | | | | | | | | |
| 1 | | 11.15 | 0.86 | 0.17 | 10.12 | 10.71 | 1 | 10.71 | 3.67 | 0.17 | 6.87 | 1 | 10.71 | 3.67 | 0.17 | 6.87 |
| 2 | | 9.94 | 0.86 | 0.17 | 8.91 | 5.83 | 2 | 5.83 | 3.67 | 0.17 | 1.99 | 2 | 5.83 | 3.67 | 0.17 | 1.99 |
| 3 | | 7.39 | 0.30 | 0.17 | 6.92 | 6.52 | 3 | 6.52 | 5.49 | 0.17 | 0.86 | 3 | 6.52 | 5.49 | 0.17 | 0.86 |
| 4 | | 5.27 | 0.30 | 0.17 | 4.80 | 4.62 | 4 | 4.62 | 5.49 | 0.17 | -1.04 | 4 | 4.62 | 5.49 | 0.17 | -1.04 |
| 5 | | 14.26 | 0 | 0.17 | 14.09 | 3.93 | 5 | 3.93 | 5.88 | 0.17 | -2.12 | 5 | 3.93 | 5.88 | 0.17 | -2.12 |
| 6 | | 21.00 | 0 | 0.17 | 20.83 | 6.31 | 6 | 6.31 | 5.88 | 0.17 | 0.26 | 6 | 6.31 | 5.88 | 0.17 | 0.26 |
| JUL. | | | | | | | | | | | | | | | | |
| 1 | | 47.82 | 0.60 | 0.17 | 47.05 | 6.87 | 1 | 6.87 | 7.13 | 0.17 | -0.43 | 1 | 6.87 | 7.13 | 0.17 | -0.43 |
| 2 | | 26.74 | 0.60 | 0.17 | 25.97 | 19.05 | 2 | 19.05 | 7.13 | 0.17 | 11.75 | 2 | 19.05 | 7.13 | 0.17 | 11.75 |
| 3 | | 16.29 | 3.50 | 0.17 | 12.62 | 12.23 | 3 | 12.23 | 3.84 | 0.17 | 8.22 | 3 | 12.23 | 3.84 | 0.17 | 8.22 |
| 4 | | 19.44 | 3.50 | 0.17 | 15.77 | 19.79 | 4 | 19.79 | 3.84 | 0.17 | 15.78 | 4 | 19.79 | 3.84 | 0.17 | 15.78 |
| 5 | | 9.37 | 2.29 | 0.17 | 6.91 | 8.86 | 5 | 8.86 | 4.54 | 0.17 | 4.15 | 5 | 8.86 | 4.54 | 0.17 | 4.15 |
| 6 | | 15.81 | 2.75 | 0.21 | 12.85 | 8.29 | 6 | 8.29 | 5.45 | 0.21 | 2.63 | 6 | 8.29 | 5.45 | 0.21 | 2.63 |

Remarks:

Q1 : Bila river flow for 5 days (10⁶ m³)

Q2 : Diversion water requirement for 10,000 ha (10⁶ m³)

Q3 : River maintenance flow (10⁶ m³)

Q4 : Water deficit for 5 days (10⁶ m³)

Q5 : Accumulated deficit (10⁶ m³)

Q1 - Q2 - Q3

Q5 : Accumulated deficit (10⁶ m³)

Table 5.2 Required Storage Capacity of Alternative Bila Dam (2/8)

| Year | Month | 1974 | | | | | | 1975 | | | | | | |
|------|-------|------|-------|------|------|-------|-------|------|------|-------|-------|------|------|-------|
| | | Q1 | Q2 | Q3 | Q4 | Q5 | Q1 | Q2 | Q3 | Q4 | Q5 | | | |
| 1974 | Mar. | 1 | 1.86 | - | 0.17 | 1.69 | 13.31 | 3.59 | 0.17 | 9.55 | 7.08 | 2.98 | 0.17 | 3.93 |
| | | 2 | 1.47 | - | 0.17 | 1.30 | 16.16 | 3.59 | 0.17 | 12.40 | 11.15 | 2.98 | 0.17 | 8.00 |
| | | 3 | 1.30 | - | 0.17 | 1.13 | 22.33 | 1.04 | 0.17 | 21.12 | 8.68 | 5.01 | 0.17 | 3.50 |
| | | 4 | 1.30 | - | 0.17 | 1.13 | 10.54 | 1.04 | 0.17 | 9.33 | 10.41 | 5.01 | 0.17 | 5.23 |
| | | 5 | 1.86 | 0.04 | 0.17 | 1.65 | 7.47 | 1.43 | 0.17 | 5.87 | 5.40 | 6.57 | 0.17 | -1.34 |
| | | 6 | 2.38 | 0.05 | 0.21 | 2.12 | 15.76 | 1.71 | 0.17 | 13.88 | 3.89 | 6.57 | 0.17 | -2.85 |
| 1974 | Apr. | 1 | 3.11 | 0.78 | 0.17 | 2.16 | 6.91 | 1.73 | 0.17 | 5.01 | 8.90 | 6.74 | 0.17 | 1.99 |
| | | 2 | 7.95 | 0.78 | 0.17 | 7.00 | 5.83 | 1.73 | 0.17 | 3.93 | 3.41 | 6.74 | 0.17 | -3.50 |
| | | 3 | 6.78 | 2.25 | 0.17 | 4.36 | 4.67 | 0.56 | 0.17 | 3.94 | 4.02 | 6.87 | 0.17 | -3.02 |
| | | 4 | 15.29 | 2.25 | 0.17 | 12.87 | 3.84 | 0.56 | 0.17 | 3.11 | 3.67 | 6.87 | 0.17 | -3.37 |
| | | 5 | 4.10 | 4.36 | 0.17 | -0.43 | 5.14 | - | 0.17 | 4.97 | 6.81 | 4.10 | 0.17 | 4.54 |
| | | 6 | 1.99 | 4.36 | 0.17 | -2.54 | 6.22 | - | 0.21 | 6.01 | 6.17 | 4.92 | 0.21 | 1.04 |
| 1975 | May | 1 | 4.54 | 2.72 | 0.17 | 1.65 | 10.58 | - | 0.17 | 10.41 | 4.28 | 5.62 | 0.17 | -1.51 |
| | | 2 | 10.07 | 2.72 | 0.17 | 7.18 | 20.26 | - | 0.17 | 20.09 | 3.97 | 5.62 | 0.17 | -1.82 |
| | | 3 | 6.70 | 2.64 | 0.17 | 3.89 | 63.59 | - | 0.17 | 63.42 | 3.07 | 4.84 | 0.17 | -1.94 |
| | | 4 | 6.52 | 2.64 | 0.17 | 3.71 | 19.44 | - | 0.17 | 19.27 | 3.24 | 4.84 | 0.17 | -1.77 |
| | | 5 | 10.76 | 2.12 | 0.19 | 8.47 | 9.76 | - | 0.17 | 9.59 | 4.32 | 3.76 | 0.17 | 0.39 |
| | | 6 | 10.94 | 2.54 | 0.21 | 8.19 | 15.05 | - | 0.17 | 14.88 | 10.78 | 4.51 | 0.21 | 6.06 |
| 1975 | Jun. | 1 | 4.06 | 6.31 | 0.17 | -2.42 | 9.72 | 0.04 | 0.17 | 9.51 | 17.50 | 1.08 | 0.17 | 16.25 |
| | | 2 | 3.93 | 6.31 | 0.17 | -2.55 | 12.10 | 0.04 | 0.17 | 11.89 | 24.49 | 1.08 | 0.17 | 23.24 |
| | | 3 | 3.20 | 0.48 | 0.17 | 2.55 | 16.42 | 0.95 | 0.17 | 15.30 | 15.68 | 1.64 | 0.17 | 13.87 |
| | | 4 | 16.29 | 0.48 | 0.17 | 15.64 | 21.64 | 0.95 | 0.17 | 20.52 | 9.29 | 1.64 | 0.17 | 7.48 |
| | | 5 | 9.29 | 0.78 | 0.17 | 8.34 | 9.63 | 2.46 | 0.17 | 7.00 | 7.60 | 0.48 | 0.17 | 6.95 |
| | | 6 | 8.47 | 0.78 | 0.17 | 7.52 | 7.26 | 2.95 | 0.21 | 4.10 | 6.25 | 0.29 | 0.10 | 5.86 |

Table 5.2 Required Storage Capacity of Alternative Bila Dam (3/8)

| Year | Month | Five Days | Q1 | Q2 | Q3 | Q4 | Q5 | Year | Month | Five Days | Q1 | Q2 | Q3 | Q4 | Q5 |
|------|-------|-----------|-------|------|------|-------|-------|------|-------|-----------|-------|------|------|-------|--------|
| 1975 | Mar. | 1 | 9.81 | - | 0.17 | 9.64 | | 1975 | Nov. | 1 | 10.89 | 3.89 | 0.17 | 6.83 | |
| | | 2 | 14.08 | - | 0.17 | 13.91 | | | | 2 | 7.00 | 3.89 | 0.17 | 2.94 | |
| | | 3 | 10.41 | - | 0.17 | 10.24 | | | | 3 | 5.83 | 5.22 | 0.17 | 0.44 | |
| | | 4 | 7.86 | - | 0.17 | 7.67 | | | | 4 | 4.92 | 5.22 | 0.17 | -0.47 | -0.47 |
| | | 5 | 6.83 | 0.04 | 0.17 | 6.62 | | | | 5 | 3.41 | 6.26 | 0.17 | -3.02 | -3.49 |
| | | 6 | 9.38 | 0.05 | 0.21 | 9.12 | | | | 6 | 6.39 | 6.26 | 0.17 | -0.04 | -3.53 |
| 1975 | Apr. | 1 | 8.08 | 1.34 | 0.17 | 6.57 | | 1975 | Dec. | 1 | 7.43 | 6.65 | 0.17 | 0.61 | -2.92 |
| | | 2 | 4.23 | 1.34 | 0.17 | 2.72 | | | | 2 | 7.95 | 6.65 | 0.17 | 1.13 | -1.79 |
| | | 3 | 5.05 | 2.12 | 0.17 | 2.76 | | | | 3 | 4.06 | 6.48 | 0.17 | -2.59 | -4.38 |
| | | 4 | 1.38 | 2.12 | 0.17 | -0.91 | -0.91 | | | 4 | 4.28 | 6.48 | 0.17 | -2.37 | -6.75 |
| | | 5 | 0.82 | 3.76 | 0.17 | -3.11 | -4.02 | | | 5 | 3.37 | 5.62 | 0.17 | -2.42 | -9.17 |
| | | 6 | 6.70 | 3.76 | 0.17 | 2.77 | -1.25 | | | 6 | 2.44 | 6.73 | 0.21 | -4.50 | -13.67 |
| 1976 | May | 1 | 15.55 | 1.73 | 0.17 | 13.65 | 12.40 | 1976 | Jan. | 1 | 3.11 | 4.23 | 0.17 | -1.29 | -14.96 |
| | | 2 | 19.61 | 1.73 | 0.17 | 17.71 | | | | 2 | 3.84 | 4.23 | 0.17 | -0.56 | -15.52 |
| | | 3 | 19.61 | 1.94 | 0.17 | 17.50 | | | | 3 | 2.59 | 4.62 | 0.17 | -2.20 | -17.72 |
| | | 4 | 19.61 | 1.94 | 0.17 | 17.50 | | | | 4 | 1.90 | 4.62 | 0.17 | -2.89 | -20.61 |
| | | 5 | 19.61 | 2.89 | 0.17 | 16.55 | | | | 5 | 1.60 | 2.68 | 0.17 | -2.25 | -21.86 |
| | | 6 | 23.54 | 3.47 | 0.21 | 19.86 | | | | 6 | 2.07 | 3.21 | 0.21 | -1.35 | -23.21 |
| 1976 | Jun. | 1 | 19.61 | 0.86 | 0.17 | 18.58 | | 1976 | Feb. | 1 | 1.43 | 2.72 | 0.17 | -1.46 | -24.67 |
| | | 2 | 19.61 | 0.86 | 0.17 | 18.58 | | | | 2 | 1.25 | 2.72 | 0.17 | -1.64 | -26.31 |
| | | 3 | 13.87 | 1.94 | 0.17 | 11.76 | | | | 3 | 1.25 | 1.64 | 0.17 | -0.56 | -26.87 |
| | | 4 | 16.24 | 1.94 | 0.17 | 14.13 | | | | 4 | 1.43 | 1.64 | 0.17 | -0.38 | -27.25 |
| | | 5 | 7.69 | 4.36 | 0.17 | 3.16 | | | | 5 | 1.43 | 0.34 | 0.17 | 0.92 | -26.33 |
| | | 6 | 7.86 | 4.36 | 0.17 | 3.33 | | | | 6 | 1.45 | 0.21 | 0.10 | 1.14 | -25.19 |

Table 5.2 Required Storage Capacity of Alternative Bila Dam (4/8)

| Year | Month | Five days | Q1 | Q2 | Q3 | Q4 | Q5 | Year | Month | Five days | Q1 | Q2 | Q3 | Q4 | Q5 |
|------|-------|-----------|-------|------|------|-------|--------|------|-------|-----------|-------|------|------|-------|--------|
| 1976 | Mar. | 1 | 3.72 | - | 0.17 | 3.55 | -21.64 | 1976 | Nov. | 1 | 1.64 | 3.50 | 0.17 | -2.03 | -2.40 |
| | | 2 | 3.37 | - | 0.17 | 3.20 | -18.44 | | | 2 | 3.28 | 3.50 | 0.17 | -0.39 | -2.79 |
| | | 3 | 7.52 | - | 0.17 | 7.35 | -11.09 | | | 3 | 10.58 | 2.81 | 0.17 | 7.60 | 4.81 |
| | | 4 | 3.93 | - | 0.17 | 3.76 | -7.33 | | | 4 | 4.97 | 2.81 | 0.17 | 1.99 | |
| | | 5 | 4.32 | 0.04 | 0.17 | 4.11 | -3.22 | | | 5 | 4.80 | 3.67 | 0.17 | 0.96 | |
| | | 6 | 3.99 | 0.05 | 0.21 | 3.73 | 0.51 | | | 6 | 4.67 | 3.67 | 0.17 | 0.83 | |
| Apr. | Apr. | 1 | 2.77 | 1.47 | 0.17 | 0.13 | | 1976 | Dec. | 1 | 3.54 | 6.78 | 0.17 | -3.41 | -3.41 |
| | | 2 | 4.15 | 1.47 | 0.17 | 2.51 | | | | 2 | 2.59 | 6.78 | 0.17 | -4.36 | 7.77 |
| | | 3 | 4.97 | 2.03 | 0.17 | 2.77 | | | | 3 | 1.43 | 6.96 | 0.17 | -5.70 | |
| | | 4 | 4.71 | 2.03 | 0.17 | 2.51 | | | | 4 | 4.32 | 6.96 | 0.17 | -2.81 | -16.28 |
| | | 5 | 2.25 | 2.03 | 0.17 | 0.05 | | | | 5 | 4.45 | 4.54 | 0.17 | -0.26 | -16.54 |
| | | 6 | 2.29 | 2.03 | 0.17 | 0.09 | | | | 6 | 9.12 | 5.44 | 0.21 | 3.47 | -13.07 |
| May | May | 1 | 12.74 | 2.89 | 0.17 | 9.68 | | 1977 | Jan. | 1 | 12.70 | 3.36 | 0.17 | 9.17 | -3.90 |
| | | 2 | 16.37 | 2.89 | 0.17 | 13.31 | | | | 2 | 4.15 | 3.36 | 0.17 | 0.62 | -3.28 |
| | | 3 | 4.06 | 5.49 | 0.17 | -1.60 | -1.60 | | | 3 | 2.25 | 4.75 | 0.17 | -2.67 | -5.95 |
| | | 4 | 2.38 | 5.49 | 0.17 | -3.28 | -4.88 | | | 4 | 1.81 | 4.75 | 0.17 | -3.11 | -9.06 |
| | | 5 | 2.51 | 4.67 | 0.17 | -3.35 | -8.23 | | | 5 | 16.42 | 2.64 | 0.17 | 13.60 | 4.55 |
| | | 6 | 7.93 | 5.60 | 0.21 | 2.12 | -6.11 | | | 6 | 1.60 | 3.16 | 0.21 | -1.77 | -1.77 |
| Jun. | Jun. | 1 | 1.38 | 0.78 | 0.17 | 0.43 | -5.68 | 1977 | Feb. | 1 | 1.56 | 2.33 | 0.17 | -0.94 | -2.71 |
| | | 2 | 4.84 | 0.78 | 0.17 | 3.89 | -1.79 | | | 2 | 1.81 | 2.33 | 0.17 | -0.69 | -3.40 |
| | | 3 | 9.94 | 0.78 | 0.17 | 8.99 | 7.2 | | | 3 | 2.16 | 1.43 | 0.17 | 0.56 | -2.84 |
| | | 4 | 7.69 | 0.78 | 0.17 | 6.74 | | | | 4 | 2.46 | 1.43 | 0.17 | 0.86 | -1.98 |
| | | 5 | 4.65 | 4.19 | 0.17 | 0.09 | | | | 5 | 2.76 | 0.43 | 0.17 | 2.16 | 0.18 |
| | | 6 | 9.20 | 4.19 | 0.17 | 4.84 | | | | 6 | 4.15 | 0.26 | 0.10 | 3.79 | |

Table 5.2 Required Storage Capacity of Alternative Bila Dam (5/8)

| Year Month | | 1977 | | | | | | 1978 | | | | | | | | |
|------------|------|------|-------|------|------|-------|------------|------|-----------|-------|-------|-------|------|------|-------|--------|
| Five Days | | Q1 | Q2 | Q3 | Q4 | Q5 | Year Month | | Five Days | | Q1 | Q2 | Q3 | Q4 | Q5 | |
| Year Month | | 1977 | | | | | | 1978 | | | | | | | | |
| Five Days | | Q1 | Q2 | Q3 | Q4 | Q5 | Year Month | | Five Days | | Q1 | Q2 | Q3 | Q4 | Q5 | |
| 1977 | Mar. | 1 | 2.72 | - | 0.17 | 2.55 | 7.99 | 4.62 | 0.17 | 3.20 | 1.22 | 0.95 | 4.45 | 0.17 | -3.67 | -10.52 |
| | | 2 | 1.86 | - | 0.17 | 1.69 | 3.28 | 4.62 | 0.17 | -1.51 | -1.51 | 0.99 | 4.45 | 0.17 | -3.63 | -14.15 |
| | | 3 | 1.81 | - | 0.17 | 1.64 | 2.94 | 3.59 | 0.17 | -0.82 | -2.33 | 0.95 | 4.75 | 0.17 | -3.97 | -18.12 |
| | | 4 | 2.29 | - | 0.17 | 2.12 | 4.92 | 3.59 | 0.17 | 1.16 | -1.17 | 1.04 | 4.75 | 0.17 | -3.88 | -22.00 |
| | | 5 | 3.71 | 0.04 | 0.17 | 3.50 | 5.96 | 2.54 | 0.17 | 3.25 | 2.08 | 1.08 | 1.56 | 0.17 | -0.65 | -22.65 |
| | | 6 | 8.29 | 0.05 | 0.21 | 8.03 | 3.21 | 3.06 | 0.21 | -0.06 | -0.06 | 1.30 | 1.56 | 0.17 | -0.43 | -23.08 |
| 1977 | Apr. | 1 | 23.72 | 0.95 | 0.17 | 22.60 | 3.93 | 0.95 | 0.17 | 2.81 | 2.75 | 3.15 | 6.35 | 0.17 | -3.37 | -26.45 |
| | | 2 | 10.37 | 0.95 | 0.17 | 9.25 | 4.15 | 0.95 | 0.17 | 3.03 | 3.03 | 7.56 | 6.35 | 0.17 | 1.04 | -25.41 |
| | | 3 | 9.72 | 3.28 | 0.17 | 6.27 | 18.19 | 0.50 | 0.17 | 17.72 | 17.72 | 34.91 | 5.62 | 0.17 | 29.12 | 3.71 |
| | | 4 | 18.92 | 3.28 | 0.17 | 15.47 | 3.63 | 0.30 | 0.17 | 3.16 | 3.16 | 14.47 | 5.62 | 0.17 | 8.68 | 8.68 |
| | | 5 | 7.73 | 2.89 | 0.17 | 4.67 | 2.85 | - | 0.17 | 2.68 | 2.68 | 13.26 | 4.41 | 0.17 | 8.68 | 8.68 |
| | | 6 | 6.05 | 2.89 | 0.17 | 2.99 | 2.80 | - | 0.71 | 2.59 | 2.59 | 8.90 | 5.29 | 0.21 | 3.40 | 3.40 |
| 1978 | May | 1 | 9.85 | 2.25 | 0.17 | 7.43 | 1.17 | - | 0.17 | 1.00 | 1.00 | 10.54 | 5.62 | 0.17 | 4.75 | 4.75 |
| | | 2 | 11.88 | 2.25 | 0.17 | 9.46 | 1.12 | - | 0.17 | 0.95 | 0.95 | 8.21 | 5.62 | 0.17 | 2.42 | 2.42 |
| | | 3 | 5.62 | 4.92 | 0.17 | 0.53 | 1.08 | - | 0.17 | 0.91 | 0.91 | 11.66 | 2.51 | 0.17 | 8.98 | 8.98 |
| | | 4 | 5.70 | 4.92 | 0.17 | 0.61 | 1.08 | - | 0.17 | 0.91 | 0.91 | 7.34 | 2.51 | 0.17 | 4.66 | 4.66 |
| | | 5 | 5.70 | 2.51 | 0.17 | 3.02 | 1.08 | - | 0.17 | 0.91 | 0.91 | 13.35 | 3.94 | 0.17 | 9.64 | 9.64 |
| | | 6 | 7.31 | 3.01 | 0.21 | 4.09 | 1.04 | - | 0.17 | 0.87 | 0.87 | 5.39 | 4.25 | 0.21 | 0.93 | 0.93 |
| 1978 | Jun. | 1 | 9.24 | 5.31 | 0.17 | 3.76 | 1.17 | 0.04 | 0.17 | 0.96 | 0.96 | 3.07 | 2.59 | 0.17 | 0.31 | 0.31 |
| | | 2 | 6.57 | 5.31 | 0.17 | 1.09 | 1.04 | 0.04 | 0.17 | 0.83 | 0.83 | 4.28 | 2.59 | 0.17 | 1.52 | 1.52 |
| | | 3 | 16.07 | 1.25 | 0.17 | 14.65 | 1.04 | 1.56 | 0.17 | -0.69 | -0.69 | 4.41 | 1.64 | 0.17 | 2.60 | 2.60 |
| | | 4 | 26.31 | 1.25 | 0.17 | 24.89 | 0.99 | 1.56 | 0.17 | -0.74 | -1.43 | 4.06 | 1.64 | 0.17 | 2.25 | 2.25 |
| | | 5 | 4.58 | 5.14 | 0.17 | -0.73 | 0.99 | 3.28 | 0.17 | -2.46 | -3.89 | 9.33 | 0.22 | 0.17 | 8.94 | 8.94 |
| | | 6 | 4.06 | 5.14 | 0.17 | -1.25 | 1.19 | 3.94 | 0.21 | -2.96 | -6.85 | 2.07 | 0.13 | 0.10 | 1.84 | 1.84 |

Table 5.2 Required Storage Capacity of Alternative Bila Dam (6/8)

| Year | Month | 1978 | | | | | 1979 | | | | | | | | |
|------|-------|------|-------|------|------|-------|-------|-------|------|------|-------|-------|------|------|-------|
| | | Q1 | Q2 | Q3 | Q4 | Q5 | Q1 | Q2 | Q3 | Q4 | Q5 | | | | |
| 1978 | Mar. | 1 | 6.48 | - | 0.17 | 6.31 | 7.52 | 11.10 | 3.41 | 0.17 | 7.66 | 2.98 | 3.15 | 0.17 | -0.34 |
| | | 2 | 22.03 | - | 0.17 | 21.86 | 6.74 | 10.32 | 3.41 | 0.17 | 13.87 | 2.72 | 3.15 | 0.17 | -0.60 |
| | | 3 | 11.45 | - | 0.17 | 11.28 | 11.54 | 12.57 | 0.86 | 0.17 | 8.25 | 3.19 | 3.59 | 0.17 | -0.57 |
| | | 4 | 11.28 | - | 0.17 | 11.11 | 14.47 | 15.50 | 0.86 | 0.17 | 6.35 | 4.23 | 3.59 | 0.17 | 0.47 |
| | | 5 | 9.29 | 0.04 | 0.17 | 9.08 | 20.01 | 22.64 | 2.46 | 0.17 | 4.02 | 2.51 | 5.92 | 0.17 | -3.58 |
| | | 6 | 12.23 | 0.05 | 0.21 | 11.97 | 14.87 | 18.03 | 2.95 | 0.21 | 3.89 | 4.06 | 5.92 | 0.17 | -2.03 |
| 1978 | Apr. | 1 | 11.19 | 1.47 | 0.17 | 9.55 | 7.66 | 8.98 | 0.95 | 0.17 | 7.66 | 7.60 | 6.52 | 0.17 | 0.91 |
| | | 2 | 16.59 | 1.47 | 0.17 | 14.45 | 13.87 | 14.99 | 0.95 | 0.17 | 13.87 | 2.98 | 6.52 | 0.17 | -3.71 |
| | | 3 | 8.08 | 3.41 | 0.17 | 4.50 | 8.25 | 8.64 | 0.22 | 0.17 | 8.25 | 12.27 | 6.00 | 0.17 | 6.10 |
| | | 4 | 5.31 | 3.41 | 0.17 | 1.73 | 6.35 | 6.74 | 0.22 | 0.17 | 6.35 | 18.66 | 6.00 | 0.17 | 12.49 |
| | | 5 | 6.86 | 1.64 | 0.17 | 5.05 | 4.02 | 4.19 | - | 0.17 | 4.02 | 6.13 | 5.66 | 0.17 | 0.30 |
| | | 6 | 16.59 | 1.97 | 0.17 | 14.45 | 3.89 | 4.10 | - | 0.21 | 3.89 | 13.67 | 6.79 | 0.20 | 6.68 |
| 1979 | May | 1 | 33.09 | 2.33 | 0.17 | 30.59 | 6.44 | 6.61 | - | 0.17 | 6.44 | 3.33 | 4.88 | 0.17 | -1.72 |
| | | 2 | 21.90 | 2.33 | 0.17 | 19.40 | 10.28 | 10.45 | - | 0.17 | 10.28 | 6.44 | 4.88 | 0.17 | 1.39 |
| | | 3 | 44.24 | 3.02 | 0.17 | 41.05 | 5.23 | 5.40 | - | 0.17 | 5.23 | 3.15 | 4.10 | 0.17 | -1.12 |
| | | 4 | 11.10 | 3.02 | 0.17 | 7.91 | 7.43 | 7.60 | - | 0.17 | 7.43 | 2.46 | 4.10 | 0.17 | -1.81 |
| | | 5 | 6.26 | 4.36 | 0.17 | 1.53 | 14.43 | 14.60 | - | 0.17 | 14.43 | 4.84 | 3.80 | 0.17 | 0.87 |
| | | 6 | 8.65 | 5.24 | 0.21 | 3.20 | 4.28 | 4.45 | - | 0.17 | 4.28 | 3.21 | 4.56 | 0.21 | -1.56 |
| 1979 | Jun. | 1 | 21.25 | 0.95 | 0.17 | 20.13 | 4.84 | 5.05 | 0.04 | 0.17 | 4.84 | 4.06 | 2.03 | 0.17 | 1.86 |
| | | 2 | 9.72 | 0.95 | 0.17 | 8.60 | 2.64 | 2.85 | 0.04 | 0.17 | 2.64 | 4.10 | 2.03 | 0.17 | 1.90 |
| | | 3 | 14.90 | 0.30 | 0.17 | 14.43 | 0.78 | 2.51 | 1.56 | 0.17 | 0.78 | 11.92 | 1.25 | 0.17 | 10.50 |
| | | 4 | 11.32 | 0.30 | 0.17 | 10.85 | 1.90 | 3.63 | 1.56 | 0.17 | 1.90 | 7.39 | 1.25 | 0.17 | 5.97 |
| | | 5 | 8.64 | 0.60 | 0.17 | 7.87 | 3.46 | 6.44 | 2.81 | 0.17 | 3.46 | 1.99 | 0.35 | 0.17 | 1.47 |
| | | 6 | 18.01 | 0.60 | 0.17 | 17.24 | 2.64 | 6.22 | 3.37 | 0.21 | 2.64 | 1.87 | 0.21 | 0.10 | 1.56 |

Table 5.2 Required Storage Capacity of Alternative Bila Dam (7/8)

| Year | Month | 1979 | | | | | 1980 | | | | | | | | | |
|------|-------|------|-------|------|------|-------|-------|------|------|-------|-------|-------|------|-------|--------|--------|
| | | Q1 | Q2 | Q3 | Q4 | Q5 | Q1 | Q2 | Q3 | Q4 | Q5 | | | | | |
| 1979 | Mar. | 1 | 4.64 | - | 0.17 | 4.67 | -1.64 | 4.49 | 0.17 | -1.64 | -1.64 | 3.11 | 2.46 | 0.17 | -0.82 | -5.76 |
| | | 2 | 2.89 | - | 0.17 | 2.72 | 3.12 | 4.49 | 0.17 | 3.12 | 3.12 | 3.11 | 1.94 | 0.17 | -1.34 | -7.10 |
| | | 3 | 2.07 | - | 0.17 | 1.90 | 6.83 | 0.65 | 0.17 | 6.83 | 6.83 | 4.28 | 2.29 | 0.17 | -2.16 | -9.26 |
| | | 4 | 3.71 | - | 0.17 | 3.54 | 7.52 | 0.65 | 0.17 | 7.52 | 7.52 | 4.28 | 2.76 | 0.17 | -1.69 | -10.95 |
| | | 5 | 2.46 | 0.04 | 0.17 | 2.25 | 0.30 | 2.85 | 0.17 | 0.30 | 0.30 | 6.57 | 4.10 | 0.17 | -2.64 | -13.59 |
| | | 6 | 17.92 | 0.05 | 0.21 | 17.66 | -0.42 | 2.64 | 0.21 | -0.42 | -0.42 | 6.57 | 3.07 | 0.17 | -3.67 | -17.26 |
| 1979 | Apr. | 1 | 9.20 | 1.08 | 0.17 | 7.96 | -0.65 | 1.73 | 0.17 | -0.65 | -1.07 | 4.19 | 7.65 | 0.17 | -3.63 | -20.89 |
| | | 2 | 19.22 | 1.08 | 0.17 | 17.97 | -0.56 | 1.73 | 0.17 | -0.56 | -1.63 | 1.64 | 7.65 | 0.17 | -6.18 | -27.07 |
| | | 3 | 7.95 | 3.46 | 0.17 | 4.32 | 0.56 | 0.56 | 0.17 | 0.56 | -1.07 | 1.25 | 6.65 | 0.17 | -5.57 | -32.64 |
| | | 4 | 4.45 | 3.46 | 0.17 | 0.82 | 0.44 | 1.17 | 0.56 | 0.44 | -0.63 | 10.75 | 6.65 | 0.17 | 3.93 | -28.71 |
| | | 5 | 5.75 | 1.56 | 0.17 | 4.02 | 0.37 | 1.17 | - | 1.00 | 0.37 | 6.05 | 6.05 | 0.17 | -0.17 | -28.88 |
| | | 6 | 19.48 | 1.87 | 0.17 | 17.44 | 3.68 | 3.89 | - | 3.68 | 3.68 | 7.77 | 7.26 | 0.21 | 0.30 | -28.56 |
| 1980 | May | 1 | 14.64 | 2.38 | 0.17 | 12.09 | 6.14 | - | 0.17 | 6.14 | 9.12 | 4.49 | 0.17 | 4.46 | -24.12 | |
| | | 2 | 15.77 | 2.38 | 0.17 | 13.22 | 12.88 | - | 0.17 | 12.88 | 4.75 | 4.49 | 0.17 | 0.09 | -24.03 | |
| | | 3 | 6.39 | 6.22 | 0.17 | 0 | 13.74 | - | 0.17 | 13.74 | 7.30 | 1.12 | 0.17 | 6.01 | -18.02 | |
| | | 4 | 4.62 | 6.22 | 0.17 | -1.77 | 1.43 | - | 0.17 | 1.43 | 5.44 | 1.12 | 0.17 | 4.15 | -13.87 | |
| | | 5 | 3.89 | 4.97 | 0.17 | -1.25 | -3.02 | - | 0.17 | 1.26 | 4.45 | 3.80 | 0.17 | 0.48 | -13.39 | |
| | | 6 | 3.94 | 5.96 | 0.21 | -2.23 | -5.25 | - | 0.17 | 1.04 | 3.99 | 4.56 | 0.21 | -0.78 | -14.17 | |
| 1980 | Jun. | 1 | 8.16 | 1.25 | 0.17 | 6.74 | 1.49 | 0.04 | 0.17 | 0.96 | 3.93 | 2.72 | 0.17 | 1.04 | -13.13 | |
| | | 2 | 22.77 | 1.25 | 0.17 | 21.35 | 0.96 | 0.04 | 0.17 | 0.96 | 3.32 | 2.72 | 0.17 | 0.43 | -12.70 | |
| | | 3 | 4.19 | 0 | 0.17 | 4.02 | -0.17 | 1.56 | 0.17 | -0.17 | -0.17 | 1.94 | 1.56 | 0.17 | 0.21 | -12.49 |
| | | 4 | 23.59 | 0 | 0.17 | 23.42 | -0.26 | 1.47 | 0.17 | -0.26 | -0.43 | 1.34 | 1.56 | 0.17 | -0.39 | -12.88 |
| | | 5 | 9.42 | 4.06 | 0.17 | 5.19 | -1.81 | 1.64 | 0.17 | -1.81 | -2.24 | 1.99 | 0.04 | 0.17 | 1.78 | -11.10 |
| | | 6 | 4.97 | 4.06 | 0.17 | 0.74 | -2.70 | 1.45 | 0.21 | -2.70 | -4.94 | 3.00 | 0.03 | 0.10 | 2.87 | -8.23 |

Table 5.2 Required Storage Capacity of Alternative Bila Dam (8/8)

| Year | Month | 1980 | | | | | 1981 | | | | | | | | | |
|------|-------|------|-------|------|------|-------|-------|------|------|------|-------|------|------|------|-------|--------|
| | | Q1 | Q2 | Q3 | Q4 | Q5 | Q1 | Q2 | Q3 | Q4 | Q5 | | | | | |
| 1980 | Mar. | 1 | 3.93 | - | 0.17 | 3.76 | -4.47 | 5.01 | 4.41 | 0.17 | 0.43 | 1.29 | 3.02 | 0.17 | -1.90 | -6.30 |
| | | 2 | 3.97 | - | 0.17 | 3.80 | -0.67 | 4.79 | 4.41 | 0.17 | 0.21 | 1.29 | 3.02 | 0.17 | -1.90 | -8.20 |
| | | 3 | 2.25 | - | 0.17 | 2.08 | 1.41 | 7.21 | 3.59 | 0.17 | 3.45 | 1.29 | 4.15 | 0.17 | -3.11 | -11.31 |
| | | 4 | 1.51 | - | 0.17 | 1.34 | | 3.84 | 3.59 | 0.17 | 0.08 | 1.38 | 4.15 | 0.17 | -2.94 | -14.25 |
| | | 5 | 1.21 | 0.04 | 0.17 | 1.00 | | 2.29 | 2.51 | 0.17 | -0.39 | 1.38 | 2.72 | 0.17 | -1.51 | -15.76 |
| | | 6 | 2.12 | 0.04 | 0.21 | 1.87 | | 2.23 | 3.01 | 0.21 | -0.99 | 2.80 | 2.72 | 0.17 | -0.09 | -15.85 |
| 1980 | Apr. | 1 | 3.93 | 0.99 | 0.17 | 2.77 | | 3.33 | 0.69 | 0.17 | 2.47 | 1.79 | 7.26 | 0.17 | -5.66 | -21.51 |
| | | 2 | 14.12 | 0.99 | 0.17 | 12.96 | | 4.41 | 0.69 | 0.17 | 3.55 | 3.15 | 7.26 | 0.17 | -4.28 | -25.79 |
| | | 3 | 14.43 | 2.72 | 0.17 | 11.54 | | 2.16 | 0.52 | 0.17 | 1.47 | 2.94 | 6.96 | 0.17 | -4.19 | -29.98 |
| | | 4 | 10.15 | 2.72 | 0.17 | 7.26 | | 3.33 | 0.52 | 0.17 | 2.64 | 1.56 | 6.96 | 0.17 | -5.57 | -35.55 |
| | | 5 | 10.71 | 3.02 | 0.17 | 7.52 | | 4.84 | - | 0.17 | 4.67 | 5.27 | 2.51 | 0.17 | -2.59 | -32.96 |
| | | 6 | 10.84 | 3.02 | 0.17 | 7.65 | | 3.99 | - | 0.21 | 3.78 | 2.28 | 3.01 | 0.21 | -0.94 | -33.90 |
| 1981 | May | 1 | 26.57 | 2.75 | 0.17 | 23.64 | | 3.33 | - | 0.17 | 3.16 | 1.29 | 5.66 | 0.17 | -4.54 | -38.44 |
| | | 2 | 11.36 | 2.76 | 0.17 | 8.43 | | 2.12 | - | 0.17 | 1.95 | 1.29 | 5.66 | 0.17 | -4.54 | -42.98 |
| | | 3 | 8.64 | 5.27 | 0.17 | 3.20 | | 1.98 | - | 0.17 | 1.81 | 1.12 | 4.80 | 0.17 | -3.85 | -46.80 |
| | | 4 | 6.00 | 5.27 | 0.17 | 0.56 | | 1.94 | - | 0.17 | 1.77 | 1.12 | 4.80 | 0.17 | -3.85 | -50.68 |
| | | 5 | 8.89 | 0.99 | 0.17 | 7.73 | | 1.77 | - | 0.17 | 1.60 | 1.21 | 3.80 | 0.17 | -2.76 | -53.44 |
| | | 6 | 24.66 | 1.19 | 0.21 | 23.26 | | 1.51 | - | 0.17 | 1.34 | 1.40 | 4.56 | 0.21 | -3.37 | -56.81 |
| 1981 | Jun. | 1 | 9.33 | 3.50 | 0.17 | 5.66 | | 1.21 | 0.04 | 0.17 | 1.00 | 1.17 | 2.72 | 0.17 | -1.72 | -58.53 |
| | | 2 | 10.41 | 3.50 | 0.17 | 6.74 | | 1.17 | 0.04 | 0.17 | 0.96 | 1.17 | 2.72 | 0.17 | -1.72 | -60.25 |
| | | 3 | 19.05 | 0.30 | 0.17 | 18.58 | | 2.38 | 1.56 | 0.17 | 0.15 | 1.29 | 1.64 | 0.17 | -0.52 | -60.77 |
| | | 4 | 30.67 | 0.30 | 0.17 | 30.20 | | 1.17 | 1.56 | 0.17 | -0.56 | 1.17 | 1.64 | 0.17 | -0.64 | -61.41 |
| | | 5 | 7.77 | 0.35 | 0.17 | 7.25 | | 1.29 | 2.98 | 0.17 | -1.86 | 1.21 | 0.52 | 0.17 | 0.52 | -60.89 |
| | | 6 | 5.31 | 0.35 | 0.17 | 4.79 | | 1.81 | 3.58 | 0.21 | -1.98 | 1.22 | 0.31 | 0.10 | 0.81 | -60.08 |
| 1981 | Mar. | 1 | 2.03 | - | 0.17 | 1.86 | | 2.03 | - | 0.17 | 1.86 | 2.03 | - | 0.17 | 1.86 | -59.22 |
| | | 2 | 3.37 | - | 0.17 | 3.20 | | 3.37 | - | 0.17 | 3.20 | 3.37 | - | 0.17 | 3.20 | -55.02 |
| | | 3 | 2.81 | - | 0.17 | 2.64 | | 2.81 | - | 0.17 | 2.64 | 2.81 | - | 0.17 | 2.64 | -52.38 |
| | | 4 | 3.72 | - | 0.17 | 3.55 | | 3.72 | - | 0.17 | 3.55 | 3.72 | - | 0.17 | 3.55 | -48.83 |

Table 5.3 Design Storage Capacity of Alternative Bila Dam

(Unit: 10^6 m^3)

| Case | Net Storage ^{/1} Capacity | Evaporation ^{/2} Loss | Domestic ^{/3} Supply | Sedimen- tation | Total |
|------|---------------------------------------|-----------------------------------|----------------------------------|--------------------|-------|
| 1 | 8.23 | 2.56 | 1.26 | 17.00 | 29.05 |
| 2 | 24.09 | 3.40 | 1.26 | 17.00 | 45.75 |
| 3 | 32.64 | 3.90 | 1.26 | 17.00 | 54.80 |
| 4 | 61.41 | 5.53 | 1.26 | 17.00 | 85.20 |

Remarks: /1 ; Irrigation use and maintenance flow (refer to Table 1 and 2).

/2 ; $0.65(\text{m}) \times \text{Reservoir Area}(\text{m}^2) \times 0.75$

/3 ; Domestic water 83,900 persons $\times 0.1 \text{ m}^3/\text{day} \times 150 \text{ days} = 1.26$

Table 5.4 Construction Cost of Alternative Bila Dam

| Case | Foreign (10^6 Rp.) | Local (10^6 Rp.) | Total (10^6 Rp.) | US\$ Equiv. ($10^3 \text{ US\$}$) | Command Area (ha) | US\$/ha (US\$/ha) |
|------|-----------------------------------|---------------------------------|---------------------------------|---|-------------------------|----------------------|
| 1 | 11,957 | 9,267 | 21,224 | 33,958 | 7,500(4,800) | 4,528(7,075) |
| 2 | 12,772 | 9,559 | 22,330 | 35,728 | 9,200(6,400) | 3,884(5,583) |
| 3 | 13,904 | 9,982 | 23,886 | 38,217 | 9,600(7,200) | 3,981(5,308) |
| 4 | 17,746 | 11,411 | 29,156 | 46,649 | 10,000 | 4,665(4,665) |

Table 5.5 Required Storage Capacity of Kalola Dam (1/13)

| Year | Month | D1 | D2 | Q1 | Q2 | Q3 | D3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q0 | |
|------|-------|------|-------|-------|-------|----------|----------|------|------|------|------|-------|-------|-------|---|
| 1973 | Apr. | 5 | 0.90 | 10.76 | 2.99 | 7.77 | 7,700.00 | 0.81 | 0.04 | 0.86 | 0.86 | 6.01 | 5.15 | - | |
| | | 5 | 1.06 | 11.79 | 3.52 | 8.27 | 7,700.00 | 0.96 | 0.04 | 1.00 | 1.00 | | | | |
| | May | 5 | 1.06 | 16.76 | 3.52 | 13.24 | 7,700.00 | 0.96 | 0.04 | 1.00 | 1.00 | | | | |
| | | 5 | 0.89 | 19.01 | 2.96 | 16.05 | 7,700.00 | 0.81 | 0.04 | 0.85 | 0.85 | | | | |
| | Jun. | 5 | 0.89 | 24.80 | 2.96 | 21.04 | 7,700.00 | 0.81 | 0.04 | 0.85 | 0.85 | | | | |
| | | 5 | 0.47 | 27.39 | 1.56 | 25.83 | 7,700.00 | 0.43 | 0.04 | 0.47 | 0.47 | | | | |
| | Jul. | 6 | 0.47 | 19.70 | 1.08 | 17.62 | 7,700.00 | 0.51 | 0.05 | 0.56 | 0.56 | 4.73 | 15.86 | 11.13 | - |
| | | 5 | 0.20 | 11.15 | 0.67 | 10.49 | 7,700.00 | 0.18 | 0.04 | 0.22 | 0.22 | | | | |
| | Aug. | 5 | 0.20 | 9.94 | 0.67 | 9.28 | 7,700.00 | 0.18 | 0.04 | 0.22 | 0.22 | | | | |
| | | 5 | 0.07 | 7.39 | 0.23 | 7.16 | 7,700.00 | 0.06 | 0.04 | 0.11 | 0.11 | | | | |
| | Sep. | 5 | 0.07 | 5.27 | 0.23 | 5.04 | 7,700.00 | 0.06 | 0.04 | 0.11 | 0.11 | | | | |
| | | 5 | 0.00 | 14.26 | 0.00 | 14.26 | 7,700.00 | 0.00 | 0.04 | 0.04 | 0.04 | | | | |
| Oct. | 5 | 0.00 | 21.00 | 0.00 | 21.00 | 7,700.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.75 | 43.21 | 42.46 | - | |
| | 5 | 0.14 | 47.82 | 0.47 | 47.35 | 7,700.00 | 0.13 | 0.04 | 0.17 | 0.17 | | | | | |
| Nov. | 5 | 0.14 | 26.74 | 0.47 | 26.27 | 7,700.00 | 0.13 | 0.04 | 0.17 | 0.17 | | | | | |
| | 5 | 0.81 | 16.29 | 2.69 | 13.60 | 7,700.00 | 0.73 | 0.04 | 0.78 | 0.78 | | | | | |
| Dec. | 5 | 0.81 | 19.44 | 2.69 | 16.75 | 7,700.00 | 0.73 | 0.04 | 0.78 | 0.78 | | | | | |
| | 5 | 0.53 | 9.37 | 1.76 | 7.61 | 7,700.00 | 0.48 | 0.04 | 0.52 | 0.52 | | | | | |
| Jan. | 6 | 0.53 | 15.81 | 2.11 | 13.70 | 7,700.00 | 0.58 | 0.05 | 0.63 | 0.63 | 3.04 | 8.17 | 5.13 | - | |
| | 5 | 0.00 | 24.41 | 0.00 | 24.41 | 7,700.00 | 0.00 | 0.04 | 0.04 | 0.04 | | | | | |
| Feb. | 5 | 0.00 | 19.22 | 0.00 | 19.22 | 7,700.00 | 0.00 | 0.04 | 0.04 | 0.04 | | | | | |
| | 5 | 0.04 | 6.44 | 0.13 | 6.31 | 7,700.00 | 0.04 | 0.04 | 0.08 | 0.08 | | | | | |
| Mar. | 5 | 0.04 | 7.78 | 0.23 | 7.65 | 7,700.00 | 0.04 | 0.04 | 0.08 | 0.08 | | | | | |
| | 5 | | 7.65 | | | | | | | | | | | | |
| Apr. | 6 | | 10.06 | | | | | | | | 0.97 | 50.59 | 49.62 | - | |
| | 5 | | 10.80 | | | | | | | | | | | | |
| May | 5 | | 10.07 | | | | | | | | | | | | |
| | 5 | | 22.64 | | | | | | | | | | | | |
| Jun. | 5 | | 18.84 | | | | | | | | | | | | |
| | 5 | | 15.38 | | | | | | | | | | | | |
| Jul. | 5 | | 15.90 | | | | | | | | 0.26 | 25.64 | 25.58 | - | |
| | 5 | | | | | | | | | | | | | | |

Remarks: D1: Number of day (5 days basis)
 D2: Unit diversion water requirement (lit./sec/ha)
 D3: Irrigation area ensured by Sula river flow (ha);
 Q1: Sula river discharge (Mil. C.M.)
 Q2: Water requirement for 7,700 ha (Mil.C.M.)
 Q3: Surplus discharge or of the Sula river flow deficit (Mil. C.M.); Q1 - Q2
 Q4: Water requirement for 2,100 ha (Mil.C.M.)
 Q5: Maintenance flow for Kalola river (Mil.C.M.)
 Q6: Total water requirement (Mil.C.M.) : Q3 + Q4 + Q5
 Q7: Accumulated Q6 in monthly basis (Mil.)
 Q8: Kalola river flow (Mil.C.M.)
 Q9: Water surplus or deficit (Mil.C.M.): Q8 - Q7
 Q0: Accumulated deficit (Mil.C.M.) : Q9

Table 5.5 Required Storage Capacity of Kalola Dam (2/13)

| Year | Month | D1 | D2 | Q1 | Q2 | Q3 | D3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q0 |
|------|-------|----|------|-------|------|-------|----------|------|------|------|------|-------|-------|-------|
| 1973 | Oct. | 5 | 0.01 | 8.16 | 0.03 | 8.13 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | |
| | | 5 | 0.01 | 4.54 | 0.03 | 4.51 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | |
| | | 5 | 0.63 | 3.89 | 2.09 | 1.80 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | |
| | | 5 | 0.63 | 3.33 | 2.09 | 1.24 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | |
| | | 5 | 0.33 | 10.97 | 1.10 | 9.87 | 7,700.00 | 0.30 | 0.04 | 0.34 | | | | |
| | | 6 | 0.33 | 21.36 | 1.32 | 20.04 | 7,700.00 | 0.36 | 0.05 | 0.41 | 2.08 | 15.27 | 13.19 | |
| | Nov. | 5 | 0.85 | 10.71 | 2.83 | 7.88 | 7,700.00 | 0.77 | 0.04 | 0.81 | | | | |
| | | 5 | 0.85 | 5.83 | 2.83 | 3.00 | 7,700.00 | 0.77 | 0.04 | 0.81 | | | | |
| | | 5 | 1.27 | 6.52 | 4.22 | 2.30 | 7,700.00 | 1.15 | 0.04 | 1.19 | | | | |
| | | 5 | 1.27 | 4.62 | 4.22 | 0.40 | 7,700.00 | 1.15 | 0.04 | 1.19 | | | | |
| | | 5 | 1.36 | 3.95 | 4.52 | -0.59 | 6,691.95 | 1.23 | 0.04 | 1.87 | | | | |
| | | 5 | 1.36 | 6.31 | 4.52 | 1.79 | 7,700.00 | 1.23 | 0.04 | 1.27 | 7.15 | 24.60 | 17.45 | |
| | Dec. | 5 | 1.65 | 6.87 | 5.49 | 1.38 | 7,700.00 | 1.49 | 0.04 | 1.54 | | | | |
| | | 5 | 1.65 | 19.05 | 5.49 | 13.56 | 7,700.00 | 1.49 | 0.04 | 1.54 | | | | |
| | | 5 | 0.89 | 12.23 | 2.96 | 9.27 | 7,700.00 | 0.81 | 0.04 | 0.85 | | | | |
| | | 5 | 0.89 | 19.79 | 2.96 | 16.83 | 7,700.00 | 0.81 | 0.04 | 0.85 | | | | |
| | | 5 | 1.05 | 8.86 | 3.49 | 5.37 | 7,700.00 | 0.95 | 0.04 | 0.99 | | | | |
| | | 6 | 1.05 | 8.29 | 4.19 | 4.10 | 7,700.00 | 1.14 | 0.05 | 1.19 | 6.96 | 7.77 | 0.81 | |
| 1974 | Jan. | 5 | 1.19 | 5.70 | 3.96 | 1.74 | 7,700.00 | 1.08 | 0.04 | 1.12 | | | | |
| | | 5 | 1.19 | 4.06 | 3.96 | 0.10 | 7,700.00 | 1.08 | 0.04 | 1.12 | | | | |
| | | 5 | 1.12 | 2.94 | 3.72 | -0.78 | 6,078.95 | 1.01 | 0.04 | 1.84 | | | | |
| | | 5 | 1.12 | 3.33 | 3.72 | -0.39 | 6,085.34 | 1.01 | 0.04 | 1.45 | | | | |
| | | 5 | 0.65 | 3.20 | 2.16 | 1.04 | 7,700.00 | 0.59 | 0.04 | 0.63 | | | | |
| | | 6 | 0.65 | 3.47 | 2.59 | 0.88 | 7,700.00 | 0.71 | 0.05 | 0.76 | 6.92 | 0.24 | -6.68 | |
| | Feb. | 5 | 0.63 | 2.46 | 2.09 | 0.37 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | |
| | | 5 | 0.63 | 2.81 | 2.09 | 0.72 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | |
| | | 5 | 0.29 | 5.10 | 0.96 | 4.14 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | |
| | | 5 | 0.29 | 5.49 | 0.96 | 4.53 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | |
| | | 5 | 0.09 | 4.19 | 0.30 | 3.89 | 7,700.00 | 0.08 | 0.04 | 0.12 | | | | |
| | | 3 | 0.09 | 1.71 | 0.18 | 1.53 | 7,700.00 | 0.05 | 0.03 | 0.07 | 2.04 | 0.12 | -1.92 | -8.60 |
| | Mar. | 5 | 1.86 | | | | | | 0.04 | 0.04 | | | | |
| | | 5 | 1.47 | | | | | | 0.04 | 0.04 | | | | |
| | | 5 | 1.30 | | | | | | 0.04 | 0.04 | | | | |
| | | 5 | 1.30 | | | | | | 0.04 | 0.04 | | | | |
| | | 5 | 0.01 | 1.86 | 0.03 | 1.83 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | |
| | | 6 | 0.01 | 2.38 | 0.04 | 2.34 | 7,700.00 | 0.01 | 0.05 | 0.06 | 0.29 | 0.05 | -0.24 | -8.84 |
| | Apr. | 5 | 0.18 | 3.11 | 0.60 | 2.51 | 7,700.00 | 0.16 | 0.04 | 0.21 | | | | |
| | | 5 | 0.18 | 7.95 | 0.60 | 7.35 | 7,700.00 | 0.16 | 0.04 | 0.21 | | | | |
| | | 5 | 0.52 | 6.70 | 1.73 | 5.05 | 7,700.00 | 0.47 | 0.04 | 0.51 | | | | |
| | | 5 | 0.52 | 15.29 | 1.73 | 13.56 | 7,700.00 | 0.47 | 0.04 | 0.51 | | | | |
| | | 5 | 1.01 | 4.10 | 3.36 | 0.74 | 7,700.00 | 0.91 | 0.04 | 0.96 | | | | |
| | | 5 | 1.01 | 1.99 | 3.36 | -1.37 | 4,562.79 | 0.91 | 0.04 | 2.33 | 4.72 | 6.25 | 1.53 | -7.31 |
| | May | 5 | 0.63 | 4.54 | 2.09 | 2.45 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | |
| | | 5 | 0.63 | 10.07 | 2.09 | 7.98 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | |
| | | 5 | 0.61 | 6.70 | 2.03 | 4.67 | 7,700.00 | 0.55 | 0.04 | 0.60 | | | | |
| | | 5 | 0.61 | 6.52 | 2.03 | 4.49 | 7,700.00 | 0.55 | 0.04 | 0.60 | | | | |
| | | 5 | 0.49 | 10.76 | 1.63 | 9.13 | 7,700.00 | 0.44 | 0.04 | 0.49 | | | | |
| | | 6 | 0.49 | 10.94 | 1.96 | 8.98 | 7,700.00 | 0.53 | 0.05 | 0.58 | 3.49 | 17.01 | 13.52 | 6.21 |

Table 5.5 Required Storage Capacity of Kalola Dam (3/13)

| Year | Month | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q0 | | |
|------|-------|----|-------|-------|------|-------|----------|------|------|------|-------|-------|--------|
| 1974 | Jun. | 3 | 1.46 | 4.06 | 4.85 | -0.79 | 6,439.80 | 1.32 | 0.04 | 2.16 | | | |
| | | 5 | 1.46 | 3.93 | 4.85 | -0.92 | 6,233.60 | 1.32 | 0.04 | 2.29 | | | |
| | | 5 | 0.11 | 3.20 | 0.37 | 2.63 | 7,700.00 | 0.10 | 0.04 | 0.14 | | | |
| | | 5 | 0.11 | 16.29 | 0.37 | 15.92 | 7,700.00 | 0.10 | 0.04 | 0.14 | | | |
| | | 5 | 0.18 | 9.29 | 0.60 | 8.69 | 7,700.00 | 0.16 | 0.04 | 0.21 | 5.15 | 12.29 | 7.14 |
| | Jul. | 5 | 0.18 | 6.47 | 0.60 | 7.87 | 7,700.00 | 0.16 | 0.04 | 0.21 | | | |
| | | 5 | 0.83 | 13.31 | 2.76 | 10.55 | 7,700.00 | 0.75 | 0.04 | 0.79 | | | |
| | | 5 | 0.83 | 16.16 | 2.76 | 13.40 | 7,700.00 | 0.75 | 0.04 | 0.79 | | | |
| | | 5 | 0.24 | 22.33 | 0.80 | 21.53 | 7,700.00 | 0.22 | 0.04 | 0.26 | | | |
| | | 5 | 0.24 | 10.54 | 0.80 | 9.74 | 7,700.00 | 0.22 | 0.04 | 0.26 | | | |
| | Aug. | 5 | 0.33 | 7.47 | 1.10 | 6.37 | 7,700.00 | 0.30 | 0.04 | 0.34 | | | |
| | | 6 | 0.33 | 15.76 | 1.32 | 14.44 | 7,700.00 | 0.36 | 0.05 | 0.41 | 2.86 | 15.64 | 12.78 |
| | | 5 | 0.40 | 6.91 | 1.33 | 5.58 | 7,700.00 | 0.36 | 0.04 | 0.41 | | | |
| | | 5 | 0.40 | 5.83 | 1.33 | 4.50 | 7,700.00 | 0.36 | 0.04 | 0.41 | | | |
| | | 5 | 0.13 | 4.67 | 0.43 | 4.24 | 7,700.00 | 0.12 | 0.04 | 0.16 | | | |
| | Sep. | 5 | 0.13 | 3.84 | 0.43 | 3.41 | 7,700.00 | 0.12 | 0.04 | 0.16 | | | |
| | | 5 | 5.14 | | | | | | 0.04 | 0.04 | | | |
| | | 6 | 6.22 | | | | | | 0.05 | 0.05 | 1.23 | 2.12 | 0.89 |
| | | 5 | 10.58 | | | | | | 0.04 | 0.04 | | | |
| | | 5 | 20.26 | | | | | | 0.04 | 0.04 | | | |
| | Oct. | 5 | 63.59 | | | | | | 0.04 | 0.04 | | | |
| | | 5 | 19.44 | | | | | | 0.04 | 0.04 | | | |
| | | 5 | 9.76 | | | | | | 0.04 | 0.04 | | | |
| | | 5 | 15.85 | | | | | | 0.04 | 0.04 | | | |
| | | 5 | 0.01 | 9.72 | 0.03 | 9.69 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | |
| | Nov. | 5 | 0.01 | 12.10 | 0.03 | 12.07 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | |
| | | 5 | 0.22 | 16.42 | 0.73 | 15.69 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | |
| | | 5 | 0.22 | 21.64 | 0.73 | 20.91 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | |
| | | 5 | 0.57 | 9.63 | 1.90 | 7.73 | 7,700.00 | 0.52 | 0.04 | 0.56 | | | |
| | | 6 | 0.57 | 7.26 | 2.27 | 4.99 | 7,700.00 | 0.82 | 0.05 | 0.67 | 1.82 | 16.77 | 14.95 |
| | Dec. | 5 | 0.69 | 7.00 | 2.29 | 4.79 | 7,700.00 | 0.62 | 0.04 | 0.67 | | | |
| | | 5 | 0.69 | 11.15 | 2.29 | 8.86 | 7,700.00 | 0.62 | 0.04 | 0.67 | | | |
| | | 5 | 1.16 | 8.68 | 3.86 | 4.82 | 7,700.00 | 1.05 | 0.04 | 1.09 | | | |
| | | 5 | 1.16 | 10.41 | 3.86 | 6.55 | 7,700.00 | 1.05 | 0.04 | 1.09 | | | |
| | | 5 | 1.52 | 5.40 | 5.05 | 0.35 | 7,700.00 | 1.38 | 0.04 | 1.42 | | | |
| 1975 | | 5 | 1.52 | 3.89 | 5.05 | -1.16 | 5,926.59 | 1.58 | 0.04 | 2.58 | 7.52 | 4.02 | -3.50 |
| | | 5 | 1.56 | 8.90 | 5.19 | 3.71 | 7,700.00 | 1.41 | 0.04 | 1.46 | | | |
| | | 5 | 1.56 | 3.41 | 5.19 | -1.78 | 5,062.08 | 1.41 | 0.04 | 3.23 | | | |
| | | 5 | 1.59 | 4.02 | 5.29 | -1.27 | 5,855.01 | 1.44 | 0.04 | 2.75 | | | |
| | | 5 | 1.59 | 3.67 | 5.29 | -1.62 | 5,345.23 | 1.44 | 0.04 | 3.10 | | | |
| | 1975 | 5 | 0.95 | 8.81 | 3.16 | 5.65 | 7,700.00 | 0.86 | 0.04 | 0.90 | | | |
| | | 6 | 0.95 | 6.17 | 3.79 | 2.38 | 7,700.00 | 1.03 | 0.05 | 1.08 | 12.52 | 2.62 | -9.90 |
| | | 5 | 1.30 | 4.28 | 4.32 | -0.04 | 7,624.29 | 1.18 | 0.04 | 1.26 | | | |
| | | 5 | 1.30 | 3.97 | 4.32 | -0.35 | 7,072.06 | 1.18 | 0.04 | 1.57 | | | |
| | | 5 | 1.12 | 3.07 | 3.72 | -0.65 | 6,347.74 | 1.01 | 0.04 | 1.71 | | | |
| | | 5 | 1.12 | 3.24 | 3.72 | -0.48 | 6,599.25 | 1.01 | 0.04 | 1.54 | | | |
| | | 5 | 0.87 | 4.32 | 2.89 | 1.43 | 7,700.00 | 0.79 | 0.04 | 0.83 | | | |
| | | 6 | 0.87 | 10.78 | 3.47 | 7.31 | 7,700.00 | 0.94 | 0.05 | 1.00 | 7.91 | 6.45 | -1.46 |
| | | 6 | | | | | | | | | | | -14.86 |

Table 5.5 Required Storage Capacity of Kalola Dam (4/13)

| Year | Month | D1 | D2 | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q0 | |
|------|-------|------|-------|-------|-------|----------|----------|------|------|------|-------|-------|-------|-------|
| 1975 | Feb. | 5 | 0.25 | 17.50 | 0.83 | 16.67 | 7,700.00 | 0.23 | 0.04 | 0.27 | | | | |
| | | 5 | 0.25 | 24.69 | 0.83 | 23.66 | 7,700.00 | 0.23 | 0.04 | 0.27 | | | | |
| | | 5 | 0.38 | 15.68 | 1.26 | 14.42 | 7,700.00 | 0.34 | 0.04 | 0.39 | | | | |
| | | 5 | 0.38 | 9.29 | 1.26 | 8.03 | 7,700.00 | 0.34 | 0.04 | 0.39 | | | | |
| | | 5 | 0.11 | 7.50 | 0.37 | 7.23 | 7,700.00 | 0.10 | 0.04 | 0.14 | | | | |
| | Mar. | 5 | 0.11 | 6.25 | 0.22 | 6.03 | 7,700.00 | 0.06 | 0.03 | 0.09 | 2.54 | 9.89 | 7.35 | -7.51 |
| | | 5 | | 9.81 | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 14.08 | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 10.41 | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 7.86 | | | | | 0.04 | 0.04 | | | | |
| Apr. | 5 | 0.01 | 6.83 | 0.03 | 6.80 | 7,700.00 | 0.01 | 0.04 | 0.05 | 0.29 | 2.92 | 2.63 | -4.88 | |
| | 6 | 0.01 | 9.39 | 0.04 | 9.34 | 7,700.00 | 0.01 | 0.05 | 0.06 | | | | | |
| | 5 | 0.31 | 8.08 | 1.03 | 7.05 | 7,700.00 | 0.28 | 0.04 | 0.32 | | | | | |
| | 5 | 0.31 | 4.23 | 1.03 | 3.20 | 7,700.00 | 0.28 | 0.04 | 0.32 | | | | | |
| | 5 | 0.49 | 5.05 | 1.63 | 3.42 | 7,700.00 | 0.44 | 0.04 | 0.49 | | | | | |
| | 5 | 0.49 | 1.38 | 1.63 | -0.25 | 6,522.02 | 0.44 | 0.04 | 0.74 | | | | | |
| | 5 | 0.87 | 0.82 | 2.89 | -2.07 | 2,182.79 | 0.79 | 0.04 | 2.90 | | | | | |
| | 5 | 0.87 | 6.70 | 2.89 | 3.81 | 7,700.00 | 0.79 | 0.04 | 0.83 | 5.60 | 27.06 | 21.46 | 16.58 | |
| | May | 5 | 0.40 | 15.55 | 1.33 | 14.22 | 7,700.00 | 0.36 | 0.04 | 0.41 | | | | |
| | | 5 | 0.40 | 19.61 | 1.33 | 18.28 | 7,700.00 | 0.36 | 0.04 | 0.41 | | | | |
| 5 | | 0.45 | 19.61 | 1.50 | 18.11 | 7,700.00 | 0.41 | 0.04 | 0.45 | | | | | |
| 5 | | 0.45 | 19.61 | 1.50 | 18.11 | 7,700.00 | 0.41 | 0.04 | 0.45 | | | | | |
| 5 | | 0.67 | 17.38 | 2.23 | 17.38 | 7,700.00 | 0.61 | 0.04 | 0.65 | | | | | |
| 6 | | 0.67 | 23.54 | 2.67 | 20.87 | 7,700.00 | 0.73 | 0.05 | 0.78 | 3.14 | 30.66 | 7.52 | - | |
| Jun. | | 5 | 0.20 | 19.61 | 0.67 | 18.95 | 7,700.00 | 0.18 | 0.04 | 0.22 | | | | |
| | | 5 | 0.20 | 19.61 | 0.67 | 18.95 | 7,700.00 | 0.18 | 0.04 | 0.22 | | | | |
| | | 5 | 0.45 | 13.87 | 1.50 | 12.37 | 7,700.00 | 0.41 | 0.04 | 0.45 | | | | |
| | | 5 | 0.45 | 16.24 | 1.50 | 14.74 | 7,700.00 | 0.41 | 0.04 | 0.45 | | | | |
| | 5 | 1.01 | 7.69 | 3.36 | 4.33 | 7,700.00 | 0.91 | 0.04 | 0.96 | | | | | |
| | 5 | 1.01 | 7.06 | 3.36 | 4.50 | 7,700.00 | 0.91 | 0.04 | 0.96 | 3.26 | 12.93 | 9.67 | - | |
| | Jul. | 5 | 0.71 | 7.65 | 2.36 | 5.29 | 7,700.00 | 0.64 | 0.04 | 0.69 | | | | |
| | | 5 | 0.71 | 7.73 | 2.36 | 5.37 | 7,700.00 | 0.64 | 0.04 | 0.69 | | | | |
| | | 5 | 0.24 | 14.52 | 0.80 | 13.72 | 7,700.00 | 0.22 | 0.04 | 0.26 | | | | |
| | | 5 | 0.24 | 19.40 | 0.80 | 18.60 | 7,700.00 | 0.22 | 0.04 | 0.26 | | | | |
| 5 | | 0.00 | 24.02 | 0.00 | 24.02 | 7,700.00 | 0.00 | 0.04 | 0.04 | | | | | |
| 6 | | 0.00 | 22.55 | 0.00 | 22.55 | 7,700.00 | 0.00 | 0.05 | 0.05 | 1.99 | 10.79 | 8.80 | - | |
| Aug. | | 5 | 0.31 | 7.52 | 1.03 | 6.49 | 7,700.00 | 0.28 | 0.04 | 0.32 | | | | |
| | | 5 | 0.31 | 9.16 | 1.03 | 9.13 | 7,700.00 | 0.28 | 0.04 | 0.32 | | | | |
| | | 5 | 0.04 | 20.35 | 0.13 | 20.22 | 7,700.00 | 0.04 | 0.04 | 0.08 | | | | |
| | | 5 | 0.04 | 8.94 | 0.13 | 8.81 | 7,700.00 | 0.04 | 0.04 | 0.08 | | | | |
| | 5 | | 7.30 | | | | | 0.04 | 0.04 | | | | | |
| | 6 | | 26.49 | | | | | 0.05 | 0.05 | 0.90 | 15.99 | 15.09 | - | |
| | Sep. | 5 | | 39.79 | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 25.66 | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 19.79 | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 10.37 | | | | | 0.04 | 0.04 | | | | |
| 5 | | | 14.00 | | | | | 0.04 | 0.04 | | | | | |
| 5 | | | 12.83 | | | | | 0.04 | 0.04 | 0.26 | 9.72 | 9.46 | - | |

Table 5.5 Required Storage Capacity of Kalola Dam (5/13)

| Year | Month | D1 | D2 | D1 | D2 | D3 | D3 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D0 | |
|------|-------|------|-------|-------|-------|----------|----------|----------|------|------|------|-------|-------|--------|--------|--------|
| 1975 | Oct. | 5 | 0.04 | 24.32 | 0.03 | 24.29 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | | | |
| | | 5 | 0.01 | 17.02 | 0.03 | 16.99 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | | | |
| | | 5 | 0.29 | 7.04 | 0.96 | 6.08 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | | | |
| | | 5 | 0.59 | 8.60 | 0.96 | 7.04 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | | | |
| | | 5 | 0.41 | 9.37 | 1.36 | 8.01 | 7,700.00 | 0.37 | 0.04 | 0.41 | | | | | | |
| | Nov. | 5 | 0.41 | 11.15 | 1.64 | 9.51 | 7,700.00 | 0.45 | 0.05 | 0.50 | | | 1.63 | 16.47 | 14.84 | - |
| | | 5 | 0.90 | 10.69 | 2.99 | 7.90 | 7,700.00 | 0.81 | 0.04 | 0.86 | | | | | | |
| | | 5 | 0.90 | 7.00 | 2.99 | 4.01 | 7,700.00 | 1.10 | 0.04 | 1.14 | | | | | | |
| | | 5 | 1.21 | 5.83 | 4.02 | 1.01 | 7,700.00 | 1.10 | 0.04 | 1.14 | | | | | | |
| | | 5 | 1.21 | 4.92 | 4.02 | 0.90 | 7,700.00 | 1.10 | 0.04 | 1.14 | | | | | | |
| Dec. | 5 | 1.45 | 3.41 | 4.82 | -1.41 | 5,446.10 | 1.31 | 0.04 | 2.77 | | | | | | | |
| | 5 | 1.45 | 6.39 | 4.82 | 1.57 | 7,700.00 | 1.31 | 0.04 | 1.36 | | | 8.11 | 2.18 | -5.93 | -5.93 | |
| | 5 | 1.54 | 7.43 | 5.12 | 2.31 | 7,700.00 | 1.39 | 0.04 | 1.44 | | | | | | | |
| | 5 | 1.54 | 7.95 | 5.12 | 2.03 | 7,700.00 | 1.39 | 0.04 | 1.44 | | | | | | | |
| | 5 | 1.50 | 4.06 | 4.99 | -0.93 | 6,268.07 | 1.36 | 0.04 | 2.13 | | | | | | | |
| | 5 | 1.50 | 4.28 | 4.99 | -0.71 | 6,607.72 | 1.36 | 0.04 | 2.11 | | | | | | | |
| | 5 | 1.30 | 3.37 | 4.32 | -0.95 | 6,003.24 | 1.18 | 0.04 | 2.17 | | | | | | | |
| | 6 | 1.30 | 2.44 | 5.19 | -2.75 | 3,622.13 | 1.41 | 0.05 | 4.21 | | | 13.69 | 1.71 | -11.98 | -17.91 | |
| | 1976 | Jan. | 5 | 0.98 | 3.11 | 3.26 | -0.15 | 7,349.09 | 0.89 | 0.04 | 1.08 | | | | | |
| | | | 5 | 0.98 | 3.84 | 3.26 | 0.58 | 7,700.00 | 0.89 | 0.04 | 0.93 | | | | | |
| 5 | | | 1.07 | 2.59 | 3.56 | -0.97 | 5,605.51 | 0.97 | 0.04 | 1.90 | | | | | | |
| 5 | | | 1.07 | 1.90 | 3.56 | -1.66 | 4,112.35 | 0.97 | 0.04 | 2.67 | | | | | | |
| 5 | | | 0.62 | 1.60 | 2.06 | -0.46 | 5,976.23 | 0.56 | 0.04 | 1.07 | | | | | | |
| Feb. | | 6 | 0.62 | 2.07 | 2.47 | -0.40 | 6,443.12 | 0.67 | 0.05 | 1.13 | | | 8.85 | 0.24 | -8.61 | -26.52 |
| | | 5 | 0.63 | 1.43 | 2.09 | -0.66 | 5,256.47 | 0.57 | 0.04 | 1.28 | | | | | | |
| | | 5 | 0.63 | 1.25 | 2.09 | -0.84 | 4,594.82 | 0.57 | 0.04 | 1.46 | | | | | | |
| | | 5 | 0.30 | 1.25 | 1.26 | -0.01 | 7,617.73 | 0.34 | 0.04 | 0.40 | | | | | | |
| | | 5 | 0.30 | 1.43 | 1.26 | 0.17 | 7,700.00 | 0.34 | 0.04 | 0.39 | | | | | | |
| Mar. | Mar. | 5 | 0.08 | 1.43 | 0.27 | 1.16 | 7,700.00 | 0.07 | 0.04 | 0.12 | | | | | | |
| | | 5 | 0.08 | 1.45 | 0.16 | 1.59 | 7,700.00 | 0.04 | 0.03 | 0.07 | | | 3.71 | 0.12 | -3.59 | -30.11 |
| | | 5 | 3.72 | | | | | | | 0.04 | 0.04 | | | | | |
| | | 5 | 3.37 | | | | | | | 0.04 | 0.04 | | | | | |
| | | 5 | 7.52 | | | | | | | 0.04 | 0.04 | | | | | |
| | Apr. | 5 | 0.01 | 4.32 | 0.03 | 4.29 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | | | |
| | | 5 | 0.01 | 3.99 | 0.04 | 3.95 | 7,700.00 | 0.01 | 0.05 | 0.06 | | | 0.29 | 0.88 | 0.59 | -29.52 |
| | | 5 | 0.24 | 1.77 | 1.13 | 0.64 | 7,700.00 | 0.31 | 0.04 | 0.35 | | | | | | |
| | | 5 | 0.34 | 4.15 | 1.13 | 3.02 | 7,700.00 | 0.31 | 0.04 | 0.35 | | | | | | |
| | | 5 | 0.47 | 4.97 | 1.56 | 3.41 | 7,700.00 | 0.43 | 0.04 | 0.47 | | | | | | |
| May | 5 | 0.47 | 4.71 | 1.56 | 3.15 | 7,700.00 | 0.43 | 0.04 | 0.47 | | | | | | | |
| | 5 | 0.47 | 2.25 | 1.56 | 0.69 | 7,700.00 | 0.43 | 0.04 | 0.47 | | | | | | | |
| | 5 | 0.47 | 2.29 | 1.56 | 0.73 | 7,700.00 | 0.43 | 0.04 | 0.47 | | | 2.58 | 11.92 | 9.34 | -20.18 | |
| | 5 | 0.67 | 12.74 | 2.23 | 10.51 | 7,700.00 | 0.61 | 0.04 | 0.65 | | | | | | | |
| | 5 | 0.67 | 16.37 | 2.23 | 14.14 | 7,700.00 | 0.61 | 0.04 | 0.65 | | | | | | | |
| Jun. | 5 | 1.27 | 4.06 | 4.22 | -0.16 | 7,403.23 | 1.15 | 0.04 | 1.36 | | | | | | | |
| | 5 | 1.27 | 2.38 | 4.22 | -1.84 | 4,339.83 | 1.15 | 0.04 | 3.04 | | | | | | | |
| | 5 | 1.08 | 1.51 | 3.59 | -2.08 | 3,237.82 | 0.98 | 0.04 | 3.10 | | | | | | | |
| | 5 | 1.08 | 7.93 | 4.51 | 3.62 | 7,700.00 | 1.17 | 0.05 | 1.22 | | | 10.02 | 6.70 | -3.32 | -23.50 | |

Table 5.5 Required Storage Capacity of Kalola Dam (6/13)

| YEAR | MONTH | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | D1 | D2 | | | | | | | |
|------|-------|------|-------|------|-------|----------|----------|------|------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|--|
| 1976 | Jun. | 5 | 0.18 | 1.38 | 0.60 | 0.78 | 7,700.00 | 0.16 | 0.04 | 0.21 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.18 | 4.84 | 0.60 | 4.24 | 7,700.00 | 0.16 | 0.04 | 0.21 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.18 | 9.94 | 0.60 | 9.34 | 7,700.00 | 0.16 | 0.04 | 0.21 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.18 | 7.69 | 0.60 | 7.09 | 7,700.00 | 0.16 | 0.04 | 0.21 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.97 | 4.45 | 3.23 | 1.22 | 7,700.00 | 0.88 | 0.04 | 0.92 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Jul. | 5 | 0.97 | 9.20 | 3.23 | 5.97 | 7,700.00 | 0.88 | 0.04 | 0.92 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.00 | 7.34 | 0.00 | 7.34 | 7,700.00 | 0.00 | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.00 | 8.55 | 0.00 | 8.55 | 7,700.00 | 0.00 | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.62 | 3.59 | 2.06 | 2.06 | 7,700.00 | 0.56 | 0.04 | 0.60 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.62 | 1.21 | 2.06 | -0.85 | 4,519.52 | 0.56 | 0.04 | 1.46 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Aug. | 5 | 0.56 | 1.17 | 1.86 | -0.69 | 4,838.35 | 0.51 | 0.04 | 1.24 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 6 | 0.56 | 6.95 | 2.23 | 4.72 | 7,700.00 | 0.61 | 0.05 | 0.66 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.46 | 8.12 | 1.53 | 6.59 | 7,700.00 | 0.42 | 0.04 | 0.46 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.46 | 6.96 | 1.53 | 5.43 | 7,700.00 | 0.42 | 0.04 | 0.46 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 0.13 | 5.79 | 0.43 | 5.36 | 7,700.00 | 0.12 | 0.04 | 0.16 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sep. | 5 | 0.23 | 4.58 | 0.43 | 4.15 | 7,700.00 | 0.12 | 0.04 | 0.16 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 3.41 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6 | 2.54 | | | | | | | 0.05 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 1.56 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 2.25 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| Oct. | 5 | 1.21 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 1.27 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 1.21 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 1.21 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 1.08 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 1.77 | | | | | | | 0.04 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | |
| Nov. | 5 | 0.01 | 1.77 | 0.03 | 1.74 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.01 | 1.64 | 0.03 | 1.61 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.36 | 2.12 | 1.20 | 0.92 | 7,700.00 | 0.33 | 0.04 | 0.37 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.56 | 1.17 | 1.20 | -0.03 | 7,526.32 | 0.33 | 0.04 | 0.40 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.57 | 2.98 | 1.90 | 1.08 | 7,700.00 | 0.52 | 0.04 | 0.56 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6 | 0.57 | 3.00 | 2.27 | 0.73 | 7,700.00 | 0.62 | 0.05 | 0.67 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dec. | 5 | 0.81 | 1.64 | 2.69 | -1.05 | 4,688.76 | 0.73 | 0.04 | 1.83 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.81 | 3.28 | 2.69 | 0.59 | 7,700.00 | 0.73 | 0.04 | 0.78 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.65 | 10.58 | 2.16 | 8.42 | 7,700.00 | 0.59 | 0.04 | 0.63 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.65 | 4.97 | 2.16 | 2.81 | 7,700.00 | 0.59 | 0.04 | 0.63 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.85 | 4.80 | 2.83 | 1.97 | 7,700.00 | 0.77 | 0.04 | 0.81 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | 0.85 | 4.67 | 2.83 | 1.84 | 7,700.00 | 0.77 | 0.04 | 0.81 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1977 | Jan. | 5 | 1.57 | 3.54 | 5.22 | -1.68 | 5,221.59 | 1.42 | 0.04 | 3.14 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 1.57 | 2.59 | 5.22 | -2.63 | 3,830.32 | 1.42 | 0.04 | 4.09 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 1.61 | 2.43 | 5.35 | -3.92 | 2,056.88 | 1.46 | 0.04 | 5.05 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 1.61 | 4.32 | 5.35 | -1.03 | 6,213.80 | 1.46 | 0.04 | 2.53 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | 1.05 | 4.45 | 5.49 | 0.96 | 7,700.00 | 0.95 | 0.04 | 0.99 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 6 | 1.05 | 9.12 | 4.19 | 4.93 | 7,700.00 | 1.14 | 0.05 | 1.19 | | | | | | | | | | | | | | | | | | | | | | | | |

Table 5.5 Required Storage Capacity of Kalola Dam (7/13)

| Year | Month | D1 | D2 | Q1 | Q2 | Q3 | D3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q0 | |
|------|-------|------|-------|-------|-------|----------|----------|----------|------|------|------|------|-------|--------|--|
| 1977 | Feb. | 5 | 0.54 | 1.56 | 1.80 | -0.24 | 6,690.06 | 0.49 | 0.04 | 0.77 | | | | | |
| | | 5 | 0.54 | 1.81 | 1.80 | 0.01 | 7,700.00 | 0.49 | 0.04 | 0.53 | | | | | |
| | | 5 | 0.33 | 2.16 | 1.10 | 1.06 | 7,700.00 | 0.30 | 0.04 | 0.34 | | | | | |
| | Mar. | 5 | 0.33 | 2.46 | 1.10 | 1.36 | 7,700.00 | 0.30 | 0.04 | 0.04 | | | | | |
| | | 5 | 0.10 | 2.76 | 0.33 | 2.43 | 7,700.00 | 0.09 | 0.04 | 0.13 | | | | | |
| | | 5 | 0.10 | 4.15 | 0.20 | 3.95 | 7,700.00 | 0.05 | 0.03 | 0.08 | 0.12 | 0.12 | -2.08 | -25.36 | |
| | Apr. | 5 | | | | | | | | | | | | | |
| | | 5 | 0.01 | | | | | 7,700.00 | | | | | | | |
| | | 5 | 0.01 | | | | | 7,700.00 | | | | | | | |
| | | 5 | 0.22 | 23.72 | 0.73 | 22.99 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | | | |
| | | 5 | 0.76 | 10.37 | 0.73 | 9.64 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | | | |
| | | 5 | 0.76 | 9.72 | 2.53 | 7.19 | 7,700.00 | 0.69 | 0.04 | 0.73 | | | | | |
| May | 5 | 0.67 | 7.73 | 2.53 | 16.39 | 7,700.00 | 0.69 | 0.04 | 0.73 | | | | | | |
| | 5 | 0.67 | 6.05 | 2.23 | 5.82 | 7,700.00 | 0.61 | 0.04 | 0.65 | | | | | | |
| | 5 | 0.52 | 9.95 | 1.73 | 8.12 | 7,700.00 | 0.47 | 0.04 | 0.51 | | | | | | |
| | 5 | 0.52 | 11.88 | 1.73 | 10.15 | 7,700.00 | 0.47 | 0.04 | 0.51 | | | | | | |
| | 5 | 1.14 | 5.62 | 3.79 | 1.83 | 7,700.00 | 1.03 | 0.04 | 1.07 | | | | | | |
| | 5 | 0.56 | 5.70 | 1.93 | 3.77 | 7,700.00 | 0.52 | 0.04 | 0.57 | | | | | | |
| Jun. | 5 | 0.56 | 7.31 | 2.31 | 5.00 | 7,700.00 | 0.63 | 0.05 | 0.68 | | | | | | |
| | 5 | 1.23 | 9.24 | 4.09 | 5.15 | 7,700.00 | 1.11 | 0.04 | 1.16 | | | | | | |
| | 5 | 1.23 | 6.57 | 4.09 | 2.40 | 7,700.00 | 1.11 | 0.04 | 1.16 | | | | | | |
| | 5 | 0.29 | 16.07 | 0.96 | 13.11 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | | | |
| | 5 | 0.29 | 26.31 | 0.96 | 25.35 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | | | |
| | 5 | 1.19 | 4.58 | 3.96 | 0.62 | 7,700.00 | 1.08 | 0.04 | 1.12 | | | | | | |
| Jul. | 5 | 1.19 | 4.06 | 3.96 | 0.10 | 7,700.00 | 1.08 | 0.04 | 1.12 | | | | | | |
| | 5 | 1.07 | 7.99 | 3.56 | 4.43 | 7,700.00 | 0.97 | 0.04 | 1.01 | | | | | | |
| | 5 | 1.07 | 3.28 | 3.56 | -0.28 | 7,098.87 | 0.97 | 0.04 | 1.29 | | | | | | |
| | 5 | 0.83 | 2.94 | 2.76 | 0.18 | 7,700.00 | 0.75 | 0.04 | 0.79 | | | | | | |
| | 5 | 0.83 | 4.92 | 2.76 | 2.16 | 7,700.00 | 0.75 | 0.04 | 0.79 | | | | | | |
| | 5 | 0.59 | 5.96 | 1.96 | 4.00 | 7,700.00 | 0.53 | 0.04 | 0.59 | | | | | | |
| Aug. | 5 | 0.59 | 3.21 | 2.35 | 0.86 | 7,700.00 | 0.64 | 0.05 | 0.69 | | | | | | |
| | 5 | 0.22 | 3.93 | 0.73 | 3.20 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | | | | |
| | 5 | 0.22 | 4.15 | 0.73 | 3.42 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | | | | |
| | 5 | 0.07 | 10.19 | 0.23 | 17.96 | 7,700.00 | 0.06 | 0.04 | 0.11 | | | | | | |
| | 5 | 0.07 | 3.63 | 0.23 | 3.40 | 7,700.00 | 0.06 | 0.04 | 0.11 | | | | | | |
| | 5 | | 2.85 | | | | | | | | | | | | |
| Sep. | 5 | | 2.80 | | | | | | | | | | | | |
| | 5 | | 1.17 | | | | | | | | | | | | |
| | 5 | | 1.12 | | | | | | | | | | | | |
| | 5 | | 1.08 | | | | | | | | | | | | |
| | 5 | | 1.08 | | | | | | | | | | | | |
| | 5 | | 1.08 | | | | | | | | | | | | |
| Oct. | 5 | | 1.04 | | | | | | | | | | | | |
| | 5 | | 1.04 | | | | | | | | | | | | |
| | 5 | | 1.04 | | | | | | | | | | | | |
| | 5 | | 1.04 | | | | | | | | | | | | |
| | 5 | | 1.04 | | | | | | | | | | | | |
| | 5 | | 1.04 | | | | | | | | | | | | |

Table 5.5 Required Storage Capacity of Kaloia Dam (8/13)

| Year | Month | D1 | D2 | D1 | D2 | Q1 | Q2 | Q3 | D3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q0 | |
|------|-------|----|-------|-------|-------|----------|----------|------|------|------|------|------|----|-------|-------|-------|--------|
| 1977 | Dec. | 5 | 0.01 | 1.17 | 0.03 | 1.14 | 7,700.00 | 0.01 | 0.04 | 0.05 | 0.04 | 0.05 | | | | | |
| | | 5 | 0.01 | 1.17 | 0.03 | 1.14 | 7,700.00 | 0.01 | 0.04 | 0.05 | 0.04 | 0.05 | | | | | |
| | | 5 | 0.36 | 1.04 | 1.20 | -0.16 | 6,690.06 | 0.33 | 0.04 | 0.53 | 0.04 | 0.53 | | | | | |
| | | 5 | 0.36 | 0.99 | 1.20 | -0.21 | 6,368.42 | 0.33 | 0.04 | 0.58 | 0.04 | 0.58 | | | | | |
| | | 5 | 0.76 | 0.99 | 2.53 | -1.54 | 3,016.62 | 0.69 | 0.04 | 2.27 | 0.04 | 2.27 | | | | | |
| | | 6 | 0.76 | 1.19 | 3.03 | -1.04 | 3,021.70 | 0.63 | 0.05 | 2.72 | 0.05 | 2.72 | | 6.19 | 1.34 | -4.65 | -4.65 |
| 1977 | Nov. | 5 | 1.03 | 0.95 | 3.42 | -2.47 | 2,135.92 | 0.93 | 0.04 | 3.24 | 0.04 | 3.24 | | | | | |
| | | 5 | 1.03 | 0.99 | 3.42 | -2.43 | 2,225.66 | 0.93 | 0.04 | 3.24 | 0.04 | 3.24 | | | | | |
| | | 5 | 1.10 | 0.95 | 3.66 | -2.71 | 2,000.00 | 1.00 | 0.04 | 3.46 | 0.04 | 3.46 | | | | | |
| | | 5 | 1.10 | 1.04 | 3.66 | -2.62 | 2,189.47 | 1.00 | 0.04 | 3.46 | 0.04 | 3.46 | | | | | |
| | | 5 | 0.36 | 1.08 | 1.20 | -0.12 | 6,947.37 | 0.33 | 0.04 | 0.49 | 0.04 | 0.49 | | | | | |
| | | 5 | 0.36 | 1.30 | 1.20 | 0.10 | 7,700.00 | 0.33 | 0.04 | 0.37 | 0.04 | 0.37 | | 14.26 | 11.25 | -3.01 | -7.86 |
| 1978 | Dec. | 5 | 1.47 | 3.15 | 4.89 | -1.74 | 4,962.41 | 1.33 | 0.04 | 3.11 | 0.04 | 3.11 | | | | | |
| | | 5 | 1.47 | 7.56 | 4.09 | 2.67 | 7,700.00 | 1.33 | 0.04 | 1.37 | 0.04 | 1.37 | | | | | |
| | | 5 | 1.36 | 34.91 | 4.52 | 30.39 | 7,700.00 | 1.23 | 0.04 | 1.27 | 0.04 | 1.27 | | | | | |
| | | 5 | 1.36 | 14.47 | 4.52 | 9.95 | 7,700.00 | 1.23 | 0.04 | 0.97 | 0.04 | 0.97 | | | | | |
| | | 5 | 1.02 | 13.26 | 3.79 | 9.67 | 7,700.00 | 0.92 | 0.04 | 1.16 | 0.04 | 1.16 | | 9.16 | 2.71 | -6.45 | -14.31 |
| | | 6 | 1.02 | 8.90 | 4.07 | 4.81 | 7,700.00 | 1.11 | 0.05 | 1.22 | 0.04 | 1.22 | | | | | |
| 1978 | Jan. | 5 | 1.30 | 10.54 | 4.32 | 6.22 | 7,700.00 | 1.18 | 0.04 | 1.22 | 0.04 | 1.22 | | | | | |
| | | 5 | 1.30 | 8.21 | 4.32 | 3.89 | 7,700.00 | 1.18 | 0.04 | 0.57 | 0.04 | 0.57 | | | | | |
| | | 5 | 0.58 | 11.66 | 1.93 | 9.73 | 7,700.00 | 0.52 | 0.04 | 0.57 | 0.04 | 0.57 | | | | | |
| | | 5 | 0.58 | 7.34 | 1.93 | 5.41 | 7,700.00 | 0.52 | 0.04 | 0.79 | 0.04 | 0.79 | | | | | |
| | | 5 | 0.82 | 13.35 | 2.73 | 10.62 | 7,700.00 | 0.74 | 0.04 | 0.94 | 0.04 | 0.94 | | | | | |
| | | 6 | 0.82 | 5.39 | 3.27 | 2.12 | 7,700.00 | 0.69 | 0.05 | 1.22 | 0.04 | 1.22 | | 5.30 | 3.24 | -2.06 | -16.37 |
| 1978 | Feb. | 5 | 0.60 | 3.07 | 2.00 | 1.08 | 7,700.00 | 0.54 | 0.04 | 0.59 | 0.04 | 0.59 | | | | | |
| | | 5 | 0.60 | 4.28 | 2.00 | 2.29 | 7,700.00 | 0.54 | 0.04 | 0.59 | 0.04 | 0.59 | | | | | |
| | | 5 | 0.38 | 4.41 | 1.26 | 3.15 | 7,700.00 | 0.34 | 0.04 | 0.39 | 0.04 | 0.39 | | | | | |
| | | 5 | 0.38 | 4.06 | 1.26 | 2.80 | 7,700.00 | 0.34 | 0.04 | 0.39 | 0.04 | 0.39 | | | | | |
| | | 5 | 0.05 | 9.33 | 0.17 | 9.16 | 7,700.00 | 0.05 | 0.04 | 0.09 | 0.04 | 0.09 | | | | | |
| | | 3 | 0.05 | 2.07 | 0.10 | 1.97 | 7,700.00 | 0.03 | 0.03 | 2.09 | 0.03 | 2.09 | | 4.94 | 2.85 | 2.85 | -13.52 |
| 1978 | Mar. | 5 | 6.48 | 6.48 | 6.48 | 7,700.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | | |
| | | 5 | 22.03 | 22.03 | 22.03 | 7,700.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | | |
| | | 5 | 11.45 | 11.45 | 11.45 | 7,700.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | | |
| | | 5 | 11.28 | 11.28 | 11.28 | 7,700.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | | |
| | | 5 | 0.01 | 9.29 | 0.03 | 9.26 | 7,700.00 | 0.01 | 0.04 | 0.05 | 0.04 | 0.05 | | | | | |
| | | 6 | 0.01 | 12.23 | 0.04 | 12.19 | 7,700.00 | 0.01 | 0.05 | 0.06 | 0.04 | 0.06 | | 0.29 | 11.06 | 10.77 | -2.75 |
| 1978 | Apr. | 5 | 0.34 | 11.19 | 1.13 | 10.06 | 7,700.00 | 0.31 | 0.04 | 0.35 | 0.04 | 0.35 | | | | | |
| | | 5 | 0.34 | 16.59 | 1.13 | 15.46 | 7,700.00 | 0.31 | 0.04 | 0.35 | 0.04 | 0.35 | | | | | |
| | | 5 | 0.79 | 8.08 | 2.63 | 5.45 | 7,700.00 | 0.71 | 0.04 | 0.76 | 0.04 | 0.76 | | | | | |
| | | 5 | 0.79 | 5.31 | 2.63 | 2.68 | 7,700.00 | 0.71 | 0.04 | 0.76 | 0.04 | 0.76 | | | | | |
| | | 5 | 0.38 | 6.06 | 1.26 | 5.80 | 7,700.00 | 0.34 | 0.04 | 0.39 | 0.04 | 0.39 | | | | | |
| | | 5 | 0.38 | 16.59 | 1.26 | 15.35 | 7,700.00 | 0.34 | 0.04 | 0.39 | 0.04 | 0.39 | | 2.99 | 14.20 | 13.21 | 8.46 |
| 1978 | May | 5 | 0.54 | 33.09 | 1.80 | 31.29 | 7,700.00 | 0.49 | 0.04 | 0.53 | 0.04 | 0.53 | | | | | |
| | | 5 | 0.54 | 21.90 | 1.80 | 20.10 | 7,700.00 | 0.49 | 0.04 | 0.53 | 0.04 | 0.53 | | | | | |
| | | 5 | 0.70 | 44.24 | 2.33 | 41.91 | 7,700.00 | 0.63 | 0.04 | 0.68 | 0.04 | 0.68 | | | | | |
| | | 5 | 0.70 | 11.10 | 2.33 | 8.77 | 7,700.00 | 0.63 | 0.04 | 0.68 | 0.04 | 0.68 | | | | | |
| | | 5 | 1.01 | 6.26 | 3.36 | 2.90 | 7,700.00 | 0.91 | 0.04 | 0.96 | 0.04 | 0.96 | | | | | |
| | | 6 | 1.01 | 8.65 | 4.03 | 4.62 | 7,700.00 | 1.10 | 0.05 | 1.15 | 0.04 | 1.15 | | 4.52 | 48.02 | 43.50 | - |

Table 5.5 Required Storage Capacity of Kalola Dam (9/13)

| Year | Month | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D0 | |
|------|-------|------|-------|-------|-------|----------|----------|------|------|-------|-------|-------|
| 1978 | Jun. | 5 | 0.22 | 21.25 | 0.73 | 20.52 | 7,700.00 | 0.20 | 0.04 | 0.24 | | |
| | | 5 | 0.22 | 9.72 | 0.73 | 8.99 | 7,700.00 | 0.20 | 0.04 | 0.24 | | |
| | | 5 | 0.07 | 14.90 | 0.23 | 14.67 | 7,700.00 | 0.06 | 0.04 | 0.11 | | |
| | | 5 | 0.07 | 11.32 | 0.23 | 11.09 | 7,700.00 | 0.06 | 0.04 | 0.11 | | |
| | | 5 | 0.14 | 8.64 | 0.47 | 8.17 | 7,700.00 | 0.13 | 0.04 | 0.17 | | |
| | | 5 | 0.14 | 18.01 | 0.47 | 17.54 | 7,700.00 | 0.13 | 0.04 | 0.17 | 49.12 | 48.08 |
| | Jul. | 5 | 0.79 | 11.10 | 2.63 | 9.47 | 7,700.00 | 0.71 | 0.04 | 0.76 | | |
| | | 5 | 0.79 | 10.32 | 2.63 | 7.69 | 7,700.00 | 0.71 | 0.04 | 0.76 | | |
| | | 5 | 0.20 | 12.57 | 0.67 | 11.91 | 7,700.00 | 0.18 | 0.04 | 0.22 | | |
| | | 5 | 0.20 | 15.50 | 0.67 | 14.84 | 7,700.00 | 0.18 | 0.04 | 0.22 | | |
| | | 5 | 0.57 | 22.64 | 1.90 | 20.74 | 7,700.00 | 0.52 | 0.04 | 0.56 | | |
| | | 6 | 0.57 | 18.03 | 2.27 | 15.76 | 7,700.00 | 0.62 | 0.05 | 0.67 | 18.83 | 15.64 |
| Aug. | 5 | 0.22 | 9.98 | 0.73 | 9.25 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | |
| | 5 | 0.22 | 14.99 | 0.73 | 14.26 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | |
| | 5 | 0.05 | 8.64 | 0.17 | 8.47 | 7,700.00 | 0.05 | 0.04 | 0.09 | | | |
| | 5 | 0.05 | 6.74 | 0.17 | 6.57 | 7,700.00 | 0.05 | 0.04 | 0.09 | | | |
| | 5 | | 4.19 | | | | | | | | | |
| | 6 | | 4.10 | | | | | | | 10.31 | 9.55 | |
| Sep. | 5 | | 6.61 | | | | | | | | | |
| | 5 | | 10.45 | | | | | | | | | |
| | 5 | | 5.40 | | | | | | | | | |
| | 5 | | 7.60 | | | | | | | | | |
| | 5 | | 14.60 | | | | | | | | | |
| | 5 | | 4.45 | | | | | | | 0.26 | 4.43 | |
| Oct. | 5 | 0.01 | 5.05 | 0.03 | 5.02 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | |
| | 5 | 0.01 | 2.85 | 0.03 | 2.82 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | |
| | 5 | 0.36 | 2.51 | 1.20 | 2.43 | 7,700.00 | 0.33 | 0.04 | 0.37 | | | |
| | 5 | 0.36 | 3.63 | 1.20 | 2.43 | 7,700.00 | 0.33 | 0.04 | 0.37 | | | |
| | 5 | 0.65 | 6.44 | 2.16 | 4.28 | 7,700.00 | 0.59 | 0.04 | 0.63 | | | |
| | 6 | 0.65 | 6.22 | 2.59 | 3.63 | 7,700.00 | 0.71 | 0.05 | 0.76 | 2.23 | 3.42 | |
| Nov. | 5 | 0.73 | 2.98 | 2.43 | 0.55 | 7,700.00 | 0.66 | 0.04 | 0.70 | | | |
| | 5 | 0.73 | 2.72 | 2.43 | 0.29 | 7,700.00 | 0.66 | 0.04 | 0.70 | | | |
| | 5 | 0.83 | 3.19 | 2.76 | 0.43 | 7,700.00 | 0.75 | 0.04 | 0.79 | | | |
| | 5 | 0.83 | 4.23 | 2.76 | 1.47 | 7,700.00 | 0.75 | 0.04 | 0.79 | | | |
| | 5 | 1.37 | 2.51 | 4.56 | -2.05 | 4,242.80 | 1.24 | 0.04 | 1.33 | | | |
| | 5 | 1.37 | 4.06 | 4.56 | -0.50 | 6,863.85 | 1.24 | 0.04 | 1.33 | 8.10 | -4.29 | |
| Dec. | 5 | 1.51 | 7.60 | 5.02 | 2.58 | 7,700.00 | 1.37 | 0.04 | 1.41 | | | |
| | 5 | 1.51 | 2.98 | 5.02 | -2.04 | 4,570.23 | 1.37 | 0.04 | 1.41 | | | |
| | 5 | 1.45 | 12.27 | 4.82 | 7.45 | 7,700.00 | 1.31 | 0.04 | 1.36 | | | |
| | 5 | 1.45 | 18.66 | 4.82 | 13.84 | 7,700.00 | 1.31 | 0.04 | 1.36 | | | |
| | 5 | 1.31 | 6.13 | 4.36 | 1.77 | 7,700.00 | 1.19 | 0.04 | 1.23 | | | |
| | 6 | 1.31 | 13.67 | 5.23 | 8.44 | 7,700.00 | 1.42 | 0.05 | 1.47 | 10.27 | -9.15 | |
| 1979 | Jan. | 5 | 1.13 | 3.33 | 3.76 | -0.43 | 6,824.41 | 1.02 | 0.04 | 1.07 | | |
| | | 5 | 1.13 | 6.44 | 3.76 | 2.68 | 7,700.00 | 1.02 | 0.04 | 1.07 | | |
| | | 5 | 0.95 | 3.15 | 3.16 | -0.01 | 7,678.67 | 0.86 | 0.04 | 0.91 | | |
| | | 5 | 0.95 | 2.46 | 3.16 | -0.70 | 5,996.68 | 0.86 | 0.04 | 0.91 | | |
| | | 5 | 0.88 | 4.84 | 2.93 | 1.91 | 7,700.00 | 0.80 | 0.04 | 0.84 | | |
| | | 6 | 0.88 | 3.21 | 3.51 | -0.30 | 7,039.47 | 0.96 | 0.05 | 1.01 | 7.22 | 1.00 |

Table 5.5 Required Storage Capacity of Kalola Dam (10/13)

| Year | Month | D1 | D2 | Q1 | Q2 | Q3 | D3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q0 | |
|------|-------|------|-------|-------|-------|----------|----------|------|------|------|------|-------|-------|-------|--------|
| 1979 | Feb. | 5 | 0.47 | 4.06 | 1.56 | 2.50 | 7,700.00 | 0.43 | 0.04 | 0.47 | | | | | |
| | | 5 | 0.47 | 4.10 | 1.54 | 2.34 | 7,700.00 | 0.43 | 0.04 | 0.47 | | | | | |
| | | 5 | 0.29 | 11.92 | 0.96 | 10.96 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | | |
| | Mar. | 5 | 0.29 | 7.39 | 0.96 | 6.43 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | | |
| | | 5 | 0.08 | 1.99 | 0.27 | 1.72 | 7,700.00 | 0.07 | 0.04 | 0.12 | | | | | |
| | | 5 | 0.08 | 1.87 | 0.16 | 1.71 | 7,700.00 | 0.04 | 0.03 | 0.07 | | 1.73 | 1.23 | -0.50 | -12.94 |
| | Apr. | 5 | | 4.84 | | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 2.89 | | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 2.07 | | | | | | 0.04 | 0.04 | | | | |
| | | 5 | | 3.71 | | | | | | 0.04 | 0.04 | | | | |
| | | 5 | 0.01 | 2.46 | 0.03 | 2.43 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | | |
| | | 6 | 0.01 | 17.92 | 0.04 | 17.88 | 7,700.00 | 0.01 | 0.01 | 0.05 | | 0.29 | 20.14 | 19.85 | 6.91 |
| 5 | | 0.25 | 9.20 | 0.83 | 8.37 | 7,700.00 | 0.23 | 0.04 | 0.27 | | | | | | |
| 5 | | 0.25 | 19.22 | 0.83 | 18.39 | 7,700.00 | 0.23 | 0.04 | 0.27 | | | | | | |
| 5 | | 0.80 | 7.95 | 2.66 | 5.29 | 7,700.00 | 0.72 | 0.04 | 0.77 | | | | | | |
| 5 | | 0.80 | 4.45 | 2.66 | 1.79 | 7,700.00 | 0.72 | 0.04 | 0.77 | | | | | | |
| 5 | | 0.36 | 5.75 | 1.20 | 4.55 | 7,700.00 | 0.33 | 0.04 | 0.37 | | | | | | |
| 5 | | 0.36 | 19.48 | 1.20 | 18.28 | 7,700.00 | 0.33 | 0.04 | 0.37 | | 2.81 | 18.66 | 15.85 | - | |
| May | 5 | 0.55 | 14.64 | 1.83 | 12.81 | 7,700.00 | 0.50 | 0.04 | 0.54 | | | | | | |
| | 5 | 0.55 | 15.77 | 1.83 | 13.94 | 7,700.00 | 0.50 | 0.04 | 0.54 | | | | | | |
| | 5 | 1.44 | 6.39 | 4.79 | 1.60 | 7,700.00 | 1.30 | 0.04 | 1.35 | | | | | | |
| | 5 | 1.44 | 4.62 | 4.79 | -0.17 | 7,429.82 | 1.30 | 0.04 | 1.35 | | | | | | |
| | 5 | 1.15 | 3.89 | 3.82 | 0.07 | 7,700.00 | 1.04 | 0.04 | 1.02 | | | | | | |
| | 6 | 1.15 | 3.94 | 4.59 | -0.65 | 6,611.75 | 1.25 | 0.05 | 1.25 | | 6.91 | 8.89 | 1.98 | - | |
| Jun. | 5 | 0.29 | 0.16 | 0.96 | 7.20 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | | | |
| | 5 | 0.29 | 22.77 | 0.96 | 21.81 | 7,700.00 | 0.26 | 0.04 | 0.31 | | | | | | |
| | 5 | 0.00 | 4.19 | 0.00 | 4.19 | 7,700.00 | 0.00 | 0.04 | 0.04 | | | | | | |
| | 5 | 0.00 | 23.59 | 0.00 | 23.59 | 7,700.00 | 0.00 | 0.04 | 0.04 | | | | | | |
| | 5 | 0.94 | 9.42 | 3.13 | 6.29 | 7,700.00 | 0.85 | 0.04 | 0.89 | | | | | | |
| | 5 | 0.94 | 4.97 | 3.13 | 1.84 | 7,700.00 | 0.85 | 0.04 | 0.89 | | 2.49 | 50.96 | 48.47 | - | |
| Jul. | 5 | 1.04 | 3.02 | 3.46 | -0.44 | 6,724.70 | 0.94 | 0.04 | 1.42 | | | | | | |
| | 5 | 1.04 | 7.78 | 3.46 | 4.32 | 7,700.00 | 0.94 | 0.04 | 0.98 | | | | | | |
| | 5 | 0.15 | 7.65 | 0.50 | 7.15 | 7,700.00 | 0.14 | 0.04 | 0.18 | | | | | | |
| | 5 | 0.15 | 8.34 | 0.50 | 7.84 | 7,700.00 | 0.14 | 0.04 | 0.18 | | | | | | |
| | 5 | 0.55 | 2.85 | 1.83 | 1.02 | 7,700.00 | 0.50 | 0.04 | 0.54 | | | | | | |
| | 6 | 0.55 | 2.64 | 2.19 | 0.45 | 7,700.00 | 0.60 | 0.05 | 0.65 | | 3.95 | 12.91 | 8.96 | - | |
| Aug. | 5 | 0.40 | 1.25 | 1.33 | -0.08 | 7,236.84 | 0.36 | 0.04 | 0.49 | | | | | | |
| | 5 | 0.40 | 1.34 | 1.33 | 0.01 | 7,700.00 | 0.36 | 0.04 | 0.41 | | | | | | |
| | 5 | 0.13 | 1.29 | 0.43 | 0.86 | 7,700.00 | 0.12 | 0.04 | 0.16 | | | | | | |
| | 5 | 0.13 | 1.17 | 0.43 | 0.74 | 7,700.00 | 0.12 | 0.04 | 0.16 | | | | | | |
| | 5 | | 1.17 | | | | | | 0.04 | 0.04 | | | | | |
| | 6 | | 3.89 | | | | | | 0.05 | 0.05 | 1.31 | 3.29 | 1.98 | - | |
| Sep. | 5 | | 6.31 | | | | | 0.04 | 0.04 | 0.04 | | | | | |
| | 5 | | 13.05 | | | | | 0.04 | 0.04 | 0.04 | | | | | |
| | 5 | | 13.91 | | | | | 0.04 | 0.04 | 0.04 | | | | | |
| | 5 | | 1.60 | | | | | 0.04 | 0.04 | 0.04 | | | | | |
| | 5 | | 1.43 | | | | | 0.04 | 0.04 | 0.04 | | | | | |
| | 5 | | 1.21 | | | | | 0.04 | 0.04 | 0.04 | 0.26 | 15.34 | 15.08 | - | |

Table 5.5 Required Storage Capacity of Kalola Dam (11/13)

| Year | Month | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 | D12 | |
|------|-------|------|-------|------|-------|----------|----------|------|------|-------|-------|-------|--------|--------|
| 1979 | Oct. | 5 | 0.01 | 1.17 | 0.03 | 1.14 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | |
| | | 5 | 0.01 | 1.17 | 0.03 | 1.14 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | |
| | | 5 | 0.36 | 1.56 | 1.20 | 0.36 | 7,700.00 | 0.33 | 0.04 | 0.37 | | | | |
| | Nov. | 5 | 0.36 | 1.47 | 1.20 | 0.33 | 7,700.00 | 0.33 | 0.04 | 0.37 | | | | |
| | | 5 | 0.76 | 1.64 | 2.33 | -0.89 | 4,997.23 | 0.69 | 0.04 | 1.62 | | | | |
| | | 6 | 0.76 | 1.43 | 3.03 | -1.58 | 3,681.90 | 0.83 | 0.05 | 2.46 | 4.92 | 2.04 | -2.88 | -2.88 |
| | Dec. | 5 | 0.72 | 2.46 | 2.59 | 0.07 | 7,700.00 | 0.65 | 0.04 | 0.69 | | | | |
| | | 5 | 0.72 | 1.94 | 2.59 | -0.43 | 6,239.77 | 0.65 | 0.04 | 1.15 | | | | |
| | | 5 | 0.99 | 2.29 | 3.29 | -1.00 | 5,356.73 | 0.90 | 0.04 | 1.94 | | | | |
| | Jan. | 5 | 0.99 | 2.76 | 3.29 | -0.53 | 6,456.14 | 0.90 | 0.04 | 1.47 | | | | |
| | | 5 | 1.52 | 4.10 | 5.05 | -0.95 | 6,246.54 | 1.38 | 0.04 | 2.37 | | | | |
| | | 5 | 1.52 | 3.07 | 5.05 | -1.98 | 4,677.29 | 1.38 | 0.04 | 3.40 | 11.03 | 1.22 | -9.81 | -12.69 |
| Feb. | 5 | 1.77 | 4.19 | 5.99 | 1.70 | 5,482.01 | 1.60 | 0.04 | 3.34 | | | | | |
| | 5 | 1.77 | 1.64 | 5.09 | -4.25 | 2,145.70 | 1.60 | 0.04 | 5.54 | | | | | |
| | 5 | 1.54 | 1.25 | 5.12 | -3.87 | 1,879.70 | 1.39 | 0.04 | 5.31 | | | | | |
| Mar. | 5 | 1.54 | 10.75 | 5.12 | 5.63 | 7,700.00 | 1.39 | 0.04 | 1.46 | | | | | |
| | 5 | 1.40 | 6.05 | 4.66 | 1.40 | 7,700.00 | 1.27 | 0.04 | 1.31 | | | | | |
| | 6 | 1.40 | 7.77 | 5.59 | 2.18 | 7,700.00 | 1.52 | 0.05 | 1.57 | 18.51 | 12.80 | -5.71 | -18.40 | |
| 1980 | Oct. | 5 | 1.04 | 9.12 | 3.46 | 7,700.00 | 0.94 | 0.04 | 0.98 | | | | | |
| | | 5 | 1.04 | 4.75 | 3.46 | 1.29 | 7,700.00 | 0.94 | 0.04 | 0.98 | | | | |
| | | 5 | 0.26 | 7.50 | 0.86 | 6.44 | 7,700.00 | 0.24 | 0.04 | 0.28 | | | | |
| | Nov. | 5 | 0.26 | 5.44 | 0.86 | 6.58 | 7,700.00 | 0.24 | 0.04 | 0.28 | | | | |
| | | 5 | 0.88 | 4.43 | 2.93 | 1.52 | 7,700.00 | 0.80 | 0.04 | 0.84 | | | | |
| | | 6 | 0.88 | 3.99 | 3.51 | 0.48 | 7,700.00 | 0.96 | 0.05 | 1.01 | 4.37 | 2.89 | -1.48 | -19.88 |
| | Dec. | 5 | 0.63 | 3.93 | 2.09 | 1.84 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | |
| | | 5 | 0.63 | 3.22 | 2.09 | 1.21 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | |
| | | 5 | 0.36 | 1.94 | 1.20 | 0.74 | 7,700.00 | 0.33 | 0.04 | 0.37 | | | | |
| | Jan. | 5 | 0.36 | 1.34 | 1.20 | 0.14 | 7,700.00 | 0.33 | 0.04 | 0.37 | | | | |
| | | 5 | 0.01 | 1.99 | 0.03 | 1.96 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | |
| | | 5 | 0.01 | 3.00 | 0.02 | 2.98 | 7,700.00 | 0.01 | 0.03 | 0.03 | 2.05 | 5.84 | 3.79 | -16.09 |
| Feb. | 5 | 3.93 | 3.93 | 0.01 | | | | | 0.04 | 0.04 | | | | |
| | 5 | 3.97 | 2.25 | | | | | | 0.04 | 0.04 | | | | |
| | 5 | 2.25 | 1.51 | | | | | | 0.04 | 0.04 | | | | |
| Mar. | 5 | 0.01 | 1.21 | 0.01 | 1.18 | 7,700.00 | 0.01 | 0.04 | 0.05 | | | | | |
| | 5 | 0.01 | 2.12 | 0.04 | 2.08 | 7,700.00 | 0.01 | 0.05 | 0.06 | 0.29 | 8.22 | 7.93 | -8.16 | |
| | 6 | 0.01 | 3.93 | 0.76 | 3.17 | 7,700.00 | 0.21 | 0.04 | 0.25 | | | | | |
| Apr. | 5 | 0.23 | 14.12 | 0.76 | 12.36 | 7,700.00 | 0.21 | 0.04 | 0.25 | | | | | |
| | 5 | 0.23 | 14.43 | 2.09 | 12.34 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | | |
| | 5 | 0.63 | 10.15 | 2.09 | 8.06 | 7,700.00 | 0.57 | 0.04 | 0.61 | | | | | |
| May | 5 | 0.70 | 10.71 | 2.33 | 8.38 | 7,700.00 | 0.63 | 0.04 | 0.68 | | | | | |
| | 5 | 0.70 | 10.84 | 2.33 | 8.51 | 7,700.00 | 0.63 | 0.04 | 0.68 | 3.08 | 47.77 | 44.69 | 36.53 | |
| | 5 | 0.64 | 26.57 | 2.13 | 24.44 | 7,700.00 | 0.58 | 0.04 | 0.62 | | | | | |
| Jun. | 5 | 0.64 | 11.36 | 2.13 | 9.23 | 7,700.00 | 0.58 | 0.04 | 0.62 | | | | | |
| | 5 | 1.22 | 8.64 | 4.06 | 4.58 | 7,700.00 | 1.10 | 0.04 | 1.15 | | | | | |
| | 5 | 1.22 | 6.00 | 4.06 | 1.94 | 7,700.00 | 1.10 | 0.04 | 1.15 | | | | | |
| Jul. | 5 | 0.23 | 8.89 | 0.76 | 8.13 | 7,700.00 | 0.21 | 0.04 | 0.25 | | | | | |
| | 5 | 0.23 | 24.86 | 0.92 | 23.74 | 7,700.00 | 0.25 | 0.05 | 0.30 | 4.09 | 20.70 | 16.61 | - | |

Table 5.5 Required Storage Capacity of Kalola Dam (12/13)

| Year | Month | D1 | D2 | D1 | D2 | Q1 | Q2 | Q3 | Q3 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q9 | |
|------|-------|------|------|-------|-------|----------|----------|------|------|------|------|------|------|----|----|----|----|--|
| 1980 | Jun. | 5 | 0.81 | 9.33 | 2.69 | 6.64 | 7,700.00 | 0.73 | 0.04 | 0.78 | 0.04 | 0.04 | 0.78 | | | | | |
| | | 5 | 0.81 | 10.41 | 2.69 | 7.72 | 7,700.00 | 0.73 | 0.04 | 0.78 | 0.04 | 0.04 | 0.78 | | | | | |
| | | 5 | 0.07 | 19.05 | 0.23 | 18.82 | 7,700.00 | 0.06 | 0.04 | 0.11 | 0.04 | 0.04 | 0.11 | | | | | |
| | Jul. | 5 | 0.07 | 30.67 | 0.23 | 30.44 | 7,700.00 | 0.07 | 0.04 | 0.12 | 0.04 | 0.04 | 0.12 | | | | | |
| | | 5 | 0.08 | 7.77 | 0.27 | 7.50 | 7,700.00 | 0.07 | 0.04 | 0.12 | 0.04 | 0.04 | 0.12 | | | | | |
| | | 5 | 0.08 | 5.31 | 0.27 | 5.04 | 7,700.00 | 0.07 | 0.04 | 0.12 | 0.04 | 0.04 | 0.12 | | | | | |
| | Aug. | 5 | 1.02 | 5.01 | 3.39 | 1.62 | 7,700.00 | 0.92 | 0.04 | 0.97 | 0.04 | 0.04 | 0.97 | | | | | |
| | | 5 | 1.02 | 4.79 | 3.39 | 1.40 | 7,700.00 | 0.92 | 0.04 | 0.97 | 0.04 | 0.04 | 0.97 | | | | | |
| | | 5 | 0.83 | 7.21 | 2.76 | 4.45 | 7,700.00 | 0.75 | 0.04 | 0.79 | 0.04 | 0.04 | 0.79 | | | | | |
| | Sep. | 5 | 0.83 | 5.84 | 2.76 | 1.08 | 7,700.00 | 0.75 | 0.04 | 0.79 | 0.04 | 0.04 | 0.79 | | | | | |
| | | 5 | 0.58 | 2.29 | 1.93 | 0.36 | 7,700.00 | 0.52 | 0.04 | 0.57 | 0.04 | 0.04 | 0.57 | | | | | |
| | | 6 | 0.58 | 2.23 | 1.93 | -0.08 | 7,419.04 | 0.63 | 0.05 | 0.77 | 0.05 | 0.05 | 0.77 | | | | | |
| Oct. | 5 | 0.16 | 3.33 | 0.53 | 2.80 | 7,700.00 | 0.14 | 0.04 | 0.19 | 0.04 | 0.04 | 0.19 | | | | | | |
| | 5 | 0.16 | 4.41 | 0.53 | 3.88 | 7,700.00 | 0.14 | 0.04 | 0.19 | 0.04 | 0.04 | 0.19 | | | | | | |
| | 5 | 0.12 | 2.16 | 0.40 | 1.76 | 7,700.00 | 0.11 | 0.04 | 0.15 | 0.04 | 0.04 | 0.15 | | | | | | |
| Nov. | 5 | 0.12 | 3.33 | 0.40 | 2.93 | 7,700.00 | 0.11 | 0.04 | 0.15 | 0.04 | 0.04 | 0.15 | | | | | | |
| | 5 | 0.84 | 4.84 | 3.33 | 0.40 | 7,700.00 | 0.11 | 0.04 | 0.15 | 0.04 | 0.04 | 0.15 | | | | | | |
| | 6 | 3.99 | 3.99 | 3.99 | 3.99 | 7,700.00 | 0.05 | 0.05 | 0.77 | 0.05 | 0.05 | 0.77 | | | | | | |
| Dec. | 5 | 3.33 | 3.33 | 3.33 | 3.33 | 7,700.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | | |
| | 5 | 2.12 | 2.12 | 2.12 | 2.12 | 7,700.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | | |
| | 5 | 1.98 | 1.98 | 1.98 | 1.98 | 7,700.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | | |
| 1981 | Jan. | 5 | 1.94 | 1.94 | 1.94 | 7,700.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | | |
| | | 5 | 1.77 | 1.77 | 1.77 | 1.77 | 7,700.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | |
| | | 5 | 1.51 | 1.51 | 1.51 | 1.51 | 7,700.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | | | | | |
| | Feb. | 5 | 0.01 | 1.21 | 0.03 | 1.18 | 7,700.00 | 0.01 | 0.04 | 0.05 | 0.04 | 0.04 | 0.05 | | | | | |
| | | 5 | 0.01 | 1.17 | 0.03 | 1.14 | 7,700.00 | 0.01 | 0.04 | 0.05 | 0.04 | 0.04 | 0.05 | | | | | |
| | | 5 | 0.36 | 2.38 | 1.20 | 1.18 | 7,700.00 | 0.33 | 0.04 | 0.37 | 0.04 | 0.04 | 0.37 | | | | | |
| | Mar. | 5 | 0.36 | 1.17 | 1.20 | -0.03 | 7,526.32 | 0.33 | 0.04 | 0.40 | 0.04 | 0.04 | 0.40 | | | | | |
| | | 5 | 0.69 | 1.29 | 2.29 | -1.00 | 4,329.52 | 0.62 | 0.04 | 1.67 | 0.04 | 0.04 | 1.67 | | | | | |
| | | 5 | 0.69 | 1.81 | 2.75 | -0.94 | 5,062.29 | 0.75 | 0.05 | 1.74 | 0.05 | 0.05 | 1.74 | | | | | |
| | Apr. | 5 | 0.70 | 1.29 | 2.33 | -1.04 | 4,267.67 | 0.63 | 0.04 | 1.71 | 0.04 | 0.04 | 1.71 | | | | | |
| | | 5 | 0.70 | 1.29 | 2.33 | -1.04 | 4,267.67 | 0.63 | 0.04 | 1.71 | 0.04 | 0.04 | 1.71 | | | | | |
| | | 5 | 0.96 | 1.21 | 3.19 | -1.98 | 2,918.86 | 0.87 | 0.04 | 2.89 | 0.04 | 0.04 | 2.89 | | | | | |
| May. | 5 | 0.96 | 1.38 | 3.19 | -1.81 | 3,328.95 | 0.87 | 0.04 | 2.72 | 0.04 | 0.04 | 2.72 | | | | | | |
| | 5 | 0.63 | 1.38 | 2.09 | -0.71 | 5,072.68 | 0.57 | 0.04 | 1.33 | 0.04 | 0.04 | 1.33 | | | | | | |
| | 5 | 0.63 | 2.80 | 2.09 | 0.71 | 7,700.00 | 0.57 | 0.04 | 1.33 | 0.04 | 0.04 | 1.33 | | | | | | |
| Jun. | 5 | 1.68 | 1.77 | 5.59 | -3.82 | 2,439.85 | 1.52 | 0.04 | 5.26 | 0.04 | 0.04 | 5.26 | | | | | | |
| | 5 | 1.68 | 3.15 | 5.59 | -2.44 | 4,342.11 | 1.52 | 0.04 | 4.00 | 0.04 | 0.04 | 4.00 | | | | | | |
| | 5 | 1.61 | 2.94 | 5.35 | -2.41 | 4,228.83 | 1.46 | 0.04 | 3.91 | 0.04 | 0.04 | 3.91 | | | | | | |
| Jul. | 5 | 1.61 | 1.56 | 5.35 | -3.79 | 2,243.87 | 1.46 | 0.04 | 5.05 | 0.04 | 0.04 | 5.05 | | | | | | |
| | 5 | 0.58 | 5.27 | 1.93 | 3.34 | 7,700.00 | 0.52 | 0.04 | 0.57 | 0.04 | 0.04 | 0.57 | | | | | | |
| | 6 | 0.58 | 2.28 | 2.31 | -0.03 | 7,586.21 | 0.63 | 0.05 | 0.72 | 0.05 | 0.05 | 0.72 | | | | | | |
| Aug. | 5 | 1.31 | 1.29 | 4.36 | -3.07 | 2,280.43 | 1.19 | 0.04 | 4.12 | 0.04 | 0.04 | 4.12 | | | | | | |
| | 5 | 1.31 | 1.29 | 4.36 | -3.07 | 2,280.43 | 1.19 | 0.04 | 4.12 | 0.04 | 0.04 | 4.12 | | | | | | |
| | 5 | 1.11 | 1.12 | 3.69 | -2.57 | 2,336.65 | 1.00 | 0.04 | 3.49 | 0.04 | 0.04 | 3.49 | | | | | | |
| Sep. | 5 | 1.11 | 1.12 | 3.69 | -2.57 | 2,336.65 | 1.00 | 0.04 | 3.49 | 0.04 | 0.04 | 3.49 | | | | | | |
| | 5 | 1.11 | 1.12 | 3.69 | -2.57 | 2,336.65 | 1.00 | 0.04 | 3.49 | 0.04 | 0.04 | 3.49 | | | | | | |
| | 5 | 0.88 | 1.21 | 2.93 | -1.72 | 3,184.21 | 0.80 | 0.04 | 2.56 | 0.04 | 0.04 | 2.56 | | | | | | |
| Oct. | 5 | 0.88 | 1.40 | 3.51 | -2.11 | 3,070.18 | 0.96 | 0.05 | 3.12 | 0.05 | 0.05 | 3.12 | | | | | | |
| | 6 | 0.88 | 1.40 | 3.51 | -2.11 | 3,070.18 | 0.96 | 0.05 | 3.12 | 0.05 | 0.05 | 3.12 | | | | | | |
| | 6 | 0.88 | 1.40 | 3.51 | -2.11 | 3,070.18 | 0.96 | 0.05 | 3.12 | 0.05 | 0.05 | 3.12 | | | | | | |

Table 5.5 Required Storage Capacity of Kalola Dam (13/13)

| Year | Month | D1 | D2 | Q1 | Q2 | Q3 | D3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q0 | |
|------|-------|----|------|-------|------|-------|----------|------|------|------|----|------|-------|-------|--------|
| 1981 | Feb. | 5 | 0.63 | 1.17 | 2.09 | -0.92 | 4,300.75 | 0.57 | 0.04 | 1.54 | | | | | |
| | | 5 | 0.63 | 1.17 | 2.09 | -0.92 | 4,300.75 | 0.57 | 0.04 | 1.54 | | | | | |
| | | 5 | 0.38 | 1.29 | 1.26 | 0.03 | 7,700.00 | 0.34 | 0.04 | 0.39 | | | | | |
| | | 5 | 0.38 | 1.17 | 1.26 | -0.09 | 7,130.19 | 0.34 | 0.04 | 0.48 | | | | | |
| | | 5 | 0.12 | 1.21 | 0.40 | 0.81 | 7,700.00 | 0.11 | 0.04 | 0.15 | | | 0.12 | -4.07 | -58.36 |
| | | 3 | 0.12 | 1.22 | 0.24 | 0.98 | 7,700.00 | 0.07 | 0.04 | 0.03 | | | 4.19 | | |
| Mar. | | 5 | 2.03 | | | | | | 0.04 | 0.04 | | | | | |
| | | 5 | 3.37 | | | | | | 0.04 | 0.04 | | | | | |
| | | 5 | 2.61 | | | | | | 0.04 | 0.04 | | | | | |
| | | 5 | 3.72 | | | | | | 0.04 | 0.04 | | | | | |
| | | 5 | 5.44 | | 0.03 | 5.41 | 7,700.00 | 0.01 | 0.04 | 0.05 | | 0.28 | 7.10 | 6.82 | -51.54 |
| | | 6 | 0.01 | 20.94 | 0.04 | 20.90 | 7,700.00 | 0.01 | 0.05 | 0.06 | | | | | |
| Apr. | | 5 | 0.31 | 13.74 | 1.03 | 12.71 | 7,700.00 | 0.28 | 0.04 | 0.32 | | | | | |
| | | 5 | 0.31 | 7.60 | 1.03 | 6.57 | 7,700.00 | 0.28 | 0.04 | 0.32 | | | | | |
| | | 5 | 0.74 | 7.86 | 2.46 | 5.40 | 7,700.00 | 0.67 | 0.04 | 0.71 | | | | | |
| | | 5 | 0.74 | 6.18 | 2.46 | 3.72 | 7,700.00 | 0.67 | 0.04 | 0.71 | | | | | |
| | | 5 | 0.83 | 9.98 | 2.76 | 7.22 | 7,700.00 | 0.75 | 0.04 | 0.79 | | 3.66 | 25.63 | 21.97 | -29.57 |
| | | 5 | 0.83 | 15.51 | 2.76 | 12.75 | 7,700.00 | 0.75 | 0.04 | 0.79 | | | | | |
| May | | 5 | 0.49 | 26.09 | 1.63 | 24.46 | 7,700.00 | 0.44 | 0.04 | 0.49 | | | | | |
| | | 5 | 0.49 | 16.52 | 1.63 | 12.89 | 7,700.00 | 0.44 | 0.04 | 0.49 | | | | | |
| | | 5 | 0.58 | 32.88 | 1.93 | 30.95 | 7,700.00 | 0.52 | 0.04 | 0.57 | | | | | |
| | | 5 | 0.58 | 35.38 | 1.93 | 33.45 | 7,700.00 | 0.52 | 0.04 | 0.57 | | | | | |
| | | 5 | 1.49 | 14.34 | 4.95 | 9.39 | 7,700.00 | 1.35 | 0.04 | 1.39 | | 5.17 | 36.35 | 31.18 | 1.61 |
| | | 6 | 1.49 | 8.24 | 5.95 | 2.29 | 7,700.00 | 1.62 | 0.05 | 1.67 | | | | | |
| Jun. | | 5 | 0.22 | 4.62 | 0.73 | 3.89 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | | | |
| | | 5 | 0.22 | 3.41 | 0.73 | 2.68 | 7,700.00 | 0.20 | 0.04 | 0.24 | | | | | |
| | | 5 | 0.00 | 4.43 | 0.00 | 4.43 | 7,700.00 | 0.00 | 0.04 | 0.04 | | | | | |
| | | 5 | 0.00 | 16.80 | 0.00 | 16.80 | 7,700.00 | 0.00 | 0.04 | 0.04 | | | | | |
| | | 5 | 0.95 | 8.25 | 3.16 | 5.09 | 7,700.00 | 0.86 | 0.04 | 0.90 | | 2.38 | 4.67 | 2.29 | - |
| | | 5 | 0.95 | 5.01 | 3.16 | 1.85 | 7,700.00 | 0.86 | 0.04 | 0.90 | | | | | |

Table 6.1 General Features of the Alternative Plans (1/2)

| Description | Proposed Plan | Alt. I | Alt. II |
|--|-----------------|--|-----------------|
| 1. Irrigation Area (ha) | 9,800 | 10,000 | 8,500 |
| 2. Project Facilities | | | |
| (1) <u>Bila Intake Weir</u> | | | |
| (a) General | | | |
| - Catchment area (Km ²) | 379 | 379 | 379 |
| - Flood water level (m) | 34.15 | 34.15 | 38.00 |
| - Intake water level (m) | 30.30 | 30.30 | 35.20 |
| - Design flood discharge (m ³ /s) | 1,136 | 1,200 | 1,136 |
| - Max. intake water discharge (m ³ /s) | 12.71 | 16.50 | 14.64 |
| - Bed rock | Conglomerate | Conglomerate | Conglomerate |
| (b) Intake Weir | | | |
| - Weir type | Masonry cascade | Concrete gravity | Masonry cascade |
| - Crest elevation (m) | 30.30 | 35.20 | 30.30 |
| - Weir height (m) | 8.30 | 17.20 | 8.30 |
| - Crest length (m) | 70.0 | 141.0 | 70.0 |
| - Scouring sluice | 6 bays | 3 bays | 6 bays |
| - Weir volume | | | |
| Concrete (m ³) | - | 55,000 | - |
| Earth embank. (m ³) | - | 79,000 | - |
| Masonry (m ³) | 36,200 | - | 36,200 |
| - Foundation treatment | - | Curtain grouting | - |
| - Diversion method | Coupure method | Multiple stage method | Coupure method |
| (2) <u>Kalola Dam</u> | | | |
| (a) General | | | |
| - Catchment area (Km ²) | 122 | 122 | 122 |
| - Total storage capacity (10 ⁶ m ³) | 43.0 | 44.0 | 35.0 |
| - Available storage capacity (10 ⁶ m ³) | 37.0 | 38.0 | 29.0 |
| - Dead water capacity (10 ⁶ m ³) | 6.0 | 6.0 | 6.0 |
| - Flood water level (m) | 39.5 | 39.5 | 38.0 |
| - Normal high water level (m) | 36.0 | 36.0 | 34.5 |
| - Low water level (m) | 30.0 | 30.0 | 30.0 |
| - Design flood discharge for spillway (m ³ /sec) | 800.0 | 800.0 | 800.0 |
| - Design flood discharge for diversion (m ³ /sec) | 455.0 | 455.0 | 455.0 |
| - Max. intake water discharge (m ³ /sec) | | | |
| - Bed rock | | - Sandstone and partly conglomerate - | |
| (b) Dam | | | |
| - Type | | - Zoned rockfill with central earth core - | |
| - Crest elevation (m) | 42.5 | 42.5 | 41.0 |
| - Dam height (m) | 30.5 | 30.5 | 29.0 |
| - Crest length (m) | 230.0 | 230.0 | 210.0 |
| - Embankment volume (m ³) | 277,000 | 291,000 | 233,000 |
| - Foundation treatment | | - Curtain grouting with max. depth of 25 m - | |
| (c) Spillway | | | |
| - Type | | - Non-gated side overflow type - | |
| - Crest elevation (m) | 36.0 | 36.0 | 34.5 |
| - Crest length (m) | 57.0 | 57.0 | 57.0 |
| - Overflow water depth (m) | 3.5 | 3.5 | 3.5 |

Table 6.1 General Features of the Alternative Plans (2/2)

| Description | Proposed Plan | Alt. I | Alt. II |
|---|---------------|---------------|---------------|
| (d) Diversion Tunnel | | | |
| - Pressure type with 2 circular sections - | | | |
| - Type | 95 and 100 | 95 and 100 | 95 and 100 |
| - Length (m) | 6.0 | 6.0 | 6.0 |
| - Diameter (m) | | | |
| (3) Canal and Road System | | | |
| (a) Main Irrigation Canal | | | |
| - Earth canal with a trapezoidal section - | | | |
| - Canal type | | | |
| - Total length (Km) | 41.0 | 45.7 | 22.4 |
| Left main canal (Km) | 30.5 | 34.3 | 21.2 |
| Right main canal (Km) | 10.5 | 11.4 | 1.2 |
| - Max. design water discharge (m ³ /sec) | 10.73 | 14.42 | 12.11 |
| + Length of lined portion (Km) | - | 6 | - |
| - Nos. of related structures | | | |
| Culvert | 2 | 4 | 1 |
| Siphon | 1 | 1 | 1 |
| Turnout with check structure | 39 | 29 | 20 |
| Measuring device | 2 | 3 | 2 |
| Spillway | 5 | 5 | 3 |
| Cross drain | 50 | 29 | 31 |
| Drop structure | 3 | 6 | 1 |
| (b) Secondary and sub-secondary canals | | | |
| - Earth canal with a trapezoidal section - | | | |
| - Canal type | | | |
| - Nos. of canal | 28 | 12 | 29 |
| - Total length (Km) | 98.3 | 74.2 | 103.3 |
| - Secondary unit (ha) | 1,900 - 80 | 1,900 - 80 | 1,900 - 80 |
| - Nos. of structures | | | |
| Culvert | 6 | 12 | 7 |
| Siphon | 3 | 3 | 1 |
| Turnout with check structure | 68 | 69 | 65 |
| Drop | 8 | 22 | 12 |
| Cross drain | 29 | 26 | 33 |
| Spillway | 10 | 15 | 11 |
| (c) Connecting canal | | | |
| - Earth canal with a trapezoidal section - | | | |
| - Canal type | | | |
| - Canal length (m) | 5.1 | - | 5.1 |
| - Max. design water discharge | 11.72 | - | 7.37 |
| - Nos. of structures | | | |
| Turnout with check structure | 3 | - | 1 |
| Drop | 3 | - | 3 |
| Measuring device | 1 | - | 1 |
| (d) Tertiary System | | | |
| - Tertiary block (ha) | less than 150 | less than 150 | less than 150 |
| (e) Major Drainage Canal | | | |
| - Earth canal with a trapezoidal section - | | | |
| - Canal type | | | |
| - Total length (m) | 86.5 | 92.5 | 81.0 |
| - Nos. of structures | | | |
| Drop | 129 | 132 | 121 |
| Bridge | 5 | 7 | 5 |
| Junction | 17 | 18 | 16 |
| (f) Farm Road Network | | | |
| - Asphalt paved road of 5.5 m wide - | | | |
| - Type of road | | | |
| Construction road | | | |
| - Length of construction road | 28.0 | 29.0 | 28.0 |
| - Nos. of related structure | | | |
| Cross drain | 56 | 58 | 56 |

Table 6.3 Work Quantity of Alternative Plans (1/7)

| Work Item | | Proposed Plan | Alt. I | Alt. II |
|---|-------------------|---------------|--------|---------|
| 1. Bila Intake Weir | | | | |
| (1) Diversion & Closure Embankment | | | | |
| Excavation, Common | (m ³) | 107,000 | - | 107,000 |
| Excavation, Weathered rock | (m ³) | 380,000 | - | 380,000 |
| Embankment | (m ³) | 88,000 | - | 88,000 |
| (2) Weir and Bridge | | | | |
| (a) Intake Weir | | | | |
| - Weir concrete | (m ³) | - | 55,000 | - |
| - Wet stone masonry | (m ³) | 36,200 | - | 36,200 |
| - Reinforced concrete | (m ³) | 500 | 1,000 | 500 |
| - Form of weir | (m ²) | - | 20,000 | - |
| - Form for reinforced concrete | (m ²) | 1,500 | 2,000 | 1,500 |
| - Reinforcement iron bar | (ton) | 60 | 60 | 60 |
| - Bearing shoe (T-14) | (nos.) | 20 | - | 20 |
| (b) Earth Works | | | | |
| - Stripping | (m ³) | - | 12,600 | - |
| - Excavation, Common | (m ³) | - | 37,800 | - |
| - Excavation, Weathered rock | (m ³) | - | 75,600 | - |
| - Excavation, Rock | (m ³) | - | 25,200 | - |
| - Excavation, Gravel | (m ³) | - | 25,200 | - |
| - Backfill | (m ³) | 8,600 | - | 8,600 |
| - Gravel retaling | (m ³) | 630 | - | 630 |
| (c) Scouring Sluice Gates | (m ²) | - | 18 | - |
| (d) Wooden Gate | (m ²) | 32 | - | 32 |
| (e) Foundation Grouting | (m) | - | 3,200 | - |
| (f) Gabion | (m ³) | 5,900 | 2,600 | 5,900 |

(to be cont'd.)

Table 6.3 Work Quantity of Alternative Plans (2/7)

| Work Item | | Proposed Plan | Alt. I | Alt. II |
|---------------------------------------|-------------------|---------------|--------|---------|
| (3) Pill Dam | | | | |
| (a) Earth Works | | | | |
| - Stripping | (m ³) | - | 8,300 | - |
| - Excavation, Common | (m ³) | - | 10,800 | - |
| - Excavation, Weathered rock | (m ³) | - | 10,800 | - |
| - Excavation, Rock | (m ³) | - | 3,600 | - |
| - Embankment, Core | (m ²) | - | 68,000 | - |
| - Embankment, Rock | (m ³) | - | 10,400 | - |
| - Gravel metaling | (m ²) | - | 2,000 | - |
| (b) Foundation Grouting | | | | |
| - Cap concrete | (m ³) | - | 2,000 | - |
| - Grouting | (m) | - | 4,400 | - |
| (4) Intake Gate | | | | |
| (a) Earth Works | | | | |
| - Stripping | (m ³) | 600 | 800 | 600 |
| - Excavation, Common | (m ³) | 4,200 | 5,600 | 4,200 |
| - Excavation, Weathered rock | (m ³) | 1,200 | 1,600 | 1,200 |
| - Excavation, Rock | (m ³) | 1,200 | 1,600 | 1,200 |
| - Backfill | (m ³) | 2,400 | 2,000 | 2,400 |
| (b) Concrete and Masonry Works | | | | |
| - Plain concrete | (m ³) | - | 4,200 | - |
| - Wet stone masonry | (m ³) | 5,300 | - | 5,300 |
| - Reinforced concrete | (m ³) | 250 | 3,800 | 250 |
| - Form | (m ²) | 650 | 8,000 | 650 |
| - Reinforcement iron bar | (ton) | 18 | 304 | 18 |
| (c) Metal Works | | | | |
| Gate | (m ²) | - | 28 | - |
| Wooden gate | (m ²) | 35 | - | 35 |
| Screen | (ton) | - | 4 | - |
| (to be cont'd.) | | | | |

Table 6.3 Work Quantity of Alternative Plans (3/7)

| Work Item | | Proposed Plan | Alt. I | Alt. II |
|------------------------------|-------------------|---------------|--------|---------|
| (d) Other Works | | | | |
| Gabion | (m ³) | - | 500 | - |
| Grouting | (m) | - | 1,600 | - |
| 2. Kalola Dam | | | | |
| (1) Coffering | | | | |
| (a) Earth Works | | | | |
| - Stripping | (m ³) | 7,000 | 7,000 | 7,000 |
| - Excavation, Common | (m ³) | 20,000 | 20,000 | 20,000 |
| - Embankment, Core | (m ³) | 20,000 | 20,000 | 20,000 |
| - Embankment, Filter | (m ³) | 3,400 | 3,400 | 3,400 |
| - Embankment, Random rock | (m ³) | 22,000 | 22,000 | 22,000 |
| - Embankment, Rock | (m ³) | 45,000 | 45,000 | 45,000 |
| (2) River Diversion | | | | |
| (a) Earth Works | | | | |
| - Stripping | (m ³) | 5,000 | 5,000 | 5,000 |
| - Excavation, Common | (m ³) | 95,000 | 95,000 | 95,000 |
| - Excavation, Weathered rock | (m ³) | 5,000 | 5,000 | 5,000 |
| (b) Concrete Works | | | | |
| - Plain concrete | (m ³) | 5,800 | 5,800 | 5,800 |
| - Lining concrete | (m ³) | 3,050 | 3,050 | 3,050 |
| - Plug concrete | (m ³) | 570 | 570 | 570 |
| - Form | (m ²) | 8,000 | 8,000 | 8,000 |
| - Reinforcement iron bar | (ton) | 171 | 171 | 171 |
| - Gabion | (m ³) | 2,700 | 2,700 | 2,700 |
| (c) Curtain Grouting | | | | |
| | (m) | 550 | 550 | 550 |

(to be cont'd.)

Table 6.3 Work Quantity of Alternative Plans (4/7)

| Work Item | | Proposed Plan | Alt. I | Alt. II |
|---------------------------------|-------------------|------------------|---------|---------|
| (3) Dam | | | | |
| (a) Earth Works | | | | |
| - Stripping | (m ³) | 36,000 | 36,000 | 36,000 |
| - Excavation, Common | (m ³) | 5,000 | 5,000 | 5,000 |
| - Excavation, Weathered rock | (m ³) | 15,000 | 15,000 | 15,000 |
| - Embankment, Core | (m ³) | 42,000 | 42,000 | 38,000 |
| - Embankment, Filter | (m ³) | 20,000 | 20,000 | 18,000 |
| - Embankment, Random rock | (m ³) | 67,000 | 67,000 | 55,000 |
| - Embankment, Rock | (m ³) | 134,000 | 134,000 | 110,000 |
| - Embankment, Riprap | (m ³) | 9,000 | 9,000 | 7,000 |
| - Embankment, Drain gravel | (m ³) | 5,000 | 5,000 | 5,000 |
| (b) Foundation Treatment | | | | |
| - Blanket grouting | (m) | 1,900 | 1,900 | 1,900 |
| - Curtain grouting | (m) | 11,300 | 11,300 | 11,300 |
| (4) Spillway | | | | |
| (a) Earth Works | | | | |
| - Stripping | (m ³) | 30,000 | 30,000 | 30,000 |
| - Excavation, Common | (m ³) | 120,000 | 120,000 | 120,000 |
| - Excavation, Weathered rock | (m ³) | 90,000 | 90,000 | 90,000 |
| - Excavation, Rock | (m ³) | 60,000 | 60,000 | 60,000 |
| - Backfill | (m ³) | 32,000 | 32,000 | 32,000 |
| (b) Concrete Works | | | | |
| - Reinforced concrete | (m ³) | 24,200 | 24,200 | 24,200 |
| - Form | (m ²) | 12,200 | 12,200 | 12,200 |
| - Reinforcement iron bar | (ton) | 380 | 380 | 380 |
| - Rock velt | (nos.) | 2,200 | 2,200 | 2,200 |
| (c) Other Works | | | | |
| - Gabion | (m ³) | 3,000 | 3,000 | 3,000 |
| - Grouting | (m) | 1,020 | 1,020 | 1,020 |
| (to be cont'd.) | | | | |

Table 6.3 Work Quantity of Alternative Plans (5/7)

| Work Item | | Proposed Plan | Alt. I | Alt. II |
|-----------------------------------|-------------------|---------------|-----------|---------|
| (5) Intake Facility | | | | |
| (a) Concrete Works | | | | |
| - Reinforced concrete | (m ³) | 720 | 730 | 660 |
| - Form | (m ²) | 2,200 | 2,200 | 2,000 |
| - Reinforcement iron bar | (ton) | 43 | 43 | 39 |
| (6) Haul Road | | | | |
| (a) Earth Works | | | | |
| - Stripping | (m ³) | 10,000 | 10,000 | 10,000 |
| - Excavation, Common | (m ³) | 68,000 | 68,000 | 68,000 |
| - Embankment | (m ³) | 8,000 | 8,000 | 8,000 |
| (b) Pavement | | | | |
| - Asphalt pavement | (m ²) | 3,000 | 3,000 | 3,000 |
| - Gravel metaling | (m ²) | 15,000 | 15,000 | 15,000 |
| (7) Metal Works and Others | | | | |
| (a) Metal Works | | | | |
| - Gate with accessory | (t) | 12 | 12 | 12 |
| - Jet flow gate ϕ 1600 | (nos.) | 1 | 1 | 1 |
| - Slide gate ϕ 1600 | (nos.) | 1 | 1 | 1 |
| - Other materials | (t) | 5 | 5 | 5 |
| (b) Others | | | | |
| - Control center building | (m ²) | 3,000 | 3,000 | 3,000 |
| 3. Canal and Road System | | | | |
| (1) Main Canal System | | | | |
| (a) Canals | | | | |
| - Excavation, Common | (m ³) | 698,000 | 898,000 | 530,000 |
| - Excavation, Rock | (m ³) | 127,000 | 282,000 | 118,000 |
| - Embankment | (m ³) | 599,000 | 1,041,000 | 413,000 |
| - Sod facing | (m ²) | 529,000 | 635,000 | 390,000 |
| - Canal lining | (m ²) | - | 114,100 | - |
| - Asphalt pavement | (m ²) | 138,500 | 136,100 | 82,600 |
| - Stripping (t = 0.10) | (m ³) | 134,000 | 143,000 | 97,000 |
| (to be cont'd.) | | | | |

Table 6.3 Work Quantity of Alternative Plans (6/7)

| Work Item | | Proposed Plan | Alt. I | Alt. II |
|-----------------------------------|-------------------|---------------|-----------|---------|
| (b) Related Structures | | | | |
| - Reinforced concrete | (m ³) | 1,900 | 1,200 | 1,200 |
| - Wet stone masonry | (m ³) | 26,800 | 18,900 | 15,700 |
| - Form | (m ²) | 6,400 | 4,000 | 3,900 |
| - Reinforcement iron bar | (ton) | 93 | 60 | 60 |
| - Base concrete | (m ³) | 1 | 40 | 40 |
| - Backfill | (m ³) | 76,000 | 67,000 | 52,000 |
| - Gate | (ton) | 6 | 5 | 2 |
| (2) Secondary Canal System | | | | |
| (a) Canals | | | | |
| - Excavation | (m ³) | 350,000 | 135,000 | 284,000 |
| - Embankment | (m ³) | 925,000 | 671,000 | 913,000 |
| - Sod facing | (m ²) | 1,025,000 | 334,000 | 902,000 |
| - Asphalt pavement | (m ²) | 210,700 | 222,600 | 218,700 |
| - Stripping | (m ³) | 204,000 | 149,000 | 200,000 |
| (b) Related Structures | | | | |
| - Reinforced concrete | (m ³) | 1,300 | 1,400 | 900 |
| - Wet stone masonry | (m ³) | 15,800 | 17,400 | 14,800 |
| - Form | (m ²) | 4,400 | 4,900 | 3,200 |
| - Reinforcement iron bar | (ton) | 55 | 60 | 41 |
| - Base concrete | (m ³) | 80 | 80 | 50 |
| - Backfill | (m ³) | 39,400 | 44,700 | 32,300 |
| - Gate | (ton) | 12 | 12 | 11 |
| (3) Tertiary Canal System | (ha) | 9,800 | 10,000 | 8,500 |
| (4) Drainage Canal System | | | | |
| (a) Canals | | | | |
| Excavation, Common | (m ³) | 1,026,000 | 1,087,000 | 971,000 |
| Embankment | (m ³) | 217,000 | 227,000 | 199,000 |
| Stripping | (m ³) | 58,000 | 61,000 | 53,000 |
| (to be cont'd.) | | | | |

Table 6.3 Work Quantity of Alternative Plans (7/7)

| Work Item | | Proposed Plan | Alt. I | Alt. II |
|-------------------------------|-------------------|---------------|---------|---------|
| (b) Related Structures | | | | |
| - Gabion | (m ³) | 12,800 | 13,000 | 9,500 |
| - Reinforced concrete | (m ³) | 40 | 60 | 40 |
| - Wet stone masonry | (m ³) | 580 | 820 | 580 |
| - Form | (m ²) | 140 | 210 | 140 |
| - Reinforcement bar | (ton) | 2 | 3 | 2 |
| (5) Farm Road System | | | | |
| (a) Roads | | | | |
| - Excavation, Common | (m ³) | 30,000 | 31,000 | 30,000 |
| - Embankment | (m ³) | 158,000 | 162,000 | 158,000 |
| - Sod facing | (m ²) | 71,000 | 73,000 | 71,000 |
| - Asphalt pavement | (m ²) | 84,000 | 87,000 | 84,000 |
| - Stripping | (m ³) | 29,000 | 30,000 | 29,000 |
| (b) Related Structures | | | | |
| - Concrete pipe | (m) | 450 | 470 | 450 |
| - Wet stone masonry | (m ³) | 130 | 140 | 130 |

Table 6.4 Construction Cost and Economic Cost of Alternative Plans

| Item | Proposed Plan | (Unit: 10 ⁶ Rp.) Cost | |
|--|---------------|----------------------------------|----------------|
| | | Alternative I | Alternative II |
| | | | |
| 1. Civil Works | | | |
| (1) Preparatory works | <u>1,718</u> | <u>1,872</u> | <u>1,532</u> |
| (2) Bila intake weir | <u>2,665</u> | <u>5,262</u> | <u>2,665</u> |
| Intake weir | 1,123 | 4,396 | 1,123 |
| Intake structure | 203 | 866 | 203 |
| Diversion channel | 1,215 | - | 1,215 |
| Closure embankment | 61 | - | 61 |
| Bridge | 63 | - | 63 |
| (3) Kalola dam | <u>7,656</u> | <u>7,657</u> | <u>7,285</u> |
| Coffering | 239 | 239 | 239 |
| River diversion | 1,045 | 1,045 | 1,045 |
| Dam embankment | 2,283 | 2,283 | 1,925 |
| Foundation treatment | 487 | 487 | 487 |
| Spillway | 2,370 | 2,370 | 2,370 |
| Intake facility | 145 | 146 | 132 |
| Haul road | 79 | 79 | 79 |
| Metal works | 1,008 | 1,008 | 1,008 |
| (4) Canal and road system | <u>10,331</u> | <u>9,964</u> | <u>8,845</u> |
| Main canal system | 3,493 | 4,263 | 2,277 |
| Secondary canal system | 4,715 | 3,480 | 4,565 |
| Drainage system | 1,343 | 1,418 | 1,223 |
| Road system | 780 | 803 | 780 |
| (5) Tertiary system | <u>4,485</u> | <u>4,578</u> | <u>3,892</u> |
| (6) Office and quarters | <u>640</u> | <u>640</u> | <u>640</u> |
| Total - 1 | <u>27,495</u> | <u>29,973</u> | <u>24,859</u> |
| 2. Land Acquisition | 2,370 | 2,400 | 2,102 |
| 3. O & M Equipment | 992 | 992 | 992 |
| 4. Administration Expenses | 612 | 612 | 612 |
| 5. Engineering Services | 4,889 | 4,980 | 4,290 |
| 6. Physical Contingency | 5,454 | 5,844 | 4,929 |
| 7. Price Contingency | 26,011 | 26,542 | 23,614 |
| GRAND TOTAL | 67,823 | 71,343 | 61,398 |
| Economic Construction cost (1+3+4+5) x 1.15 x 0.9 | 35,178 | 37,836 | 31,829 |

Table 7.1 Choice of Spillway Dimensions

| | | Case 1 | Case 2 | Case 3 |
|--|------------------------|---------|---------|---------|
| I. <u>Main Features</u> | | | | |
| 1. Main Dam | | | | |
| Crest EL. | (m) | 42.0 | 42.5 | 43.0 |
| Crest Length | (m) | 220.0 | 230.0 | 240.0 |
| 2. Spillway | | | | |
| Crest EL. | (m) | 36.0 | 36.0 | 36.0 |
| Crest Length | (m) | 71.0 | 57.0 | 47.0 |
| II. <u>Construction Materials</u> | | | | |
| 1. Main Dam | | | | |
| Excavation | (m ³) | 55,000 | 56,000 | 56,000 |
| Embankment | (m ³) | 268,000 | 277,000 | 289,000 |
| 2. Spillway | | | | |
| Excavation | (m ³) | 312,000 | 300,000 | 284,000 |
| Backfill | (m ³) | 34,000 | 32,000 | 31,000 |
| R. Concrete | (m ³) | 26,400 | 24,200 | 23,400 |
| III. <u>Construction Cost</u> | | | | |
| 1. Main Dam | (10 ⁶ Rp.) | 2,198 | 2,256 | 2,381 |
| 2. Spillway | (10 ⁶ Rp.) | 2,527 | 2,370 | 2,270 |
| 3. Total | (10 ⁶ Rp.) | 4,725 | 4,626 | 4,651 |
| | (10 ³ US\$) | 7,561 | 7,401 | 7,441 |

Table 7.2 Hydraulic Properties of Canals (1/7)

| DOE PLAN | | | | | | | | | | PROPOSED PLAN | | | | | | | | | |
|---|-------|------|-----|-----------------------|-----------------------|------|-------|-------|---------------|---------------|------|-----|---------|-----------------------|------|------|------|--|--|
| Name of Canal | L | k | m | v | Q | B | h | B/h | Name of Canal | L | k | m | v | Q | B | h | B/h | | |
| | (m) | | | (m ³ /sec) | (m ³ /sec) | (m) | (m) | | | (m) | | | (m/sec) | (m ³ /sec) | (m) | (m) | | | |
| 1. SAL. INDUK BILA KIRI (Bila Left Main Canal) | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | 449 | 50.0 | 1.5 | 12.107 | 0.70 | 9.10 | 1.520 | 5.99 | Ruas 1 | 449 | 50.0 | 1.5 | 10.73 | 0.70 | 7.50 | 1.56 | 4.81 | | |
| 2 | 484 | 50.0 | 1.5 | 12.101 | 0.70 | 9.05 | 1.515 | 5.97 | 2 | 484 | 50.0 | 1.5 | 10.72 | 0.70 | 7.50 | 1.56 | 4.81 | | |
| 3 | 977 | 50.0 | 1.5 | 12.050 | 0.70 | 9.05 | 1.509 | 5.98 | 3 | 977 | 50.0 | 1.5 | 10.67 | 0.70 | 7.50 | 1.55 | 4.83 | | |
| 4 | 1,582 | 50.0 | 1.5 | 11.800 | 0.70 | 8.95 | 1.494 | 5.99 | 4 | 1,582 | 50.0 | 1.5 | 10.48 | 0.70 | 7.50 | 1.53 | 4.90 | | |
| 5 | 2,540 | 50.0 | 1.5 | 11.683 | 0.70 | 8.90 | 1.487 | 5.98 | 5 | 2,540 | 50.0 | 1.5 | 10.36 | 0.70 | 7.50 | 1.52 | 4.94 | | |
| 6 | 2,234 | 50.0 | 1.5 | 11.587 | 0.70 | 8.90 | 1.477 | 6.03 | 6 | 2,234 | 50.0 | 1.5 | 10.29 | 0.70 | 7.50 | 1.51 | 4.97 | | |
| 7 | 1,606 | 50.0 | 1.5 | 11.498 | 0.70 | 8.85 | 1.473 | 6.01 | 7 | 1,606 | 50.0 | 1.5 | 10.22 | 0.70 | 7.50 | 1.49 | 5.06 | | |
| 8 | 958 | 50.0 | 1.5 | 11.267 | 0.70 | 8.75 | 1.459 | 5.997 | 8 | 958 | 50.0 | 1.5 | 10.03 | 0.70 | 7.50 | 1.48 | 5.08 | | |
| 9 | 1,032 | 47.5 | 1.5 | 8.307 | 0.70 | 6.30 | 1.397 | 4.51 | 9 | 1,042 | 47.5 | 1.5 | 9.16 | 0.70 | 7.00 | 1.43 | 4.89 | | |
| 10 | 769 | 47.5 | 1.5 | 8.211 | 0.70 | 6.25 | 1.391 | 4.49 | 10 | 769 | 47.5 | 1.5 | 9.08 | 0.70 | 7.00 | 1.42 | 4.93 | | |
| 11 | 817 | 47.5 | 1.5 | 8.106 | 0.70 | 6.20 | 1.383 | 4.48 | 11 | 880 | 47.5 | 1.5 | 8.98 | 0.70 | 6.50 | 1.47 | 4.41 | | |
| 12 | 2,379 | 47.5 | 1.5 | 8.029 | 0.70 | 6.20 | 1.372 | 4.51 | 12 | 2,418 | 47.5 | 1.5 | 8.91 | 0.70 | 6.50 | 1.46 | 4.44 | | |
| 13 | 1,065 | 47.5 | 1.5 | 7.848 | 0.70 | 6.15 | 1.358 | 4.52 | 13 | 1,065 | 47.5 | 1.5 | 8.79 | 0.70 | 6.50 | 1.45 | 4.48 | | |
| 14 | 1,140 | 47.5 | 1.5 | 7.813 | 0.70 | 6.10 | 1.356 | 4.50 | 14 | 1,140 | 47.5 | 1.5 | 8.75 | 0.70 | 6.50 | 1.44 | 4.50 | | |
| 15 | 1,550 | 47.5 | 1.5 | 7.626 | 0.70 | 6.05 | 1.336 | 4.52 | 15 | 1,550 | 47.5 | 1.5 | 8.63 | 0.70 | 6.50 | 1.43 | 4.55 | | |
| 16 | 631 | 47.5 | 1.5 | 7.558 | 0.70 | 5.50 | 1.402 | 3.92 | 16 | 621 | 47.5 | 1.5 | 8.42 | 0.70 | 6.50 | 1.40 | 4.64 | | |
| 17 | 427 | 47.5 | 1.5 | 7.371 | 0.70 | 5.50 | 1.375 | 4.00 | 17 | 425 | 47.5 | 1.5 | 8.42 | 0.70 | 6.50 | 1.40 | 4.64 | | |
| 18 | 450 | 47.5 | 1.5 | 5.037 | 0.70 | 4.20 | 1.336 | 3.14 | 18 | 450 | 45.0 | 1.5 | 3.98 | 0.65 | 3.50 | 1.17 | 3.00 | | |
| 2. SAL. INDUK BILA KAWAN (Bila Right Main Canal) | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | 338 | 45.0 | 1.5 | 2.528 | 0.55 | 2.70 | 1.068 | 2.53 | Ruas 1 | 338 | 45.0 | 1.5 | 1.98 | 0.60 | 2.00 | 0.74 | 2.70 | | |
| 2 | 886 | 45.0 | 1.5 | 2.461 | 0.55 | 2.65 | 1.057 | 2.51 | 2 | 886 | 45.0 | 1.5 | 1.91 | 0.60 | 2.00 | 0.74 | 2.70 | | |

Table 7.2 Hydraulic Properties of Canals (2/7)

| DOI PLAN | | | | | | | | | | PROPOSED PLAN | | | | | | | | | |
|-----------------------------------|-------|------|-----|-----------------------|---------|----------|------|-------|------|----------------|-------|------|-----|-----------------------|---------|----------|------|-------|------|
| Name of Canal | L | X | m | Q | V | I | B | h | B/h | Name of Canal | L | X | m | Q | V | I | B | h | B/h |
| | (m) | | | (m ³ /sec) | (m/sec) | | (m) | (m) | | | (m) | | | (m ³ /sec) | (m/sec) | | (m) | (m) | |
| 3. KALOLA CONNECTING CANAL | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | |
| Ruas 1 (7,100) | | | | (Newly provided) | | | | | | Ruas 1 (7,100) | 1,135 | 50.0 | 1.5 | 11.72 | 0.70 | 0.000154 | 9.00 | 1.49 | 6.04 |
| 2 (7,079) | | | | | | | | | | 2 (7,079) | 895 | 50.0 | 1.5 | 11.68 | 0.70 | 0.000154 | 9.00 | 1.49 | 6.04 |
| 3 (7,069) | | | | | | | | | | 3 (7,069) | 1,352 | 50.0 | 1.5 | 11.66 | 0.70 | 0.000154 | 9.00 | 1.48 | 6.07 |
| 4 (5,100) | | | | | | | | | | 4 (5,100) | 1,720 | 47.5 | 1.5 | 8.42 | 0.70 | 0.000200 | 6.50 | 1.40 | 4.65 |
| 4. SAL. SEK. PALA BUIDJ | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | |
| Ruas 1 (1,157) | 452 | 45.0 | 1.5 | 1.851 | 0.55 | 0.000295 | 2.30 | 0.916 | 2.51 | Ruas 3 (889) | 452 | 45.0 | 1.0 | 1.47 | 0.55 | 0.000295 | 1.90 | 0.941 | 2.02 |
| 2 (1,037) | 1,229 | 45.0 | 1.5 | 1.659 | 0.55 | 0.000316 | 2.15 | 0.872 | 2.47 | 4 (773) | 1,229 | 45.0 | 1.0 | 1.28 | 0.55 | 0.000316 | 1.80 | 0.871 | 2.07 |
| 3 (977) | 1,830 | 45.0 | 1.5 | 1.563 | 0.55 | 0.000330 | 2.10 | 0.844 | 2.49 | 5 (729) | 1,830 | 45.0 | 1.0 | 1.20 | 0.55 | 0.000330 | 1.70 | 0.854 | 1.99 |
| 4 (898) | 671 | 45.0 | 1.0 | 1.437 | 0.50 | 0.000239 | 1.95 | 0.981 | 1.99 | 6 (705) | 671 | 45.0 | 1.0 | 1.16 | 0.55 | 0.000239 | 1.70 | 0.833 | 2.04 |
| 5 (743) | 908 | 45.0 | 1.0 | 1.189 | 0.50 | 0.000351 | 1.70 | 0.848 | 2.00 | 7 (648) | 908 | 45.0 | 1.0 | 1.07 | 0.55 | 0.000351 | 1.60 | 0.808 | 1.98 |
| 6 (590) | 1,040 | 45.0 | 1.0 | 0.969 | 0.55 | 0.000404 | 1.55 | 0.760 | 2.04 | 8 (551) | 1,040 | 45.0 | 1.0 | 0.91 | 0.55 | 0.000404 | 1.50 | 0.739 | 2.03 |
| 7 (518) | 1,060 | 45.0 | 1.0 | 0.881 | 0.55 | 0.000428 | 1.45 | 0.743 | 1.95 | 9 (477) | 1,060 | 45.0 | 1.0 | 0.79 | 0.55 | 0.000428 | 1.40 | 0.688 | 2.04 |
| 8 (390) | 920 | 45.0 | 1.0 | 0.668 | 0.50 | 0.000400 | 1.35 | 0.664 | 2.03 | 10 (375) | 920 | 45.0 | 1.0 | 0.62 | 0.50 | 0.000400 | 1.30 | 0.639 | 2.03 |
| 9 (273) | 1,178 | 45.0 | 1.0 | 0.492 | 0.45 | 0.000361 | 1.00 | 0.695 | 1.44 | 11 (264) | 1,178 | 45.0 | 1.0 | 0.44 | 0.45 | 0.000361 | 0.90 | 0.636 | 1.41 |
| 5. SAL. SEK. BILA BARAT | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | |
| Ruas 1 (282) | 1,978 | 45.0 | 1.0 | 0.507 | 0.50 | 0.000479 | 1.15 | 0.585 | 1.97 | Ruas 1 (185) | 1,978 | 45.0 | 1.0 | 0.31 | 0.40 | 0.000479 | 0.80 | 0.567 | 1.41 |
| 6. SAL. SEK. PALAE | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | |
| Ruas 1 (1,720) | 2,121 | 45.0 | 1.5 | 2.752 | 0.60 | 0.000286 | 2.70 | 1.067 | 2.53 | Ruas 1 (441) | 2,121 | 45.0 | 1.0 | 0.73 | 0.50 | 0.000286 | 1.40 | 0.696 | 2.01 |
| 2 (1,631) | 1,024 | 45.0 | 1.5 | 2.610 | 0.60 | 0.000295 | 2.60 | 1.044 | 2.49 | 2 (365) | 1,024 | 45.0 | 1.0 | 0.60 | 0.50 | 0.000295 | 1.30 | 0.634 | 2.08 |

Table 7.2 Hydraulic Properties of Canals (3/7)

| DOI PLAN | | | | | | | | | | PROPOSED PLAN | | | | | | | | | | | | | | | | | |
|------------------------------------|---------|-------|------|-----|-------|------|----------|------|-------|-----------------------|--------|---------|-------|------|-----|------|------|----------|-----------------------|-------|------|--|--|--|--|--|--|
| Name of Canal | L | x | m | Q | v | i | B | b | B/b | Name of Canal | L | x | m | Q | v | i | B | b | B/b | | | | | | | | |
| | (m) | | | | | | | | | (m ² /sec) | | | | | | | | | (m ³ /sec) | | | | | | | | |
| 6. SAL. SEK. PALAE (Cont'd) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ruas 3 | (1,395) | 1,422 | 45.0 | 1.5 | 2.232 | 0.60 | 0.000328 | 2.40 | 0.966 | 2.48 | Ruas 3 | (174) | 1,422 | 45.0 | 1.0 | 0.29 | 0.35 | 0.000328 | 0.60 | 0.658 | 0.91 | | | | | | |
| 4 | (1,318) | 1,178 | 45.0 | 1.5 | 2.109 | 0.60 | 0.000341 | 2.35 | 0.936 | 2.51 | 4 | (89) | 1,178 | 45.0 | 1.0 | 0.18 | 0.35 | 0.000341 | 0.50 | 0.509 | 0.98 | | | | | | |
| 5 | (1,202) | 736 | 45.0 | 1.5 | 1.923 | 0.60 | 0.000363 | 2.25 | 0.893 | 2.52 | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | (1,090) | 1,002 | 45.0 | 1.5 | 1.744 | 0.60 | 0.000387 | 2.15 | 0.849 | 2.53 | Ruas 3 | (1,293) | 2,050 | 45.0 | 1.5 | 2.13 | 0.60 | 0.000400 | 2.40 | 0.934 | 2.57 | | | | | | |
| 7 | (1,023) | 837 | 45.0 | 1.5 | 1.637 | 0.60 | 0.000403 | 2.05 | 0.829 | 2.47 | 4 | (1,194) | 1,002 | 45.0 | 1.5 | 1.97 | 0.60 | 0.000387 | 2.30 | 0.900 | 2.56 | | | | | | |
| 8 | (983) | 671 | 45.0 | 1.5 | 1.573 | 0.60 | 0.000413 | 2.00 | 0.814 | 2.46 | 5 | (1,100) | 837 | 45.0 | 1.5 | 1.82 | 0.60 | 0.000403 | 2.20 | 0.867 | 2.54 | | | | | | |
| 9 | (648) | 819 | 45.0 | 1.0 | 1.047 | 0.55 | 0.000382 | 1.60 | 0.795 | 2.01 | 6 | (1,060) | 671 | 45.0 | 1.5 | 1.75 | 0.60 | 0.000413 | 2.10 | 0.860 | 2.44 | | | | | | |
| 10 | (632) | 996 | 45.0 | 1.0 | 1.024 | 0.55 | 0.000388 | 1.60 | 0.782 | 2.05 | 7 | (589) | 819 | 45.0 | 1.0 | 0.97 | 0.55 | 0.000382 | 1.50 | 0.775 | 1.94 | | | | | | |
| 11 | (599) | 1,203 | 45.0 | 1.0 | 0.976 | 0.55 | 0.000400 | 1.55 | 0.766 | 2.02 | 8 | (578) | 996 | 45.0 | 1.0 | 0.95 | 0.55 | 0.000388 | 1.50 | 0.763 | 1.97 | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | (360) | 1,366 | 45.0 | 1.0 | 0.624 | 0.50 | 0.000418 | 1.30 | 0.642 | 2.02 | 9 | (526) | 1,203 | 45.0 | 1.0 | 0.87 | 0.55 | 0.000400 | 1.40 | 0.739 | 1.89 | | | | | | |
| 13 | (284) | 1,314 | 45.0 | 1.0 | 0.510 | 0.50 | 0.000477 | 1.15 | 0.587 | 1.96 | | | | | | | | | | | | | | | | | |
| 14 | (216) | 1,053 | 45.0 | 1.0 | 0.401 | 0.45 | 0.000414 | 0.90 | 0.596 | 1.51 | Ruas 1 | (337) | 1,366 | 45.0 | 1.0 | 0.56 | 0.50 | 0.000418 | 1.20 | 0.617 | 1.95 | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | (229) | 943 | 45.0 | 1.0 | 0.426 | 0.45 | 0.000396 | 0.90 | 0.622 | 1.45 | 2 | (250) | 1,314 | 45.0 | 1.0 | 0.41 | 0.45 | 0.000477 | 0.90 | 0.605 | 1.49 | | | | | | |
| 2 | (184) | 824 | 45.0 | 1.0 | 0.348 | 0.40 | 0.000333 | 0.90 | 0.586 | 1.54 | 3 | (141) | 1,053 | 45.0 | 1.0 | 0.23 | 0.35 | 0.000414 | 0.80 | 0.504 | 1.59 | | | | | | |
| 3 | (132) | 1,313 | 45.0 | 1.0 | 0.269 | 0.35 | 0.000285 | 0.60 | 0.627 | 0.96 | | | | | | | | | | | | | | | | | |
| 7. SAL. SEK. UMRUL | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | (229) | 943 | 45.0 | 1.0 | 0.426 | 0.45 | 0.000396 | 0.90 | 0.622 | 1.45 | Ruas 1 | (362) | 943 | 45.0 | 1.0 | 0.60 | 0.50 | 0.000396 | 1.30 | 0.624 | 2.08 | | | | | | |
| 2 | (184) | 824 | 45.0 | 1.0 | 0.348 | 0.40 | 0.000333 | 0.90 | 0.586 | 1.54 | 2 | (305) | 824 | 45.0 | 1.0 | 0.50 | 0.50 | 0.000333 | 0.90 | 0.647 | 1.39 | | | | | | |
| 3 | (132) | 1,313 | 45.0 | 1.0 | 0.269 | 0.35 | 0.000285 | 0.60 | 0.627 | 0.96 | 3 | (233) | 1,313 | 45.0 | 1.0 | 0.38 | 0.40 | 0.000285 | 0.90 | 0.624 | 1.44 | | | | | | |

Table 7.2 Hydraulic Properties of Canals (4/7)

| DOI PLAN | | | | | | | | | | PROPOSED PLAN | | | | | | | | | | |
|------------------------------|-----------------------|-------|------|-----|-------|------|----------|------|-------|-----------------------|---------|---------|-------|------|-----|------|----------|------|-------|------|
| Name of Canal | L | k | m | Q | v | i | D | h | B/h | Name of Canal | L | k | m | Q | v | i | B | h | B/h | |
| | (m) | | | | | | | | | (m) | | | | | | | | | | |
| | (m ³ /sec) | | | | | | | | | (m ³ /sec) | | | | | | | | | | |
| 8. SAL. SEK. LONDRA | | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | (126) | 1,471 | 45.0 | 1.0 | 0.260 | 0.35 | 0.000278 | 0.60 | 0.613 | 0.98 | Ruas 10 | (81) | 1,471 | 45.0 | 1.0 | 0.16 | 0.000278 | 0.50 | 0.471 | 1.06 |
| 9. SAL. SEK. KALOSI | | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | (1,363) | 1,892 | 45.0 | 1.5 | 2.181 | 0.60 | 0.000344 | 2.35 | 0.950 | 2.47 | Ruas 1 | (2,566) | 1,892 | 45.0 | 1.5 | 4.27 | 0.000344 | 3.60 | 1.212 | 2.97 |
| Ruas 2 | (1,297) | 1,294 | 45.0 | 1.5 | 2.075 | 0.60 | 0.000354 | 2.25 | 0.934 | 2.41 | Ruas 2 | (2,514) | 1,294 | 45.0 | 1.5 | 4.15 | 0.000354 | 3.60 | 1.203 | 2.91 |
| SAL. SEK. WAJUE | | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | |
| Ruas 3 | (781) | 1,488 | 45.0 | 1.0 | 1.250 | 0.55 | 0.000357 | 1.65 | 0.868 | 1.90 | Ruas 1 | (697) | 1,488 | 45.0 | 1.0 | 1.15 | 0.000357 | 1.70 | 0.827 | 2.05 |
| Ruas 4 | (718) | 1,957 | 45.0 | 1.0 | 1.149 | 0.55 | 0.000378 | 1.60 | 0.839 | 1.91 | Ruas 2 | (645) | 1,957 | 45.0 | 1.0 | 1.06 | 0.000378 | 1.60 | 0.802 | 1.99 |
| Ruas 5 | (623) | 1,587 | 45.0 | 1.0 | 1.013 | 0.55 | 0.000415 | 1.50 | 0.788 | 1.90 | Ruas 3 | (528) | 1,587 | 45.0 | 1.0 | 0.87 | 0.000415 | 1.50 | 0.714 | 2.09 |
| Ruas 6 | (494) | 952 | 45.0 | 1.0 | 0.820 | 0.50 | 0.000376 | 1.60 | 0.734 | 1.91 | Ruas 4 | (338) | 952 | 45.0 | 1.0 | 0.56 | 0.000376 | 1.20 | 0.617 | 1.95 |
| Ruas 7 | (448) | 1,014 | 45.0 | 1.0 | 0.749 | 0.50 | 0.000401 | 1.35 | 0.710 | 1.90 | Ruas 5 | (288) | 1,014 | 45.0 | 1.0 | 0.48 | 0.000401 | 1.00 | 0.647 | 1.54 |
| 10. SAL. SEK. LOPONG | | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | (382) | 797 | 45.0 | 1.0 | 0.657 | 0.50 | 0.000403 | 1.30 | 0.668 | 1.95 | Ruas 1 | (397) | 797 | 45.0 | 1.0 | 0.66 | 0.000403 | 1.30 | 0.670 | 1.94 |
| Ruas 2 | (108) | 1,888 | 45.0 | 1.0 | 0.223 | 0.35 | 0.000300 | 0.60 | 0.569 | 1.05 | Ruas 2 | (108) | 1,888 | 45.0 | 1.0 | 0.18 | 0.000300 | 0.50 | 0.509 | 0.98 |
| 11. SAL. SEK. REBIJAH | | | | | | | | | | | | | | | | | | | | |
| ha | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | (1,117) | 1,029 | 45.0 | 1.5 | 1.787 | 0.60 | 0.000380 | 2.15 | 0.864 | 2.49 | Ruas 1 | (997) | 1,029 | 45.0 | 1.5 | 1.65 | 0.000380 | 2.10 | 0.824 | 2.55 |
| Ruas 2 | (1,065) | 735 | 45.0 | 1.5 | 1.704 | 0.60 | 0.000392 | 2.10 | 0.846 | 2.49 | Ruas 2 | (948) | 735 | 45.0 | 1.5 | 1.56 | 0.000392 | 2.00 | 0.809 | 2.47 |
| Ruas 3 | (929) | 1,208 | 45.0 | 1.0 | 1.487 | 0.55 | 0.000302 | 1.90 | 0.949 | 2.00 | Ruas 3 | (796) | 1,208 | 45.0 | 1.0 | 1.31 | 0.000302 | 1.80 | 0.887 | 2.03 |
| Ruas 4 | (854) | 1,161 | 45.0 | 1.0 | 1.367 | 0.55 | 0.000319 | 1.80 | 0.915 | 1.97 | Ruas 4 | (706) | 1,161 | 45.0 | 1.0 | 1.16 | 0.000319 | 1.70 | 0.833 | 2.04 |

Table 7.2 Hydraulic Properties of Canals (5/7)

| DOI PLAN | | | | | | | | | | PROPOSED PLAN | | | | | | | | | | | |
|-------------------------------------|---------|-------|------|-------------------------|-----------|------|----------|-------|-------|---------------------------------|--|---------|-------|-------------------------|-----------|------|----------|-------|-------|------|--|
| Name of Canal | L (m) | K | m | Q (m ³ /sec) | V (m/sec) | I | B (m) | h (m) | B/h | Name of Canal | L (m) | K | m | Q (m ³ /sec) | V (m/sec) | I | B (m) | h (m) | B/h | | |
| 11. SAL. SEK. REBIK (Cont'd) | | | | | | | | | | SAL. SEK. REBIK (Cont'd) | | | | | | | | | | | |
| | ha | | | | | | | | | | ha | | | | | | | | | | |
| Ruas 5 | (736) | 1,678 | 45.0 | 1.0 | 1.178 | 0.55 | 0.000353 | 1.70 | 0.842 | 2.02 | Ruas 5 | (565) | 1,678 | 45.0 | 1.0 | 0.93 | 0.000353 | 1.50 | 0.751 | 2.00 | |
| 6 | (496) | 1,128 | 45.0 | 1.0 | 0.824 | 0.55 | 0.000447 | 1.40 | 0.710 | 1.97 | 6 | (331) | 1,128 | 45.0 | 1.0 | 0.55 | 0.000447 | 1.20 | 0.608 | 1.97 | |
| 7 | (436) | 1,270 | 45.0 | 1.0 | 0.731 | 0.50 | 0.000376 | 1.40 | 0.697 | 2.01 | 7 | (256) | 1,270 | 45.0 | 1.0 | 0.42 | 0.000376 | 0.90 | 0.616 | 1.46 | |
| 8 | (229) | 1,171 | 45.0 | 1.0 | 0.421 | 0.45 | 0.000400 | 0.90 | 0.617 | 1.46 | 8 | (87) | 1,171 | 45.0 | 1.0 | 0.17 | 0.000400 | 0.50 | 0.490 | 1.02 | |
| 9 | (137) | 766 | 45.0 | 1.0 | 0.277 | 0.35 | 0.000267 | 0.65 | 0.622 | 1.05 | 9 | (12) | 766 | 45.0 | 1.0 | 0.05 | 0.000267 | 0.30 | 0.285 | 1.05 | |
| 12. SAL. SEK. JONGBANG | | | | | | | | | | SAL. ENDUK BILA KIRI | | | | | | | | | | | |
| | ha | | | | | | | | | | ha | | | | | | | | | | |
| Ruas 1 | (1,973) | 1,063 | 45.0 | 1.5 | 3.157 | 0.65 | 0.000330 | 3.10 | 1.042 | 2.98 | Ruas 19 | (1,361) | 1,063 | 45.0 | 1.5 | 2.25 | 0.000330 | 2.40 | 0.972 | 2.47 | |
| 2 | (1,939) | 790 | 45.0 | 1.5 | 3.102 | 0.65 | 0.000335 | 3.10 | 1.042 | 2.98 | 20 | (1,322) | 790 | 45.0 | 1.5 | 2.18 | 0.000335 | 2.40 | 0.950 | 2.53 | |
| 3 | (1,894) | 910 | 45.0 | 1.5 | 3.030 | 0.65 | 0.000340 | 3.05 | 1.018 | 3.00 | 21 | (1,273) | 910 | 45.0 | 1.5 | 2.10 | 0.000340 | 2.30 | 0.942 | 2.44 | |
| 4 | (1,533) | 635 | 45.0 | 1.5 | 2.453 | 0.55 | 0.000244 | 2.65 | 1.054 | 2.51 | 22 | (893) | 635 | 45.0 | 1.0 | 1.47 | 0.000244 | 1.90 | 0.941 | 2.02 | |
| 5 | (1,522) | 1,289 | 45.0 | 1.5 | 2.435 | 0.55 | 0.000246 | 2.65 | 1.048 | 2.53 | 23 | (887) | 1,289 | 45.0 | 1.0 | 1.46 | 0.000246 | 1.90 | 0.936 | 2.03 | |
| 6 | (1,408) | 971 | 45.0 | 1.5 | 2.253 | 0.55 | 0.000259 | 2.55 | 1.008 | 2.53 | 24 | (760) | 971 | 45.0 | 1.0 | 1.25 | 0.000259 | 1.70 | 0.881 | 1.93 | |
| 7 | (1,350) | 1,529 | 45.0 | 1.5 | 2.160 | 0.55 | 0.000266 | 2.50 | 0.987 | 2.53 | 25 | (697) | 1,529 | 45.0 | 1.0 | 1.15 | 0.000266 | 1.70 | 0.827 | 2.05 | |
| 8 | (1,082) | 1,078 | 45.0 | 1.5 | 1.731 | 0.55 | 0.000308 | 2.20 | 0.890 | 2.47 | 26 | (423) | 1,078 | 45.0 | 1.0 | 0.70 | 0.000308 | 1.40 | 0.675 | 2.07 | |
| 9 | (895) | 524 | 45.0 | 1.0 | 1.432 | 0.50 | 0.000240 | 1.95 | 0.978 | 1.99 | 27 | (227) | 524 | 45.0 | 1.0 | 0.37 | 0.000240 | 0.90 | 0.612 | 1.47 | |
| 10 | (880) | 596 | 45.0 | 1.0 | 1.408 | 0.50 | 0.000243 | 1.95 | 0.966 | 2.02 | 28 | (211) | 536 | 45.0 | 1.0 | 0.35 | 0.000243 | 0.90 | 0.588 | 1.53 | |
| 11 | (624) | 1,172 | 45.0 | 1.0 | 1.013 | 0.50 | 0.000303 | 1.65 | 0.820 | 2.01 | (The lower reaches from Ruas 11 are cancelled) | | | | | | | | | | |
| 12 | (594) | 857 | 45.0 | 1.0 | 0.971 | 0.50 | 0.000311 | 1.60 | 0.807 | 1.98 | | | | | | | | | | | |
| 13 | (512) | 1,301 | 45.0 | 1.0 | 0.848 | 0.50 | 0.000340 | 1.50 | 0.753 | 1.99 | | | | | | | | | | | |
| 14 | (413) | 817 | 45.0 | 1.0 | 0.700 | 0.45 | 0.000293 | 1.45 | 0.718 | 2.02 | | | | | | | | | | | |
| 15 | (330) | 1,010 | 45.0 | 1.0 | 0.580 | 0.45 | 0.000331 | 1.30 | 0.658 | 1.98 | | | | | | | | | | | |
| 16 | (258) | 717 | 45.0 | 1.0 | 0.469 | 0.40 | 0.000273 | 1.05 | 0.678 | 1.55 | | | | | | | | | | | |
| 17 | (160) | 538 | 45.0 | 1.0 | 0.310 | 0.35 | 0.000251 | 0.90 | 0.593 | 1.52 | | | | | | | | | | | |

Table 7.2 Hydraulic Properties of Canals (6/7)

| PROPOSED PLAN | | | | | | | | | | | | | | | | | | | | |
|--|------------|-------|------|-----------------------|---------|---------------|----------|------|-----------------------|---------|--------------------------------|-------|------|-----|------|------|----------|------|-------|------|
| Name of Canal | DOI PLAN | | | | | PROPOSED PLAN | | | | | | | | | | | | | | |
| | L | k | m | Q | V | I | k | m | Q | V | I | B | h | B/h | | | | | | |
| | (m) | | (m) | (m ³ /sec) | (m/sec) | | (m) | | (m ³ /sec) | (m/sec) | | (m) | (m) | (m) | | | | | | |
| <u>13. SAL. SEK. LONGKONG</u> | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | ha (143) | 1,684 | 45.0 | 1.0 | 0.286 | 0.35 | 0.000261 | 0.65 | 0.636 | 1.02 | ha (127) | 1,684 | 45.0 | 1.0 | 0.21 | 0.35 | 0.000261 | 0.50 | 0.564 | 0.89 |
| <u>14. SAL. SEK. BULOE</u> | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | ha (188) | 877 | 45.0 | 1.0 | 0.355 | 0.40 | 0.000328 | 0.90 | 0.594 | 1.51 | (SAL. SEK. BULOE is cancelled) | | | | | | | | | |
| <u>15. KALOLA SECONDARY CANAL</u> | | | | | | | | | | | | | | | | | | | | |
| (Kalola secondary canal is newly provided) | | | | | | | | | | | | | | | | | | | | |
| Ruas 1 | ha (1,871) | 1,700 | 45.0 | 1.5 | 3.09 | 0.65 | 0.000330 | 3.00 | 1.04 | 2.88 | ha (1,841) | 400 | 45.0 | 1.5 | 3.04 | 0.65 | 0.000330 | 3.00 | 1.03 | 2.91 |
| Ruas 2 | ha (1,825) | 1,300 | 45.0 | 1.5 | 3.01 | 0.65 | 0.000330 | 3.00 | 1.02 | 2.94 | ha (1,721) | 900 | 45.0 | 1.5 | 2.84 | 0.60 | 0.000300 | 2.80 | 1.07 | 2.61 |
| Ruas 3 | ha (1,692) | 400 | 45.0 | 1.5 | 2.79 | 0.60 | 0.000300 | 2.70 | 1.08 | 2.51 | ha (1,628) | 500 | 45.0 | 1.5 | 2.69 | 0.60 | 0.000300 | 2.70 | 1.05 | 2.57 |
| Ruas 4 | ha (1,600) | 300 | 45.0 | 1.5 | 2.64 | 0.60 | 0.000300 | 2.60 | 1.05 | 2.46 | ha (1,498) | 1,050 | 45.0 | 1.5 | 2.47 | 0.60 | 0.000300 | 2.50 | 1.02 | 2.45 |
| Ruas 5 | ha (1,450) | 750 | 45.0 | 1.5 | 2.39 | 0.60 | 0.000330 | 2.50 | 1.00 | 2.51 | ha (1,345) | 650 | 45.0 | 1.5 | 2.22 | 0.60 | 0.000330 | 2.40 | 0.96 | 2.49 |
| Ruas 6 | ha (1,244) | 650 | 45.0 | 1.5 | 2.05 | 0.60 | 0.000350 | 2.30 | 0.92 | 2.48 | ha (1,226) | 1,050 | 45.0 | 1.5 | 2.02 | 0.60 | 0.000350 | 2.30 | 0.92 | 2.51 |
| Ruas 7 | ha (1,182) | 900 | 45.0 | 1.5 | 1.95 | 0.60 | 0.000350 | 2.20 | 0.91 | 2.41 | ha (1,076) | 950 | 45.0 | 1.5 | 1.78 | 0.60 | 0.000370 | 2.10 | 0.87 | 2.41 |
| Ruas 8 | ha (1,042) | 250 | 45.0 | 1.5 | 1.72 | 0.60 | 0.000380 | 2.10 | 0.85 | 2.47 | ha (1,035) | 350 | 45.0 | 1.5 | 1.71 | 0.60 | 0.000380 | 2.10 | 0.85 | 2.48 |
| Ruas 9 | ha (951) | 1,950 | 45.0 | 1.5 | 1.57 | 0.60 | 0.000410 | 2.00 | 0.81 | 2.47 | | | | | | | | | | |

Table 7.2 Hydraulic Properties of Canals (7/7)

| DOJ PLAN | | | | | | | | | | PROPOSED PLAN | | | | | | | | | |
|--|-------|-------|-------|-------------------------|-----------|-----|-------|-------|----------|---------------|-------|-------|-------|-------------------------|-----------|---|-------|-------|-----|
| Name of Canal | L (m) | X (m) | M (m) | Q (m ³ /sec) | V (m/sec) | I | B (m) | h (m) | B/H | Name of Canal | L (m) | X (m) | M (m) | Q (m ³ /sec) | V (m/sec) | I | B (m) | h (m) | B/H |
| <u>KALOLA SECONDARY CANAL (Cont'd)</u> | | | | | | | | | | | | | | | | | | | |
| Road 18 | (847) | | | 900 | 45.0 | 1.0 | 1.40 | 0.55 | 0.000310 | 1.80 | 0.93 | 1.93 | | | | | | | |
| 19 | (763) | | | 300 | 45.0 | 1.0 | 1.26 | 0.55 | 0.000320 | 1.70 | 0.89 | 1.92 | | | | | | | |
| 20 | (684) | | | 1,200 | 45.0 | 1.0 | 1.13 | 0.55 | 0.000350 | 1.60 | 0.84 | 1.90 | | | | | | | |
| 21 | (440) | | | 1,000 | 45.0 | 1.0 | 0.73 | 0.50 | 0.000360 | 1.40 | 0.69 | 2.01 | | | | | | | |
| 22 | (403) | | | 900 | 45.0 | 1.0 | 0.66 | 0.50 | 0.000390 | 1.30 | 0.67 | 1.94 | | | | | | | |
| 23 | (338) | | | 1,000 | 45.0 | 1.0 | 0.56 | 0.50 | 0.000430 | 1.20 | 0.62 | 1.95 | | | | | | | |
| 24 | (292) | | | 850 | 45.0 | 1.0 | 0.48 | 0.45 | 0.000350 | 1.00 | 0.65 | 1.54 | | | | | | | |
| 25 | (279) | | | 300 | 45.0 | 1.0 | 0.46 | 0.45 | 0.000350 | 1.00 | 0.63 | 1.59 | | | | | | | |
| 26 | (221) | | | 1,450 | 45.0 | 1.0 | 0.36 | 0.40 | 0.000330 | 0.90 | 0.60 | 1.50 | | | | | | | |

THE BILA IRRIGATION PROJECT

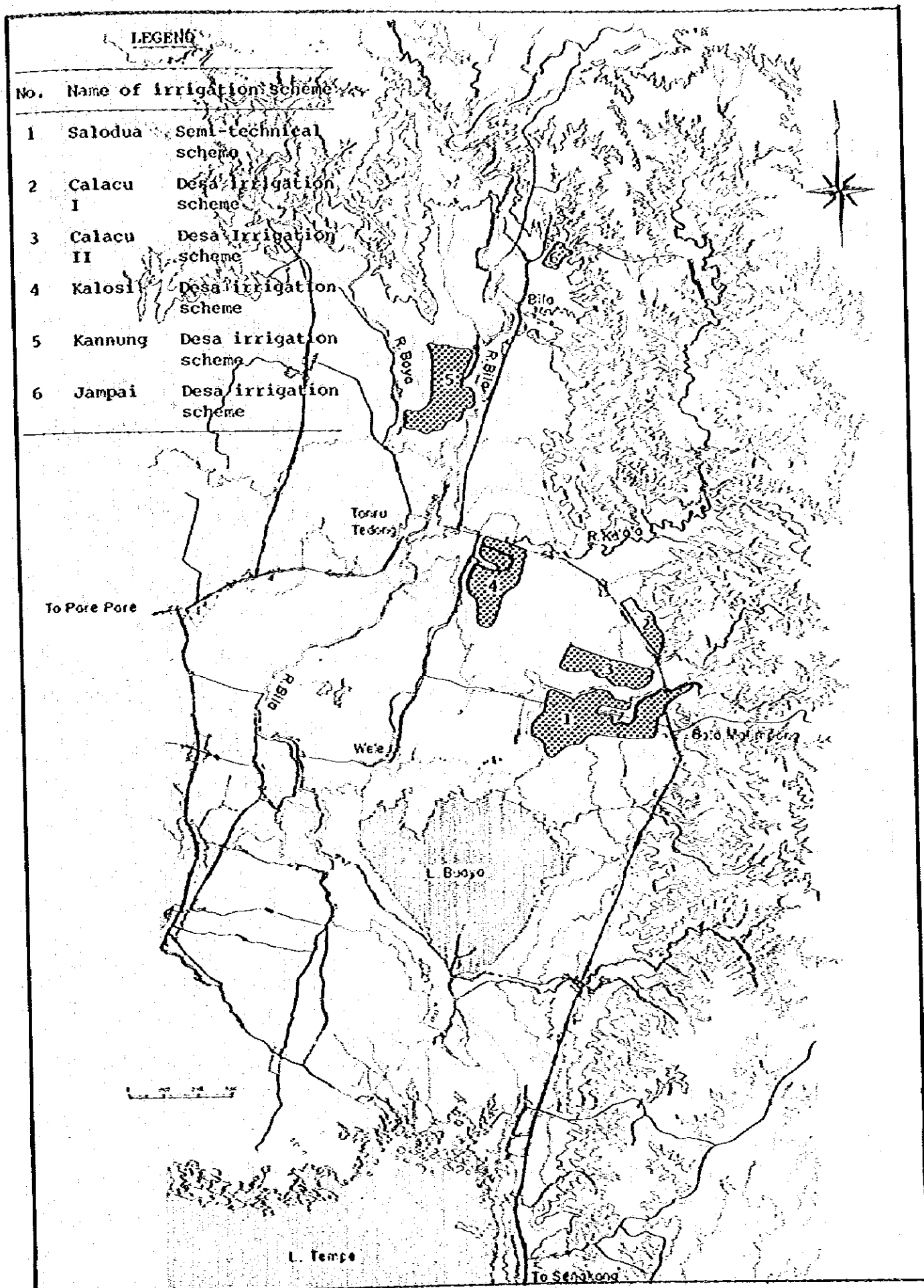


Fig. 1.1 LOCATION OF EXISTING IRRIGATION SYSTEMS

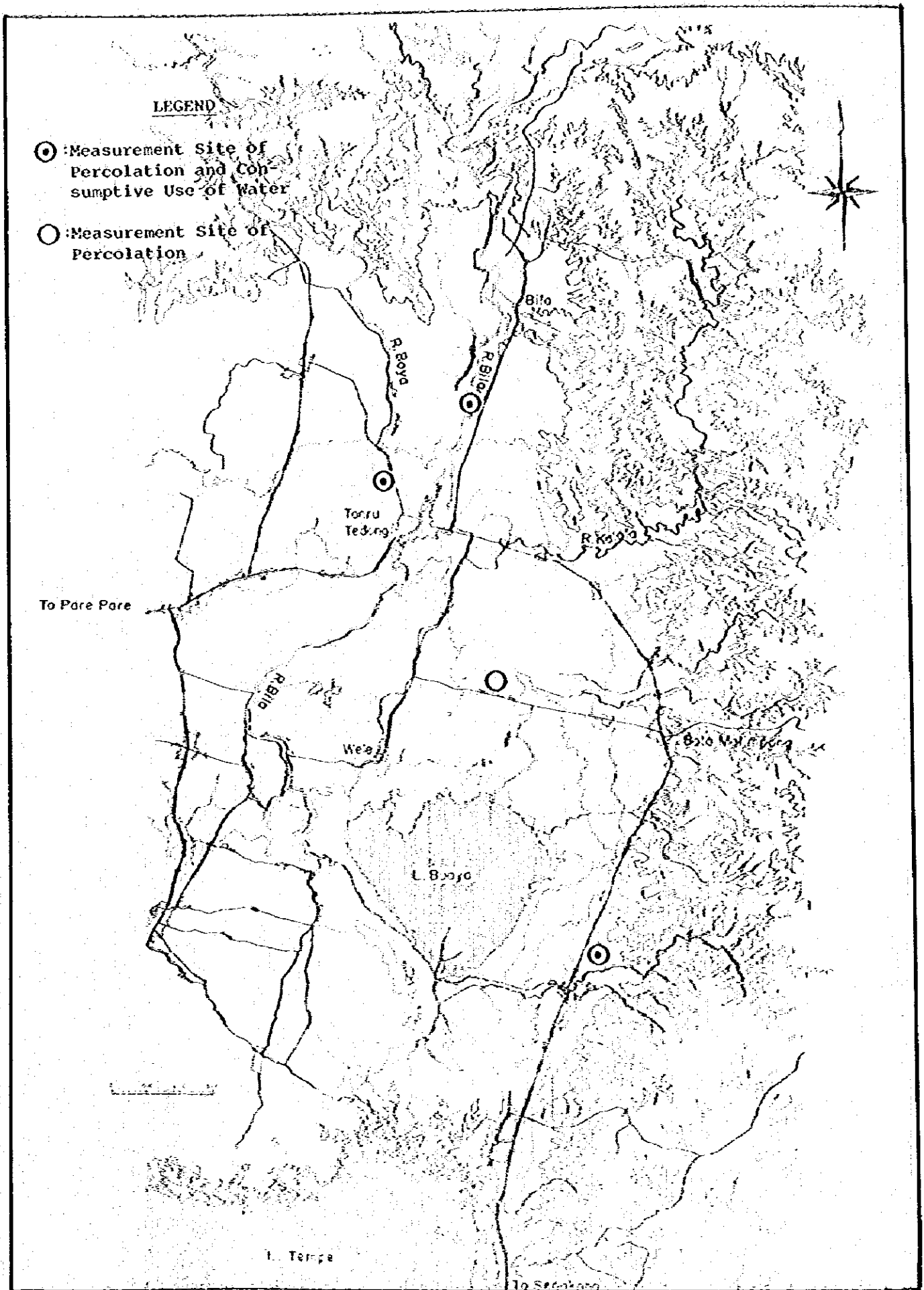
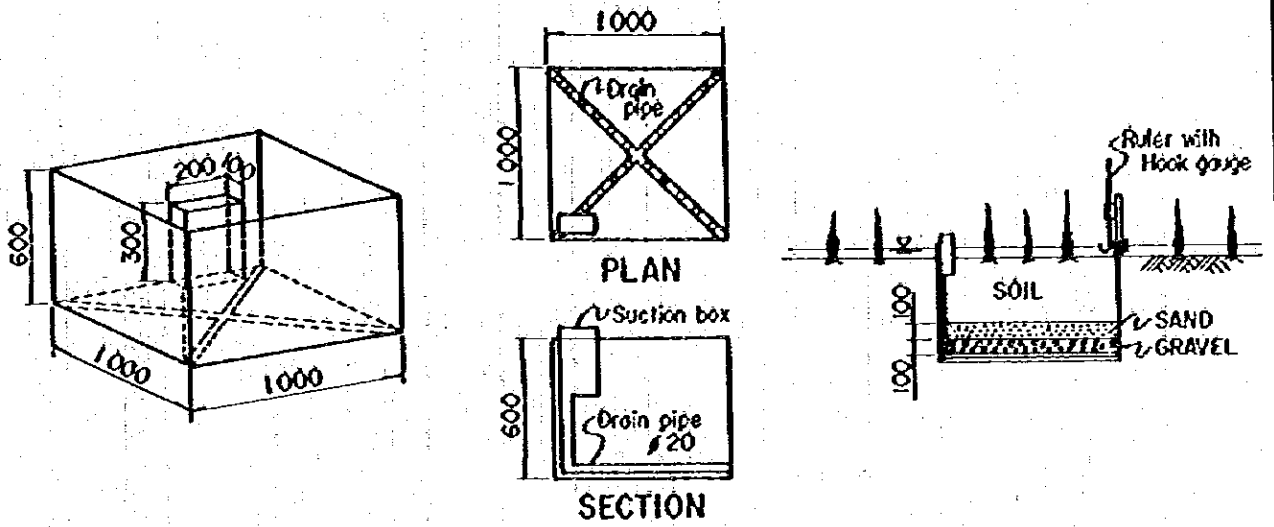


Fig. 2.1 LOCATION OF MEASUREMENT OF CONSUMPTIVE USE AND PERCOLATION

Evapo-Transpiration Measuring Tank



Percolation Cylinder

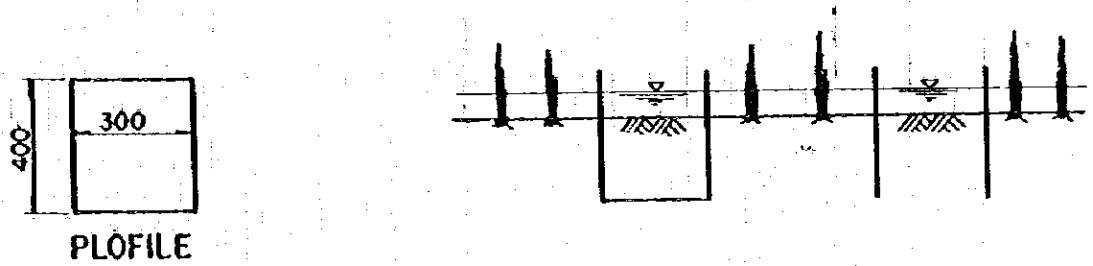


Fig. 2.2 MEASURING INSTRUMENTS OF CONSUMPTIVE USE AND PERCOLATION

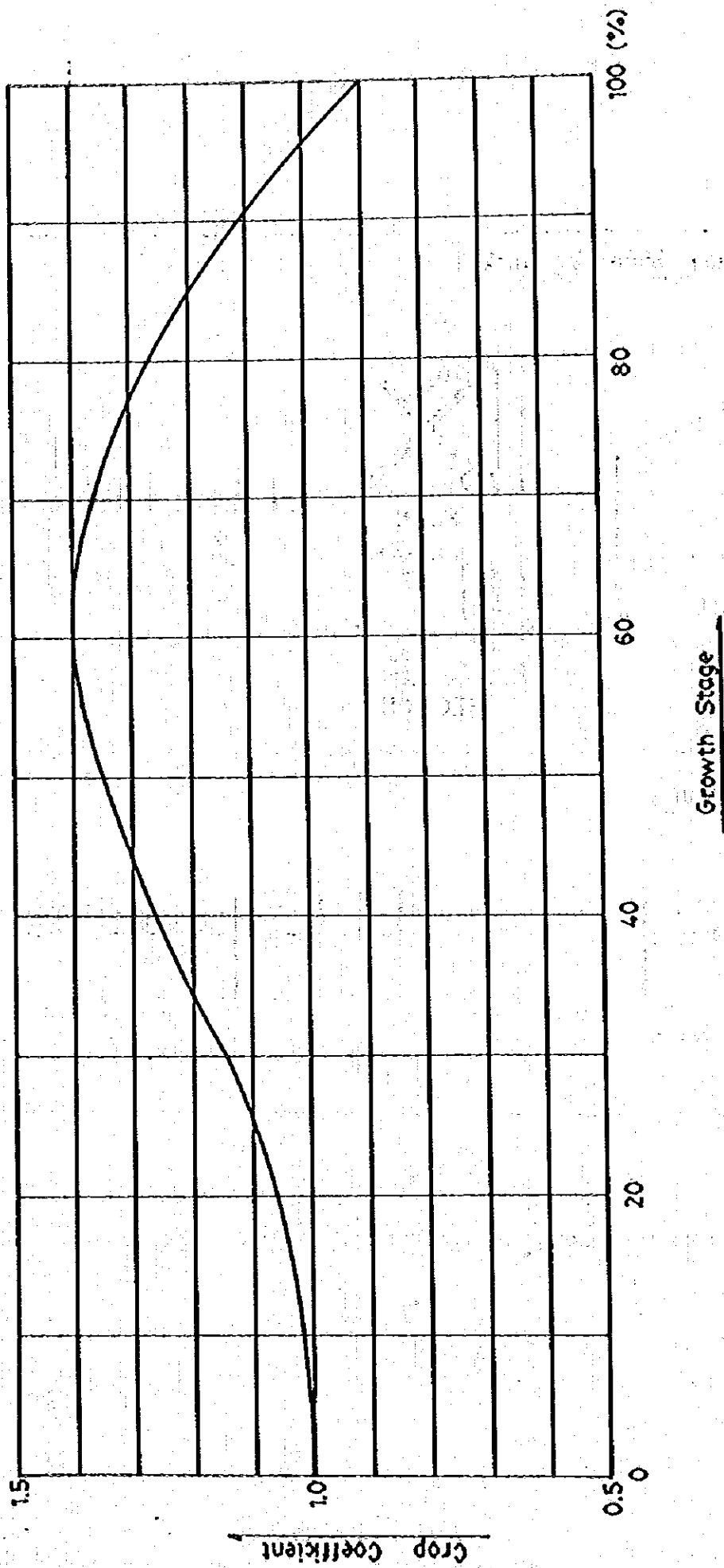


Fig. 2.3 CROP COEFFICIENT CURVE FOR PADDY.

(mm/day).

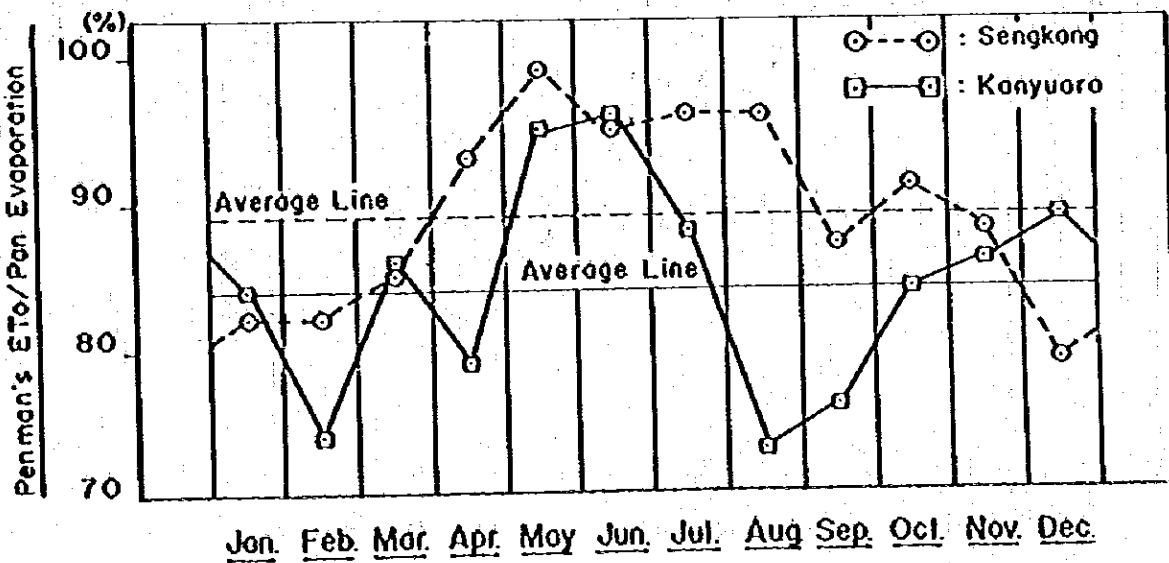
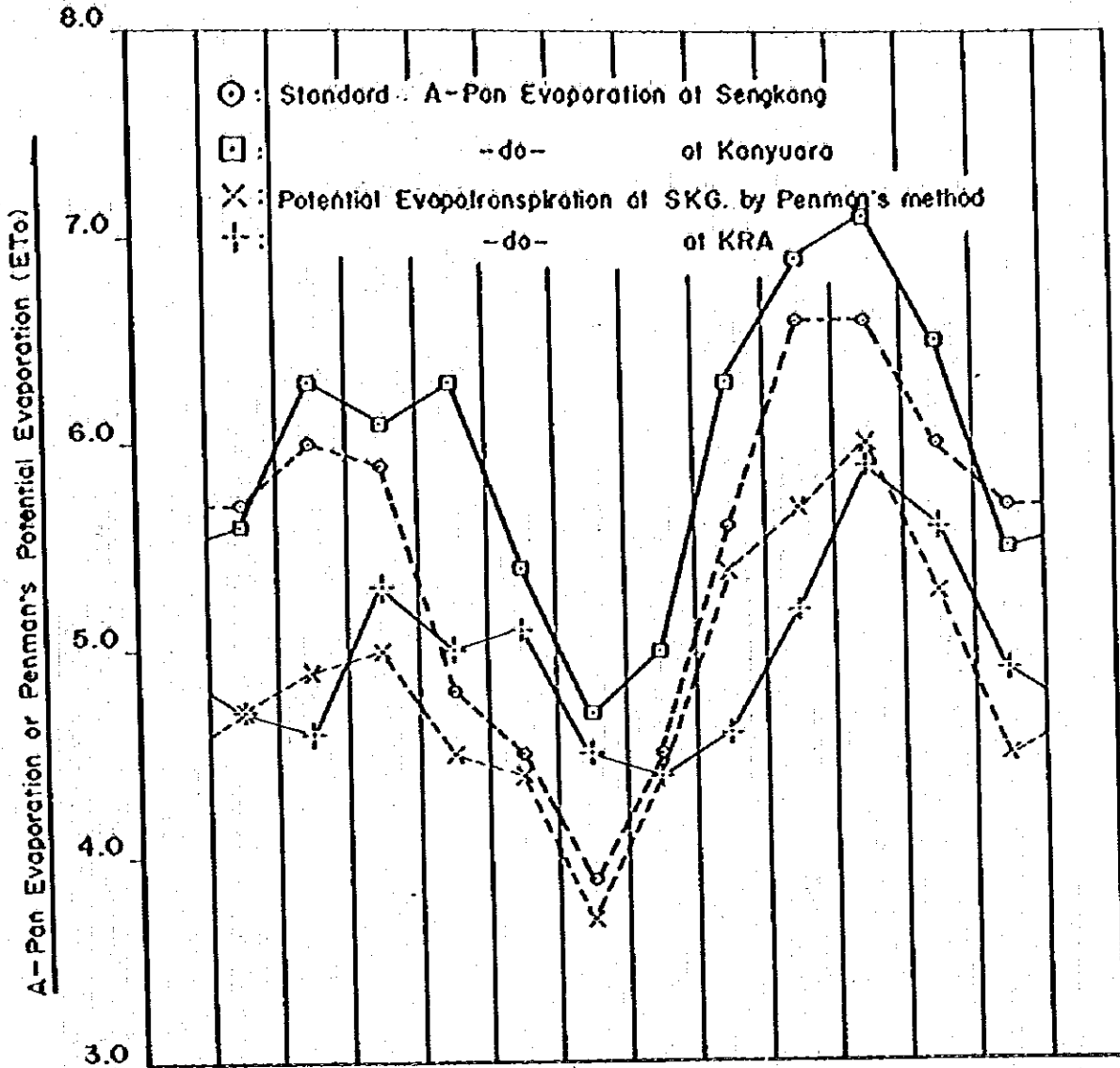
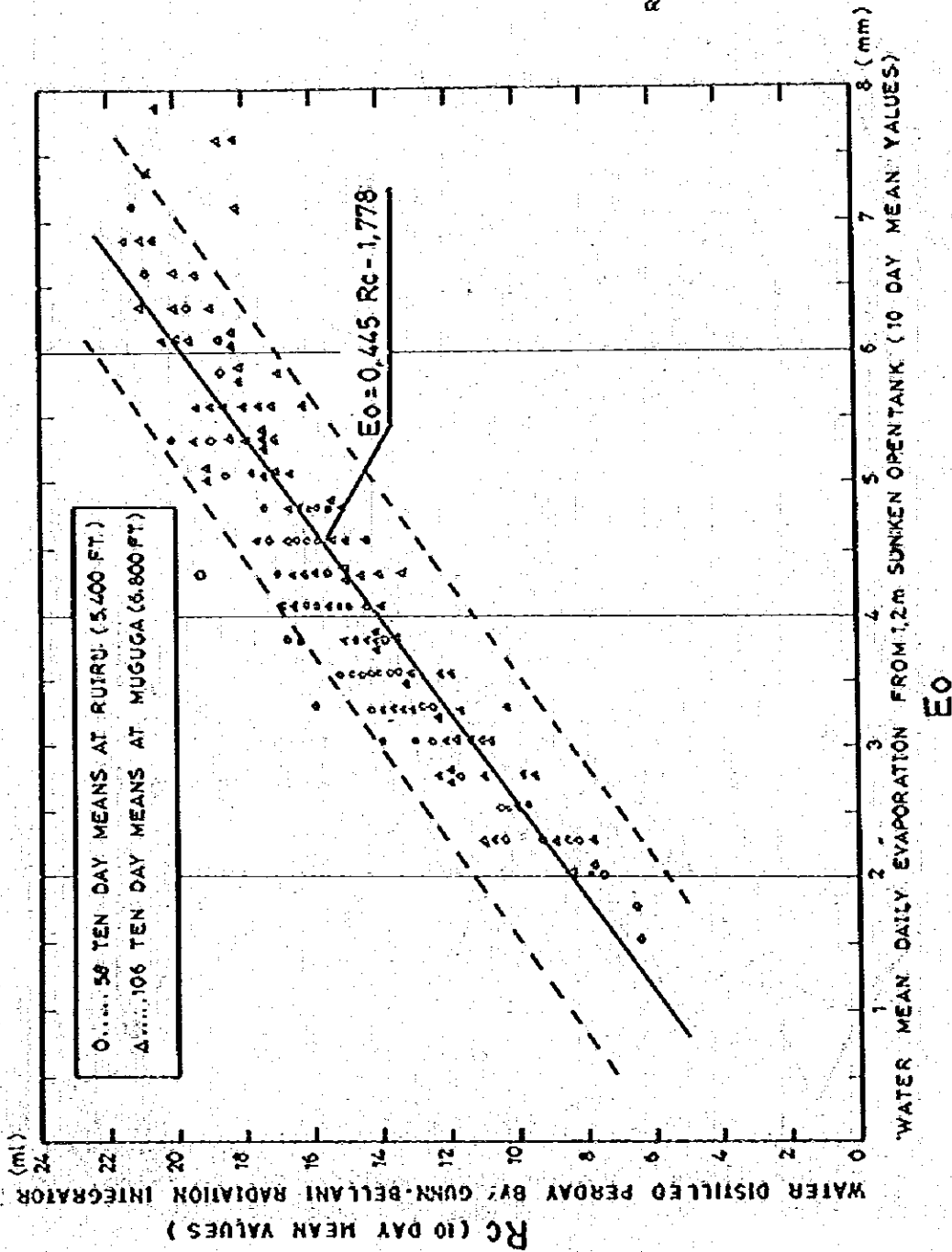


Fig. 2.4 COMPARISON OF POTENTIAL EVAPOTRANSPIRATION AND PAN EVAPORATION



References:
 Dr. PEREIRA, C
 Quart. J.R. Met. Soc. 1959, 85
 P.P. 253 - 261
 (Specification Note of
 Gunn-Bellani Radiation
 Integrator)

Fig. 2.5 RELATION OF WATER DISTILLED BY GUNN-BELLANI
 RADIATION INTEGRATOR AND EVAPORATION

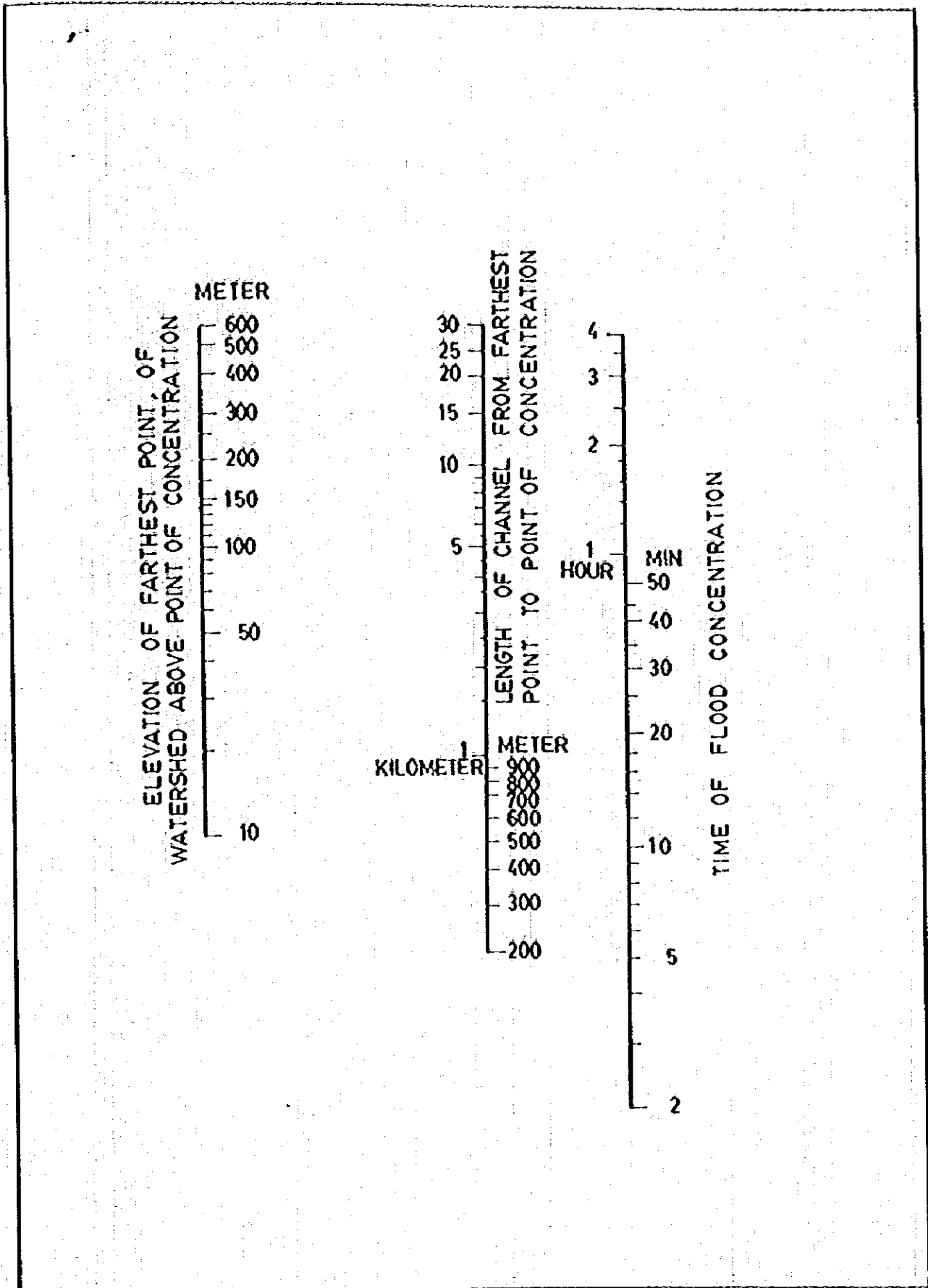
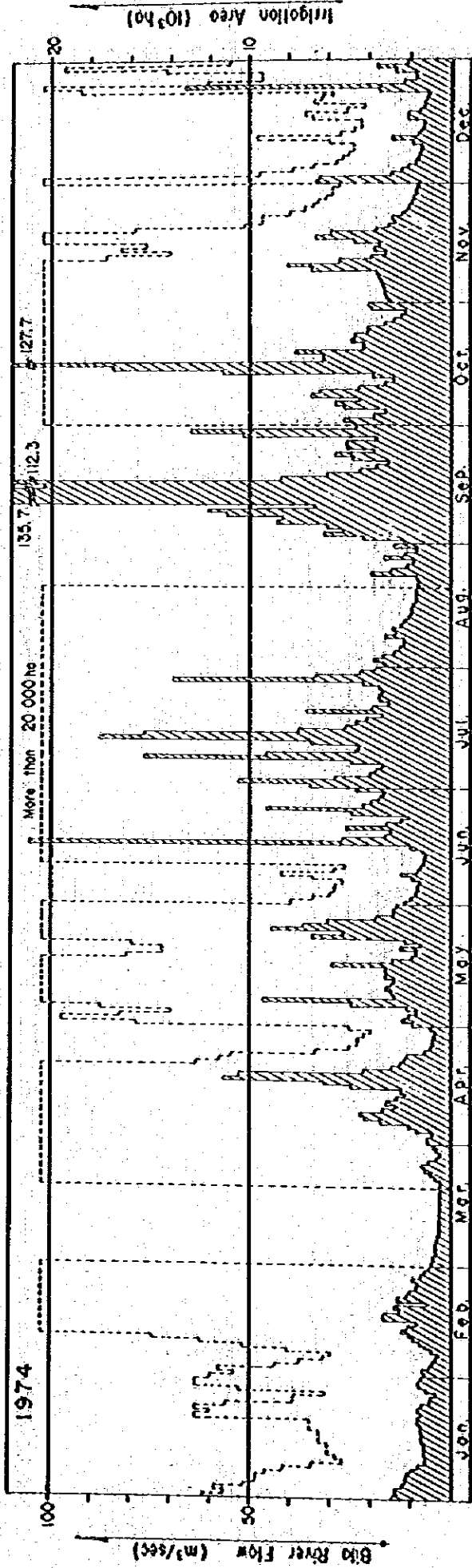
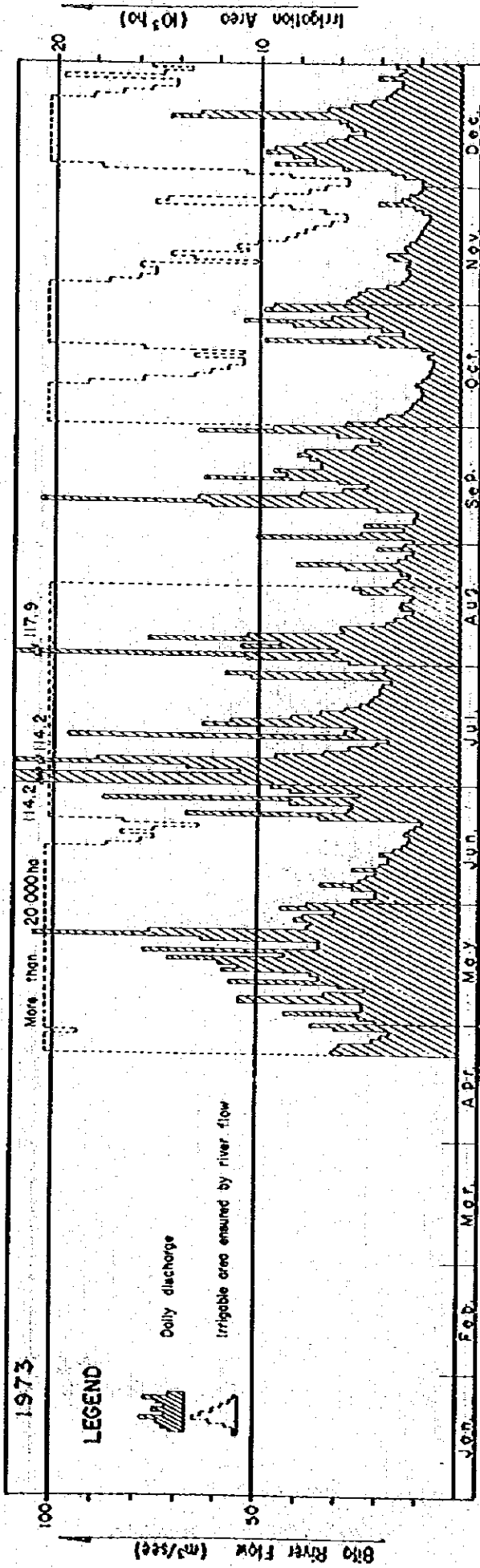


Fig. 2.6 NOMOGRAPH FOR ESTIMATING TIME OF FLOOD CONCENTRATION



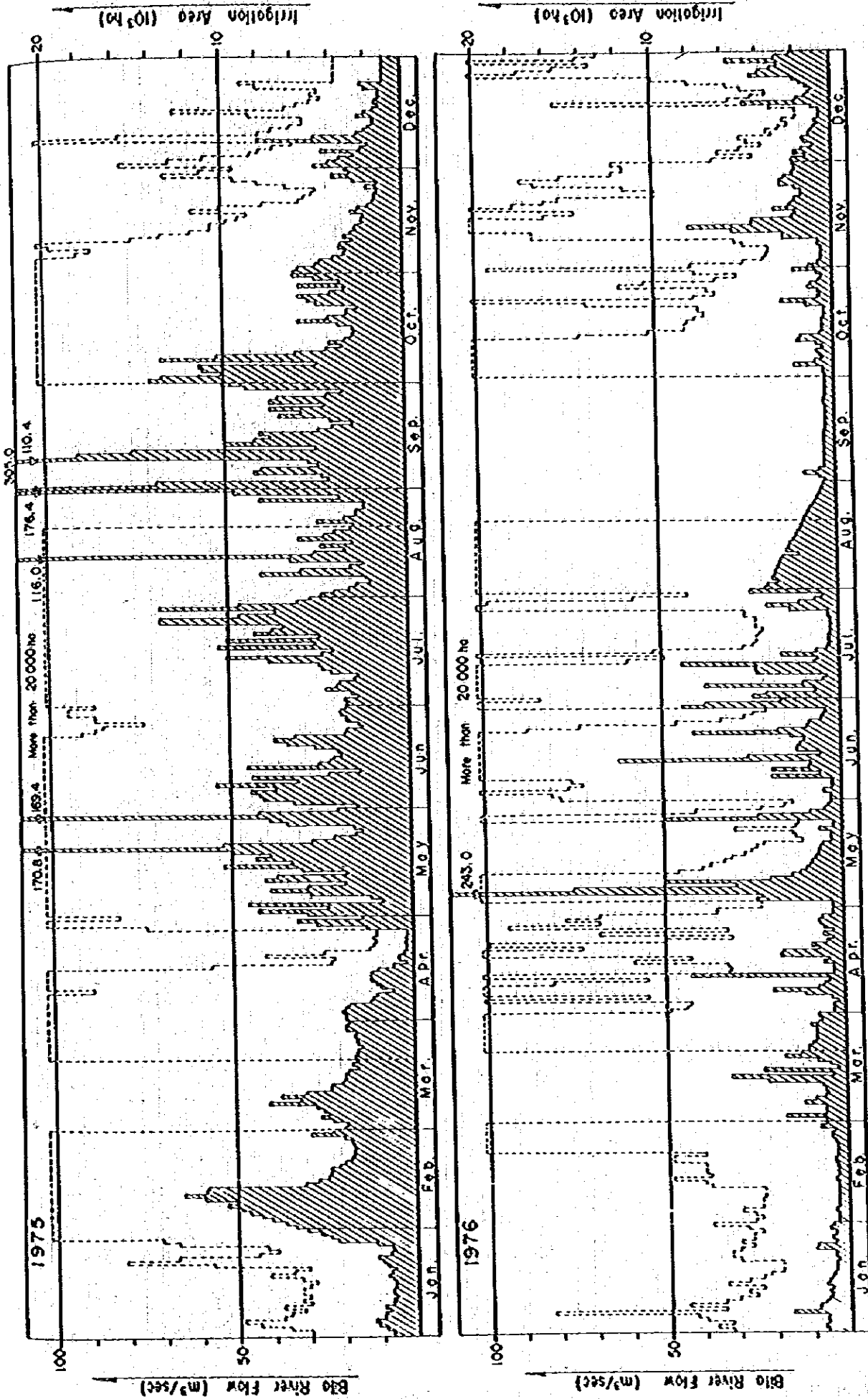


Fig. 3.1 DAILY DISCHARGE OF BILA RIVER AND WATER BALANCE (2/5)

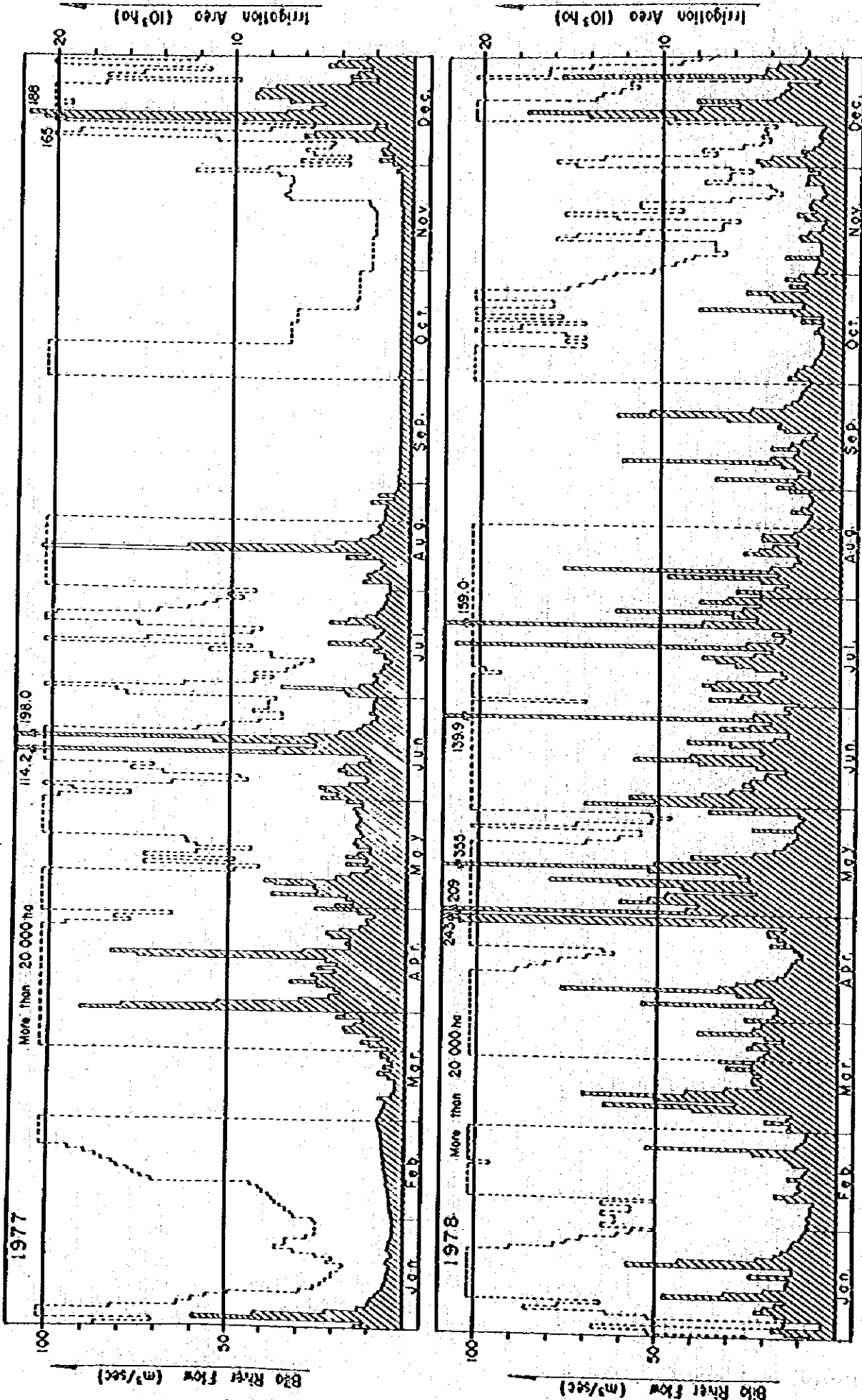


Fig. 3.1 DAILY DISCHARGE OF BILA RIVER AND WATER BALANCE (3/5)

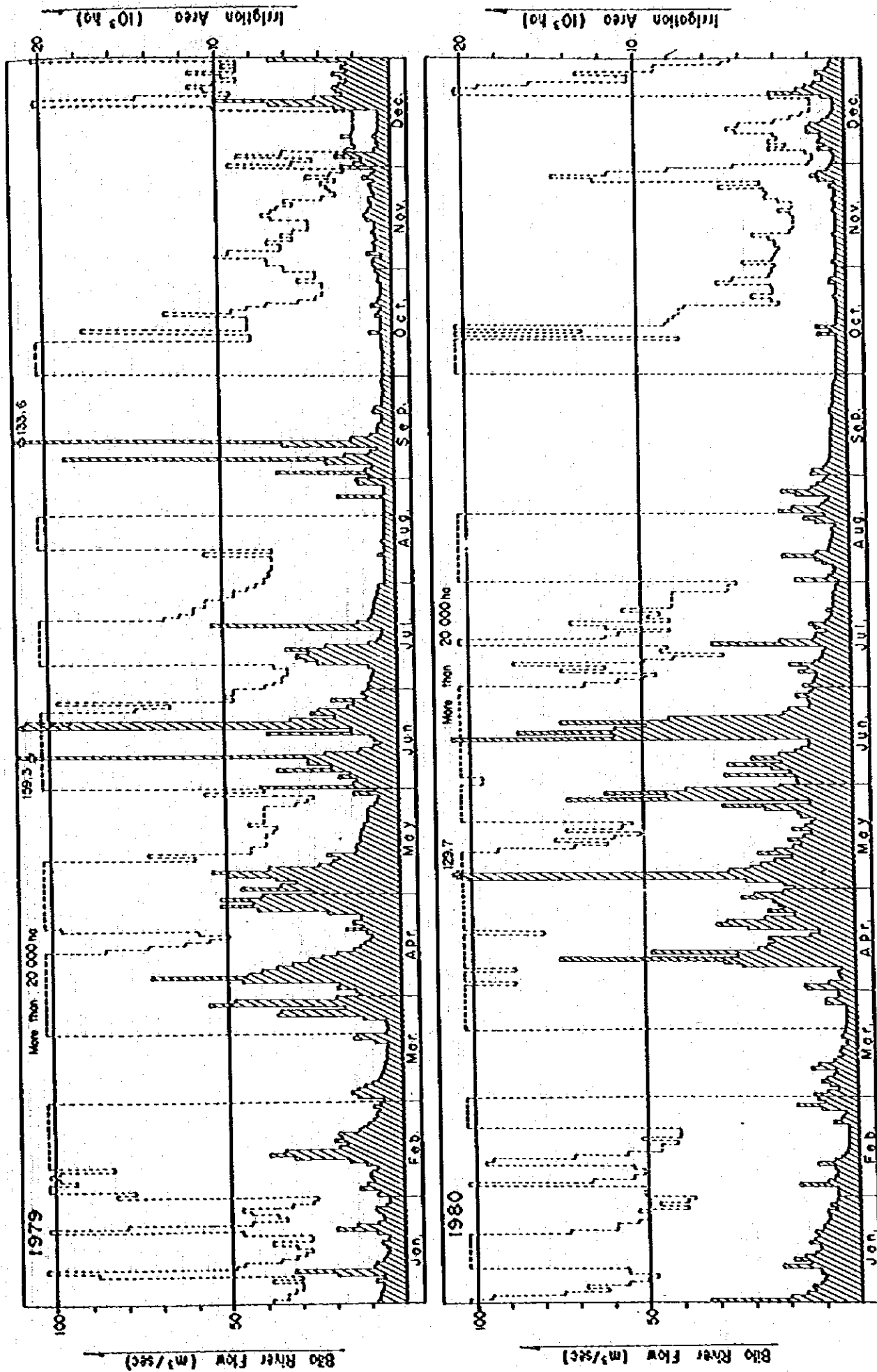


Fig. 3.1 DAILY DISCHARGE OF BILA RIVER AND WATER BALANCE (4/5)

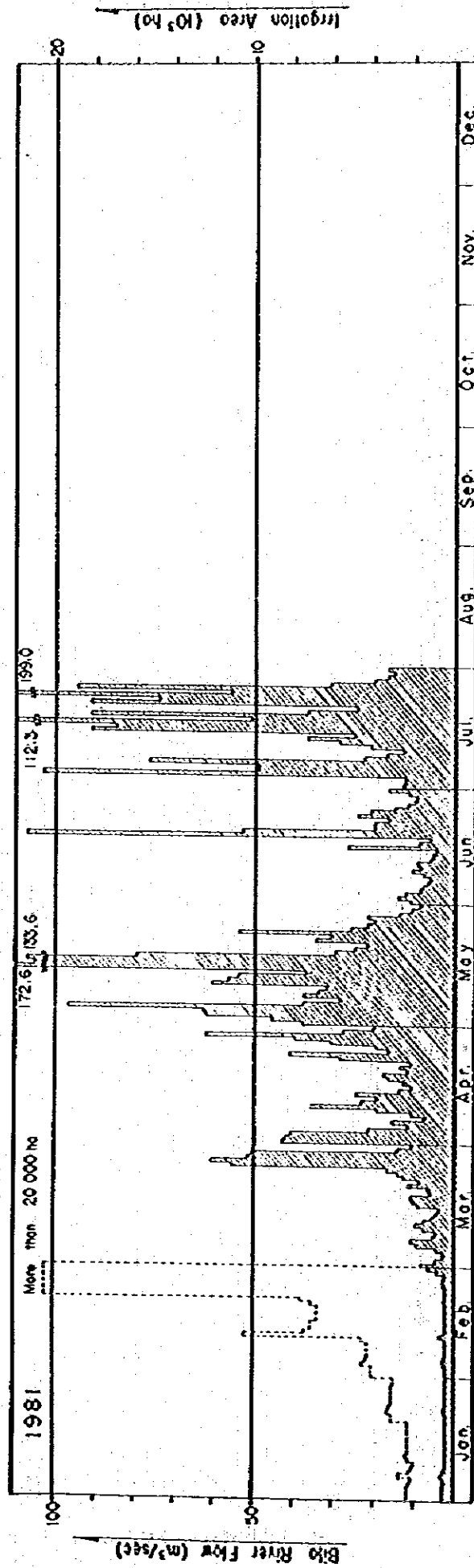


Fig. 3.1 DAILY DISCHARGE OF BILA RIVER AND WATER BALANCE (5/5)

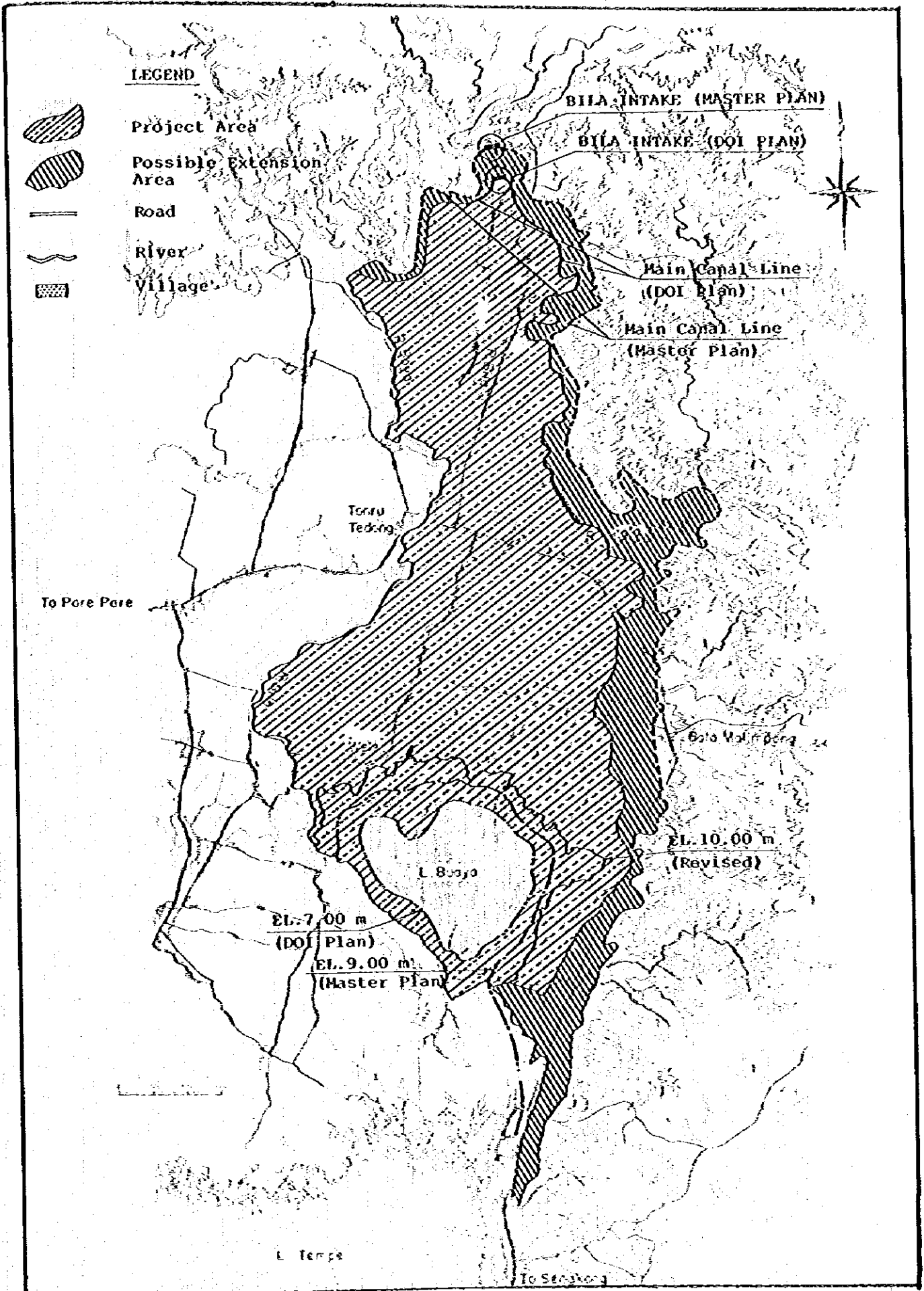


Fig. 4.1 GENERAL MAP OF MASTER PLAN AND DOI PLAN

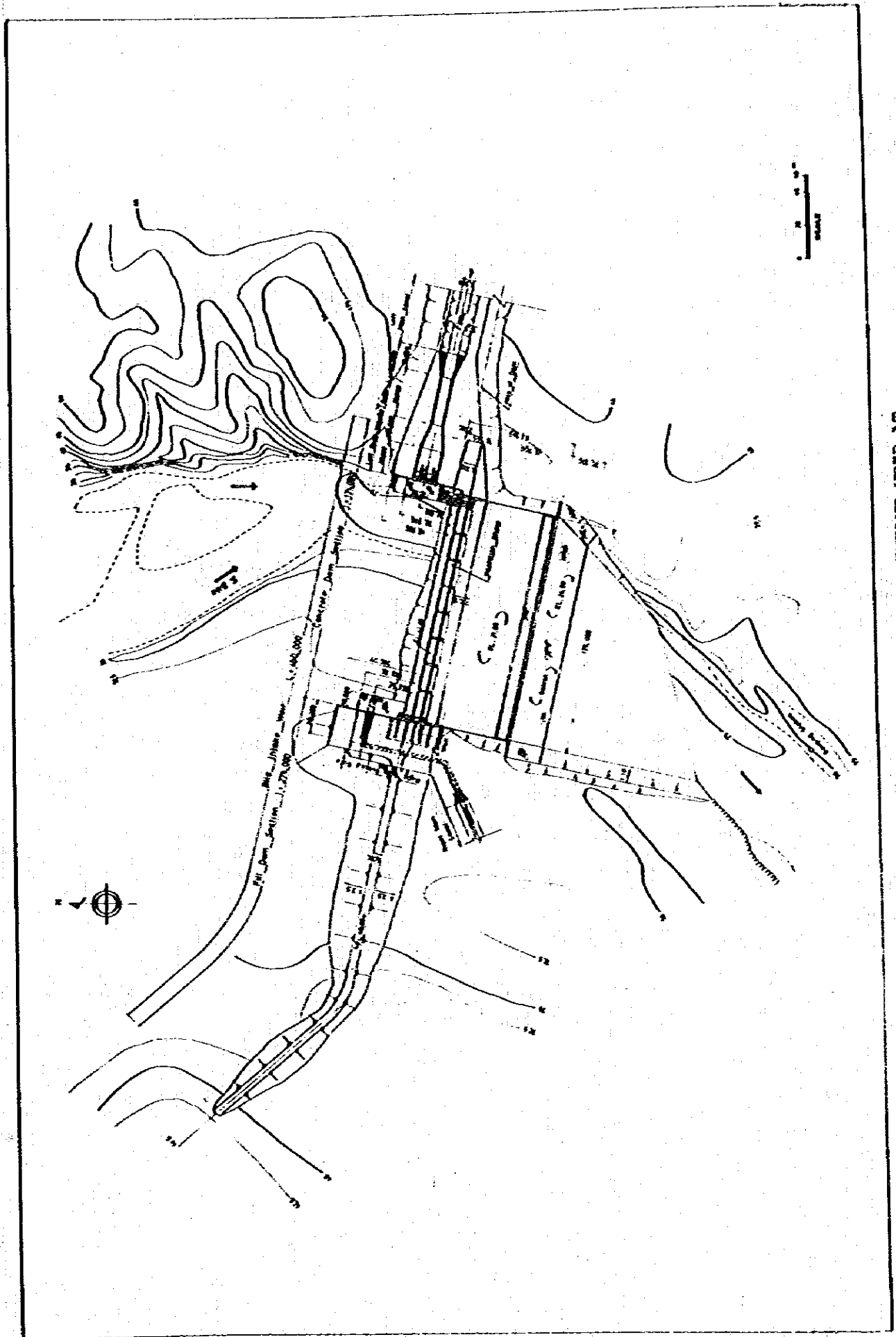


Fig. 4.2 PRELIMINARY DESIGN OF BILA INTAKE WEIR AT
 MASTER PLAN SITE, GENERAL PLAN

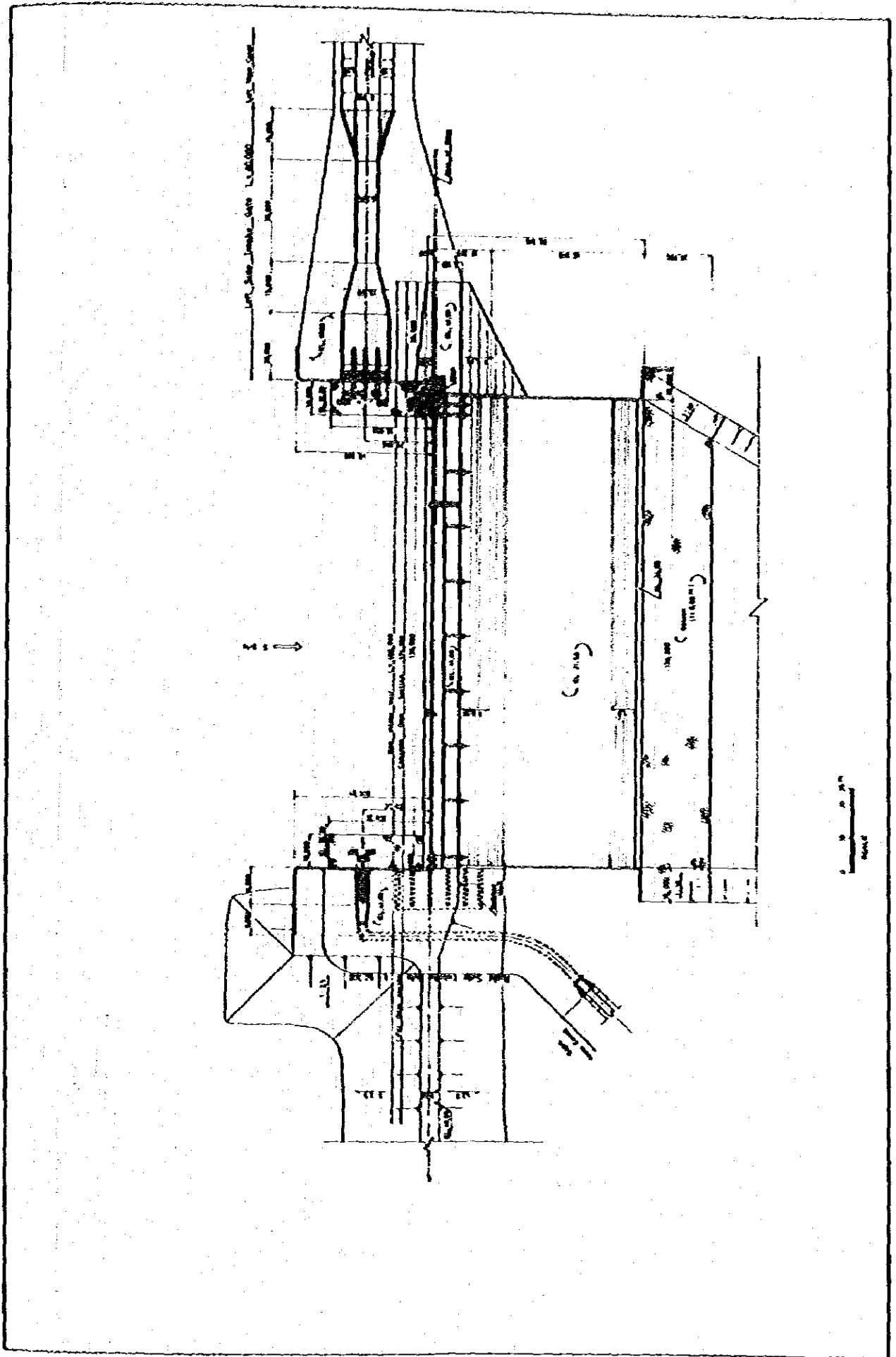
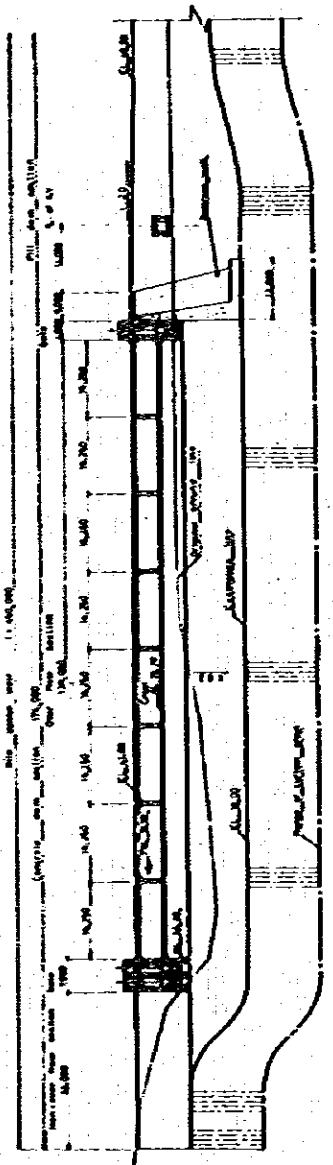
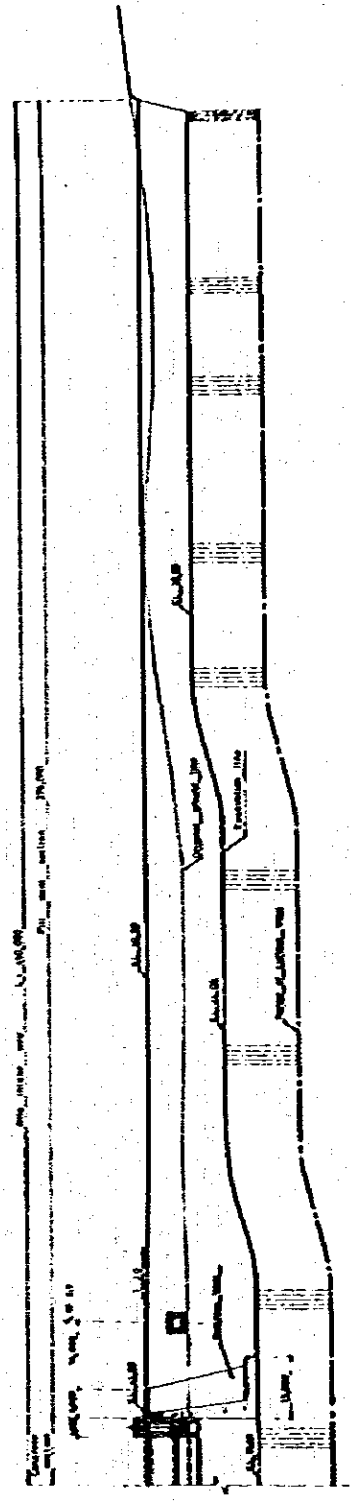


Fig. 4.3 PRELIMINARY DESIGN OF BILA INTAKE WEIR AT
 MASTER PLAN SITE, PLAN OF WEIR



CONCRETE DAM SECTION



SILL DAM SECTION



Fig. 4.4 PRELIMINARY DESIGN OF BILA INTAKE WEIR AT MASTER PLAN SITE, PROFILE OF WEIR

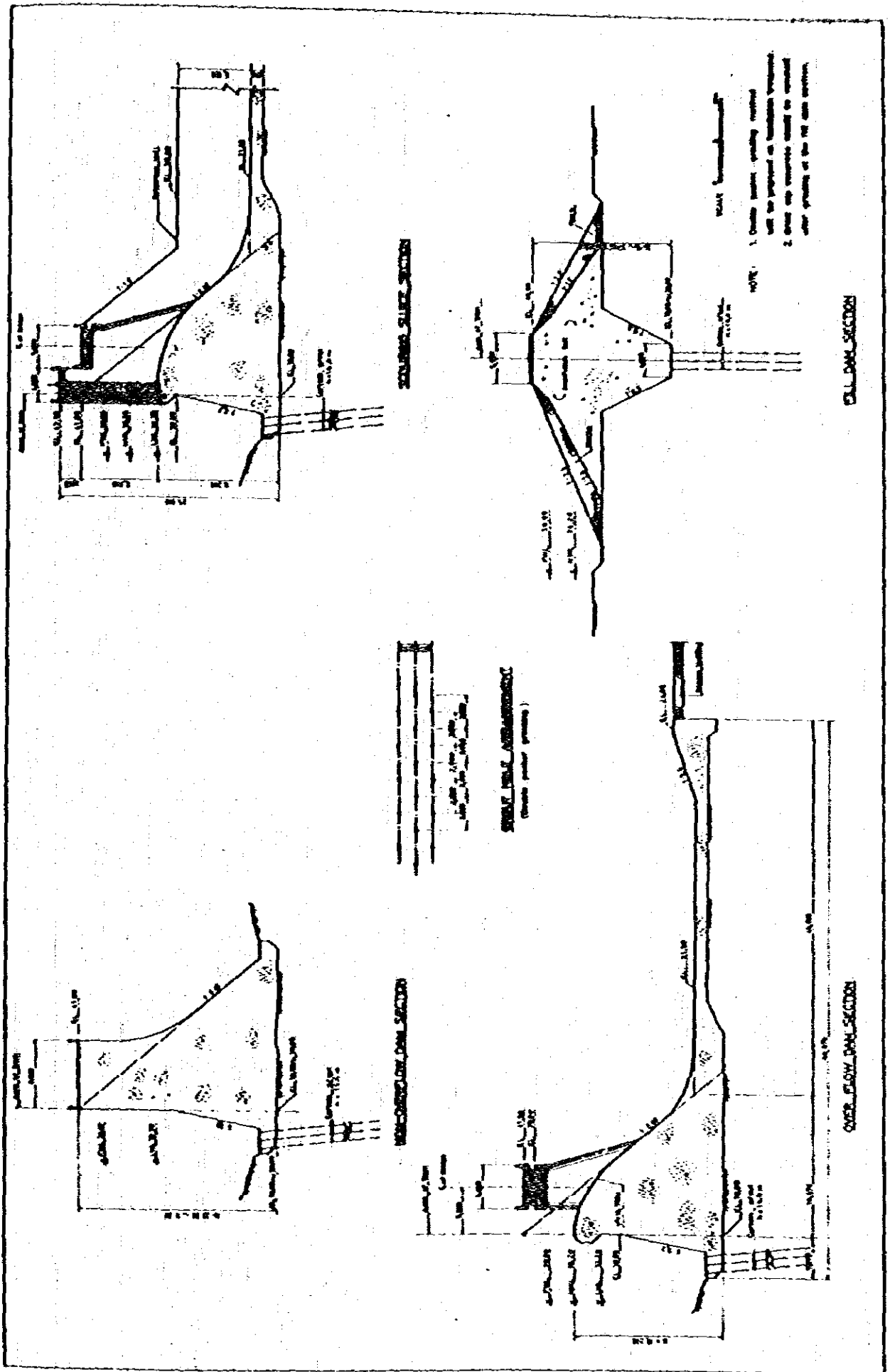


Fig. 4.5 PRELIMINARY DESIGN OF BILA INTAKE WEIR AT MASTER PLAN SITE, TYPICAL CROSS SECTION

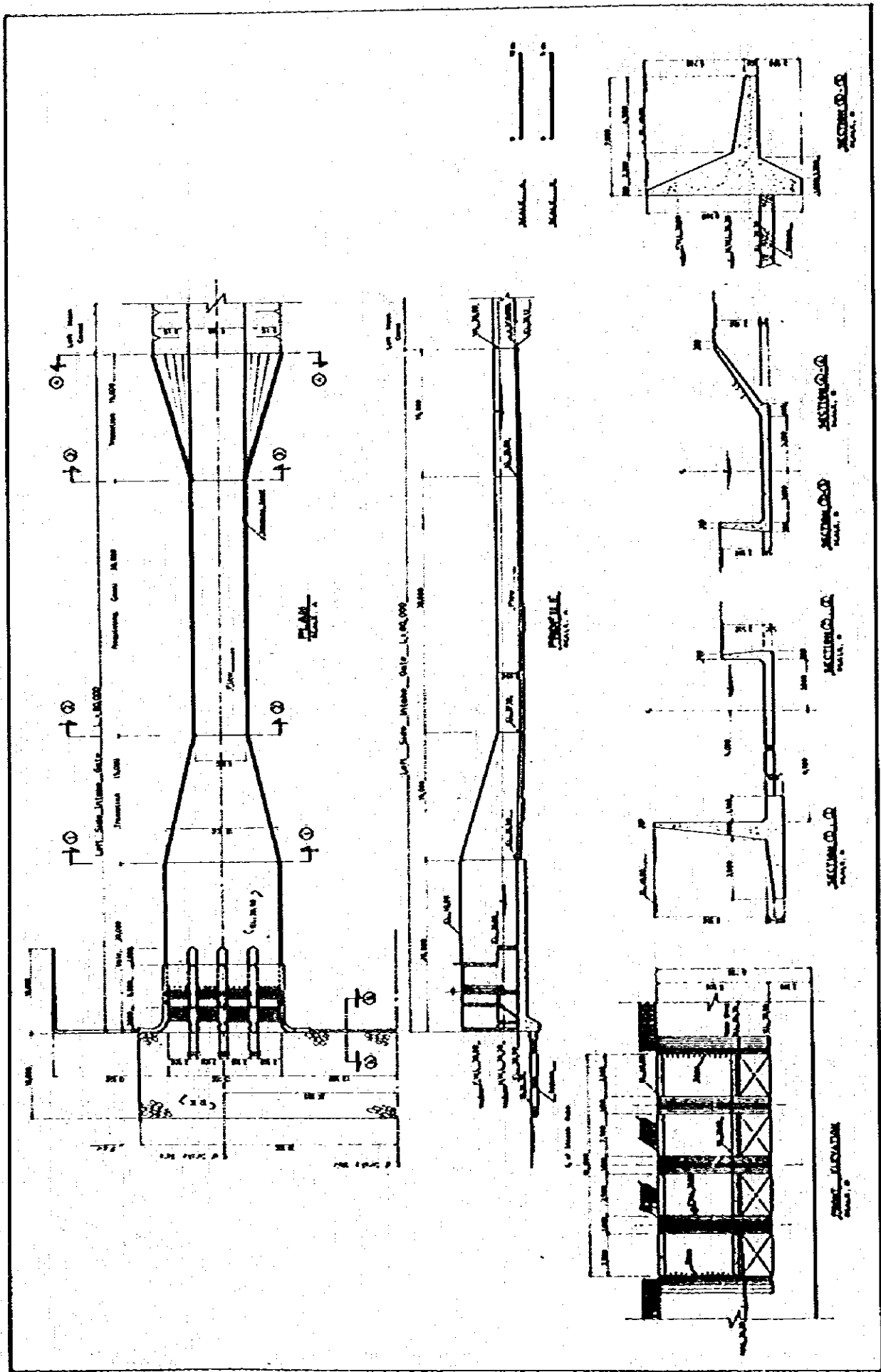


Fig. 4.6 PRELIMINARY DESIGN OF BIFA INTAKE WEIR AT MASTER PLAN SITE, LEFT SIDE INTAKE SITE

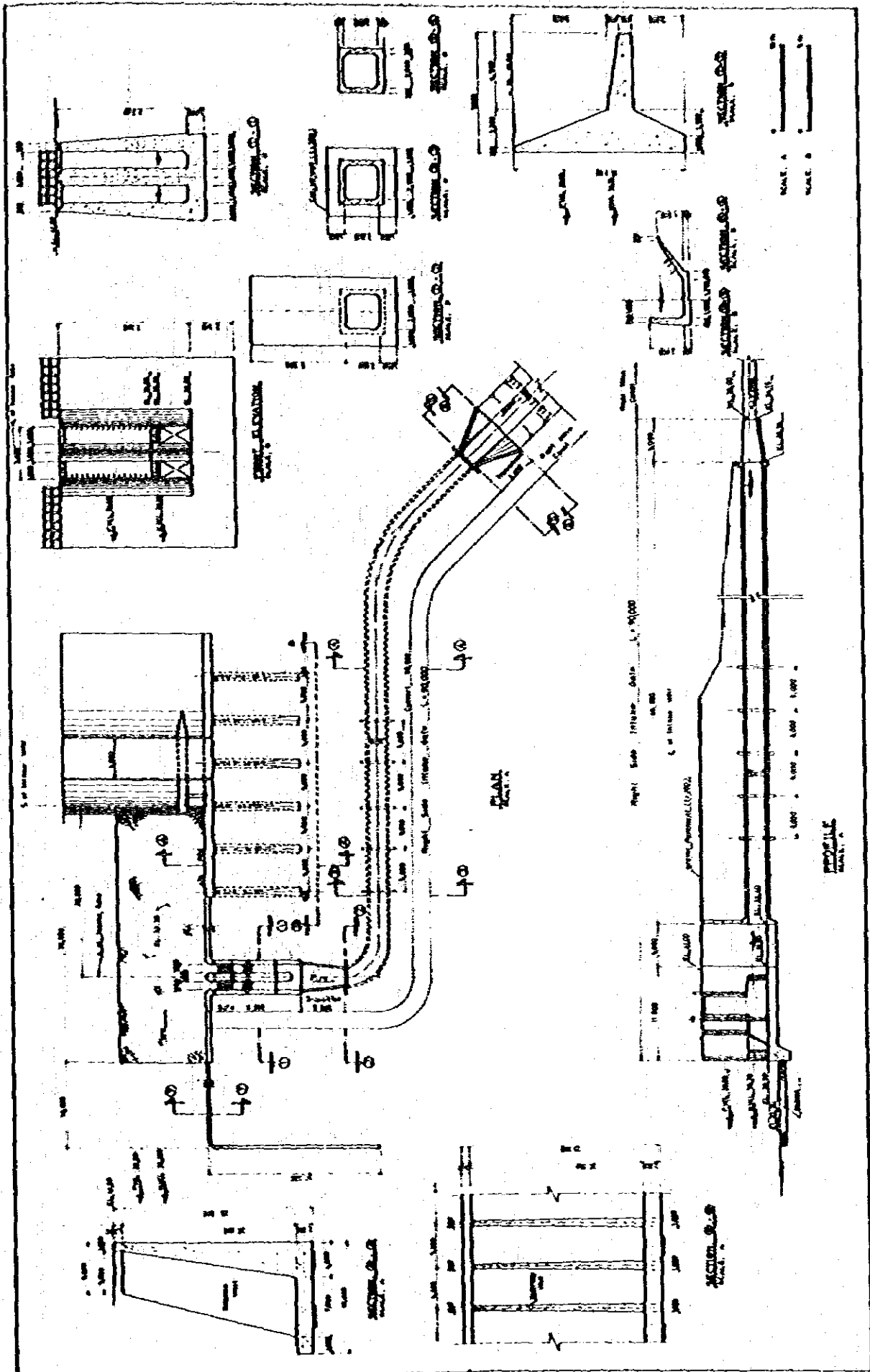


Fig. 4.7 PRELIMINARY DESIGN OF BIA INTAKE WEIR AT MASTER PLAN SITE, RIGHT SIDE INTAKE SITE

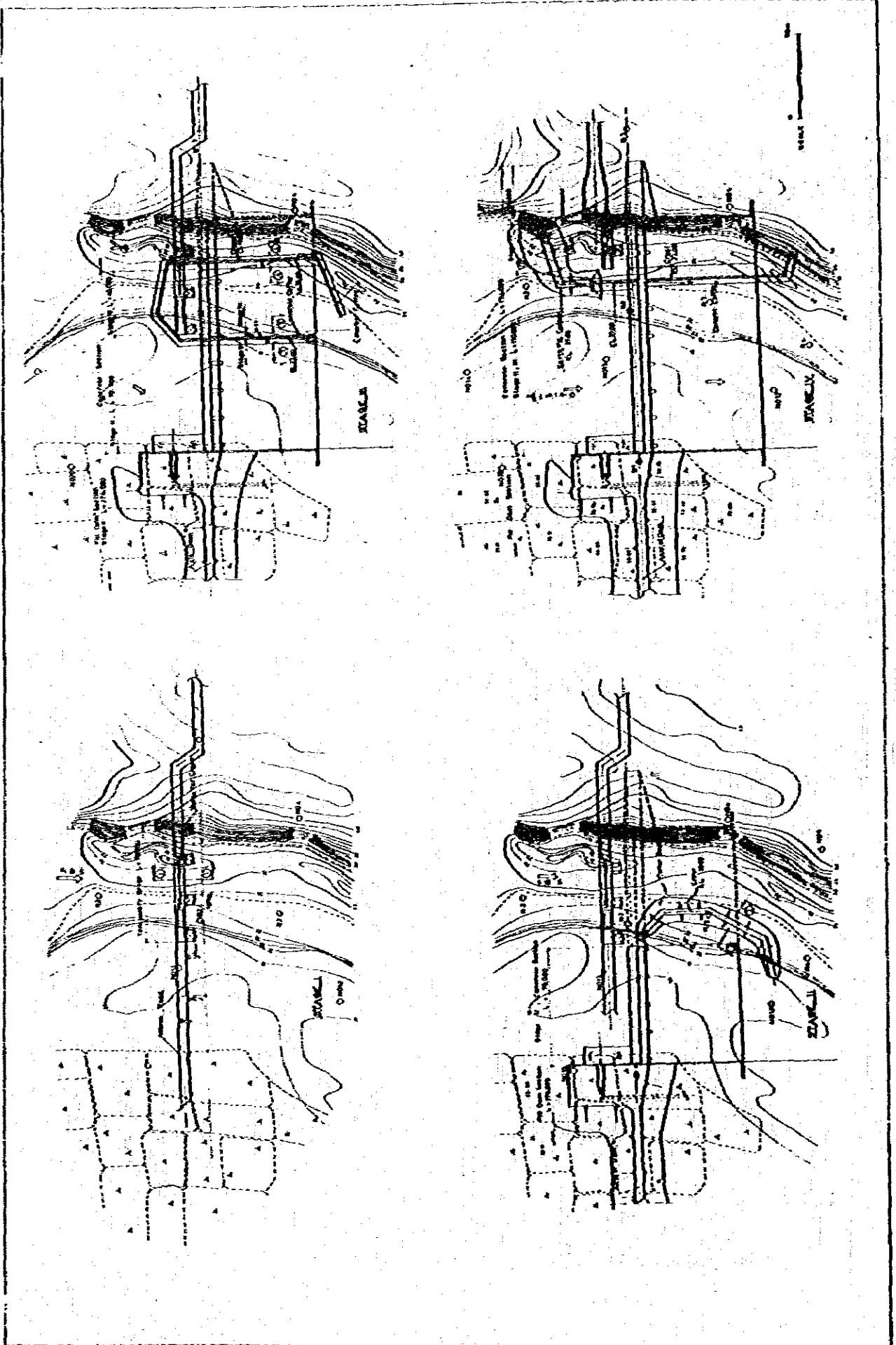


FIG. 4.8 PRELIMINARY DESIGN OF BILA INTAKE WEIR AT MASTER PLAN SITE, DIVERSION METHOD (J/2).

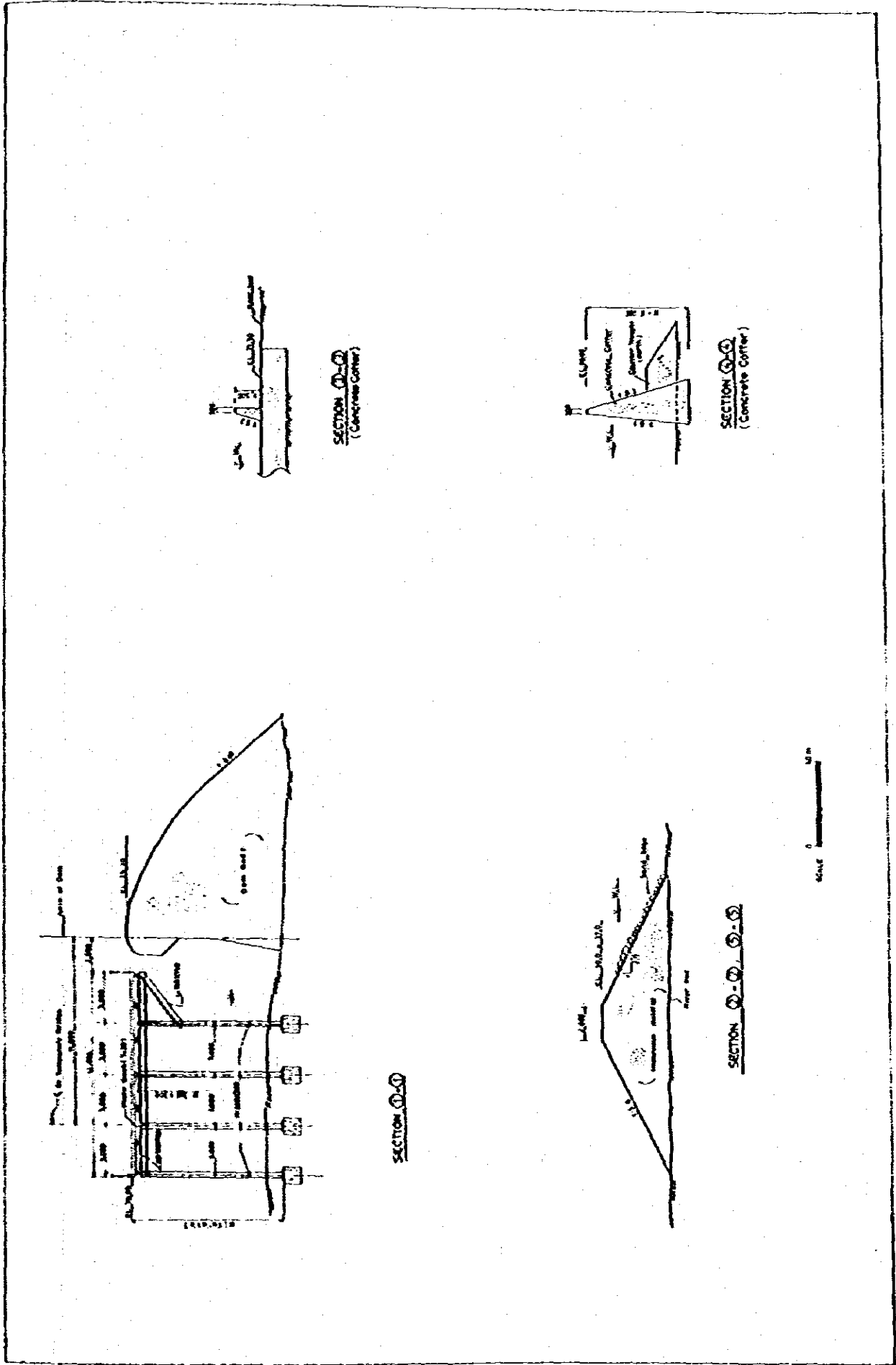


Fig. 4.8 PRELIMINARY DESIGN OF BILA INTAKE WEIR AT MASTER PLAN SITE, DIVERSION METHOD (2/2)

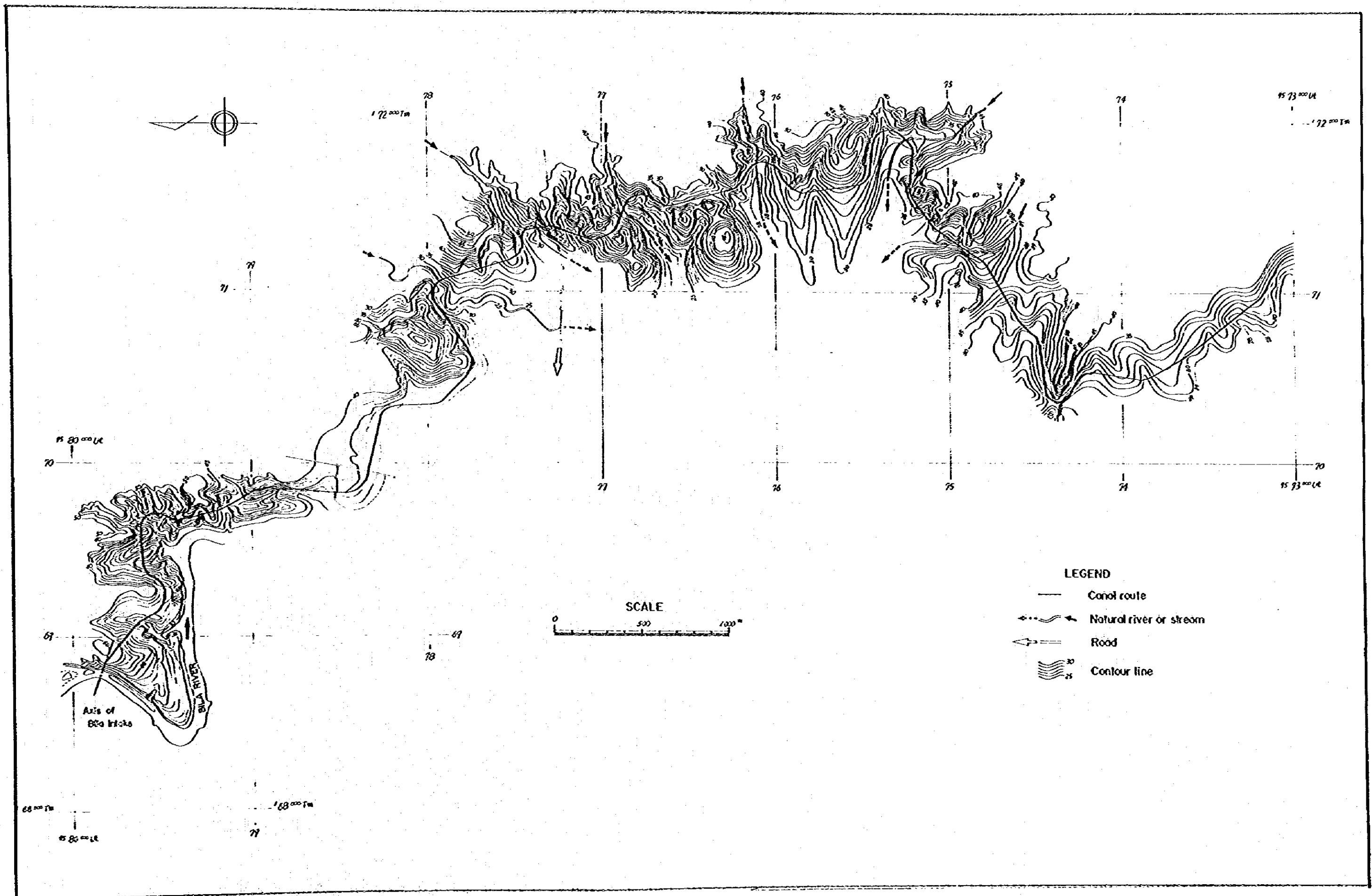


Fig. 4.9 TOPOGRAPHIC SURVEY AND MAIN IRRIGATION ROUTE OF MASTER PLAN (1/3)

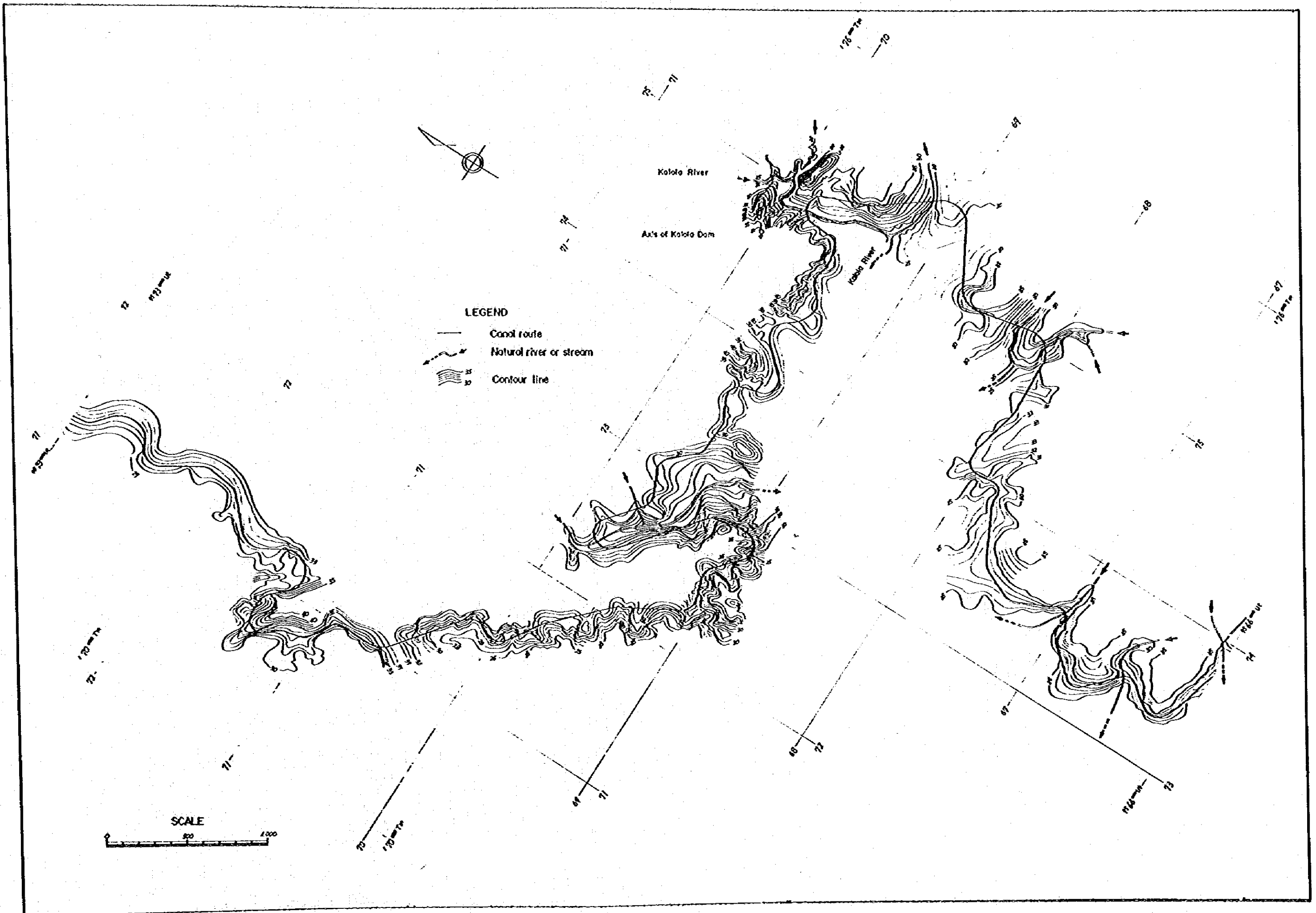


Fig. 4.9 TOPOGRAPHIC SURVEY AND MAIN IRRIGATION ROUTE
OF MASTER PLAN (2/3)

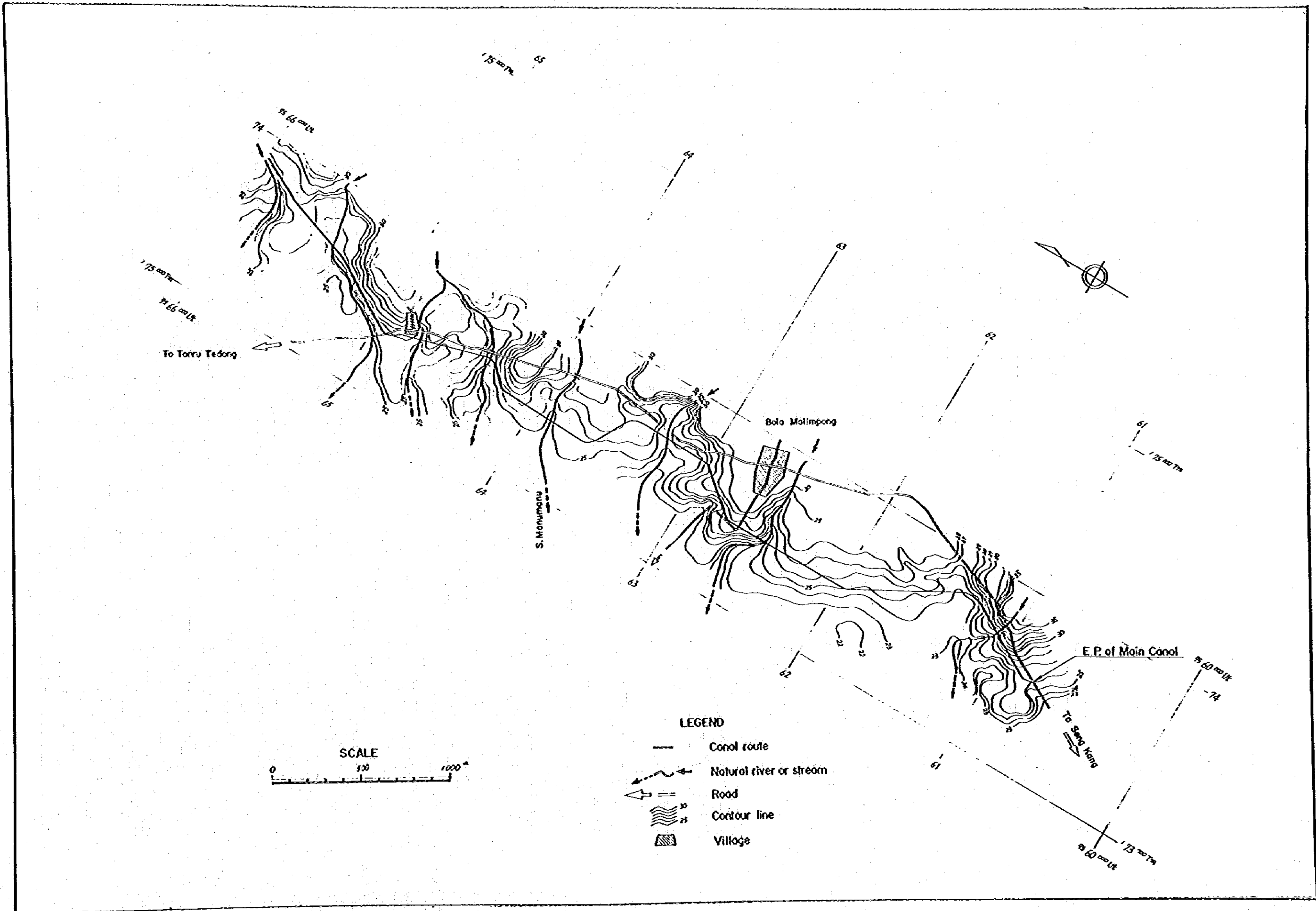


Fig. 4.9 TOPOGRAPHIC SURVEY AND MAIN IRRIGATION ROUTE OF MASTER PLAN (3/3)

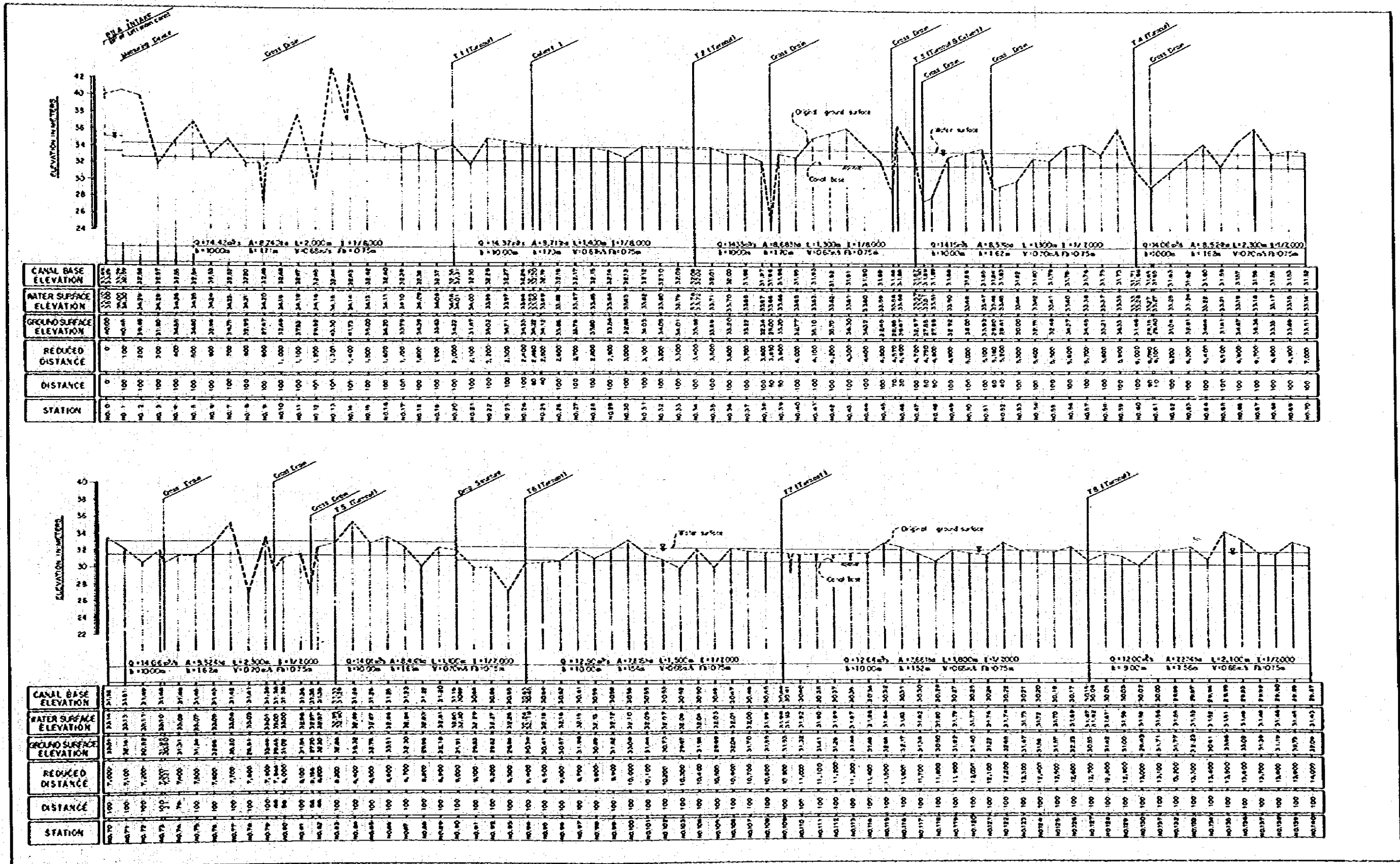


Fig. 4.10 LONGITUDINAL PROFILE OF MAIN IRRIGATION CANAL OF MASTER PLAN (1/3)

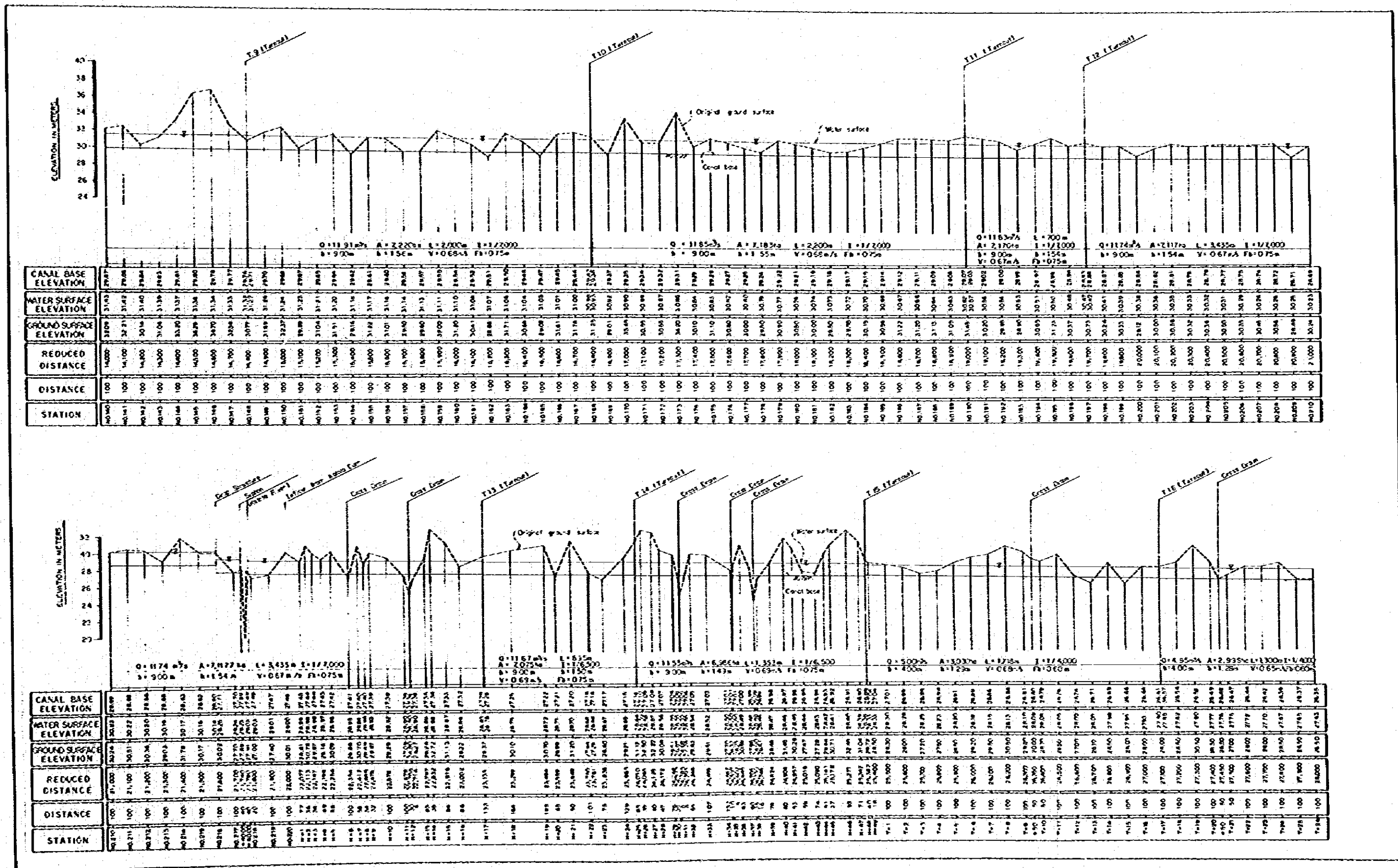


Fig. 4.10 LONGITUDINAL PROFILE OF MAIN IRRIGATION CANAL OF MASTER PLAN (2/3)

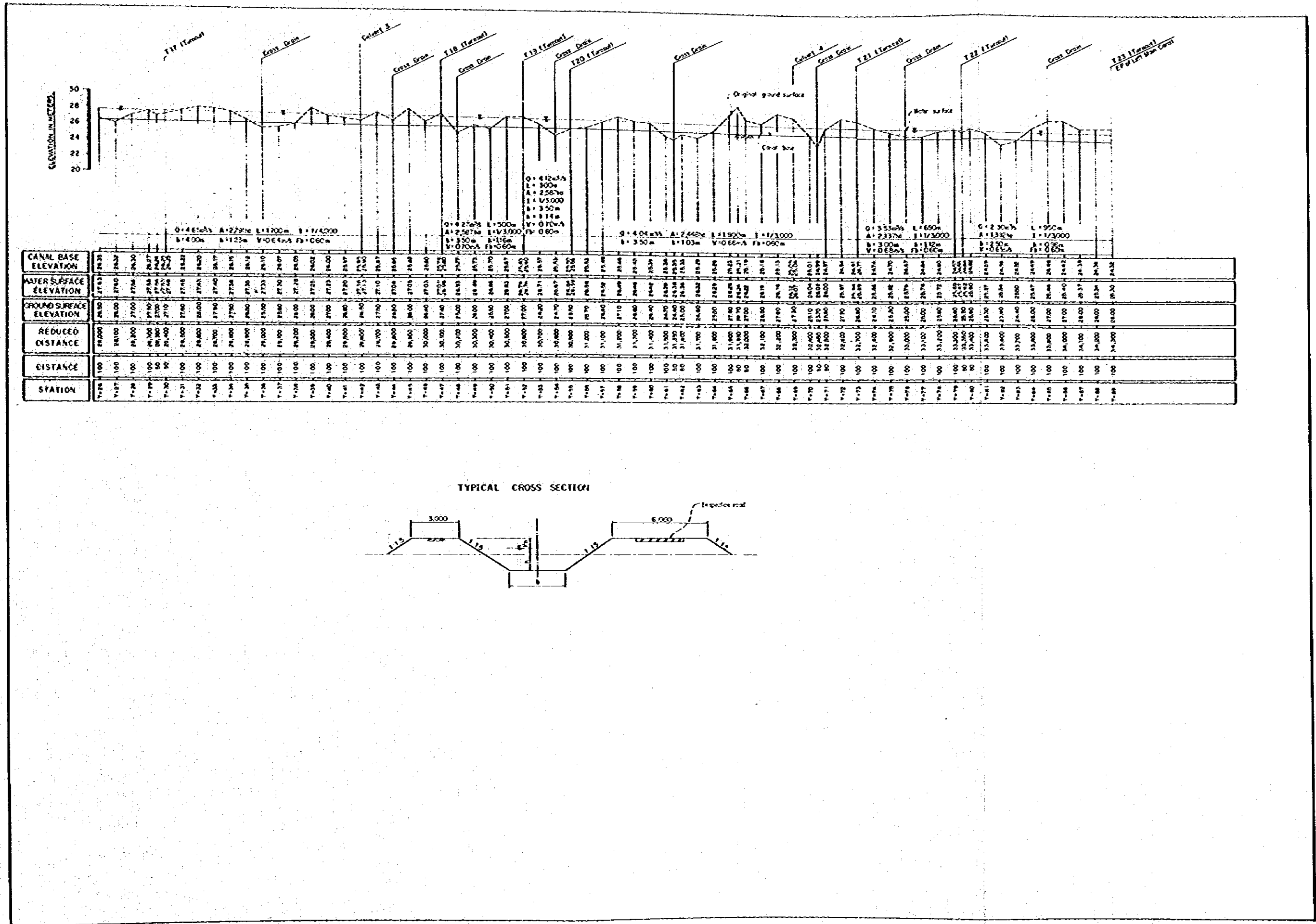


Fig. 4.10 LONGITUDINAL PROFILE OF MAIN IRRIGATION CANAL OF MASTER PLAN (3/3)



Fig. 5.1 ALTERNATIVE BILA DAM SITE

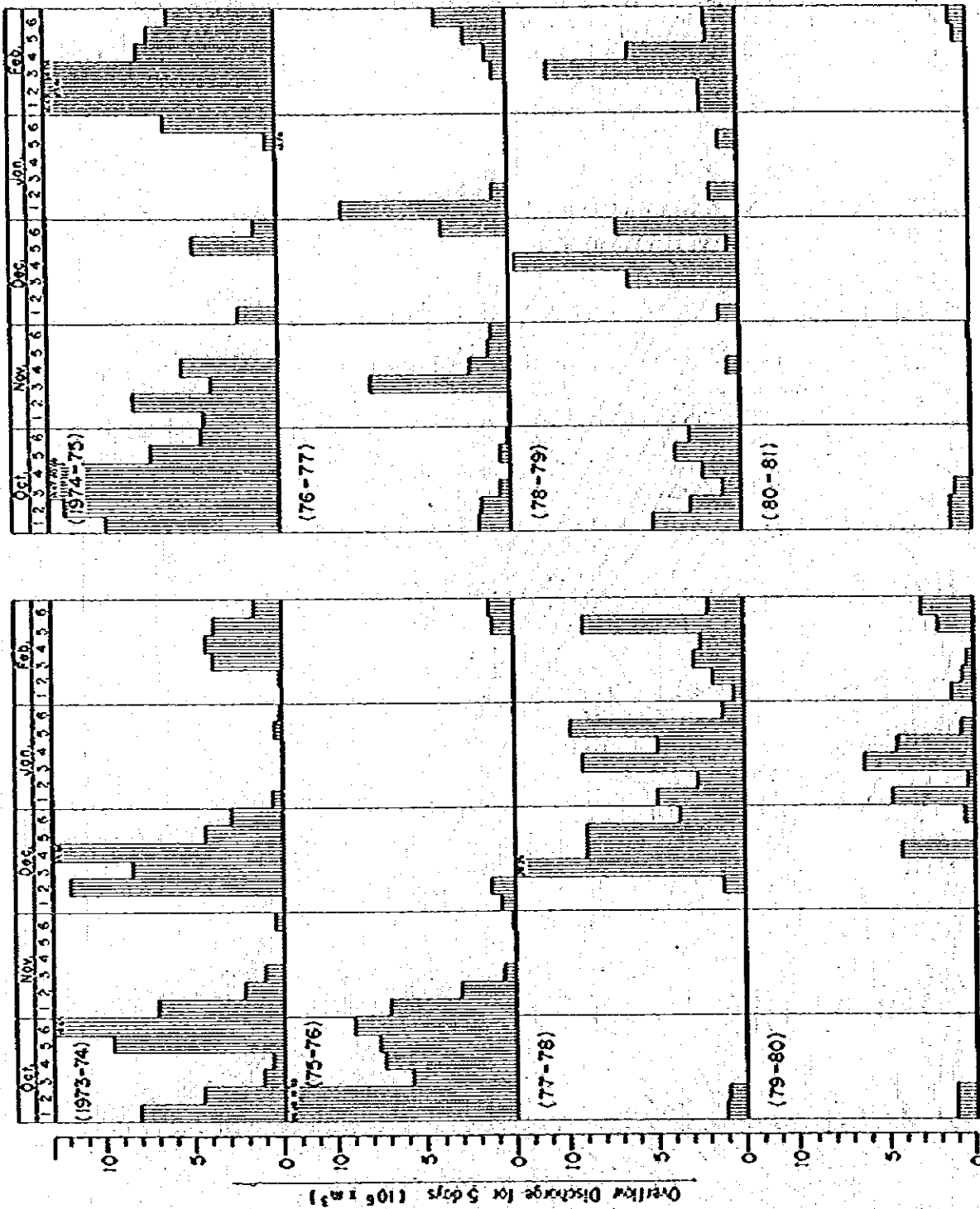


Fig. 5.2 OVERFLOW DISCHARGE IN GROWING PERIOD OF DRY SEASON PADDY
(IN CASE OF INTAKE WEIR PLAN)

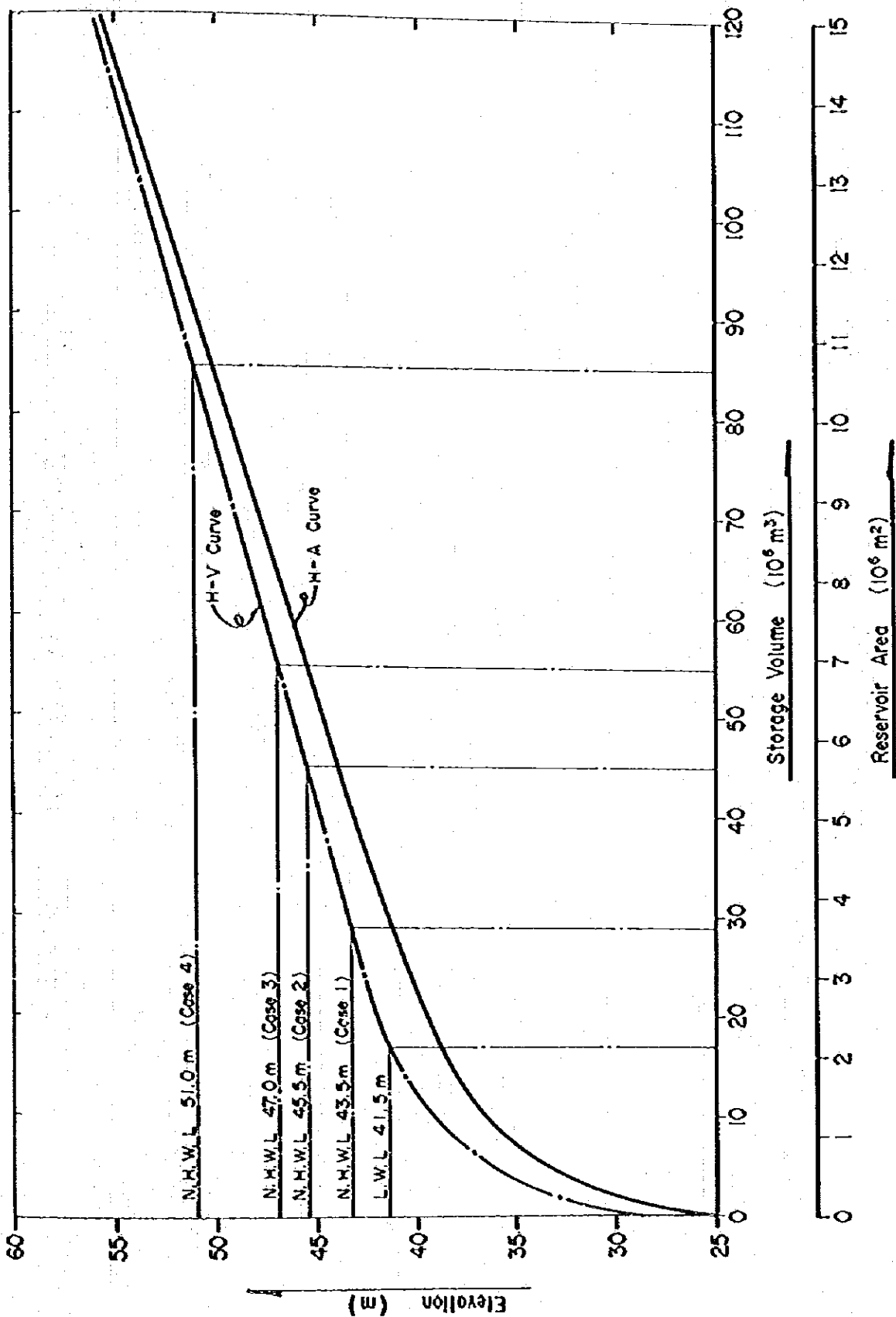


Fig. 5.3 STORAGE CAPACITY AND RESERVOIR AREA CURVE OF ALTERNATIVE BILA RESERVOIR

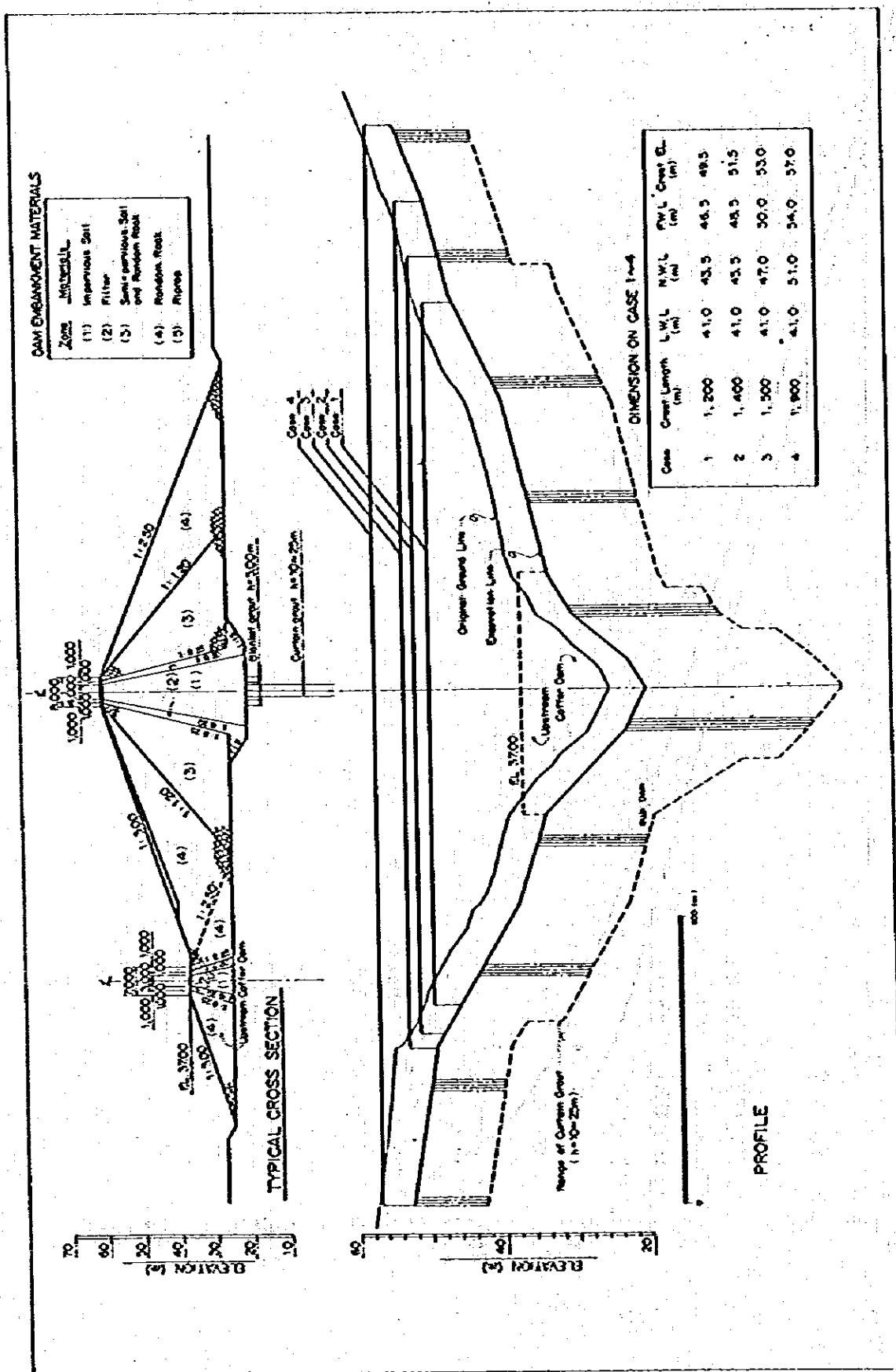


Fig. 5.4 TYPICAL CROSS SECTION AND PROFILE OF ALTERNATIVE BILLA DAM