

TABLE A.3.3-1 INTEGRATED IRRIGATION EFFICIENCY IN AMRIS

Name of Canal	Wet Season			Dry Season			Remarks
	1981	1982	Average	1981	1982	Average	
	S - D	0.373	0.348	0.361	0.479	0.434	
S - E	0.422	0.292	0.357	0.541	0.616	0.579	
S - F	0.300	0.395	0.348	0.539	0.658	0.599	
S - J	0.315	-	0.315	0.345	0.373	0.359	
N - A	0.414	0.283	0.349	0.652	0.530	0.591	
N - B	0.488	0.208	0.348	0.595	0.590	0.593	
N - C	0.218	0.263	0.241	0.487	0.676	0.582	
N - D	0.477	0.223	0.350	0.701	0.666	0.684	
N - E	0.403	0.378	0.391	0.676	0.607	0.642	
N - G	0.273	0.357	0.315	0.648	0.637	0.643	
Average	0.368	0.305	0.337	0.566	0.579	0.573	

Note: The total irrigated area of sample laterals concerned under the study are as follows:

Crop Season	Irrigated	Potential	Proportion
1981 Wet	14,401 ha.	31,485 ha.	45.7 %
1982 Wet	14,029 "	31,485 "	44.6 %
1981 Dry	15,836 "	31,485 "	50.3 %
1982 Dry	15,910 "	31,485 "	50.5 %

TABLE A.3.3-2 CONVEYANCE LOSSES OF LATERAL AND SUB-LATERAL IN AMRIS

Name of W.S.	Area		Turnout W.R.				Conveyance Losses				Ratio		
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	D.W.R.	Dry	Wet
	ha	ha	l/s	l/s	l/s	l/s	l/s	l/s	l/s	l/s	l/s	%	%
1	2,018	2,018	2,071	2,033	56,148	2.15	0.492	0.353	687	493	(2,526)	24.9	19.5
2	2,591	2,572	2,504	2,769	63,390	3.44	0.479	0.381	1,209	962	(3,731)	32.6	25.8
3	2,655	2,684	2,495	2,441	69,209	2.99	0.427	0.385	1,023	922	(3,363)	29.1	27.4
4	3,040	3,040	2,986	3,098	65,180	3.59	0.450	0.382	1,219	1,035	(4,133)	29.0	25.0
5 (South)	2,536	1,717	2,570	1,703	38,088	3.10	0.495	0.358	676	407	(2,110)	20.8	19.3
6	1,833	1,833	1,581	1,687	40,408	2.77	0.452	0.364	586	472	(2,159)	27.0	21.9
7	2,949	1,800	2,726	1,660	66,851	3.24	0.438	0.402	1,098	675	(2,335)	28.7	28.9
8	2,695	1,055	2,526	1,005	44,946	2.81	0.419	0.389	612	317	(1,322)	19.5	24.0
9	2,300	1,365	2,160	1,281	36,924	3.48	0.411	0.400	611	325	(1,606)	22.0	20.2
10	2,222	1,545	2,327	1,589	32,617	3.58	0.402	0.405	543	460	(2,049)	18.9	22.4
11	2,334	2,228	2,406	2,262	32,820	3.00	0.449	0.369	512	449	(2,711)	17.5	16.6
12 (North)	2,028	835	2,090	0,842	29,672	3.02	0.442	0.381	458	249	(1,091)	18.0	22.8
(Total)												21.7	22.4
												24.0	22.8

Note: The figures in parenthesis indicate wet season value.  
Average wetted perimeters are calculated following formula as adjustment

$$W.P = \left( \frac{\text{Wet TWR}}{\text{Dry TWR}} + 1 \right) \times 0.50$$

TABLE A. 3.3-3 AVERAGE RATE OF CONVEYANCE LOSSES BY WORKING STATION

Name of W.S.	Soil Texture	Share of S.T.	Rate of C.L. (m <sup>3</sup> /m <sup>2</sup> /day)		Name of W.S.	Soil Texture	Share of S.T.	Rate of C.L. (m <sup>3</sup> /m <sup>2</sup> /day)	
			Dry	Wet				Dry	Wet
1 (Average)	SiCL	100%	0.492 (0.492)	0.353 (0.353)	7	CL	60	0.402	0.405
2	SiCL	60	0.492	0.353	7	SiC	20	0.518	0.440
2	CL	20	0.402	0.405	(Average)	SiL	20	0.465	0.354
2 (Average)	SiC	20	0.518	0.440	8	SiCL	30	0.492	0.353
3	CL	60	0.402	0.405	8	CL	70	0.402	0.405
3 (Average)	SiL	40	0.465	0.354	(Average)	CL	90	0.402	0.405
4	S L	20	0.547	0.367	9	SiCL	10	0.492	0.353
4	C L	50	0.402	0.405	(Average)	CL	100	0.402	0.405
4 (Average)	SiL	30	0.465	0.354	(Average)	CL	60	0.465	0.354
5	SL	30	0.547	0.367	11	SiL	10	0.492	0.353
5	SiCL	20	0.492	0.353	11	CL	30	0.402	0.405
5 (Average)	SiL	50	0.465	0.354	(Average)	SL	10	0.547	0.367
6	SiL	80	0.465	0.354	12	CL	50	0.402	0.405
6 (Average)	CL	20	0.402	0.405	12	SiL	40	0.465	0.354
			0.452	0.364	(Average)			0.442	0.381

TABLE A.3.3-4 PROPOSED LAND USE AND PLANTING PROGRAM IN AMRIS

(Unit : ha)

Land Use Criteria	Service Area		Planted Area				Total
	Without Project	With Project	Wet Season		Dry Season		
			Without	With	Without	With	
<u>1. Present Service Area</u>							
Pattern A	22,082	19,982	21,255	19,982	20,732	41,987	39,964
B	2,111	2,111	2,111	2,111	603	2,714	4,222
C	0	2,100	0	4,200	0	0	6,300
D	0	2,000	0	2,000	0	0	4,000
E	7,292	5,292	0	5,292	7,292	7,292	5,292
<u>Sub-total</u>	<u>31,485</u>	<u>31,485</u>	<u>23,366</u>	<u>26,193</u>	<u>28,627</u>	<u>51,993</u>	<u>59,778</u>
(Cropping Intensity)	(100.0)	(100.0)	(74.2)	(83.2)	(90.9)	(165.1)	(189.9)
<u>2. Expansion Area</u>							
Pattern A	230	230	230	230	0	230	460
C	150	150	150	300	150	300	450
E	2,021	3,100	0	3,100	2,021	2,021	3,100
<u>Sub-total</u>	<u>2,401</u>	<u>3,480</u>	<u>380</u>	<u>3,630</u>	<u>2,171</u>	<u>2,551</u>	<u>4,010</u>
(Cropping Intensity)	(100.0)	(100.0)	(15.8)	(10.9)	(90.4)	(106.2)	(115.2)
<u>Total</u>	<u>33,886</u>	<u>34,965</u>	<u>23,746</u>	<u>24,573</u>	<u>30,798</u>	<u>54,544</u>	<u>63,788</u>
(Cropping Intensity)	(100.0)	(100.0)	(70.1)	(76.0)	(90.9)	(161.0)	(182.4)

TABLE A.3.3-5 PROPOSED SERVICE AREA OF AMRIS

(Unit : ha)

Name of Blocks	Wet Season		Dry Season		Remarks	Service Area
	Area	Cropping Pattern	Area	Cropping Pattern		
Upper Maasin	2,111	B	2,111	B	Existing Area	2,111
	-	-	900	E	Expansion Area (WS6-Ex.3)	900
<u>Sub-total</u>	<u>2,111</u>		<u>3,011</u>			<u>3,011</u>
Lower Maasin	299	A	299	A	Existing Area	299
	-	-	760	E	"	760
<u>Sub-total</u>	<u>299</u>		<u>1,059</u>			<u>1,059</u>
Third Maasin	-	-	(680)	E	Expansion Area (WS7-Ex.)	680
North Main Canal of Bustos	8,917	A	8,917	A	Existing Area	8,917
	400	C	400	C	"	400
	-	-	2,641	E	"	2,641
	2,000	D	2,000	D	"	2,000
	230	A	230	A	Expansion Area (WS6-Ex.2)	230
	-	-	1,370	E	" (WS8-Ex.2, WS9-Ex)	1,370
	150	C	150	C	" (WS6-Ex.1)	150
	-	-	(1,010)	E	Re-Used Area	1,010
<u>Sub-total</u>	<u>11,697</u>		<u>16,718</u>			<u>16,718</u>
South Main Canal of Bustos	9,480	A	9,480	A	Existing Area	9,480
	1,700	C	1,700	C	"	1,700
	-	-	881	E	"	881
	-	-	150	E	Expansion Area (WS2-Ex, WS5-Ex)	150
<u>Sub-total</u>	<u>11,180</u>		<u>12,211</u>			<u>12,211</u>
Tibagan Pump I.S	1,286	A	1,286	A	Existing Area	1,286
<u>Total</u>	<u>26,573</u>		<u>34,965</u>			<u>34,965</u>
Type A	20,212		20,212			20,212
" B	2,111		2,111			2,111
" C	2,250		2,250			2,250
" D	2,000		2,000			2,000
" E	0		8,392			8,392

Note : In Case-2, parenthesized areas are desucted.

TABLE A.3.3-6 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-A, WET)

MONTH 10 DAYS	MAY			JUN			JUL			AUG			SEP			OCT			NOV			
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
CROPPING PATTERN																						
1. ELEMENT	<p>WR 140</p> <p>NORMAL IRRIGATION</p>																					
PERCENT OF GROWING SEASON	8	17	25	33	41	50	56	67	75	83	92	100										
CROP COEFFICIENT	0.80	0.83	1.04	1.12	1.12	1.20	1.21	1.15	1.01	0.85	0.85											
(Kc)	0.80	0.83	1.04	1.12	1.12	1.20	1.21	1.15	1.01	0.85	0.85											
KE AVERAGE	0.80	0.82	0.95	0.90	0.94	1.01	1.08	1.14	1.16	1.14	1.08	1.01	0.97	0.90	0.85	0.85						
EVAPORATION (E <sub>p</sub> ) (mm/day)	5.0	4.1	4.3	4.3	4.3	4.8	4.8	5.0	5.1	5.6	5.3	4.9	4.7	4.3	4.1	3.8	4.8	4.5	4.5	4.5		
EVAPOTRANSPIRATION (E <sub>t</sub> ) (mm/day)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
Sn + S (mm)	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145		
0.8 x Ep + P (mm/day)	5.9	6.0	6.2	6.2	6.4	6.7	6.7	6.9	7.0	7.5	7.2	6.8	6.6	6.2	6.0	5.7	5.7	5.7	5.7	5.7		
ET + P (mm/day)	5.9	6.0	6.2	6.2	6.4	6.7	6.7	6.9	7.0	7.5	7.2	6.8	6.6	6.2	6.0	5.7	5.7	5.7	5.7	5.7		
2. EQUATION																						
LAND SOAKING	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5		
LAND PREPARATION	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5		
NORMAL IRRIGATION	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5		
3. WATER REQUIREMENT																						
LAND SOAKING (mm)	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	
LAND PREPARATION (mm)	11.8	11.8	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	
NORMAL IRRIGATION (mm)	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	
10 days TOTAL (mm)	29.0	40.8	53.2	65.2	76.8	65.0	67.0	69.0	70.0	75.0	72.0	68.0	66.0	62.0	60.0	57.0	57.0	57.0	57.0	57.0	57.0	
MONTHLY TOTAL (mm)	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	123.0	
FLDP (mm)	50.0	100.0	116.0	132.0	146.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	
FWL (mm)	4.0	8.0	12.0	16.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
ALLOWABLE FLOODING DEPTH	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
STANDING WATER LEVEL (mm)	15.0	12.0	8.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

TABLE A.3.3-7 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-A, DRY)

MONTH 10 DAYS	OCT			NOV			DEC			JAN			FEB			MAR			APR			MAY		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN																								
ELEMENT	<p>PERCENT OF GROWING SEASON</p> <p>0.80 0.83 0.93 1.04 1.12 1.12 1.20 1.21 1.15 1.01 0.85 1.085</p> <p>0.80 0.83 0.93 1.04 1.12 1.12 1.20 1.21 1.15 1.01 0.85 1.085</p> <p>0.80 0.83 0.93 1.04 1.12 1.12 1.20 1.21 1.15 1.01 0.85 1.085</p> <p>0.80 0.83 0.93 1.04 1.12 1.12 1.20 1.21 1.15 1.01 0.85 1.085</p>																							
CROP COEFFICIENT (Kc)	<p>0.60 0.82 0.85 0.90 0.94 1.01 1.08 1.14 1.16 1.14 1.08 1.01 0.97 0.80 0.85 0.85</p>																							
Kc AVERAGE	4.5																							
EVAPORATION (E <sub>p</sub> , mm/day)	3.6 3.7 3.8 3.8 3.9 4.2 4.8 5.1 5.2 5.7 5.4 5.1 6.0 5.6 5.3 5.8																							
EVAPOTRANSPIRATION (E <sub>t</sub> , mm/day)	1.6																							
PERCOLATION (P, mm/day)	1.6																							
S <sub>n</sub> + S (mm)	1.6																							
0.8 x E <sub>p</sub> + P (mm/day)	5.2																							
E <sub>t</sub> + P (mm/day)	5.2 5.3 5.4 5.4 5.5 5.8 6.0 6.7 6.8 7.3 7.0 6.7 7.6 7.2 6.9 7.4																							
EQUATION	<p>LAND SOAKING: 1/5 1/5 1/5 1/5 1/5 1/5</p> <p>LAND PREPARATION: 1/5 1/5 1/5 1/5 1/5 1/5</p> <p>NORMAL IRRIGATION: 1/5 2/5 3/5 4/5 5/5</p>																							
WATER REQUIREMENT	<p>LAND SOAKING (mm): 23.2 25.2 23.2 23.2 23.2</p> <p>LAND PREPARATION (mm): 10.4 10.4 10.0 10.0 10.0</p> <p>NORMAL IRRIGATION (mm): 10.8 21.6 33.0 46.4 60.0 67.0 68.0 73.0 70.0 67.0 67.0 70.0 67.0 60.8 43.2 27.6 14.8</p>																							
10 days TOTAL (mm)	23.2 35.6 44.4 54.8 66.2 76.4 85.0 67.0 68.0 73.0 70.0 67.0 60.8 43.2 27.6 14.8																							
MONTHLY TOTAL (mm)	101.2 177.4 200.0 210.0																							
FLDP (mm)	50.0 100.0 115.0 132.0 148.0 164.0 80.0 90.0 90.0 80.0 80.0 80.0 64.0 48.0 32.0 16.0																							
WWL (mm)	4.0 8.0 12.0 16.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 16.0 12.0 8.0 4.0																							
	<p>(S<sub>n</sub> + S) x Equation</p> <p>(0.8 x E<sub>p</sub> + P) x Equation</p> <p>(E<sub>t</sub> + P) x Equation</p>																							

TABLE A.3.3-8 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-B, WET)

MONTH 10 DAYS	MAY			JUN			JUL			AUG.			SEP.			OCT.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN																		
ELEMENT																		
PERCENT OF GROWING SEASON																		
CROP COEFFICIENT (Kc)																		
Kc AVERAGE																		
EVAPORATION (E <sub>p</sub> , mm/day)																		
EVAPOTRANSPIRATION (E <sub>t</sub> , mm/day)																		
PERCOLATION (P, mm/day)																		
S <sub>n</sub> + S (mm)																		
0.8 x E <sub>p</sub> + P (mm/day)																		
ET + P (mm/day)																		
2. EQUATION																		
LAND SOAKING																		
LAND PREPARATION																		
NORMAL IRRIGATION																		
3. WATER REQUIREMENT																		
LAND SOAKING (mm)																		
LAND PREPARATION (mm)																		
NORMAL IRRIGATION (mm)																		
10 days TOTAL (mm)																		
MONTHLY TOTAL (mm)																		
4. FLDP (mm)																		
WWL (mm)																		

L.S.; LAND SOAKING  
L.P.; LAND PREPARATION  
T.D.; TERMINAL DRAINAGE

S<sub>n</sub>; Soil Saturation Req.  
S; Standing Water

(S<sub>n</sub> + S) x Equation  
(0.8 x E<sub>p</sub> + P) x 10 x Equation  
(ET + P) x 10 x Equation

FLDP, ALLOWABLE FLOODING DEPTH  
WWL, STANDING WATER LEVEL (MIN)



TABLE A.3.3-9 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-B, DRY)

MONTH 10 DAYS	SEP			OCT			NOV			DEC			JAN			FEB		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN																		
ELEMENT																		
PERCENT OF GROWING SEASON				10	20	30	40	50	60	70	80	90	100					
CROP COEFFICIENT				0.90	0.93	0.93	1.04	1.12	1.20	1.21	1.15	1.01	0.85					
(Kc)				0.90	0.83	0.93	1.04	1.12	1.20	1.21	1.15	1.01	0.85					
				0.80	0.83	0.93	1.04	1.12	1.20	1.21	1.15	1.01	0.85					
Kc AVERAGE				0.80	0.82	0.85	0.93	1.03	1.12	1.18	1.19	1.12	1.00	0.93	0.85			
EVAPORATION (Ep,mm/day)				4.8			4.5			4.2			4.5					
EVAPOTRANSPIRATION (E <sub>p</sub> +P,mm/day)				3.8	3.9	4.1	4.2	4.6	5.0	5.0	5.0	4.7	4.5	4.2	3.8			
PERCOLATION (P,mm/day)				1.6			1.5			1.6			1.6					
Sr + S (mm)				11.6														
0.8 x Ep + P (mm/day)				5.4			5.2			5.0			5.2					
ET + P (mm/day)				5.4	5.5	5.7	5.8	6.2	6.6	6.6	6.6	6.3	6.1	5.8	5.4			
2. EQUATION																		
LAND SOAKING				1/3	1/3	1/3												
LAND PREPARATION				1/3	1/3	1/3												
NORMAL IRRIGATION				1/3	2/3	3/3							3/3	2/3	1/3			
3. WATER REQUIREMENT																		
LAND SOAKING (mm)				38.7	38.7	38.7												
LAND PREPARATION (mm)				38.0	38.0	38.0												
NORMAL IRRIGATION (mm)				19.0	38.7	52.0	66.0	66.0	66.0	66.0	66.0	63.0	61.0	58.7	48.0			
10 days TOTAL (mm)				38.7	56.7	75.7	56.0	62.0	66.0	66.0	66.0	63.0	61.0	58.7	48.0			
MONTHLY TOTAL (mm)				171.1			184.0			195.0			117.7					
4. FLDP (mm)				63.3	66.7	133.3	136.7	90.0	90.0	90.0	90.0	80.0	90.0	53.4	26.7			
WWL (mm)				6.7	13.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	13.4	6.7			

L.S.; LAND SOAKING  
L.P.; LAND PREPARATION  
T.D.; TERMINAL DRAINAGE

Sr; Soil Saturation Req.  
S; Standing Water

(Sr+S) x Equation  
(0.8 x Ep + P) x 10 x Equation  
(ET + P) x 10 x Equation

FLDP; ALLOWABLE FLOODING DEPTH  
WWL; STANDING WATER LEVEL (MM)

TABLE A.3.3-10 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-C, WET)

MONTH 10 DAYS	MAY			JUN			JUL			AUG			SEP			OCT			NOV				
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		
CROPPING PATTERN																							
1. ELEMENT	<p>L.S.; LAND SOAKING L.P.; LAND PREPARATION T.D.; TERMINAL DRAINAGE</p>																						
PERCENT OF GROWING SEASON	8	17	25	33	41	50	58	67	75	83	92	100											
CROP COEFFICIENT	0.90	0.83	0.93	1.04	1.12	1.12	1.20	1.21	1.15	1.01	0.85	0.85											
	0.80	0.83	0.93	1.04	1.12	1.12	1.20	1.21	1.15	1.01	0.85	0.85											
(Kc)	0.80	0.83	0.93	1.04	1.12	1.12	1.20	1.21	1.15	1.01	0.85	0.85											
Kc AVERAGE	0.80	0.82	0.85	0.93	1.03	1.09	1.15	1.18	1.19	1.12	1.00	0.90	0.85	0.85									
EVAPORATION (Ep, mm/day)	5.0												4.4			4.9			4.8				
EVAPOTRANSPIRATION (E, mm/day)	4.0	4.1	4.3	4.5	4.9	5.2	5.1	5.2	5.2	5.5	4.9	4.4	4.1	4.1									
PERCOLATION (P, mm/day)	1.9												1.9			1.9			1.9				
Sh + S (mm)	145												5.4			5.8			5.7				
0.8 x Ep + P (mm/day)	5.9												5.4			5.8			5.7				
ET + P (mm/day)	5.9	6.0	6.2	6.4	6.8	7.1	7.0	7.1	7.1	7.4	6.8	6.3	5.0	6.0									
2. EQUATION																							
LAND SOAKING	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3		
LAND PREPARATION	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3		
NORMAL IRRIGATION	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3		
3. WATER REQUIREMENT																							
LAND SOAKING (mm)	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3		
LAND PREPARATION (mm)	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7		
NORMAL IRRIGATION (mm)	20.7	42.7	69.0	71.0	70.0	71.0	70.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0		
10 days TOTAL (mm)	48.3	69.0	98.7	61.7	69.0	71.0	70.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0		
MONTHLY TOTAL (mm)	205.0											200.7			212.0			205.0			60.0		
4. FLDP (mm)	83.3	166.8	183.3	196.7	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0		
WWL (mm)	6.7	13.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0		
ALLOWABLE FLOODING DEPTH WWL Standing Water Level (MIN)																							

TABLE A.3.3-11 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-C, DRY)

MONTH 10 DAYS	OCT			NOV			DEC			JAN			FEB		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN															
1. ELEMENT	14														
PERCENT OF GROWING SEASON	0.54   0.65   0.89   1.05   1.09   1.05   0.95														
CROP COEFFICIENT (Kc)	0.54   0.65   0.89   1.05   1.09   1.05   0.95														
Kc AVERAGE	0.54   0.60   0.77   0.97   1.07   1.07   1.00   0.95														
EVAPOTRANSPIRATION (E <sub>p</sub> , mm/day)	3.5														
EVAPOTRANSPIRATION (ET, mm/day)	1.9   2.1   2.5   3.1   3.4   3.4   3.2   3.0														
PERCOLATION (P, mm/day)															
Sh + S (mm)															
0.8 x Ep + P (mm/day)															
ET + P (mm/day)															
2. EQUATION															
LAND SOAKING															
LAND PREPARATION															
NORMAL IRRIGATION	1/2 x 0.72 x 0.7														
3. WATER REQUIREMENT															
LAND SOAKING (mm)															
LAND PREPARATION (mm)															
NORMAL IRRIGATION (mm)	6.7   14.7   17.5   21.7   23.8   23.8   22.4   10.5														
10 days TOTAL (mm)	6.7   14.7   17.5   21.7   23.8   23.8   22.4   10.5														
MONTHLY TOTAL (mm)	21.4   63.0   56.7														

L.P.; LAND PREPARATION  
T.D.; TERMINAL DRAINAGE

ET x 10 x Equation

TABLE A.3.3-12 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-C, DRY)

MONTH 10 DAYS	OCT.			NOV.			DEC.			JAN.			FEB.			MAR.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN																		
1. ELEMENT																		
PERCENT OF GROWING SEASON	<p>14 28 42 56 70 84 100</p>																	
CROP COEFFICIENT (Kc)	<p>0.54 0.65 0.83 0.97 1.00 0.90 0.65</p> <p>0.54 0.65 0.83 0.97 1.00 0.90 0.65</p>																	
Kc AVERAGE	0.54 0.60 0.74 0.90 0.99 1.05 0.78 0.65																	
P. EVAPOTRANSPIRATION (ETo, mm/day)	3.6																	
EVAPOTRANSPIRATION (ET, mm/day)	1.9 2.1 2.6 2.9 3.2 3.0 2.5 2.1																	
PERCOLATION (P, mm/day)																		
Sn + S (mm)																		
0.8 x Ep + P (mm/day)																		
ET + P (mm/day)																		
2. EQUATION																		
LAND SOAKING																		
LAND PREPARATION																		
NORMAL IRRIGATION	<p>1/2 x 0.3 1/2 x 0.3</p> <p>2 x 0.3 1/2 x 0.3</p>																	
3. WATER REQUIREMENT																		
LAND SOAKING (mm)																		
LAND PREPARATION (mm)																		
NORMAL IRRIGATION (mm)	2.9 6.3 7.8 8.7 9.6 9.0 7.5 3.2																	
10 days TOTAL (mm)	2.9 6.3 7.8 8.7 9.6 9.0 7.5 3.2																	
MONTHLY TOTAL (mm)	17.0 27.3 10.7																	

L.P.; LAND PREPARATION  
T.D.; TERMINAL DRAINAGE

ET x 10 x EQUATION

TABLE A.3.3-13 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN - C, DRY)

MONTH	JAN.			FEB.			MAR.			APR.			MAY			JUN						
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3				
CROPPING PATTERN																						
1. ELEMENT																						
PERCENT OF GROWING SEASON																						
	10	20	30	40	50	60	70	80	90	100												
CROP COEFFICIENT (Kc)	0.50	0.59	0.75	0.93	1.07	1.10	1.05	0.95	0.77	0.55												
	0.50	0.59	0.75	0.93	1.07	1.10	1.05	0.95	0.77	0.55												
Kc AVERAGE																						
EVAPOTRANSPIRATION (ETo, mm/day)																						
EVAPOTRANSPIRATION (ET, mm/day)	3.2																					
PERCOLATION (P, mm/day)	1.6	2.3	2.7	3.4	4.8	5.2	5.2	5.3	4.6	3.5	2.7											
Sn + S (mm)																						
0.8 x Ep + P (mm/day)																						
ET + P (mm/day)																						
2. EQUATION																						
LAND SOAKING																						
LAND PREPARATION																						
NORMAL IRRIGATION																						
3. WATER REQUIREMENT																						
LAND SOAKING (mm)																						
LAND PREPARATION (mm)																						
NORMAL IRRIGATION (mm)	3.7	10.7	16.9	23.8	33.6	36.4	36.4	37.1	32.2	16.3	6.3											
10 days TOTAL (mm)	3.7	10.7	16.9	23.8	33.6	36.4	36.4	37.1	32.2	16.3	6.3											
MONTHLY TOTAL (mm)	3.7	53.4										106.4										

T.D.; TERMINAL DRAINAGE

Sn ; SOIL SATURATION REQ.  
S ; STANDING WATER

(Sn + S) x EQUATION  
(0.8 x Ep + P) x 10 x EQUATION  
(ET + P) x 10 x EQUATION  
ET x 10 x EQUATION

TABLE A.3.3-14 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-C, DRY)

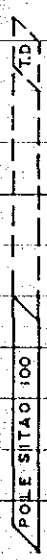
MONTH	JAN.			FEB.			MAR.			APR.			MAY			JUN.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN	POLE SITAO 100 																	
1. ELEMENT																		
PERCENT OF GROWING SEASON	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	10.0									
CROP COEFFICIENT (Kc)	0.54	0.59	0.62	0.60	0.91	0.98	1.00	0.94	0.85									
	0.54	0.59	0.68	0.80	0.91	0.98	1.00	0.94	0.85									
Kc AVERAGE	0.54	0.57	0.64	0.74	0.86	0.95	0.99	0.97	0.90	0.85								
P. EVAPOTRANSPIRATION (ETc, mm/day)	3.2	4.1																
EVAPOTRANSPIRATION (ET, mm/day)	1.7	2.3	2.6	3.0	4.1	4.6	4.8	5.1	4.8	4.5	4.9							
PERCOLATION (P, mm/day)																		
Sn + S (mm)																		
0.8 x Ep + P (mm/day)																		
ET + P (mm/day)																		
2. EQUATION																		
LAND SOAKING																		
LAND PREPARATION																		
NORMAL IRRIGATION	$\frac{1}{2} \times 0.3 \times 100$																	
3. WATER REQUIREMENT																		
LAND SOAKING (mm)																		
LAND PREPARATION (mm)																		
NORMAL IRRIGATION (mm)	2.6	6.9	7.8	9.0	12.3	13.8	14.4	15.3	14.4	6.8	$\frac{1}{2} \times 0.3 \times 100$							
10 days TOTAL (mm)																		
MONTHLY TOTAL (mm)	2.6	6.9			7.8	9.0	12.3	13.8	14.4	15.3	14.4	6.8	40.5			36.5		

TABLE A.3.3-15 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-C, DRY)

MONTH K DAYS	OCT.			NOV.			DEC.			JAN.			FEB.			MAR.			APR.			MAY		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN																								
	<p>1. ELEMENT</p> <p>PERCENT OF GROWING SEASON</p> <p>CROP</p> <p>COEFFICIENT (Kc)</p>																							
<p>2. EQUATION</p>																								
GREEN CORN	0.35 0.7																							
WATERMELON	0.15 0.30																							
YELLOW CORN	0.25 0.46 0.70																							
POLE SITAO	0.15 0.30																							
TOTAL	0.15 0.65 1.0 1.0 1.0 1.0 1.0 0.88 0.73 0.76 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.61 0.23																							
<p>3. WATER REQUIREMENT</p>																								
GREEN CORN	6.7 14.7 17.5 21.7 23.8 23.8 22.4 10.5																							
WATERMELON	2.9 6.3 7.8 8.7 9.6 9.0 7.5 3.2																							
YELLOW CORN	3.7 10.7 18.9 23.8 33.6 36.4 36.4 37.1 32.2 16.3 6.3																							
POLE SITAO	2.6 6.9 7.8 9.0 12.3 13.8 14.4 15.3 14.4 6.8																							
10days TOTAL (mm)	2.9 13.0 22.5 26.2 31.3 32.8 31.3 28.6 16.8 17.8 26.7 32.8 45.9 50.2 50.8 52.4 46.6 28.1 6.3																							
MONTHLY TOTAL (mm)	38.4 26.0 40.0 40.0 40.0 40.0 40.0 40.0 34.0 29.2 30.4 40.0 40.0 40.0 40.0 40.0 40.0 40.0 40.0 40.0 24.4 9.2																							
4. TRAM (mm)	TRAM - Total Readily Available Moisture																							

TABLE A.3.3-16 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-D, WET)

MONTH 10 DAYS	FEB			MAR			APR			MAY			JUN			JUL		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN																		
1. ELEMENT	L. S.; LAND SOAKING																	
PERCENT OF GROWING SEASON	L. P.; LAND PREPARATION																	
CROP COEFFICIENT	T. D.; TERMINAL DRAINAGE																	
(Kc)																		
Kc AVERAGE																		
EVAPORATION (E <sub>p</sub> , mm/day)																		
EVAPOTRANSPIRATION (E <sub>t</sub> , mm/day)																		
PERCOLATION (P, mm/day)																		
S <sub>n</sub> + S (mm)																		
0.8 x EP + P (mm/day)																		
ET + P (mm/day)																		
2. EQUATION	S <sub>n</sub> ; SOIL SATURATION REQ.																	
LAND SOAKING	S; STANDING WATER																	
LAND PREPARATION																		
NORMAL IRRIGATION																		
3. WATER REQUIREMENT	(S <sub>n</sub> +S) x EQUATION																	
LAND SOAKING (mm)	(0.8 x EP + P) x 10 x EQUATION																	
LAND PREPARATION (mm)	(ET + P) x 10 x EQUATION																	
NORMAL IRRIGATION (mm)																		
10 days TOTAL (mm)																		
MONTHLY TOTAL (mm)																		
4. FLDP (mm)	FLDP; ALLOWABLE FLOODING DEPTH																	
WWL (mm)	WWL; STANDING WATER LEVEL (MIN)																	



TABLE A.3.3-17 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN-D, DRY)

MONTH 10 DAYS	OCT.			NOV.			DEC.			JAN.			FEB.			MAR.					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
CROPPING PATTERN																					
1. ELEMENT	L.S.; LAND SOAKING																				
PERCENT OF GROWING SEASON	L.P.; LAND PREPARATION																				
CROP COEFFICIENT	T.D.; TERMINAL DRAINAGE																				
(Kc)																					
Kc AVERAGE	0.80	0.82	0.85	0.93	1.03	1.12	1.18	1.19	1.12	1.00	0.93	0.85									
EVAPORATION (Ep, mm/day)	4.8			4.5			4.2			4.5			5.0								
EVAPOTRANSPIRATION (ET, mm/day)	3.8	3.9	3.8	4.2	4.6	4.7	5.0	5.0	5.0	4.5	4.2	4.3									
PERCOLATION (P, mm/day)	1.6			1.6			1.6			1.6			1.6								
Sn + S (mm)	116												5.6								
0.8 x Ep + P (mm/day)	5.4			5.2			5.0			5.2			5.6								
ET + P (mm/day)	5.4	5.5	5.4	5.8	6.2	6.3	6.6	6.6	6.6	6.1	5.8	5.9									
2. EQUATION																					
LAND SOAKING	1/3			1/3			1/3			1/3			1/3			1/3					
LAND PREPARATION	1/3			1/3			1/3			1/3			1/3			1/3					
NORMAL IRRIGATION	1/3			2/3			3/3			3/3			2/3			1/3					
3. WATER REQUIREMENT																					
LAND SOAKING (mm)	38.7			38.7			38.7			38.7			38.7			38.7					
LAND PREPARATION (mm)	18.0			17.3			17.3			17.3			17.3			17.3					
NORMAL IRRIGATION (mm)	18.0			38.7	62.0	65.0	66.0	66.0	66.0	61.0	56.7	19.7									
10 days TOTAL (mm)	38.7	56.7	74.0	56.0	62.0	63.0	66.0	66.0	66.0	61.0	56.7	19.7									
MONTHLY TOTAL (mm)	95.4			192.0			195.0			165.7			19.7								
4. F.L.D.P. (mm)	63.3	166.6	193.3	126.7	80.0	80.0	80.0	80.0	80.0	80.0	53.4	26.7							F.L.D.P.; ALLOWABLE FLOODING DEPTH		
W.W.L. (mm)	6.7	13.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	13.4	6.7							W.W.L.; STANDING WATER LEVEL (MIN.)		

TABLE A.3.3-18 FIELD IRRIGATION REQUIREMENT (PROPOSED, PATTERN - E, DRY)

MONTH 10 DAYS	OCT.			NOV.			DEC.			JAN.			FEB.			MAR.			APR.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CROPPING PATTERN																					
1. ELEMENT	L.S.; LAND SOAKING L.P.; LAND PREPARATION T.D.; TERMINAL DRAINAGE																				
PERCENT OF GROWING SEASON	8 17 25 33 41 50 56 67 75 83 92 100																				
CROP	0.80 0.83 0.93 1.04 1.12 1.20 1.21 1.15 1.01 0.85 0.85																				
COEFFICIENT (Kc)	0.80 0.83 0.93 1.04 1.12 1.20 1.21 1.15 1.01 0.85 0.85																				
Kc AVERAGE	0.80 0.82 0.85 0.90 0.94 1.01 1.08 1.14 1.16 1.14 1.08 1.01 0.97 0.90 0.85 0.85																				
EVAPORATION (Ep, mm/day)	4.8																				
EVAPOTRANSPIRATION (ET, mm/day)	3.6 3.7 3.8 4.1 3.9 4.2 4.5 5.1 5.2 5.1 5.4 5.1 4.9 5.6 5.3 5.3																				
PERCOLATION (P, mm/day)	1.6																				
Sn + S (mm)	116																				
0.8 x Ep + P (mm/day)	5.4																				
ET + P (mm/day)	5.4 5.3 5.4 5.7 5.5 5.8 6.1 6.7 6.8 6.7 7.0 6.7 6.5 7.2 6.9 6.9																				
2. EQUATION																					
LAND SOAKING	1/5 1/5 1/5 1/5 1/5																				
LAND PREPARATION	1/5 1/5 1/5 1/5 1/5																				
NORMAL IRRIGATION	1/5 2/5 3/5 4/5 5/5																				
3. WATER REQUIREMENT																					
LAND SOAKING (mm)	23.2 23.2 23.2 23.2 23.2																				
LAND PREPARATION (mm)	10.4 10.4 10.4 10.4 10.4																				
NORMAL IRRIGATION (mm)	10.8 22.8 35.0 48.4 61.0 67.0 69.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0																				
10 days TOTAL (mm)	23.2 35.6 44.4 56.4 66.2 56.4 61.0 67.0 68.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0																				
MONTHLY TOTAL (mm)	23.2 134.4 183.6 202.0 189.0 84.6																				
4. FLD.P (mm)	50.0 100.0 116.0 132.0 148.0 114.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0 80.0																				
W.W.L. (mm)	4.0 8.0 12.0 16.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0																				
	FLD.P; ALLOWABLE FLOODING DEPTH W.W.L; STANDING WATER LEVEL (MIN)																				

TABLE A.3.3-19 ANNUAL TOTAL OF EFFECTIVE RAINFALL (PROPOSED CONDITION)

(Unit: MM)

Type Year	Wet Season				Dry Season				Total of Actual Rainfall	
	A	B	C	D	A	B	{Up land Crops}	D		E
1972	900.0	854.2	952.1	266.2	170.2	169.9	154.8	161.6	195.3	3.338.3
1973	884.7	607.0	792.3	178.5	331.1	403.6	110.3	269.3	177.6	1.729.7
1974	726.8	690.7	724.3	233.9	488.9	578.9	210.0	508.9	396.9	2.453.9
1975	895.4	691.9	889.3	122.8	287.1	357.5	99.3	233.9	168.3	1.654.8
1976	929.3	772.0	890.2	257.2	162.8	162.8	68.5	123.9	117.5	2.383.8
1977	838.0	763.5	813.7	171.2	227.8	149.5	77.1	201.8	195.2	1.813.8
1978	764.9	732.9	726.4	177.6	267.3	372.2	70.3	317.0	125.2	2.088.8
1979	705.9	556.6	656.1	161.1	142.1	142.1	23.0	117.8	80.4	1.173.8
1980	730.3	532.3	622.1	211.3	181.8	171.2	76.8	181.3	167.8	1.570.2
1981	714.1	603.7	635.9	58.6	200.5	163.1	31.6	200.5	168.3	975.5
1982	833.1	768.2	869.1	220.9	111.9	111.9	61.9	109.7	79.4	1.444.1
Average	811.1	688.5	779.2	187.2	233.8	253.0	89.4	220.5	170.2	1.875.2
Ratio	43.3	36.7	41.6	10.0	12.5	13.5	4.8	11.8	9.1	100.0

TABLE A.3.3-20 ANNUAL DIVERSION WATER REQUIREMENT  
(ALTERNATIVE CASE-1)

(Unit: MCM)

Year	Maasim			Angat Main		Tibagan P.I.P.	Total	Remarks
	Upper	Lower	Third	North	South			
1972	33.0	12.2	7.6	210.3	140.8	15.8	419.7	Irrigation Efficiency = 0.60
1973	26.8	11.3	7.1	195.8	133.5	14.4	388.9	
1974	18.4	9.0	5.0	175.1	133.2	14.8	355.5	
1975	27.2	11.7	7.3	204.6	135.7	15.1	401.6	Service Area (ha)
1976	33.7	12.8	8.0	219.0	149.6	16.5	439.6	Wet 26,573
1977	32.5	11.6	7.1	209.2	143.6	15.9	419.9	Dry 34,965
1978	28.0	13.6	7.9	244.4	183.5	20.6	498.0	
1979	42.4	14.4	8.4	262.3	194.0	21.5	543.0	
1980	41.1	13.1	7.5	241.5	181.7	20.1	505.0	
1981	38.3	13.0	7.4	247.7	183.8	20.4	510.6	
1982	36.9	13.7	8.4	236.6	164.3	18.3	478.2	
Average	32.6	12.4	7.4	222.4	158.5	17.6	450.9	
Max.	42.4	14.4	8.4	262.3	194.0	21.5	543.0	
Min.	18.4	9.0	5.0	175.1	133.2	14.4	355.5	

TABLE A.3.3-21 DIVERSION WATER REQUIREMENT (CASE-1-1/6)  
(UPPER MAASIM)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	7.24	3.29	1.14	0.03	0.34	0.02	0.00	0.00	0.00	6.35	5.64	8.92	32.97
1973	6.42	3.57	1.54	0.04	1.01	2.74	0.76	1.33	0.09	0.43	0.66	8.21	26.80
1974	7.40	3.15	1.41	0.04	1.37	0.01	0.21	1.63	0.48	0.60	0.61	1.52	18.43
1975	6.46	3.04	1.30	0.04	1.88	0.60	1.28	0.00	0.04	0.51	2.86	9.22	27.23
1976	7.25	3.59	1.28	0.04	0.00	1.15	0.97	0.00	0.06	3.87	7.24	8.22	33.67
1977	6.10	3.36	1.55	0.04	0.40	1.18	0.00	0.00	0.00	7.13	2.85	9.92	32.53
1978	7.48	3.59	1.55	0.04	0.55	0.31	0.00	0.00	1.23	0.57	3.45	9.21	27.98
1979	7.48	3.59	1.55	0.04	0.72	3.84	1.68	2.05	1.12	4.42	6.17	9.76	42.42
1980	7.48	3.58	1.31	0.01	0.00	5.54	2.90	1.48	0.00	5.63	2.66	10.48	41.07
1981	7.48	3.59	1.55	0.04	1.63	3.32	0.48	1.25	0.61	5.79	2.18	10.39	38.31
1982	7.48	3.59	1.55	0.04	0.55	2.15	0.00	0.00	0.03	5.76	7.14	8.59	36.88
Average	7.12	3.45	1.43	0.04	0.77	1.90	0.75	0.70	0.33	3.73	3.77	8.59	32.57
Max.	7.48	3.59	1.55	0.04	1.88	5.54	2.90	2.05	1.23	7.13	7.24	10.48	42.42
Min.	6.10	3.04	1.14	0.01	0.00	0.01	0.00	0.00	0.00	0.43	0.61	1.52	18.43

Note: Irrigation Efficiency = 0.60

Service Area (ha) = Wet; Type A = 230, Type B = 2111

Dry; Type A = 230, Type B = 2111, Type E = 900

TABLE A.3.3-22 DIVERSION WATER REQUIREMENT (CASE-1-2/6)  
(LOWER MAASIM)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	3.36	3.12	1.12	0.04	0.00	0.03	0.00	0.00	0.00	0.41	1.28	2.82	12.18
1973	3.20	3.38	1.51	0.05	0.00	0.00	0.00	0.00	0.12	0.28	0.59	2.15	11.28
1974	3.54	2.98	1.39	0.05	0.00	0.01	0.23	0.20	0.48	0.16	0.00	0.00	9.04
1975	3.08	2.88	1.27	0.05	0.00	0.04	0.09	0.00	0.05	0.12	1.16	2.93	11.67
1976	3.48	3.40	1.26	0.05	0.00	0.04	0.00	0.00	0.08	0.09	1.78	2.59	12.77
1977	2.99	3.18	1.52	0.05	0.00	0.08	0.00	0.00	0.00	0.66	0.32	2.83	11.63
1978	3.56	3.40	1.52	0.05	0.00	0.04	0.00	0.00	0.84	0.10	1.20	2.92	13.63
1979	3.56	3.40	1.52	0.05	0.00	0.16	0.05	0.29	0.47	0.31	1.51	3.09	14.41
1980	3.56	3.39	1.28	0.01	0.00	0.38	0.39	0.00	0.00	0.29	0.48	3.31	13.09
1981	3.56	3.40	1.52	0.05	0.00	0.09	0.00	0.07	0.49	0.46	0.12	3.27	13.03
1982	3.56	3.40	1.52	0.05	0.00	0.08	0.00	0.00	0.04	0.54	1.77	2.71	13.67
Average	3.40	3.27	1.40	0.05	0.00	0.09	0.07	0.05	0.23	0.31	0.93	2.60	12.40
Max.	3.56	3.40	1.52	0.05	0.00	0.38	0.39	0.29	0.84	0.66	1.78	3.31	14.41
Min.	2.99	2.88	1.12	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	9.04

Note: Irrigation Efficiency = 0.60

Service Area (ha) = Wet; Type A = 299,

Dry; Type A = 299, Type E = 760

TABLE A.3.3-23 DIVERSION WATER REQUIREMENT (CASE-1-3/6)  
(THIRD MAASIM)

(Unit: MCM)

<u>Year</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>Jun.</u>	<u>Jul.</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
1972	2.17	1.92	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.93	1.82	7.63
1973	2.06	2.09	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.44	1.43	7.09
1974	2.28	1.84	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	5.00
1975	2.01	1.77	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.85	1.89	7.32
1976	2.24	2.10	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.08	1.24	1.67	7.99
1977	1.93	1.97	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.24	1.84	7.12
1978	2.29	2.10	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.73	1.88	7.90
1979	2.29	2.10	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.94	1.99	8.41
1980	2.29	2.09	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.23	2.13	7.51
1981	2.29	2.10	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	2.10	7.41
1982	2.29	2.10	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.21	1.24	1.75	8.42
Average	2.19	2.02	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.62	1.68	7.44
Max.	2.29	2.10	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.31	1.24	2.13	8.42
Min.	1.93	1.77	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	5.00

Note: Irrigation Efficiency = 0.60

Service Area (ha) = Dry; Type E = 680

TABLE A.3.3-24 DIVERSION WATER REQUIREMENT (CASE-1-4/6)  
(NORTH MAIN CANAL)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	49.72	45.28	26.75	9.89	5.20	1.14	0.00	0.00	0.00	10.39	18.67	43.27	210.31
1973	47.14	49.48	33.63	10.76	6.73	0.61	0.14	0.36	3.58	1.85	8.64	32.91	195.83
1974	52.29	43.44	31.79	9.44	6.59	0.61	7.09	6.24	15.11	1.04	0.00	1.42	175.06
1975	45.12	42.73	29.13	11.75	8.32	1.15	2.83	0.00	1.65	1.17	15.95	44.79	204.59
1976	51.51	49.78	29.71	12.18	2.83	1.56	0.00	0.00	2.38	2.71	26.65	39.66	218.97
1977	43.89	46.57	33.76	12.18	5.19	3.07	0.00	0.00	0.00	15.16	5.37	44.04	209.23
1978	52.68	49.78	33.76	10.91	6.30	1.34	0.12	0.00	26.41	1.30	17.20	44.65	244.45
1979	52.68	49.78	33.76	12.11	4.44	6.16	1.96	9.14	14.89	4.32	25.72	47.32	262.28
1980	52.68	49.65	27.55	10.41	4.29	13.94	12.23	0.35	0.00	9.54	10.19	50.70	241.53
1981	52.68	49.78	33.76	12.18	7.96	4.36	0.11	2.24	15.50	14.18	4.51	50.47	247.73
1982	52.68	48.78	33.76	11.69	3.79	2.96	0.00	0.00	1.12	13.23	26.19	41.45	236.65
Average	50.28	47.82	31.58	11.23	5.60	3.35	2.23	1.67	7.33	6.81	14.46	40.06	222.42
Max.	52.68	49.78	33.76	12.18	8.32	13.94	12.23	9.14	26.41	15.16	26.65	50.70	262.28
Min.	43.89	42.73	26.75	9.44	2.83	0.61	0.00	0.00	0.00	1.04	0.00	1.42	175.06

Note: Irrigation Efficiency = 0.60

Service Area (ha) = Wet; Type A = 8917, Type C = 550, Type D = 2000

Dry; Type A = 8917, Type C = 550, Type D = 2000, Type E = 5021



TABLE A.3.3-25 DIVERSION WATER REQUIREMENT (CASE-1-5/6)  
(SOUTH MAIN CANAL)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	34.80	35.43	19.02	3.80	0.00	1.91	0.00	0.00	0.00	6.52	9.43	29.88	140.79
1973	33.22	38.44	24.26	4.92	0.00	1.90	0.43	1.10	4.07	0.38	3.77	21.04	133.53
1974	36.92	34.02	22.98	4.45	0.00	1.40	8.09	7.41	17.74	0.21	0.00	0.00	133.22
1975	31.06	32.87	20.71	4.97	0.18	1.45	3.38	0.00	1.83	0.17	8.13	30.94	135.69
1976	36.39	38.66	21.42	5.18	0.12	2.70	0.00	0.00	2.80	0.12	14.91	27.24	149.54
1977	30.91	36.25	24.36	5.18	0.14	4.59	0.00	0.00	0.00	10.41	1.87	29.93	143.64
1978	37.22	38.66	24.36	4.64	0.00	2.01	0.38	0.00	31.02	0.96	13.40	30.81	183.46
1979	37.22	38.66	24.36	5.13	0.03	7.03	2.79	10.84	17.53	0.74	16.97	32.73	194.03
1980	37.22	38.55	19.79	3.59	0.14	16.75	14.21	1.09	0.00	7.31	7.92	35.15	181.72
1981	37.22	38.66	24.36	5.18	0.18	5.37	0.35	3.01	18.14	12.38	3.87	35.10	183.82
1982	37.22	38.66	24.36	4.94	0.08	3.91	0.00	0.00	1.19	10.82	14.57	28.53	164.28
Average	35.40	37.17	22.73	4.73	0.08	4.46	2.69	2.13	8.57	4.55	8.62	27.40	158.52
Max.	37.22	38.66	24.36	5.18	0.18	16.75	14.21	10.84	31.02	12.38	16.97	35.15	194.03
Min.	30.91	32.87	19.02	3.59	0.00	1.40	0.00	0.00	0.00	0.12	0.00	0.00	133.22

Note: Irrigation Efficiency = 0.60

Service Area (ha)

= Wet; Type A = 9480, Type C = 1700

Dry; Type A = 9480, Type C = 1700, Type E = 1031

TABLE A.3.3-26 DIVERSION WATER REQUIREMENT (CASE-1-6/6)  
(TIBAGAN PUMP I.P.)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	4.05	4.18	1.97	0.17	0.00	0.12	0.00	0.00	0.00	0.82	1.04	3.40	15.75
1973	3.85	4.49	2.56	0.23	0.00	0.00	0.00	0.00	0.50	0.00	0.42	2.37	14.42
1974	4.26	4.01	2.42	0.23	0.00	0.04	0.99	0.85	2.06	0.00	0.00	0.00	14.86
1975	3.61	3.88	2.15	0.23	0.00	0.15	0.38	0.00	0.23	0.00	0.90	3.52	15.05
1976	4.20	4.51	2.25	0.23	0.00	0.15	0.00	0.00	0.32	0.00	1.71	3.11	16.48
1977	3.60	4.25	2.57	0.23	0.00	0.35	0.00	0.00	0.00	1.33	0.20	3.33	15.86
1978	4.29	4.51	2.57	0.23	0.00	0.15	0.00	0.00	3.60	0.12	1.62	3.51	20.60
1979	4.29	4.51	2.57	0.23	0.00	0.67	0.23	1.24	2.03	0.05	1.99	3.72	21.53
1980	4.29	4.50	2.12	0.06	0.00	1.64	1.68	0.00	0.00	0.93	0.95	3.98	20.15
1981	4.29	4.51	2.57	0.23	0.00	0.41	0.00	0.28	2.12	1.53	0.50	3.98	20.42
1982	4.29	4.51	2.57	0.23	0.00	0.34	0.00	0.00	0.16	1.31	1.64	3.25	18.30
Average	4.09	4.35	2.39	0.21	0.00	0.37	0.30	0.22	1.00	0.55	1.00	3.11	17.59
Max.	4.29	4.51	2.57	0.23	0.00	1.64	1.68	1.24	3.60	1.53	1.99	3.98	21.53
Min.	3.50	3.88	1.97	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.42

Note: Irrigation Efficiency = 0.60

Service Area (ha) = Wet; Type A = 1286

Dry; Type A = 1286

TABLE A.3-3-27 ANNUAL DIVERSION WATER REQUIREMENT  
(ALTERNATIVE CASE-2)

(Unit: MCM)

Year	Maasim		Angat Main		Tibagan P.I.P.	Total	Remarks
	Upper	Lower	North	South			
1972	33.0	12.2	199.0	140.8	15.8	400.8	Irrigation Efficiency = 0.60
1973	26.8	11.3	185.3	133.5	14.4	371.3	
1974	18.4	9.0	167.6	133.2	14.8	343.0	
1975	27.2	11.7	193.7	135.7	15.1	383.4	Service Area (ha)
1976	33.7	12.8	207.1	149.6	16.5	419.7	Wet 26,573
1977	32.5	11.6	198.7	143.6	15.9	402.3	Dry 33,275
1978	28.0	13.6	232.7	183.5	20.6	478.4	
1979	42.4	14.4	249.8	194.0	21.5	522.1	
1980	41.1	13.1	230.4	181.7	20.1	486.4	
1981	38.3	13.0	236.7	183.8	20.4	492.2	
1982	36.9	13.7	224.1	164.3	18.3	457.3	
Average	32.6	12.4	211.4	158.5	17.6	432.5	
Max.	42.4	14.4	249.8	194.0	21.5	522.1	
Min.	18.4	9.0	167.6	133.2	14.4	343.0	

TABLE A.3.3-28 DIVERSION WATER REQUIREMENT (CASE-2-1/5)  
(UPPER MAASIM)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	7.24	3.29	1.14	0.03	0.34	0.02	0.00	0.00	0.00	6.35	5.64	8.92	32.97
1973	6.42	3.57	1.54	0.04	1.01	2.74	0.76	1.33	0.09	0.43	0.66	8.21	26.80
1974	7.40	3.15	1.41	0.04	1.37	0.01	0.21	1.63	0.48	0.60	0.61	1.52	18.43
1975	6.46	3.04	1.30	0.04	1.88	0.60	1.28	0.00	0.04	0.51	2.86	9.22	27.23
1976	7.25	3.59	1.28	0.04	0.00	1.15	0.97	0.00	0.06	3.87	7.24	8.22	33.67
1977	6.10	3.36	1.55	0.04	0.40	1.18	0.00	0.00	0.00	7.13	2.85	9.92	32.53
1978	7.48	3.59	1.55	0.04	0.55	0.31	0.00	0.00	1.23	0.57	3.45	9.21	27.98
1979	7.48	3.59	1.55	0.04	0.72	3.84	1.68	2.05	1.12	4.42	6.17	9.76	42.42
1980	7.48	3.58	1.31	0.01	0.00	5.54	2.90	1.48	0.00	5.63	2.66	10.48	41.07
1981	7.48	3.59	1.55	0.04	1.63	3.32	0.48	1.25	0.61	5.79	2.18	10.39	38.31
1982	7.48	3.59	1.55	0.04	0.55	2.15	0.00	0.00	0.03	5.76	7.14	8.59	36.88
Average	7.12	3.45	1.43	0.04	0.77	1.90	0.75	0.70	0.33	3.73	3.77	8.59	32.58
Max.	7.48	3.59	1.55	0.04	1.88	5.54	2.90	2.05	1.23	7.13	7.24	10.48	42.42
Min.	6.10	3.04	1.14	0.01	0.00	0.01	0.00	0.00	0.00	0.43	0.61	1.52	18.43

Note: Irrigation Efficiency = 0.60

Service Area (ha)

= Wet; Type A = 230, Type B = 2111

Dry; Type A = 230, Type B = 2111, Type E = 900

TABLE A.3.3-29 DIVERSION WATER REQUIREMENT (CASE-2-2/5)  
(LOWER MAASIM)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	3.36	3.12	1.12	0.04	0.00	0.03	0.00	0.00	0.00	0.41	1.28	2.82	12.18
1973	3.20	3.38	1.51	0.05	0.00	0.00	0.00	0.00	0.12	0.28	0.59	2.15	11.28
1974	3.54	2.98	1.39	0.05	0.00	0.01	0.23	0.20	0.48	0.16	0.00	0.00	9.04
1975	3.08	2.88	1.27	0.05	0.00	0.04	0.09	0.00	0.05	0.12	1.16	2.93	11.67
1976	3.48	3.40	1.26	0.05	0.00	0.04	0.00	0.00	0.08	0.09	1.78	2.59	12.77
1977	2.99	3.18	1.52	0.05	0.00	0.08	0.00	0.00	0.00	0.66	0.32	2.83	11.63
1978	3.56	3.40	1.52	0.05	0.00	0.04	0.00	0.00	0.84	0.10	1.20	2.92	13.63
1979	3.56	3.40	1.52	0.05	0.00	0.16	0.05	0.29	0.47	0.31	1.51	3.09	14.41
1980	3.56	3.39	1.28	0.01	0.00	0.38	0.39	0.00	0.00	0.29	0.48	3.31	13.09
1981	3.56	3.40	1.52	0.05	0.00	0.09	0.00	0.07	0.49	0.46	0.12	3.27	13.03
1982	3.56	3.40	1.52	0.05	0.00	0.08	0.00	0.00	0.04	0.54	1.77	2.71	13.67
Average	3.40	3.27	1.40	0.05	0.00	0.09	0.07	0.05	0.23	0.31	0.93	2.60	12.40
Max.	3.56	3.40	1.52	0.05	0.00	0.38	0.39	0.29	0.84	0.66	1.78	3.31	14.41
Min.	2.99	2.88	1.12	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	9.04

Note: Irrigation Efficiency = 0.60

Service Area (ha) = Wet; Type A = 299

Dry; Type A = 299, Type E = 760

TABLE A.3.3-30 DIVERSION WATER REQUIREMENT (CASE-2-3/5)  
(NORTH MAIN CANAL)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	46.50	42.43	25.87	9.89	5.20	1.14	0.00	0.00	0.00	10.09	17.28	40.57	198.97
1973	44.08	46.38	32.42	10.76	6.73	0.61	0.14	0.36	3.58	1.48	7.98	30.78	185.30
1974	48.90	40.72	30.69	9.44	6.59	0.61	7.09	6.24	15.11	0.83	0.00	1.42	167.64
1975	42.14	40.11	28.10	11.75	8.32	1.15	2.83	0.00	1.65	1.01	14.68	41.99	193.73
1976	48.18	46.66	28.73	12.18	2.83	1.56	0.00	0.00	2.38	2.59	24.81	37.18	207.10
1977	41.03	43.66	32.53	12.18	5.19	3.07	0.00	0.00	0.00	14.69	5.00	41.31	198.66
1978	49.28	46.66	32.53	10.91	6.30	1.34	0.12	0.00	26.41	1.20	16.11	41.86	232.72
1979	49.28	46.66	32.53	12.11	4.44	6.16	1.96	9.14	14.89	3.93	24.33	44.37	249.80
1980	49.28	46.54	26.50	10.41	4.29	13.94	12.23	0.35	0.00	9.44	9.85	47.54	230.37
1981	49.28	46.66	32.53	12.18	7.96	4.36	0.11	2.24	15.50	14.04	4.51	47.35	236.72
1982	49.28	46.66	32.53	11.69	3.79	2.96	0.00	0.00	1.12	12.91	24.34	38.86	224.14
Average	47.02	44.83	30.45	11.23	5.60	3.35	2.23	1.67	7.33	6.56	13.54	37.57	211.38
Max.	49.28	46.66	32.53	12.18	8.32	13.94	12.23	9.14	26.41	14.69	24.81	47.54	249.80
Min.	41.03	40.11	25.87	9.44	2.83	0.61	0.00	0.00	0.00	0.83	0.00	1.42	167.64

Note: Irrigation Efficiency = 0.60

Service Area (ha)

= Wet; Type A = 8917, Type C = 550, Type D = 2000

Dry; Type A = 8917, Type C = 550, Type D = 2000, Type E = 4011

TABLE A.3.3-31 DIVERSION WATER REQUIREMENT (CASE-2-4/5)  
(SOUTH MAIN CANAL)

(Unit: MCM)

<u>Year</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>Jun.</u>	<u>Jul.</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
1972	34.80	35.43	19.02	3.80	0.00	1.91	0.00	0.00	0.00	6.52	9.43	29.88	140.79
1973	33.22	38.44	24.26	4.92	0.00	1.90	0.43	1.10	4.07	0.38	3.77	21.04	133.53
1974	36.92	34.02	22.98	4.45	0.00	1.40	8.09	7.41	17.74	0.21	0.00	0.00	133.22
1975	31.06	32.87	20.71	4.97	0.18	1.45	3.38	0.00	1.83	0.17	8.13	30.94	135.69
1976	36.39	38.66	21.42	5.18	0.12	2.70	0.00	0.00	2.80	0.12	14.91	27.24	149.54
1977	38.91	36.25	24.36	5.18	0.14	4.59	0.00	0.00	0.00	10.41	1.87	29.93	143.64
1978	37.22	38.66	24.36	4.64	0.00	2.01	0.38	0.00	31.02	0.96	13.40	30.81	183.46
1979	37.22	38.66	24.36	5.13	0.03	7.03	2.79	10.84	17.53	0.74	16.97	32.73	194.03
1980	37.22	38.55	19.79	3.59	0.14	16.75	14.21	1.09	0.00	7.31	7.92	35.15	181.72
1981	37.22	38.66	24.36	5.18	0.18	5.37	0.35	3.01	18.14	12.38	3.87	35.10	183.82
1982	37.22	38.66	24.36	4.94	0.08	3.91	0.00	0.00	1.19	10.82	14.57	28.53	164.28
Average	35.40	37.17	22.73	4.73	0.08	4.46	2.69	2.13	8.57	4.55	8.62	27.40	158.52
Max.	37.22	38.66	24.36	5.18	0.18	16.75	14.21	10.84	31.02	12.38	16.97	35.15	194.03
Min.	30.91	32.87	19.02	3.59	0.00	1.40	0.00	0.00	0.00	0.12	0.00	0.00	133.22

Note: Irrigation Efficiency = 0.60

Service Area (ha) = Wet; Type A = 9480, Type C = 1700

Dry; Type A = 9480, Type C = 1700, Type E = 1031

TABLE A.3.3-32 DIVERSION WATER REQUIREMENT (CASE-2-4-5/5)  
(TIBAGAN PUMP I.P.)

(Unit: MCM)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1972	4.05	4.18	1.97	0.17	0.00	0.12	0.00	0.00	0.00	0.82	1.04	3.40	15.75
1973	3.85	4.49	2.56	0.23	0.00	0.00	0.00	0.00	0.50	0.00	0.42	2.37	14.42
1974	4.26	4.01	2.42	0.23	0.00	0.04	0.99	0.85	2.06	0.00	0.00	0.00	14.86
1975	3.61	3.88	2.15	0.23	0.00	0.15	0.38	0.00	0.23	0.00	0.90	3.52	15.05
1976	4.20	4.51	2.25	0.23	0.00	0.15	0.00	0.00	0.32	0.00	1.71	3.11	16.48
1977	3.60	4.25	2.57	0.23	0.00	0.35	0.00	0.00	0.00	1.33	0.20	3.33	15.86
1978	4.29	4.51	2.57	0.23	0.00	0.15	0.00	0.00	3.60	0.12	1.62	3.51	20.60
1979	4.29	4.51	2.57	0.23	0.00	0.67	0.23	1.24	2.03	0.05	1.99	3.72	21.53
1980	4.29	4.50	2.12	0.06	0.00	1.64	1.68	0.00	0.00	0.93	0.95	3.98	20.15
1981	4.29	4.51	2.57	0.23	0.00	0.41	0.00	0.28	2.12	1.53	0.50	3.98	20.42
1982	4.29	4.51	2.57	0.23	0.00	0.34	0.00	0.00	0.16	1.31	1.64	3.25	18.30
Average	4.09	4.35	2.39	0.21	0.00	0.37	0.30	0.22	1.00	0.55	1.00	3.11	17.59
Max.	4.29	4.51	2.57	0.23	0.00	1.64	1.68	1.24	3.60	1.53	1.99	3.98	21.53
Min.	3.60	3.88	1.97	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.42

Note: Irrigation Efficiency = 0.60

Service Area (ha) = Wet; Type A = 1286

Dry; Type A = 1286



TABLE A.3.3-33 NPC AND NWRC RULE CURVE OF ANGAT DAM

(Unit: m)

M O N T H	N P C				N W R C	
	1974 - 1978	1979 - 1980	1981 - 1982	1979	1983	
JANUARY	216.00	216.50	208.80	203.51	203.50	
FEBRUARY	213.00	213.50	205.60	200.55	199.50	
MARCH	208.50	207.50	200.90	197.37	195.50	
APRIL	202.50	199.50	196.60	193.39	194.00	
MAY	195.00	191.00	194.50	182.60	190.50	
JUNE	190.00	186.00	191.50	180.50	180.00	
JULY	191.00	180.00	182.50	180.27	187.50	
AUGUST	198.00	185.00	187.80	183.57	192.50	
SEPTEMBER	201.00	192.50	194.50	190.21	197.00	
OCTOBER	207.00	196.50	199.00	196.00	201.50	
NOVEMBER	212.50	204.50	204.70	201.05	205.50	
DECEMBER	216.50	212.50	212.00	204.57	207.50	

NOTE: Elevation at the end of the Month

TABLE A.3.3-34 RESERVOIR ELEVATION AT THE END OF THE MONTH

(Unit: m)

M O N T H	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
JANUARY	211.55	208.93	199.48	217.02	215.37	193.09	207.72	211.52	206.44	209.52	214.77
FEBRUARY	205.20	207.25	194.61	213.28	211.15	180.83	203.86	204.84	201.58	205.04	210.31
MARCH	196.00	199.38	190.28	207.11	204.95	181.29	199.51	195.51	201.24	199.27	203.05
APRIL	183.05	192.45	183.72	201.75	195.74	180.92	196.23	193.47	194.65	193.82	193.72
MAY	168.30	179.72	181.92	193.91	217.10	183.13	193.84	192.18	198.21	190.75	190.63
JUNE	166.45	168.88	180.74	186.62	214.28	181.12	189.98	187.81	187.33	193.85	178.81
JULY	216.87	161.29	180.67	180.29	210.04	189.41	187.56	185.10	193.82	199.12	196.70
AUGUST	216.56	163.59	212.30	187.90	199.06	192.93	199.91	190.40	190.69	202.98	205.22
SEPTEMBER	212.44	168.26	204.40	183.40	200.90	201.13	212.84	192.43	197.38	199.73	206.01
OCTOBER	206.72	191.37	213.32	187.48	199.55	201.76	216.66	197.48	204.48	206.89	204.30
NOVEMBER	209.68	204.85	217.40	190.60	200.73	211.89	209.60	208.85	213.20	217.03	207.05
DECEMBER	211.85	205.05	217.11	214.35	197.93	210.21	213.72	208.74	211.70	217.00	206.65

TABLE A.3.3-35 CORRELATION CURVE OF POTENTIAL POWER GENERATION

RESERVOIR ELEVATION (METERS)	MAIN UNITS WATER DISCHARGE (cu.m./kwh)	AUX. UNITS WATER DISCHARGE (cu.m./kwh)	RESERVOIR ELEVATION (METERS)	MAIN UNITS WATER DISCHARGE (cu.m./kwh)	AUX. UNITS WATER DISCHARGE (cu.m./kwh)
160.0	5.390	8.710	189.5	3.750	5.260
160.5	5.350	8.620	190.0	3.730	5.230
161.0	5.310	8.530	190.5	3.720	5.190
161.5	5.280	8.440	191.0	3.700	5.160
162.0	5.240	8.360	191.5	3.680	5.120
162.5	5.210	8.270	192.0	3.670	5.090
163.0	5.170	8.190	192.5	3.650	5.080
163.5	5.140	8.110	193.0	3.630	5.020
164.0	5.100	8.030	193.5	3.620	4.980
164.5	5.070	7.950	194.0	3.610	4.950
165.0	5.030	7.870	194.5	3.590	4.920
165.5	5.000	7.800	195.0	3.570	4.890
166.0	4.970	7.720	195.5	3.560	4.860
166.5	4.940	7.650	196.0	3.550	4.820
167.0	4.900	7.580	196.5	3.530	4.790
167.5	4.880	7.510	197.0	3.510	4.760
168.0	4.840	7.440	197.5	3.500	4.730
168.5	4.820	7.370	198.0	3.490	4.700
169.0	4.780	7.300	198.5	3.470	4.680
169.5	4.740	7.240	199.0	3.450	4.650
170.0	4.720	7.170	199.5	3.440	4.620
170.5	4.680	7.110	200.0	3.420	4.590
171.0	4.660	7.040	200.5	3.410	4.560
171.5	4.630	6.970	201.0	3.400	4.540
172.0	4.600	6.930	201.5	3.380	4.510
172.5	4.570	6.860	202.0	3.370	4.480
173.0	4.540	6.800	202.5	3.360	4.460
173.5	4.510	6.740	203.0	3.340	4.430
174.0	4.480	6.690	203.5	3.330	4.400
174.5	4.450	6.630	204.0	3.320	4.380
175.0	4.430	6.580	204.5	3.310	4.350
175.5	4.400	6.520	205.0	3.290	4.330
176.0	4.370	6.470	205.5	3.280	4.310
176.5	4.350	6.410	206.0	3.270	4.280
177.0	4.320	6.360	206.5	3.250	4.260
177.5	4.300	6.330	207.0	3.240	4.230
178.0	4.270	6.260	207.5	3.230	4.210
178.5	4.240	6.210	208.0	3.220	4.190
179.0	4.220	6.160	208.5	3.200	4.170
179.5	4.190	6.110	209.0	3.190	4.150
180.0	4.170	6.060	209.5	3.180	4.130
180.5	4.140	6.020	210.0	3.170	4.110
181.0	4.120	5.970	210.5	3.150	4.090
181.5	4.090	5.920	211.0	3.140	4.070
182.0	4.070	5.880	211.5	3.130	4.050
182.5	4.050	5.830	212.0	3.120	4.030
183.0	4.030	5.790	212.5	3.110	4.010
183.5	4.000	5.740	213.0	3.098	3.990
184.0	3.980	5.700	213.5	3.090	3.970
184.5	3.950	5.660	214.0	3.080	3.950
185.0	3.930	5.620	214.5	3.060	3.930
185.5	3.910	5.580	215.0	3.050	3.910
186.0	3.890	5.540	215.5	3.040	3.890
186.5	3.870	5.500	216.0	3.020	3.870
187.0	3.850	5.460	216.5	3.012	3.854
187.5	3.830	5.420	217.0	3.000	3.830
188.0	3.810	5.380	217.5	2.990	3.810
188.5	3.790	5.340	218.0	2.970	3.790
189.0	3.770	5.300			

TABLE A.3.3-36 ACTUAL PRODUCTION OF POWER GENERATION OF ANGAT PLANT

Year / Month	(Unit: GWH)											
	1978	1979	1980	1981	1982	Remarks						
Jan.	33.0	42.3	34.9	38.2	40.2							
Feb.	31.8	52.0	37.9	41.4	46.8	Main Power Station						
Mar.	26.6	57.5	34.4	34.1	53.2	+ Aux. Power Station						
Apr.	17.1	19.8	40.3	27.0	55.3							
May	18.1	20.3	21.1	16.7	19.1							
June	30.7	45.8	51.3	31.1	49.4							
July	27.5	46.5	57.9	53.7	7.9							
Aug.	26.6	51.9	35.3	52.7	35.6							
Sept.	52.5	25.8	29.3	59.5	44.0							
Oct.	83.8	47.4	62.9	57.8	29.2							
Nov.	97.7	33.5	82.6	74.6	76.0							
Dec.	57.5	30.5	53.1	81.1	46.2							
TOTAL	502.9	473.3	541.0	567.9	502.9							

TABLE A.3.3-37 ANGAT RESERVOIR CAPACITY DATA

RESERVOIR ELEVATION (METERS)	RESERVOIR SURFACE AREA (ha)	TOTAL STORAGE CAPACITY (cu.m <sup>x10</sup> <sup>6</sup> )	MIN.USABLE: STORAGE (BASE ON) 160.0 m.	RESERVOIR ELEVATION: (METERS)	RESERVOIR SURFACE AREA (ha)	TOTAL STORAGE CAPACITY (cu.m <sup>x10</sup> <sup>6</sup> )	MIN. USABLE STORAGE (BASE ON) 160.0 m.
160.0	860	180.00	0.00	189.5	1500	514.50	334.50
160.5	300	184.50	4.30	190.0	1500	522.00	342.00
161.0	340	188.30	3.30	190.5	1500	529.50	349.50
161.5	340	192.50	12.50	191.0	1500	537.00	357.00
162.0	860	196.70	16.70	191.5	1520	544.50	364.50
162.5	900	201.00	21.00	192.0	1560	552.10	372.10
163.0	900	205.50	25.50	192.5	1560	559.90	379.90
163.5	900	210.00	30.00	193.0	1580	567.70	387.70
164.0	900	214.50	34.50	193.5	1580	575.60	395.60
165.5	900	219.00	39.00	194.0	1600	583.50	403.50
165.0	900	223.50	43.50	194.5	1600	591.50	411.50
165.5	1000	228.00	48.00	195.0	1640	599.50	419.50
166.0	900	233.00	53.00	195.5	1660	607.70	427.70
166.5	1000	237.50	57.50	196.0	1660	616.00	436.00
167.0	960	242.50	62.50	196.5	1660	624.30	444.30
167.5	1000	247.30	67.30	197.0	1680	632.60	452.60
168.0	1040	252.30	72.30	197.5	1700	641.00	461.00
168.5	1000	257.50	77.50	198.0	1700	649.50	469.50
169.0	1100	262.50	82.50	198.5	1700	658.00	478.00
169.5	1000	268.00	88.00	199.0	1740	666.50	486.50
170.0	1000	273.00	93.00	199.5	1760	675.20	495.20
170.5	1060	278.00	98.00	200.0	1800	684.00	504.00
171.0	1040	283.30	103.30	200.5	1820	693.00	513.00
171.5	1100	288.50	108.50	201.0	1820	702.10	522.10
172.0	1000	294.00	114.00	201.5	1860	711.20	531.20
172.5	1100	299.00	119.00	202.0	1880	720.50	540.50
173.0	1100	304.50	124.50	202.5	1900	729.90	549.90
173.5	1100	310.00	130.00	203.0	1900	739.40	559.40
174.0	1100	315.50	135.50	203.5	1920	748.90	568.90
174.5	1100	321.00	141.00	204.0	1900	758.50	578.40
175.0	1160	326.50	146.50	204.5	1920	768.00	588.00
175.5	1140	332.30	152.30	205.0	1920	777.60	597.60
176.0	1140	338.00	158.00	205.5	1940	787.20	607.20
176.5	1160	343.70	163.70	206.0	1940	796.90	616.90
177.0	1200	349.50	169.50	206.5	1960	806.60	626.60
177.5	1200	355.50	175.50	207.0	1960	816.40	636.40
178.0	1200	361.50	181.50	207.5	1980	826.20	646.20
178.5	1200	367.50	187.50	208.0	1980	836.10	656.10
179.0	1240	373.50	193.50	208.5	2000	846.00	666.00
179.5	1260	379.70	199.70	209.0	2000	856.00	676.00
180.0	1200	386.00	206.00	209.5	2000	866.00	686.00
180.5	1260	392.00	212.00	210.0	2060	876.00	696.00
181.0	1280	398.30	218.30	210.5	2100	886.30	706.30
181.5	1260	404.70	224.70	211.0	2100	896.80	716.80
182.0	1300	411.00	231.00	211.5	2140	907.30	727.30
182.5	1300	417.50	237.50	212.0	2140	918.00	738.00
183.0	1300	424.00	244.00	212.5	2140	928.70	748.70
183.5	1300	430.50	250.50	213.0	2160	939.40	759.40
184.0	1340	437.00	257.00	213.5	2160	950.20	770.20
184.5	1320	443.70	263.70	214.0	2200	961.00	781.00
185.0	1400	450.30	270.30	214.5	2200	972.00	792.00
185.5	1340	457.30	277.30	215.0	2240	983.00	803.00
186.0	1400	464.00	284.00	215.5	2240	994.20	814.20
186.5	1400	471.00	291.00	216.0	2300	1005.40	825.40
187.0	1400	478.00	298.00	216.5	2300	1016.90	836.90
187.5	1460	485.00	305.00	217.0	2300	1028.40	848.40
188.0	1440	492.30	312.30	217.5	2300	1039.90	859.90
188.5	1500	499.50	319.50	218.0		1051.40	971.40
189.0	1500	507.00	327.00				

TABLE A.3.3-38 DESCRIPTION OF ITEMS INVOLVED IN MODEL

	<u>Description</u>	<u>Item No.</u>
1.	<u>Angat Dam</u>	
	Inflow	1
	Reservoir Water Stage	2
	Area	3
	Storage	4
	Evaporation Loss	5
	Outflow Main Generator	6
	Auxillary Generator	7
	Spillage	8
2.	<u>Ipo Dam</u>	
	Inflow	9
	Demand	10
	Outflow	11
3.	<u>Between Ipo Dam and Tibagan P.I.S</u>	
	Intermediate Runoff of Angat River	12
	Total Available Water for Irrigation	13
	Irrigation Use for 100 ha	14
	Available Water for Irrigation of AMRIS	15
4.	<u>Tibagan Pump Irrigation System</u>	
	Available Water	16 = 15
	Irrigation Water Demand	17
	Difference in Water Balance	18
	Available Water at Bustos Dam	19
5.	<u>Upper Maasim Dam</u>	
	Maasim Runoff at Gaging Station No.57	20
	Upstream Irrigation Use for 183 ha	21
	Available Water at Upper Maasim Dam	22
	Supplemental Water from Angat	23
	Irrigation Water Demand	24
	Difference in Water Balance	25
6.	<u>Lower Maasim Dam</u>	
	Available Maasim Runoff	26
	Return Flow from Irrigated Service Area	27
	Supplemental Water from Angat	28
	Irrigation Water Demand	29
	Difference in Water Balance	30
7.	<u>Third Maasim Dam</u>	
	Available Maasim Runoff	31
	Return Flow from Irrigated Service Area	32
	Supplemental Water from Angat	33
	Irrigation Water Demand	34
	Difference in Water Balance	35
8.	<u>Bustos Dam</u>	
	Available Angat Water	36 = 19
	Water Release for Salt Water Exclusion	37
	Available Angat Water for Irrigation	38 = 36-37
	Irrigation Water Demand for N.M.C.	39
	- do - for S.M.C.	40
	Total of 39 and 40	41 = 39+40
	Water Supply to Maasim	42
	Water Balance at Bustos Dam	43

TABLE A.3.3-39 NPC, NWRC AND PROPOSED RULE CURVES OF ANGAT DAM

(Unit: m)

M O N T H	N P C			NWRC	PROPOSED RULE CURVE			
	1974 - 1978	1979 - 1980	1981 - 1982		A		B	
					Lower	Upper	Lower	Upper
JANUARY	216.00	216.50	208.80	203.51	201.50	211.50	201.50	-
FEBRUARY	213.00	213.50	205.60	200.55	198.00	210.00	198.00	-
MARCH	208.50	207.50	200.90	197.37	194.50	205.00	194.50	-
APRIL	202.50	199.50	196.60	193.39	189.50	199.00	189.50	-
MAY	195.00	191.00	194.50	182.60	184.50	194.00	184.50	-
JUNE	190.00	186.00	191.50	180.50	181.50	191.00	181.50	191.00
JULY	191.00	180.00	182.50	180.27	180.27	190.00	180.27	190.00
AUGUST	198.00	185.00	187.80	183.57	183.57	192.50	183.57	192.50
SEPTEMBER	201.00	192.50	194.50	190.21	189.00	201.00	189.00	201.00
OCTOBER	207.00	196.50	199.00	196.00	195.00	210.00	195.00	210.00
NOVEMBER	212.50	204.50	204.70	201.05	200.00	212.00	200.00	-
DECEMBER	216.50	212.50	212.00	204.57	205.00	212.00	205.00	-

Note: Elevation at the end of the month

TABLE A.3.3-40 WATER SHORTAGE OF AMRIS PROJECT AREA IN PROPOSED CONDITION  
(CASE-1 + CASE-A)

(Unit: m or MCM)

Period of 1978	Water Stage of Angat Res.	Discharge at Upper Maasim Dam	Discharge at Bustos Dam	Upper Maasim Dam		Lower Maasim Dam		Third Maasim Dam		Tibagan Pump I.P.		Bustos Dam	
				Demand	Deficit	Demand	Deficit	Demand	Deficit	Demand	Deficit	Demand	Deficit
JAN *F	204.27	0.0	36.912	3.402	-	1.174	-	0.759	-	1.400	-	30.177	-
*M	203.51	0.060	36.159	2.417	-	1.196	-	1.771	-	1.435	-	30.400	-
*L	201.50	0.129	32.922	1.664	1.342	1.187	-	0.759	-	1.458	-	29.324	-
FEB *F	200.33	0.135	7.426	1.335	1.200	1.255	1.255	0.796	0.796	1.574	-	30.699	24.847
*M	199.17	0.120	0.824	1.273	1.153	1.198	1.198	0.759	0.759	1.505	0.680	29.291	29.291
*L	198.00	0.086	11.248	0.978	0.892	0.942	0.942	0.545	0.545	1.435	-	28.450	19.674
MAR *F	196.83	0.096	11.943	0.809	0.713	0.782	0.782	0.447	0.447	1.215	-	25.693	16.001
*M	195.67	0.084	9.392	0.508	0.424	0.497	0.497	0.269	0.269	0.845	-	19.769	11.222
*L	194.50	0.081	2.386	0.237	0.156	0.242	0.242	0.110	0.110	0.509	-	12.653	11.813
APR *F	192.83	0.064	6.940	0.041	-	0.054	0.031	-	-	0.231	-	8.246	1.537
*M	191.17	0.058	8.836	-	-	-	-	-	-	-	-	4.588	-
*L	189.82	0.182	10.676	-	-	-	-	-	-	-	-	2.718	-
<u>Total</u>		<u>1.095</u>	<u>175.664</u>	<u>12.664</u>	<u>5.880</u>	<u>8.527</u>	<u>4.947</u>	<u>5.215</u>	<u>2.926</u>	<u>11.607</u>	<u>0.680</u>	<u>252.008</u>	<u>114.385</u>

Note: Total Irrigated Area (Wet: 26,573 ha, Dry: 34,965 ha)



TABLE A.3.3-4I WATER SHORTAGE OF AMRIS PROJECT AREA IN PROPOSED CONDITION  
(CASE-2 + CASE-A)

(Unit: m or MCM)

Period of 1978	Water Stage of Angat Res.	Discharge at Upper Maasim Dam	Discharge at Bustos Dam	Upper Maasim Dam		Lower Maasim Dam		Third Maasim Dam		Tibagan Pump I.P.		Bustos Dam	
				Demand	Deficit	Demand	Deficit	Demand	Deficit	Demand	Deficit	Demand	Deficit
JAN *F	204.65	0.0	35.026	3.402	-	1.174	-	-	-	1.400	-	29.050	-
*M	203.99	0.060	34.242	2.417	-	1.196	-	-	-	1.435	-	29.255	-
*L	202.03	0.129	32.378	1.664	-	1.187	-	-	-	1.458	-	28.197	-
FEB *F	200.33	0.135	17.094	1.335	1.200	1.255	1.255	-	-	1.574	-	29.517	13.997
*M	199.17	0.120	0.824	1.273	1.153	1.198	1.198	-	-	1.505	0.680	28.164	28.164
*L	198.00	0.086	11.248	0.978	0.892	0.942	0.942	-	-	1.435	-	27.641	18.865
MAR *F	196.83	0.096	11.943	0.809	0.713	0.782	0.782	-	-	1.215	-	25.029	15.338
*M	195.67	0.084	9.392	0.508	0.424	0.497	0.497	-	-	0.845	-	19.369	10.822
*L	194.50	0.081	2.386	0.237	0.156	0.242	0.242	-	-	0.509	-	12.490	11.650
APR *F	192.83	0.064	6.940	0.041	-	0.054	0.031	-	-	0.231	-	8.246	1.537
*M	191.17	0.058	8.836	-	-	-	-	-	-	-	-	4.588	-
*L	189.82	0.182	10.676	-	-	-	-	-	-	-	-	2.718	-
<b>Total</b>		<b>1.095</b>	<b>180.985</b>	<b>12.664</b>	<b>4.538</b>	<b>8.527</b>	<b>4.947</b>	<b>-</b>	<b>-</b>	<b>11.607</b>	<b>0.680</b>	<b>244.264</b>	<b>100.373</b>

Note: Total Irrigated Area (Wet: 26,573 ha, Dry: 33,275 ha)

TABLE A.3.3-42 WATER SHORTAGE OF AMRIS PROJECT AREA IN PROPOSED CONDITION  
(CASE-1 + CASE-B)

Period of 1978	Water Stage of Angat Res.	Discharge at Maasim Dam	Discharge at Upper Maasim Dam	Discharge at Bustos Dam	Upper Maasim Dam		Lower Maasim Dam		Third Maasim Dam		Tibagan Pump I.P.		Bustos Dam	
					Demand	Deficit	Demand	Deficit	Demand	Deficit	Demand	Deficit	Demand	Deficit
JAN *F	204.27	0.0	36.912	3.402	-	1.174	-	0.759	-	1.400	-	30.177	-	-
*M	203.51	0.060	36.159	2.417	-	1.196	-	1.771	-	1.435	-	30.400	-	-
*L	201.50	0.129	32.922	1.664	1.342	1.187	-	0.759	-	1.458	-	29.324	-	-
FEB *F	200.33	0.135	7.426	1.335	1.200	1.255	1.255	0.796	0.796	1.574	-	30.699	24.847	-
*M	199.17	0.120	0.824	1.273	1.153	1.198	1.198	0.759	0.759	1.505	0.680	29.291	29.291	-
*L	198.00	0.086	11.248	0.978	0.892	0.942	0.942	0.545	0.545	1.435	-	28.450	19.674	-
MAR *F	196.83	0.096	11.943	0.809	0.713	0.782	0.782	0.447	0.447	1.215	-	25.693	16.001	-
*M	195.67	0.084	9.392	0.508	0.424	0.497	0.497	0.269	0.269	0.845	-	19.769	11.222	-
*L	194.50	0.081	2.386	0.237	0.156	0.242	0.242	0.110	0.110	0.509	-	12.653	11.813	-
APR *F	192.83	0.064	6.940	0.041	-	0.054	0.031	-	-	0.231	-	8.246	1.537	-
*M	191.17	0.058	8.836	-	-	-	-	-	-	-	-	4.588	-	-
*L	189.82	0.182	10.676	-	-	-	-	-	-	-	-	2.718	-	-
<u>Total</u>		<u>1.095</u>	<u>175.664</u>	<u>12.664</u>	<u>5.880</u>	<u>8.527</u>	<u>4.947</u>	<u>5.215</u>	<u>2.926</u>	<u>11.607</u>	<u>0.680</u>	<u>252.008</u>	<u>114.385</u>	

Note: Total Irrigated Area (Wet: 26,573 ha, Dry: 34,965 ha)

TABLE A.3.3-43 WATER SHORTAGE OF AMRIS PROJECT AREA IN PROPOSED CONDITION  
(CASE-2 + CASE-B)

(Unit: m or MCM)

Period of 1978	Water Stage of Angat Res.	Discharge at Upper Maasin Dam	Discharge at Bustos Dam	Upper Maasin Dam		Lower Maasin Dam		Third Maasin Dam		Tibagan Pump I.P.		Bustos Dam	
				Demand	Deficit	Demand	Deficit	Demand	Deficit	Demand	Deficit	Demand	Deficit
JAN *F	204.65	0.0	35.026	3.402	-	1.174	-	-	-	1.400	-	29.050	-
*M	203.99	0.060	34.242	2.417	-	1.196	-	-	-	1.435	-	29.255	-
*L	202.03	0.129	32.378	1.664	-	1.187	-	-	-	1.458	-	28.197	-
FEB *F	200.33	0.135	17.094	1.335	1.200	1.255	1.255	-	-	1.574	-	29.517	13.997
*M	199.17	0.120	0.824	1.273	1.153	1.198	1.198	-	-	1.505	0.680	28.164	28.164
*L	198.00	0.086	11.248	0.978	0.892	0.942	0.942	-	-	1.435	-	27.641	18.865
MAR *F	196.83	0.096	11.943	0.809	0.713	0.782	0.782	-	-	1.215	-	25.029	15.338
*M	195.67	0.084	9.392	0.508	0.424	0.497	0.497	-	-	0.845	-	19.369	10.822
*L	194.50	0.081	2.386	0.237	0.156	0.242	0.242	-	-	0.509	-	12.490	11.650
APR *F	192.83	0.064	6.940	0.041	-	0.054	0.031	-	-	0.231	-	8.246	1.537
*M	191.17	0.058	8.836	-	-	-	-	-	-	-	-	4.588	-
*L	189.82	0.182	10.676	-	-	-	-	-	-	-	-	2.718	-
<b>Total</b>		<u>1.095</u>	<u>180.985</u>	<u>12.664</u>	<u>4.538</u>	<u>8.527</u>	<u>4.947</u>	<u>-</u>	<u>-</u>	<u>11.607</u>	<u>0.680</u>	<u>244.264</u>	<u>100.373</u>

Note: Total Irrigated Area (Wet: 26,573 ha, Dry: 33,275 ha)



TABLE A.3.3-44 (2) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-1 + CASE-A)

\*\*\* ANNUAL SUMMARY OF SHORTAGE \*\*\* CASE=PROPOSED CONDITION (UNIT = MCM)

YEAR	W. SUPPLY<---UPPER BUSTOS---	UP. BUSTOS TIBAGAN PIS	U.U.IRRIG.	IRRIGATED AREA BY MAASIM	UPPER DAM	LOWER DAM	THIRD DAM	RELEASE FOR ANGAT RIVER SALT WATER AT BUSTOS EXCLUSION FOR N+S M.C
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975	0.0	0.0	0.105	0.0	0.0	0.0	0.0	0.0
1976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978	0.0	0.680	0.019	5.878	4.948	2.925	0.0	114.386
1979	0.0	0.0	0.125	0.0	0.0	0.0	0.0	0.0
1980	0.0	0.0	0.365	0.0	0.0	0.0	0.0	0.0
1981	0.0	0.0	0.459	0.0	0.0	0.0	0.0	0.0
1982	0.0	0.0	0.123	0.0	0.0	0.0	0.0	0.0

TABLE A.3.3-44 (3) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-I + CASE-A)

MONTH	YEAR	CASE=PROPOSED CONDITION												TOTAL
		1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	
JAN.	MAIN	55.11	25.93	30.15	87.42	71.19	35.78	28.69	27.94	28.83	28.52	28.71	448.28	
	AUX.	14.58	14.22	14.34	14.70	14.73	14.57	13.44	14.44	14.22	14.33	14.41	157.96	
	TOTAL	69.69	40.15	44.50	102.12	85.92	50.35	42.13	42.38	43.05	42.84	43.11	606.24	
FEB.	MAIN	25.36	25.90	22.21	26.80	28.16	25.02	5.14	28.74	28.47	27.99	27.95	271.74	
	AUX.	13.43	12.55	12.44	13.03	13.35	12.94	11.57	12.57	12.64	12.45	12.51	139.48	
	TOTAL	38.79	38.45	34.65	39.83	41.51	37.96	16.71	41.30	41.11	40.44	40.47	411.22	
MAR.	MAIN	23.62	17.36	14.45	28.70	16.88	29.10	5.49	17.68	16.92	18.48	17.16	205.82	
	AUX.	13.85	13.21	13.50	13.95	13.76	13.96	12.25	13.11	12.71	13.90	13.12	146.31	
	TOTAL	37.47	30.57	27.95	42.65	30.63	43.05	17.74	30.78	29.63	31.38	30.28	352.14	
APR.	MAIN	30.96	7.48	7.61	49.58	19.58	23.41	6.32	7.44	8.47	7.27	7.52	175.64	
	AUX.	13.99	13.43	13.77	13.99	13.99	13.99	12.33	13.37	13.76	12.90	13.52	149.01	
	TOTAL	44.94	20.90	21.38	63.57	33.55	37.39	18.66	20.81	22.23	20.17	21.03	324.64	
MAY.	MAIN	20.13	7.44	19.85	13.85	59.60	20.85	6.99	10.64	14.30	7.21	7.87	188.72	
	AUX.	15.36	14.88	15.32	15.36	15.36	15.36	13.57	15.13	15.27	14.21	15.22	165.69	
	TOTAL	35.49	22.32	35.17	29.21	75.62	36.21	20.55	25.77	29.57	21.42	23.09	354.41	
JUN.	MAIN	16.69	6.90	30.80	13.46	136.88	7.07	6.50	26.00	29.59	15.98	8.13	297.99	
	AUX.	13.52	12.98	13.54	13.52	16.43	13.44	11.97	13.54	13.51	12.97	13.44	148.86	
	TOTAL	30.21	19.88	44.34	26.98	153.31	20.51	18.46	39.54	43.10	28.95	21.58	446.85	
JUL.	MAIN	131.89	6.97	18.94	7.20	128.14	40.02	6.63	26.14	75.66	63.51	72.92	578.02	
	AUX.	12.14	10.28	10.77	10.75	12.04	10.71	9.63	10.77	10.77	10.89	10.78	119.53	
	TOTAL	144.03	17.25	29.71	17.94	140.18	50.73	16.26	36.91	86.43	74.40	83.70	697.55	
AUG.	MAIN	148.16	6.93	95.92	30.74	16.70	19.85	27.48	48.28	7.19	42.83	54.78	498.88	
	AUX.	14.30	10.21	12.02	10.88	10.89	10.89	10.22	10.88	10.72	10.89	10.89	122.78	
	TOTAL	162.47	17.14	107.94	41.62	27.59	30.74	37.70	59.16	17.91	53.72	65.67	621.66	
SEP.	MAIN	133.90	6.86	50.71	8.25	19.26	9.06	50.88	9.28	7.25	7.17	19.29	321.92	
	AUX.	12.20	9.66	11.06	10.56	10.61	10.61	10.73	10.25	10.50	10.51	10.57	117.06	
	TOTAL	146.10	16.52	61.77	18.81	29.87	19.67	61.62	19.53	17.75	17.67	29.87	438.98	
OCT.	MAIN	8.00	21.14	7.94	7.78	8.01	8.20	77.23	7.97	29.99	11.99	8.51	196.76	
	AUX.	11.95	11.96	11.83	11.47	11.96	11.53	12.48	11.88	11.89	11.79	11.10	129.85	
	TOTAL	19.95	33.10	19.76	19.25	19.96	19.73	89.71	19.85	41.89	23.78	19.61	326.61	
NOV.	MAIN	32.59	62.81	134.36	9.40	17.04	7.87	101.66	43.76	106.65	135.74	8.43	660.29	
	AUX.	12.50	12.60	12.69	11.92	12.34	11.81	13.00	12.39	12.95	12.69	11.61	136.50	
	TOTAL	45.10	75.41	147.05	21.32	29.37	19.68	114.65	56.15	119.59	148.44	20.04	796.79	
DEC.	MAIN	67.98	68.13	146.74	103.37	51.46	23.78	60.95	24.61	32.99	16.78	16.78	675.71	
	AUX.	12.41	12.47	12.63	12.48	12.43	11.98	12.43	12.32	12.39	12.46	11.93	135.94	
	TOTAL	80.39	80.61	159.38	115.84	63.89	35.76	73.38	36.93	45.37	29.24	28.72	811.65	
TOTAL	MAIN	694.41	263.85	579.69	386.55	572.88	250.00	383.96	278.47	386.31	445.62	278.04	410.89	
	AUX.	160.23	148.46	153.90	152.59	158.53	151.78	143.61	150.64	151.33	148.80	149.12	151.73	
	TOTAL	854.64	412.30	733.59	539.14	731.41	401.78	527.57	429.10	537.64	594.41	427.17	562.61	

TABLE A.3.3-45 (1) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-2 + CASE-A)

(UNIT = MCM)

\*\*\* ANNUAL SUMMARY OF COMPUTATION \*\*\* CASE=PROPOSED CONDITION

TIME OR PERIOD	RESERVOIR			DAM		DRAINAGE			DAM			DRAINAGE			DRAINAGE			DRAINAGE			DRAINAGE			DRAINAGE			
	INFLOW (1)	WATER STAGE	STOR- AGE	EVAP. (2)	MAIN AGE	SPILL (3)	INFLOW (4)	INFLOW (5)	INFLOW (6)	INFLOW (7)	INFLOW (8)	INFLOW (9)	INFLOW (10)	INFLOW (11)	INFLOW (12)	INFLOW (13)	INFLOW (14)	INFLOW (15)	INFLOW (16)	INFLOW (17)	INFLOW (18)	INFLOW (19)	INFLOW (20)	INFLOW (21)	INFLOW (22)		
1972	2993.48			25.14	2241.42	693.50	44.39	739.89	693.50	44.39	613.30	2901.11	1.36	2899.75													
1973	1591.60			23.04	861.97	693.60	0.0	693.60	693.60	0.0	327.15	1189.11	1.25	1187.87													
1974	2688.31			23.86	1887.57	693.60	0.0	693.60	693.60	0.0	552.57	2440.24	1.58	2438.95													
1975	2011.45			23.59	1255.97	693.60	11.18	704.78	693.60	11.18	413.44	1680.59	1.50	1679.29													
1976	2488.97			24.71	1878.98	693.50	0.0	693.50	693.50	0.0	511.60	2390.58	1.42	2389.16													
1977	1460.54			23.45	843.40	693.60	0.0	693.60	693.60	0.0	300.21	1143.61	1.37	1142.23													
1978	2127.86			21.88	1287.42	693.60	45.02	738.62	693.60	45.02	437.37	1749.81	1.78	1748.03													
1979	1644.65			23.22	946.73	693.60	0.0	693.60	693.60	0.0	338.05	1884.77	1.86	1882.91													
1980	2029.60			23.42	1299.35	693.50	1.66	697.17	693.50	1.66	417.18	1718.39	1.74	1716.65													
1981	2211.15			22.91	1485.16	693.60	0.0	693.60	693.60	0.0	454.29	1939.65	1.76	1937.89													
1982	1635.51			22.92	970.78	693.60	0.0	693.60	693.60	0.0	336.17	1306.95	1.58	1305.36													
AVERAGE	2080.28			23.47	1338.09	694.12	9.30	703.41	694.12	9.30	427.59	1794.98	1.52	1793.46													

TIME OR PERIOD	ANGAT RIVER AT BUSTOS			UPPER MAASIM DAM			LOWER MAASIM DAM			SOUTH MAIN CANAL AT BUSTOS			NORTH MAIN CANAL AT BUSTOS		
	INFLOW (1)	RETURN (2)	DIFFER (3)	DIS. (4)	DIS. (5)	DIS. (6)	DIS. (7)	DIS. (8)	DIS. (9)	DIS. (10)	DIS. (11)	DIS. (12)	DIS. (13)	DIS. (14)	DIS. (15)
1972	2699.75	15.75	2883.99	568.86	1.93	566.92	20.68	32.97	554.65	354.83	0.0	11.74	12.19	552.18	
1973	1187.87	14.42	1173.44	155.70	1.83	154.28	15.88	26.79	143.37	143.37	0.0	10.27	11.28	142.35	
1974	2438.95	14.84	2424.12	236.64	0.98	235.76	11.85	18.44	229.17	229.17	0.0	7.92	9.03	228.05	
1975	1679.29	15.06	1664.23	1664.23	1.94	150.94	22.58	37.33	141.06	141.06	0.0	11.01	11.67	140.39	
1976	2389.16	16.49	2372.66	243.35	1.94	241.41	22.58	37.66	250.33	250.33	0.0	12.53	12.76	230.10	
1977	1142.23	15.86	1126.38	165.01	1.95	163.05	21.94	32.54	152.45	152.45	0.0	11.29	11.63	152.10	
1978	1748.03	20.60	1727.43	1728.11	2.02	170.84	1.33	201.53	188.71	193.24	0.0	17.48	18.61	187.11	
1979	1282.91	21.53	1261.39	86.65	2.84	84.13	30.12	42.42	71.83	71.83	0.0	13.51	14.60	70.94	
1980	1718.65	20.15	1698.50	1698.50	2.85	123.31	51.16	41.02	115.64	115.64	0.0	12.80	13.08	115.16	
1981	1937.89	20.42	1917.47	59.99	2.39	58.04	31.27	38.30	51.01	51.01	0.0	12.24	13.02	50.23	
1982	1305.36	18.31	1287.05	1287.05	2.16	123.03	29.15	36.89	115.29	115.29	0.0	13.26	13.66	114.89	
AVERAGE	1793.46	17.58	1775.88	1775.94	1.89	173.13	22.47	32.57	163.02	163.44	0.0	11.28	12.40	162.32	

TIME OR PERIOD	THIRD MAASIM DAM			NORTH MAIN CANAL AT BUSTOS			SOUTH MAIN CANAL AT BUSTOS		
	RETURN (1)	FLOW (2)	DIFFER (3)	DIS. (4)	DIS. (5)	DIS. (6)	DIS. (7)	DIS. (8)	DIS. (9)
1972	354.18	0.0	0.0	0.0	354.18	2883.99	4.15	2879.85	198.98
1973	142.35	0.0	0.0	0.0	142.35	1173.44	4.15	1169.30	133.93
1974	228.05	0.0	0.0	0.0	228.05	2424.12	4.15	2419.97	137.84
1975	140.39	0.0	0.0	0.0	140.39	1664.23	4.15	1660.08	193.72
1976	230.10	0.0	0.0	0.0	230.10	2372.66	4.15	2368.52	149.56
1977	152.10	0.0	0.0	0.0	152.10	1126.38	4.15	1122.23	143.93
1978	192.06	0.0	0.0	0.0	192.06	1728.11	4.15	1723.96	232.72
1979	70.94	0.0	0.0	0.0	70.94	1261.39	4.15	1257.24	183.45
1980	115.16	0.0	0.0	0.0	115.16	1696.50	4.15	1692.35	230.37
1981	50.23	0.0	0.0	0.0	50.23	1917.47	4.15	1913.33	181.71
1982	114.89	0.0	0.0	0.0	114.89	1287.05	4.15	1282.91	254.14
AVERAGE	162.77	0.0	0.0	0.0	162.77	1775.94	4.15	1771.79	211.58

TABLE A.3.3-45 (2) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-2 + CASE-A)

\*\*\* ANNUAL SUMMARY OF SHORTAGE \*\*\* CASE-PROPOSED CONDITION (UNIT = MCM)

YEAR	W. SUPPLY FOR MWS UP.	UPPER BUSTOS	UPPER BUSTOS TIBAGAN PIS	U.U. IRRIG.	IRRIGATED AREA BY MAASIM	LOWER DAM	THIRD DAM	RELEASE FOR ANGAT RIVER	SALT WATER AT BUSTOS	EXCLUSION FOR N+S M.C
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975	0.0	0.0	0.0	0.105	0.0	0.0	0.0	0.0	0.0	0.0
1976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978	0.0	0.0	0.680	0.019	4.537	4.948	0.0	0.0	0.0	100.372
1979	0.0	0.0	0.0	0.125	0.0	0.0	0.0	0.0	0.0	0.0
1980	0.0	0.0	0.0	0.365	0.0	0.0	0.0	0.0	0.0	0.0
1981	0.0	0.0	0.0	0.439	0.0	0.0	0.0	0.0	0.0	0.0
1982	0.0	0.0	0.0	0.123	0.0	0.0	0.0	0.0	0.0	0.0



TABLE A.3.3-45 (3) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-2 + CASE-A)

\*\*\* ANNUAL SUMMARY OF POSSIBLE POWER GENERATION \*\*\* CASE=PROPOSED CONDITION (UNIT...GWH)

MONTH	YEAR	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TOTAL
JAN.	MAIN	55.12	24.36	28.39	87.42	70.59	35.78	27.46	26.16	27.14	26.77	26.94	436.14
	AUX.	14.58	14.25	14.36	14.70	14.73	14.58	13.51	14.46	14.27	14.36	14.43	158.21
	TOTAL	69.70	38.60	42.75	102.12	85.32	50.36	40.97	40.62	40.62	41.41	41.13	41.36
FEB.	MAIN	26.56	24.39	20.88	26.05	26.56	23.50	8.00	27.23	27.03	26.49	26.45	263.13
	AUX.	13.40	12.62	12.50	13.03	13.38	12.95	11.58	12.63	12.74	12.52	12.57	139.92
	TOTAL	39.96	37.01	33.38	39.08	39.94	36.45	19.58	39.85	39.77	39.01	39.02	403.05
MAR.	MAIN	22.42	16.83	13.95	29.46	16.43	30.63	5.49	17.16	16.54	17.99	16.63	203.52
	AUX.	13.83	13.32	13.59	13.96	13.82	13.95	12.25	13.21	12.87	13.03	13.23	147.06
	TOTAL	36.25	30.15	27.54	43.42	30.25	44.58	17.74	30.37	29.41	31.01	29.86	350.58
APR.	MAIN	30.96	7.53	8.97	49.58	22.22	23.41	6.32	7.50	12.06	7.33	7.56	183.45
	AUX.	13.99	13.56	13.87	13.99	13.99	13.99	12.33	13.48	13.89	13.05	13.63	149.75
	TOTAL	44.94	21.09	22.85	63.57	36.21	37.39	18.66	20.98	25.95	20.38	21.20	333.20
MAY.	MAIN	20.13	7.49	21.98	13.85	59.60	20.85	6.99	14.27	15.82	7.28	11.52	199.78
	AUX.	15.36	15.06	15.36	15.36	16.02	15.36	13.57	15.24	15.32	14.40	15.32	166.35
	TOTAL	35.49	22.54	37.34	29.21	75.62	36.21	20.55	29.51	31.15	21.67	26.84	366.13
JUN.	MAIN	16.69	6.96	30.80	13.46	136.88	7.07	6.50	26.00	29.59	19.98	8.13	302.05
	AUX.	13.52	13.15	13.54	13.52	16.43	13.44	11.97	13.54	13.51	13.11	13.44	149.16
	TOTAL	30.21	20.11	44.34	26.98	153.31	20.51	18.46	39.54	43.10	33.09	21.58	451.21
JUL.	MAIN	131.89	7.04	18.94	7.20	128.14	40.02	6.63	26.14	75.66	63.51	72.92	578.09
	AUX.	12.14	10.42	10.77	10.75	12.04	10.71	9.63	10.77	10.77	10.89	10.78	119.68
	TOTAL	144.03	17.46	29.71	17.94	140.18	50.73	16.26	36.91	86.43	74.40	83.70	697.77
AUG.	MAIN	148.16	7.00	95.92	30.74	16.70	19.85	27.48	48.28	7.19	42.83	54.78	498.95
	AUX.	14.30	10.35	12.02	10.88	10.89	10.89	10.22	10.88	10.72	10.89	10.89	122.93
	TOTAL	162.47	17.36	107.94	41.62	27.59	30.74	37.70	59.16	17.91	53.72	65.67	621.88
SEP.	MAIN	133.90	6.93	50.71	8.25	19.26	9.06	50.88	9.28	7.25	7.17	19.29	321.99
	AUX.	12.20	9.79	11.06	10.56	10.61	10.61	10.73	10.25	10.50	10.31	10.57	117.19
	TOTAL	146.10	16.71	61.77	18.81	29.87	19.67	61.62	19.53	17.75	17.47	29.87	439.17
OCT.	MAIN	8.00	25.36	7.94	7.78	8.01	7.97	77.23	7.97	29.99	11.99	8.51	200.75
	AUX.	11.95	12.02	11.83	11.47	11.96	11.54	12.48	11.88	11.89	11.79	11.10	129.91
	TOTAL	19.95	37.38	19.76	19.25	19.96	19.51	89.71	19.85	41.89	23.78	19.61	330.65
NOV.	MAIN	32.59	62.81	134.36	8.93	17.04	7.87	101.11	43.76	106.65	135.74	8.08	658.94
	AUX.	12.50	12.60	12.69	11.92	12.34	11.82	13.00	12.39	12.95	12.69	11.62	136.51
	TOTAL	45.10	75.41	147.05	20.85	29.37	19.68	114.11	56.15	119.59	148.44	19.70	795.45
DEC.	MAIN	67.50	68.13	146.74	102.93	51.46	22.39	61.50	23.05	52.44	78.92	15.46	670.53
	AUX.	12.41	12.47	12.63	12.49	12.43	12.00	12.43	12.34	12.40	12.46	11.96	136.02
	TOTAL	79.91	80.61	159.38	115.42	63.89	34.39	73.93	35.39	44.84	91.38	27.42	806.55
TOTAL	MAIN	693.93	264.83	579.60	385.65	572.88	248.39	385.59	276.79	387.37	446.00	276.27	410.66
	AUX.	160.19	149.60	154.21	152.63	158.64	151.83	143.70	151.07	151.82	149.49	149.54	152.06
	TOTAL	854.12	414.43	733.81	538.27	731.52	400.22	529.29	427.85	539.19	595.49	425.81	562.73

TABLE A.3.3-46 (1) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-1 + CASE-B)

\*\*\* ANNUAL SUMMARY OF COMPUTATION \*\*\* CASE=PROPOSED CONDITION (UNIT = MCM)

TIME OR PERIOD	INFLOW (1)	RESERVOIR WATER STAGE AREA	EVAP. (2)	MAINT. (3)	SPILL (4)	OUTFLOW (5)	UPPER MAASIM DAM (6)	UPPER MAASIM DAM (7)	UPPER MAASIM DAM (8)	UPPER MAASIM DAM (9)	UPPER MAASIM DAM (10)	UPPER MAASIM DAM (11)
1972	2953.48		26.63	2234.18	693.50	51.68	747.18	693.50	51.68	615.30	2901.16	1.36
1973	1591.60		23.83	859.63	693.60	0.0	693.60	693.60	0.0	37.15	1186.77	1.25
1974	2688.31		24.74	1887.72	693.60	36.85	730.45	693.60	36.85	52.57	2477.13	1.88
1975	2011.43		25.28	1266.64	693.60	26.09	718.69	693.60	26.09	413.44	1705.97	1.50
1976	2488.97		25.60	1883.19	693.50	150.06	843.56	693.50	150.06	511.60	2324.85	1.42
1977	1460.54		24.78	712.24	693.60	0.0	693.60	693.60	0.0	300.21	1212.45	1.37
1978	217.86		21.96	1397.16	693.60	45.02	738.62	693.60	45.02	437.37	1679.56	1.78
1979	1644.65		24.06	952.52	693.60	0.0	693.60	693.60	0.0	338.05	1290.57	1.86
1980	2039.60		24.16	1300.54	693.50	1.66	697.17	693.50	1.66	417.18	1719.38	1.74
1981	2211.15		23.55	1476.15	693.60	0.0	693.60	693.60	0.0	434.49	1930.65	1.76
1982	1635.51		23.57	1040.45	693.60	0.0	693.60	693.60	0.0	336.17	1376.62	1.58
AVERAGE	2080.28		24.38	1346.38	694.12	26.49	720.60	694.12	26.49	427.59	1800.46	1.52

TIME OR PERIOD	ANGAT RIVER AT BUSTOS (1)	LIBAGAN PIS (2)	UP. UP. MAASIM (3)	UP. UP. MAASIM (4)	UP. UP. MAASIM (5)	UP. UP. MAASIM (6)	UP. UP. MAASIM (7)	UP. UP. MAASIM (8)	UP. UP. MAASIM (9)	UP. UP. MAASIM (10)	UP. UP. MAASIM (11)	UP. UP. MAASIM (12)
1972	2959.79	15.75	2884.04	2884.04	368.86	1.93	366.92	20.68	32.97	354.63	354.63	0.0
1973	1185.53	14.42	1171.11	1171.11	155.70	1.43	154.28	15.88	28.79	143.57	143.57	0.0
1974	2475.85	14.84	2441.01	2441.01	236.64	0.88	235.76	11.85	18.44	229.17	229.17	0.0
1975	1704.87	15.06	1689.62	1689.62	152.26	1.43	150.84	17.35	27.23	141.06	141.06	0.0
1976	2353.43	16.49	2306.93	2306.93	243.35	1.94	241.41	22.58	33.66	230.33	230.33	0.0
1977	1211.08	15.86	1195.22	1195.22	165.01	1.93	163.08	21.94	32.45	152.45	152.45	0.0
1978	1677.78	20.60	1657.17	1657.17	202.84	1.33	201.53	13.82	27.98	187.36	187.36	0.0
1979	1288.71	21.53	1267.19	1267.19	86.65	2.65	84.13	30.12	42.42	71.83	71.83	0.0
1980	1717.44	20.15	1697.49	1697.49	127.59	2.65	125.11	31.16	41.02	115.44	115.44	0.0
1981	1928.88	20.42	1908.47	1908.47	59.99	2.39	58.66	31.27	38.50	51.01	51.01	0.0
1982	1375.04	18.31	1356.73	1356.73	125.07	2.16	123.03	29.15	36.89	115.29	115.29	0.0
AVERAGE	1798.94	17.58	1781.36	1781.42	176.91	1.89	175.13	22.34	32.57	162.90	163.44	0.0

TIME OR PERIOD	MAASIM RETURN FLOW (1)	MAASIM SUPPLY (2)	MAASIM DEMAND (3)	MAASIM DIFFER (4)	MAASIM DIS. (5)	MAASIM DIS. (6)	MAASIM DIS. (7)	MAASIM DIS. (8)	MAASIM DIS. (9)	MAASIM DIS. (10)	MAASIM DIS. (11)	MAASIM DIS. (12)
1972	354.18	0.0	7.50	7.50	354.05	2884.04	4.15	2879.90	210.30	140.78	351.08	39.91
1973	142.35	0.0	6.40	6.40	141.66	1171.11	4.15	1166.96	195.84	133.53	329.36	32.54
1974	228.05	0.0	4.85	4.85	227.91	2461.01	4.15	2456.86	175.06	133.22	308.28	24.62
1975	148.39	0.0	6.96	6.96	148.05	1689.62	4.15	1685.47	204.58	135.68	340.26	35.33
1976	236.10	0.0	7.91	7.91	230.02	2306.93	4.15	2302.79	218.97	149.56	368.52	43.02
1977	152.10	0.0	6.96	6.96	151.96	1195.22	4.15	1191.08	209.22	143.63	352.84	40.19
1978	192.06	0.0	4.85	4.85	189.01	1657.85	4.15	1653.71	244.44	183.42	427.90	28.15
1979	170.94	0.0	8.40	8.40	170.94	1267.19	4.15	1263.04	262.26	196.03	456.29	52.03
1980	115.16	0.0	7.52	7.52	115.16	1697.49	4.15	1693.34	247.53	181.71	423.24	51.48
1981	50.23	0.0	7.33	7.33	50.15	1908.47	4.15	1904.32	247.73	183.82	431.55	50.85
1982	144.89	0.0	8.41	8.41	144.89	1356.73	4.15	1352.58	236.64	164.27	400.91	50.82
AVERAGE	162.77	0.0	7.01	7.43	162.35	1781.42	4.15	1777.27	222.41	158.52	380.93	40.63

TABLE A.3.3-46 (2) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-1 + CASE-B)

\*\*\* ANNUAL SUMMARY OF SHORTAGE \*\*\* CASE=PROPOSED CONDITION (UNIT = MCM)

YEAR	W. SUPPLY<--UPPER BUSTOS	>>--IRRIGATED AREA BY MAASIM	THIRD DAM	RELEASE FOR ANGAT RIVER
	FOR WASS UP. BUSTOS TIBAGAN PIS U.U.IRRIG. UPPER DAM LOWER DAM			SALT WATER AT BUSTOS EXCLUSION FOR N+S M.C
1972	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	0.0
1975	0.0	0.105	0.0	0.0
1976	0.0	0.0	0.0	0.0
1977	0.0	0.0	0.0	0.0
1978	0.0	0.019	0.0	0.0
1979	0.0	0.680	4.948	114.386
1980	0.0	0.0	0.0	0.0
1981	0.0	0.125	0.0	0.0
1982	0.0	0.365	0.0	0.0
		0.439	0.0	0.0
		0.123	0.0	0.0

TABLE A.3.3-46 (3) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-1 + CASE-B)

*** ANNUAL SUMMARY OF POSSIBLE POWER GENERATION *** CASE-PROPOSED CONDITION													(UNIT...GWH)		
MONTH	YEAR	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TOTAL		
JAN.	MAIN	52.93	26.55	30.83	73.15	46.49	33.18	28.69	28.57	29.50	29.09	29.35	408.34		
	AUX.	15.05	14.66	14.79	15.11	15.07	15.07	13.44	14.88	14.65	14.72	14.85	162.34		
	TOTAL	67.98	41.21	45.62	88.27	61.60	48.25	42.13	43.45	44.15	43.82	44.20	570.69		
FEB.	MAIN	26.03	26.56	22.78	21.80	28.94	25.68	5.14	29.48	29.19	28.63	28.67	272.90		
	AUX.	13.92	12.96	12.86	13.57	13.85	13.40	11.57	12.98	13.10	12.83	12.93	143.97		
	TOTAL	39.95	39.52	35.64	35.36	42.79	39.08	16.71	42.47	42.28	41.46	41.60	416.87		
MAR.	MAIN	13.80	17.81	14.81	16.79	14.43	16.61	5.49	18.14	17.40	18.94	17.61	171.83		
	AUX.	14.42	13.74	14.01	14.70	14.33	14.56	12.25	13.64	13.25	13.39	13.65	151.94		
	TOTAL	28.22	31.54	28.82	31.49	28.76	31.17	17.74	31.78	30.65	32.33	31.26	323.77		
APR.	MAIN	8.17	7.70	7.82	8.29	8.02	8.16	6.32	7.68	7.81	7.49	7.73	85.21		
	AUX.	15.24	14.02	14.34	15.52	14.87	15.21	12.33	13.96	14.32	13.47	14.10	157.40		
	TOTAL	23.41	21.72	22.16	23.82	22.89	23.37	18.66	21.63	22.14	20.96	21.84	242.60		
MAY.	MAIN	8.29	7.69	7.88	8.57	8.00	8.25	6.99	7.77	7.84	7.45	7.79	134.52		
	AUX.	17.48	15.65	16.21	18.23	17.31	17.38	13.57	15.88	16.07	14.94	15.96	178.68		
	TOTAL	25.77	23.34	24.09	26.79	25.32	25.63	20.55	23.66	23.91	22.40	23.75	313.19		
JUN.	MAIN	82.28	9.27	82.67	100.79	137.73	64.98	6.50	45.81	48.51	32.17	25.44	616.13		
	AUX.	15.17	13.73	14.61	15.30	16.59	15.04	11.97	14.42	14.43	13.55	14.11	158.90		
	TOTAL	97.45	23.00	77.28	116.08	154.32	80.02	18.48	60.23	62.93	45.71	39.55	775.03		
JUL.	MAIN	132.27	13.68	18.94	7.53	131.74	44.65	6.63	28.12	82.60	63.51	73.81	603.69		
	AUX.	12.20	10.73	10.77	10.76	12.17	10.77	9.63	10.79	10.81	10.89	10.79	120.30		
	TOTAL	144.48	24.41	29.71	18.28	143.91	55.43	16.26	38.91	93.41	74.40	84.60	723.99		
AUG.	MAIN	148.24	7.10	95.92	30.91	18.72	19.85	27.48	48.28	7.19	42.83	54.78	501.31		
	AUX.	14.31	10.54	12.02	10.88	10.90	10.89	10.22	10.88	10.72	10.89	10.89	123.14		
	TOTAL	162.55	17.64	107.94	41.79	29.62	30.74	37.70	59.16	17.91	53.72	65.67	624.45		
SEP.	MAIN	133.90	7.01	50.71	8.25	19.26	9.06	50.88	9.28	7.25	7.17	19.39	322.07		
	AUX.	12.20	9.95	11.06	10.56	10.61	10.61	10.73	10.25	10.50	10.31	10.87	117.35		
	TOTAL	146.10	16.96	61.77	18.81	29.87	19.67	61.62	19.53	17.75	17.47	29.87	439.42		
OCT.	MAIN	8.00	31.03	7.94	7.78	8.01	8.20	77.23	7.97	29.99	11.99	8.51	206.65		
	AUX.	11.95	12.09	11.83	11.47	11.96	11.53	12.48	11.88	11.89	11.79	11.10	129.98		
	TOTAL	19.95	43.12	19.76	19.25	19.96	19.73	89.71	19.85	41.89	23.78	19.61	336.62		
NOV.	MAIN	12.04	53.07	128.52	9.40	8.12	7.87	91.81	23.94	96.59	127.02	8.43	566.81		
	AUX.	12.63	12.70	12.79	11.92	12.37	11.81	13.09	12.54	13.00	12.81	11.61	137.26		
	TOTAL	24.68	65.76	141.31	21.32	20.49	19.68	104.90	36.47	109.59	139.83	20.04	704.07		
DEC.	MAIN	69.51	58.91	135.27	97.92	40.30	23.78	51.12	25.14	24.73	69.09	16.78	612.55		
	AUX.	12.79	12.83	12.93	12.52	12.72	11.98	12.74	12.69	12.65	12.81	11.93	138.59		
	TOTAL	82.30	71.74	148.20	110.43	53.02	35.76	63.86	37.83	37.38	81.90	28.72	751.15		
TOTAL	MAIN	695.48	266.37	584.10	391.16	517.77	270.27	364.27	280.19	388.80	445.39	298.19	409.27		
	AUX.	167.37	153.59	158.22	160.54	162.78	158.26	144.02	154.79	155.39	152.40	152.50	186.35		
	TOTAL	862.84	419.97	742.32	551.70	680.55	428.53	508.29	434.97	544.18	597.80	450.70	585.62		

TABLE A.3.3-47 (1) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-2 + CASE-B)

(UNIT = MCM)

TIME OR PERIOD	RESERVOIR			A N G A T			D A M			CASE=PROPOSED CONDITION			BUSTOS		
	INFLW (1)	WATER STOR- AGE	EVAP. (2)	MAIN AUX. (3)	OUTFLOW AUX. (4)	SPILL (5)	INFLOW (6)	WATER OUTFLOW (7)	RUNOFF (8)	IRRIGATION DEMAND (9)	AVAIL. (10)	IRRI- GATION DEMAND (11)	RESID. (12)	AVAIL.	
1972	2993.68	0.0	26.68	2322.63	693.50	51.68	747.18	693.50	51.68	615.30	2899.61	1.36	2898.24		
1973	3591.60	0.0	23.95	661.01	693.60	0.0	693.60	693.60	0.0	327.15	1168.15	1.25	1186.94		
1974	2688.31	0.0	24.84	1887.61	693.60	36.85	730.45	693.60	36.85	552.57	2477.03	1.28	2475.75		
1975	2011.43	0.0	23.25	1266.47	693.60	26.09	719.59	693.60	26.09	413.44	1706.00	1.30	1704.70		
1976	2488.97	0.0	25.60	1682.04	693.60	131.22	826.72	693.60	131.22	511.60	2324.85	1.42	2323.43		
1977	1460.54	0.0	24.83	906.86	693.60	0.0	693.60	693.60	0.0	300.21	1207.07	1.57	1205.70		
1978	2127.86	0.0	21.97	1202.88	693.60	45.02	735.62	693.60	45.02	437.37	1684.87	1.78	1683.09		
1979	1444.65	0.0	24.18	954.39	693.60	0.0	693.60	693.60	0.0	338.05	1292.44	1.86	1290.58		
1980	2029.60	0.0	24.26	1272.59	693.60	1.66	697.17	693.60	1.66	417.18	1711.43	1.74	1709.69		
1981	2211.15	0.0	23.23	1681.83	693.60	0.0	693.60	693.60	0.0	454.49	1936.33	1.76	1934.56		
1982	1635.51	0.0	23.68	1034.85	693.60	0.0	693.60	693.60	0.0	336.17	1371.02	1.58	1369.44		
AVERAGE 2080.28			24.45	1345.71	694.12	26.59	720.71	694.12	26.59	427.59	1797.89	1.52	1798.37		

TIME OR PERIOD	ANGAT RIVER AT BUSTOS			UP. UF.			MAASIM			UPPER MAASIM DAM			LOWER MAASIM DAM			BUSTOS		
	MAASIM DIS.	RETURN FR MCM	DIFFER	DIS.	DIS.	USE	DIS.	DIS.	DIS.	DIS.	DIS.	DIS.	DIS.	DIS.	DIS.	DIS.	DIS.	DIS.
1972	2998.24	35.75	2962.49	2892.49	369.86	1.93	366.92	20.68	32.97	354.83	354.83	0.0	11.74	12.19	354.10	12.19	354.10	
1973	1866.91	14.42	1852.49	1772.49	155.70	1.43	154.28	15.88	26.79	143.37	143.37	0.0	10.27	11.28	142.35	11.28	142.35	
1974	2175.75	14.84	2160.91	2460.91	236.64	0.88	235.76	11.85	18.44	229.17	229.17	0.0	7.92	9.03	228.05	9.03	228.05	
1975	1704.70	15.06	1689.64	1899.64	152.26	1.43	150.94	17.35	27.33	141.06	141.06	0.0	11.01	14.09	140.39	14.09	140.39	
1976	2323.43	16.49	2306.93	2306.93	243.35	1.94	241.41	22.58	33.66	230.33	230.33	0.0	12.53	12.76	230.10	12.76	230.10	
1977	1205.70	15.86	1189.84	1189.84	165.01	1.95	163.05	21.94	32.54	152.45	152.45	0.0	11.29	11.63	152.10	11.63	152.10	
1978	1883.09	20.60	1862.49	1653.17	202.84	1.33	201.53	15.16	27.98	168.71	168.71	0.0	7.48	13.61	167.11	13.61	167.11	
1979	1709.69	21.33	1688.36	1688.36	186.85	2.64	184.13	30.12	42.62	171.83	171.83	0.0	13.51	14.60	170.94	14.60	170.94	
1980	1934.56	20.15	1914.41	1869.54	127.59	2.65	125.31	31.16	41.02	115.44	115.44	0.0	12.80	13.08	115.16	13.08	115.16	
1981	1369.44	18.31	1351.13	1351.13	125.07	2.16	123.03	29.15	36.89	115.29	115.29	0.0	13.26	13.66	114.89	13.66	114.89	
AVERAGE 1798.37	17.58	1780.79	1780.85	174.91	1.89	173.13	22.47	32.57	163.02	163.44	0.0	11.28	12.60	162.32	12.60	162.32		

TIME OR PERIOD	THIRD MAASIM DAM			NORTH MAIN CANAL			SOUTH MAIN CANAL AT BUSTOS			BUSTOS			
	MAASIM DIS.	RETURN FR MCM	DIFFER	AVAIL. DIS.	SALT EX. AVAIL.	N.M.C.	AVAIL. DIS.	AVAIL.	AVAIL.	DIS.	S.M.C.	AVAIL.	DIS.
1972	354.18	0.0	354.18	2862.49	4.15	2878.35	198.98	160.78	339.75	32.41	2506.18	32.41	2506.18
1973	142.35	0.0	142.35	1172.49	4.15	1168.34	185.30	135.53	318.83	26.14	823.37	26.14	823.37
1974	228.05	0.0	228.05	2460.91	4.15	2456.76	167.64	133.22	300.86	19.76	2136.14	19.76	2136.14
1975	140.39	0.0	140.39	1689.64	4.15	1685.49	193.72	135.68	329.40	28.36	1337.23	28.36	1337.23
1976	230.10	0.0	230.10	2306.93	4.15	2302.79	207.10	169.56	356.66	35.11	1911.02	35.11	1911.02
1977	152.10	0.0	152.10	1189.84	4.15	1185.69	198.65	143.63	342.28	33.22	810.39	33.22	810.39
1978	192.06	0.0	192.06	1653.17	4.15	1649.05	232.72	183.45	416.17	22.84	1220.21	22.84	1220.21
1979	170.94	0.0	170.94	1669.05	4.15	1664.91	249.78	194.03	443.81	43.63	777.47	43.63	777.47
1980	115.16	0.0	115.16	1689.54	4.15	1685.40	230.37	181.71	412.08	43.96	1229.55	43.96	1229.55
1981	150.23	0.0	150.23	1314.15	4.15	1310.00	236.73	183.62	420.55	43.52	1445.93	43.52	1445.93
1982	114.89	0.0	114.89	1151.13	4.15	1146.99	224.14	164.27	388.41	42.41	916.16	42.41	916.16
AVERAGE 162.77	0.0	0.0	162.77	1780.85	4.15	1776.70	211.38	158.52	389.89	33.74	1375.07	33.74	1375.07

TABLE A.3.3-47 (2) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-2 + CASE-B)

\*\*\* ANNUAL SUMMARY OF SHORTAGE \*\*\* CASE=PROPOSED CONDITION (UNIT = MCM)

YEAR	W. SUPPLY FOR MUSS	UPPER BUSTOS	BUSTOS TIBAGAN PIS	U.U. IRRIG.	UPPER DAM	LOWER DAM	THIRD DAM	RELEASE FOR ANGAT RIVER SALT WATER AT BUSTOS EXCLUSION FOR N+S M.C
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975	0.0	0.0	0.0	0.105	0.0	0.0	0.0	0.0
1976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978	0.0	0.0	0.680	0.019	4.537	4.948	0.0	100.372
1979	0.0	0.0	0.0	0.125	0.0	0.0	0.0	0.0
1980	0.0	0.0	0.0	0.365	0.0	0.0	0.0	0.0
1981	0.0	0.0	0.0	0.439	0.0	0.0	0.0	0.0
1982	0.0	0.0	0.0	0.123	0.0	0.0	0.0	0.0

TABLE A.3.3-47 (3) ANNUAL SUMMARY OF WATER BALANCE  
(CASE-2 + CASE-B)

\*\*\* ANNUAL SUMMARY OF POSSIBLE POWER GENERATION \*\*\* CASE=PROPOSED CONDITION (UNIT...GWH)

MONTH	YEAR	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TOTAL
JAN.	MAIN	52.94	24.94	29.04	73.16	48.35	33.15	27.46	26.75	27.69	27.34	27.53	398.34
	AUX.	15.06	14.69	14.81	15.12	15.11	15.05	13.51	14.78	14.65	14.78	14.87	162.55
	TOTAL	68.00	39.63	43.84	88.28	63.46	48.20	40.97	41.65	42.34	42.12	42.40	560.89
FEB.	MAIN	24.50	25.02	21.41	23.15	27.22	24.12	8.00	27.91	27.65	27.15	27.10	263.23
	AUX.	13.93	13.02	12.91	13.54	13.83	13.42	11.58	13.04	13.14	12.92	12.98	144.31
	TOTAL	38.43	38.04	34.32	36.68	41.06	37.54	19.58	40.94	40.79	40.07	40.09	407.54
MAR.	MAIN	13.50	17.27	14.31	16.22	13.91	16.07	5.49	17.60	16.95	18.45	17.07	166.85
	AUX.	14.46	13.84	14.09	14.68	14.33	14.60	12.25	13.74	13.53	13.54	13.75	152.62
	TOTAL	27.96	31.11	28.40	30.90	28.25	30.67	17.74	31.34	30.28	31.99	30.82	319.46
APR.	MAIN	8.19	7.75	7.86	8.29	8.02	8.18	6.32	7.72	7.85	7.56	7.78	85.51
	AUX.	15.28	14.14	14.45	15.51	14.88	15.26	12.33	14.07	14.41	13.64	14.22	158.19
	TOTAL	23.47	21.89	22.31	23.79	22.90	23.44	18.66	21.79	22.26	21.20	21.99	243.71
MAY.	MAIN	8.31	7.74	7.92	8.56	8.02	8.27	6.99	7.82	7.88	7.52	7.84	134.86
	AUX.	17.53	15.81	16.34	18.20	17.32	17.44	13.57	16.03	16.19	15.17	16.10	179.70
	TOTAL	25.84	23.54	24.25	26.76	24.34	25.71	20.55	23.86	24.07	22.70	23.94	314.56
JUN.	MAIN	84.06	13.07	66.24	100.00	137.73	66.98	6.50	48.56	48.73	37.46	29.08	638.41
	AUX.	15.19	13.86	14.67	15.29	16.59	15.07	11.97	14.51	14.54	13.73	14.22	159.64
	TOTAL	99.25	26.93	80.92	115.29	154.32	82.05	18.46	63.07	63.27	51.19	43.31	798.06
JUL.	MAIN	132.27	13.68	18.94	7.53	131.74	44.65	6.63	29.16	85.74	63.51	73.81	607.67
	AUX.	12.20	10.73	10.77	10.76	12.17	10.77	9.63	10.79	10.83	10.89	10.79	120.33
	TOTAL	144.48	24.41	29.71	18.28	143.91	55.43	16.26	39.95	96.57	74.40	84.60	728.00
AUG.	MAIN	148.24	7.10	95.92	30.91	18.72	19.85	27.48	48.28	7.19	42.83	54.78	501.31
	AUX.	14.31	10.54	12.02	10.88	10.90	10.89	10.22	10.88	10.72	10.89	10.89	123.14
	TOTAL	162.55	17.64	107.94	41.79	29.62	30.74	37.70	59.16	17.91	53.72	65.67	624.45
SEP.	MAIN	133.90	7.01	50.71	8.25	19.26	9.06	50.88	9.28	7.25	7.17	19.29	322.07
	AUX.	12.20	9.95	11.06	10.56	10.61	10.61	10.73	10.25	10.50	10.51	10.57	117.35
	TOTAL	146.10	16.96	61.77	18.81	29.87	19.67	61.62	19.53	17.75	17.67	29.87	439.42
OCT.	MAIN	8.00	31.03	7.94	7.78	8.01	7.97	77.23	7.97	29.99	11.99	8.51	206.42
	AUX.	11.95	12.09	11.83	11.47	11.96	11.54	12.48	11.88	11.89	11.79	11.10	129.98
	TOTAL	19.95	43.12	19.76	19.25	19.96	19.51	89.71	19.85	41.89	23.78	19.61	336.40
NOV.	MAIN	12.04	53.07	128.52	8.93	8.12	7.87	91.26	26.18	96.41	127.02	8.08	567.50
	AUX.	12.63	12.70	12.79	11.92	12.37	11.82	13.09	12.53	13.00	12.81	11.62	137.27
	TOTAL	24.68	65.76	141.31	20.85	20.49	19.68	104.35	38.71	109.40	139.83	19.70	704.77
DEC.	MAIN	69.02	58.91	135.27	98.46	40.51	22.39	51.69	23.49	23.04	69.09	15.46	607.13
	AUX.	12.80	12.83	12.93	12.72	12.72	12.00	12.75	12.66	12.67	12.81	11.96	138.65
	TOTAL	81.82	71.74	148.20	110.96	53.03	34.39	64.44	36.15	35.71	81.90	27.42	745.79
TOTAL	MAIN	694.99	266.58	584.08	391.22	517.43	268.56	365.93	280.73	386.36	447.10	296.34	409.03
	AUX.	167.55	154.19	158.66	160.45	162.79	158.46	144.11	155.28	155.89	153.29	153.07	156.70
	TOTAL	862.53	420.77	742.74	551.67	680.22	427.03	510.04	436.01	542.25	600.39	449.41	565.73

TABLE A.3.3-48 COMPARISON OF VARIOUS TYPE OF GATE  
(AT THIRD MAASIM OAM)

Type of Gate	(a) Roller Gate	(b) Slide Gate	(c) Hinge Gate	(d) Rubber Gate
Kinds of gate	O Roller gate caterpillar gate	O Slide gate Ring follower gate	Radial gate O Tainter gate	O Rubber dam
Appropriate for diversion dam	Ring seal gate Jet flow gate	Stop-log	Sector gate Flap gate Drum gate	
Gate scale for application (Approx)	$B \times H \geq 10$ sq.m. (Span x height)	$B \times H \leq 5$ sq.m.	$B \leq 100$ m $H \leq 3$ m	$B \leq 200$ m $H \leq 4$ m
Lifting mechanism	Manpower and/or Engine drive	Manpower	Oil pressure by Engine	Inflation:Engine blower Deflation:Self defla.
Gate element	$H = 2.30$ m $B = 4.00$ m x 5bays $A = 46$ sq.m	$H = 2.30$ m $B = 2.00$ m x 10bays $A = 46$ sq.m	$H = 2.30$ m $B = 12.00$ x 2bays $A = 55.2$ sq.m	$H = 2.50$ m $B = 10.00$ x 2bays $A = 56.2$ sq.m
Cost for gate with all performance Ratio	₹ 3,500,000 (2) 1.5 /O	₹ 2,800,000 (3) 1.2 /O	₹ 5,000,000 (4) 2.1 /X	₹ 2,400,000 (1) 1.0 /O
Operation	Smooth operation with Engine drive /O	Hard operation with man power /X	Smooth operation with Engine oil pressure /O	Easy operation
Maintenance & others	Not easy due to Engine inspection Required fuel, oil gate and mechanical /Δ parts (Advantage)	Difficulty for flood release due to small span of gate Required fuel, oil gate and mechanical /Δ parts (Disadvantage)	Not easy due to engine inspection Required fuel, oil and mechanical /Δ parts (Disadvantage)	Not easy due to engine and other mechanical inspection Required fuel, oil and mechanical parts. /Δ (Advantage)



TABLE A.3.3-49 HYDRAULIC SITUATION OF FEEDER CANALS TO EXPANSION AREA

WS	Canal name	Section of canal from to	Existing					Proposed					Need for Widening	Remarks		
			A	Q	b	S	d	H	A	Q	b	S			d	H
6	N.M.C. Angat	Constant gate to BPIP	16,027	22,674	10.0	0.0003	2.25	4.3	21,468	26,729	10.0	0.0003	2.49	3.50	No need	*shown is Profile at AMIADP
			*26,648									(n=0.03)				
6		Constant gate to LAT A	15,886	22,192	10.0	0.0006	1.85	3.4	20,977	26,119	10.0	0.0006	2.00	2.80	-do-	
			*26,648									(n=0.03)				
12		LAT G to LAT J	1,623	2,296	6.0	0.0004	0.70	2.0	1,933	2,407	6.0	0.0004	0.78	1.10	-do-	
												(n=0.03)				
6	LAT A Angat North		793	1,121	3.0	0.0003	0.70	1.2	4,390	5,466					Refer to feeder canal to Maasin	
6	LAT B -do-	STA 0 - STA 2+040	1,776	2,442	6.0	0.0008	0.80	1.6	2,406	2,997	6.0	0.0008	0.66	1.00	No need	
			*4,562													
8	LAT B Bitokan		162	0,229	2.0	0.00048	0.33	1.2	340	0,423	2.0	0.00048	0.44	0.80	No need	ss 1:1.0
8	LAT C Bitokan	STA 0 - STA 1+032	224	0,317	2.0	0.0005	0.35	1.0	640	0,797	2.0	0.0005	0.62	1.00	No need	224 + 416 = 640ha
8	-do-	STA 1+032 - STA 2+080	(90)	0,22	2.0	0.0005	0.29	0.9	330	0,411	2.0	0.0005	0.42	0.80	No need	90 + 240 = 330 ha
8	LAT C-1 -do-		115	0,163	1.0	0.0011	0.28	0.8	291	0,362	1.0	0.0004	0.54	0.90	Need	115 + 176 = 291 ha
9	LAT D-1 N.M.C		1,997	2,826	4.0	0.00065	0.82	1.70	2,463	3,066	4.0	0.00065	0.84	1.20	No need	
9	LAT D-1-D N.M.C	STA 0 - STA 3+128	396	0,560	1.8	0.0014	0.40	1.10	482	0,600	1.8	0.0014	0.45	0.75	No need	ss 1:1.0
	-do-	STA 3+128 - STA 4+900	0,050	1.0	0.00025	0.22	0.76		0,157	1.0	0.0003	0.37	0.70	Need	ss 1:1.5	
9	LAT D-1-A N.M.C		397	0,562	1.8	0.00075	0.48	1.00	777	0,967	2.5	0.00025	0.70	1.00	-do-	ss 1:1.5
9	LAT D-1-A EXT'N #2		75	0,106	1.0	0.00065	0.30	0.63	455	0,566	1.5	0.0003	0.63	1.00	Need	ss 1:1.5
12	LAT J N.M.C.		738	1,044	3.0	0.0003	0.66	1.05	1,048	1,305	3.0	0.0003	0.75	1.05	No need	
			672	0,950	2.4	0.0004	0.55	0.94	982	1,223	2.4	0.0004	0.77	1.10	Need	raise embankment
12	LAT J-3		140	0,198	1.0	0.00035	0.44	0.75	450	0,560	2.0	0.0002	0.62	1.00	Need	ss 1:1.5
12	LAT J-3-B		13	0,018	1.0	0.0003	0.12	0.70	323	0,402	1.5	0.0002	0.59	0.90	Need	ss 1:1.5

TABLE A.3.3-50 MAIN ELEMENTS OF BUSTOS DAM

a. Name of the river	Angat river
b. Total length of the diversion dam	L = 520.3 m
Flood sluice way	79.0 x 6 = 474.0 m
Scouring sluice way	4.5 <sup>m</sup> x 2 + 6.0 x 1 = 15.0 m
Fixed ogee	N o n e
Others (Control house and piers)	= 31.3 m
c. Type of Gate and Height of Gate	5 feet
Scouring sluice way	Roller gate x 10 feet ) (2 stages)
Flood sluice way	Sector gate x 2.5 <sup>m</sup>
Others	N o n e
d. Intake works	
Direction of intake	Right (North) and Left (South)
Intake discharge	North Main Canal Q = 26.729 cu.m/s South Main Canal Q = 15.323 cu.m/s
Regulated intake water level	O. W. L. = 17.50 m
Intake gate (Span x Height x Bays)	
e. Design flood discharge	Q <sub>f</sub> = 42,094 cu.m/s
Design flood stage	HWL = 21.00 m
f. Elevations	
Upstream apron	EL 12.00 m
Downstream apron	EL 12.00 - EL 9.00 m
Top of crest (Flood sluice)	EL 15.00 m
Top of crest (Scouring sluice)	EL 13.00 m
Top of gates	EL 17.50 m
Bottom of intake channel	EL 13.50 m

TABLE A.3.3-51 MAIN ELEMENTS OF BUSTOS DAM

a. Name of the river	The Maasim river
b. Total length of the diversion dam	L = 32.0 m
Flood sluice way	L = 1.7 x 14 = 23.8 m
Scouring sluice way	L = 1.75 x 2 = 3.5 m
Fixed ogee	None
Others (piers)	= 4.7 m
c. Type of Gate and Height of Gate	
Flood sluice way (Poured concrete up to EL 10.3)	None
Scouring sluice way	Slide gate 3.3
Others	
d. Intake works	
Direction of intake	Right (North) and Left (South)
Intake discharge	North Main Canal Q = 3.318 cu.m/s South Main Canal Q = 0.875 cu.m/s
Regulated intake water level	O. W. L. = 10.30 m
Intake gate (Span x Height x Bays)	S. M. C. (Left) 1.0 x 1.5 x 1 N. M. C. (North) 1.8 x 1.5 x 2
e. Design flood discharge	(*Q <sub>f</sub> = 575 cu.m/s)
Design flood stage	N.W.L. = 14.70

\* Design flood discharge at lower maasim dam is 575 cu.m/s.

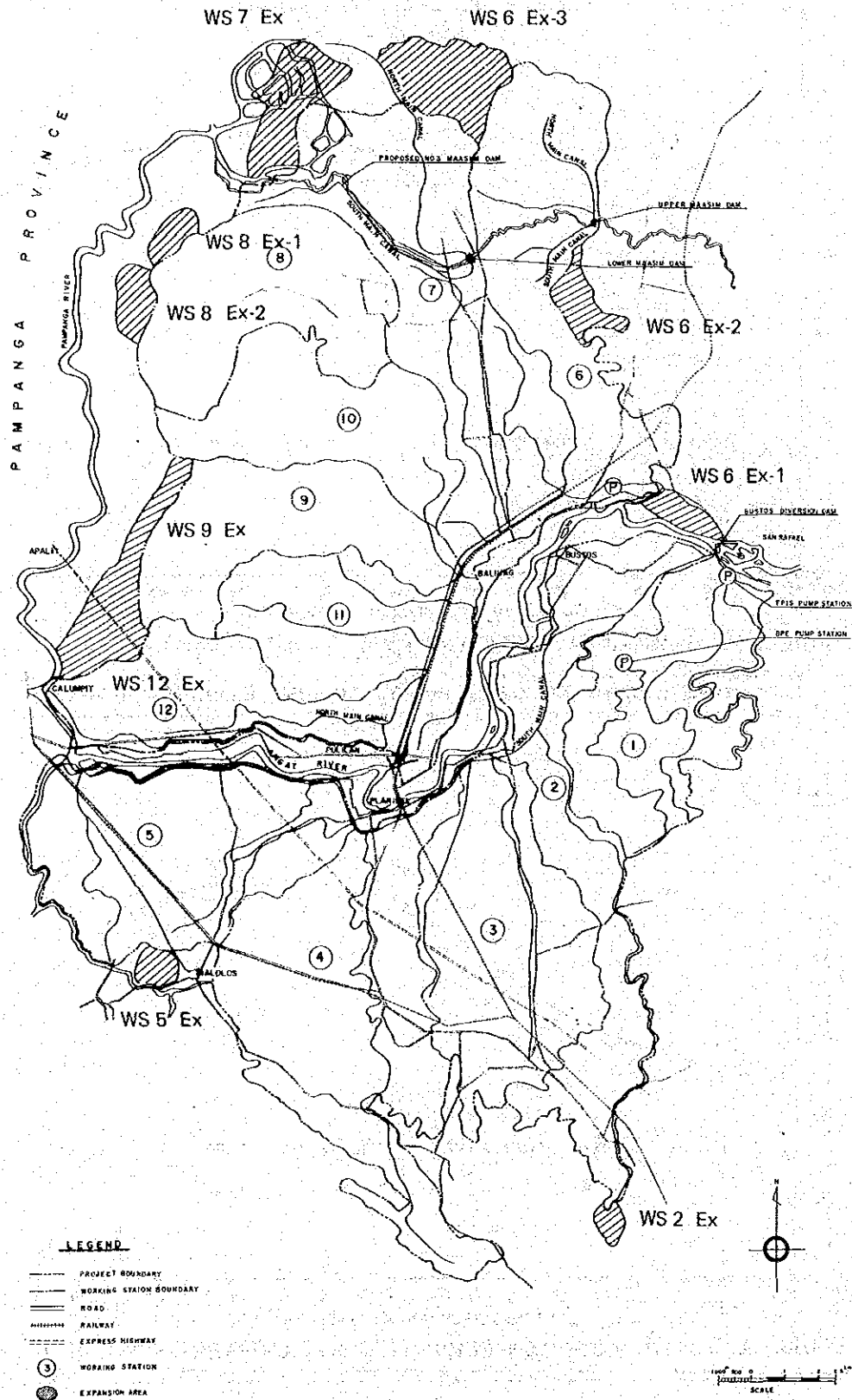
TABLE A.3.3-52 MAIN ELEMENTS OF LOWER MAASIM DAM

a. Name of the river	The Maasim river
b. Total length of the diversion dam	L = 22.90 m
Flood sluice way	2.0 <sup>m</sup> x 8 = 16.00 m
Scouring sluice way	2.0 <sup>m</sup> x 2 = 4.00 m
Fixed ogee	N o n e
Others	Piers 2.90 m
c. Type of Gate and Height of Gate	
Flood sluice way	Stoplog H = 2.10 m
Scouring sluice way	Slide gate H = 2.10 m
Others	N o n e
d. Intake works	
Direction of intake	Right (North) and Left (South)
Intake discharge	North Main Canal Q = 1.072 cu.m/s South Main Canal Q = 0.247 cu.m/s
Regulated intake water level	O. M. L. = 7.00 m
Intake gate (Span x Height x Bays)	N.M.C. 60" x 48" x 2 S.M.C. 48" x 36 " x 1
e. Design flood discharge	Q <sub>f</sub> = 575 cu.m/s
Design flood stage	HWL = 9.07 m
f. Elevations	
Upstream apron	EL 3.70 m
Downstream apron	EL 3.70 m
Top of crest	EL 4.90 m
Top of gates	EL 7.00 m
Bottom of intake channel	N.M.C. EL 5.60 m S.M.C. EL 5.91 m
g. Length of upstream and downstream apron	L = 28.1 m
Length of riprap	L = 10.0 m

TABLE A.3.3-53 MAIN ELEMENTS OF PROPOSED #3 MAASIM DAM

a. Name of the river	The Maasim river
b. Total length of the diversion dam	L = 30.2 m
Flood sluice way	L = (10.0 ~ 13.4) x 2 = 20.0 ~ 26.8 m
Scouring sluice way	L = 2.0 m
Fixed ogee	None
Others	L = 8.2 ~ 1.4
c. Type of Gate and Height of Gate	
Flood sluice way	Lubber Dam H = 2.50 m
Scouring sluice way	Slide gate H = 3.50 m
Others	None
d. Intake works	
Direction of intake	Right side
Intake discharge	Q = 0.847 cu.m/s
Regulated intake water level	O. W. L. = 4.00 m
Intake gate (Span x Height x Bays)	
e. Elevations	
Upstream apron	EL = 0.50 m
Downstream apron	EL = 0.50 m
Top of crest at flood sluice way	EL = 1.70 m
Bottom of scouring sluice way	EL = 0.50 m
Top of river dike	EL = 6.00 m
f. Length of upstream and downstream apron	L = 25 m
Length of riprap (upstream)	L = 10 m

FIGURE A.3.3-1 LOCATION OF PROPOSED EXPANSION AREA



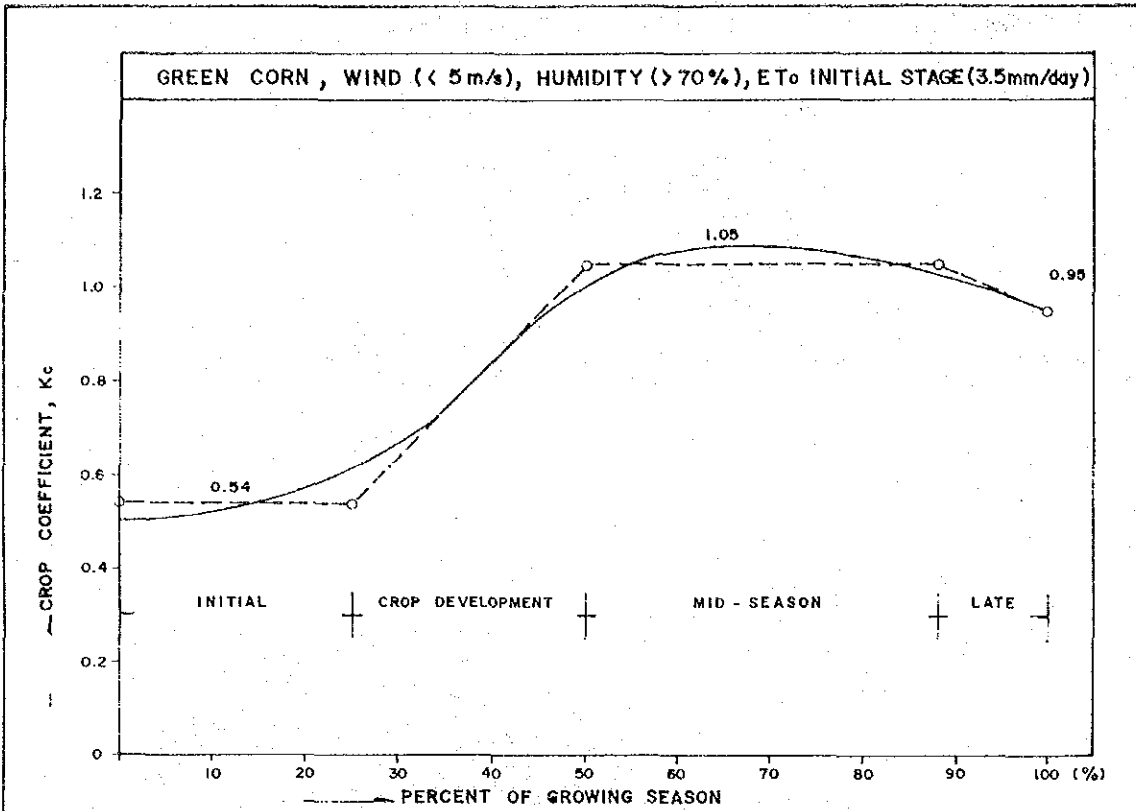


FIGURE A.3.3-2 CROP COEFFICIENT CURVE (GREEN CORN)

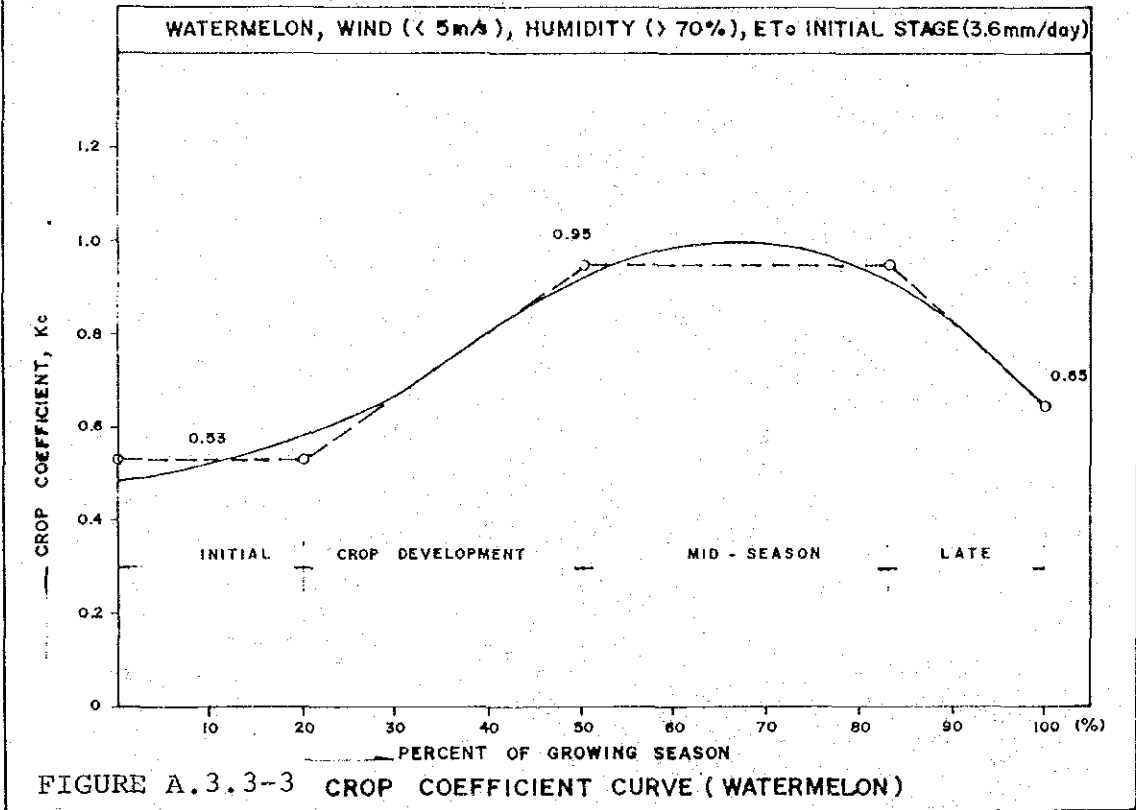


FIGURE A.3.3-3 CROP COEFFICIENT CURVE (WATERMELON)

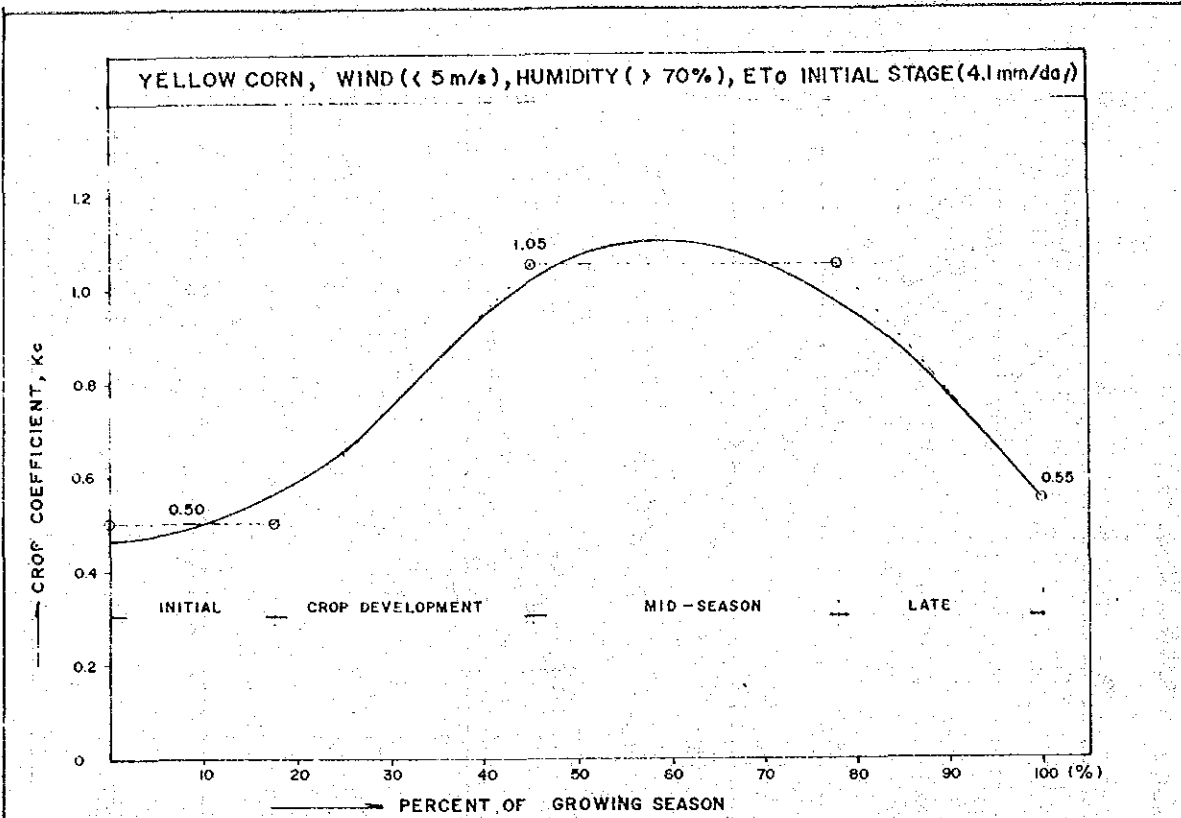


FIGURE A.3.3-4 CROP COEFFICIENT CURVE (YELLOW CORN)

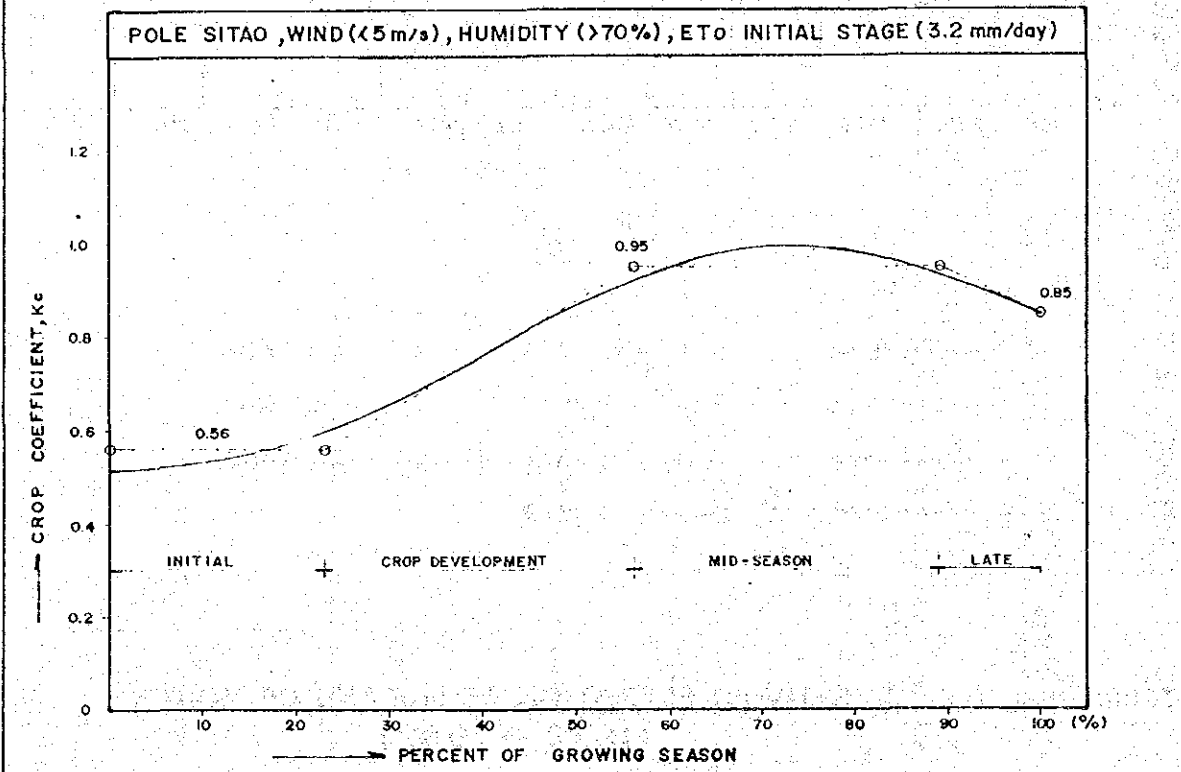
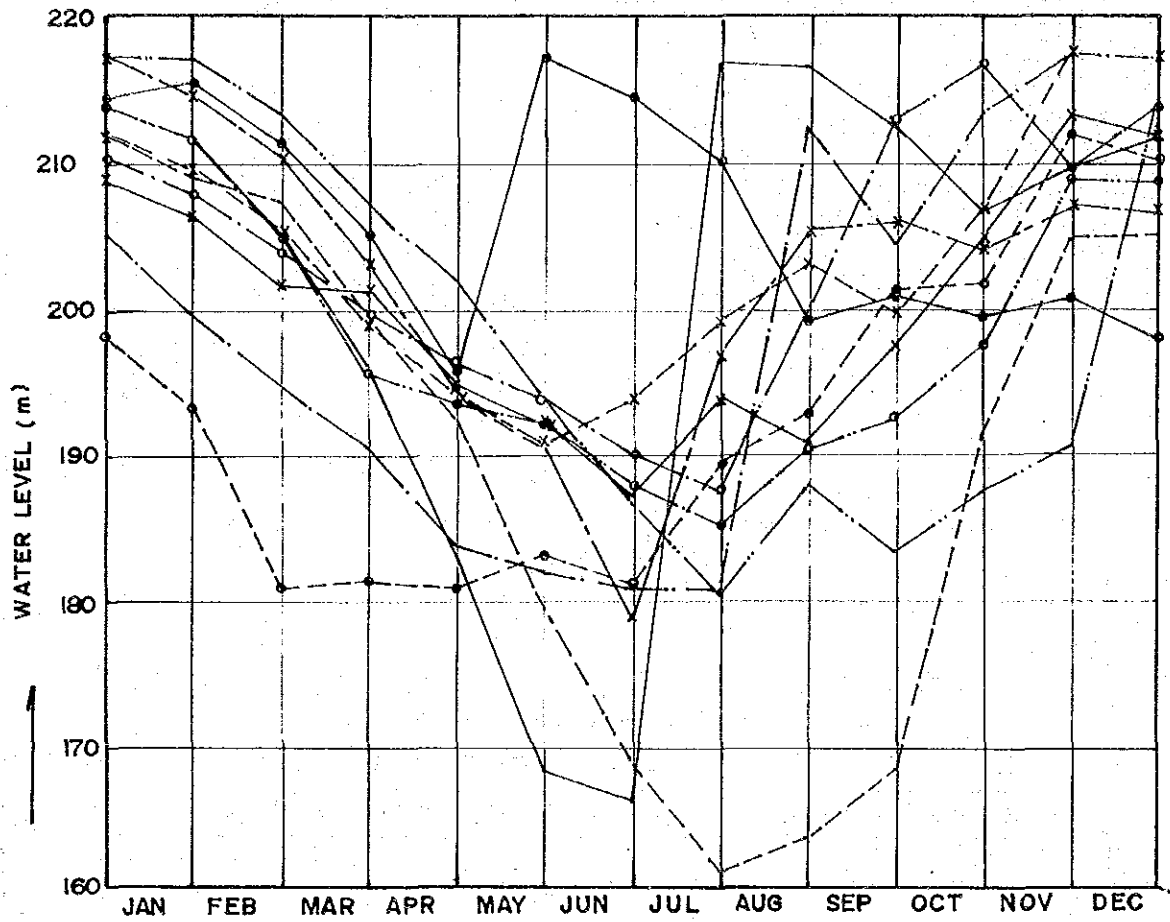


FIGURE A.3.3-5 CROP COEFFICIENT CURVE (POLE SITAO)





**LEGEND:**

- |              |                |              |
|--------------|----------------|--------------|
| — 1972       | ○—○ 1976       | x—x 1980     |
| - - - 1973   | ○- - -○ 1977   | x- - -x 1981 |
| - · - 1974   | ○- · -○ 1978   | x- · -x 1982 |
| - · - · 1975 | ○- · - ·○ 1979 |              |

**FIGURE A.3.3-6 RESERVOIR ELEVATION AT THE END OF MONTH (1972 - 1982)**

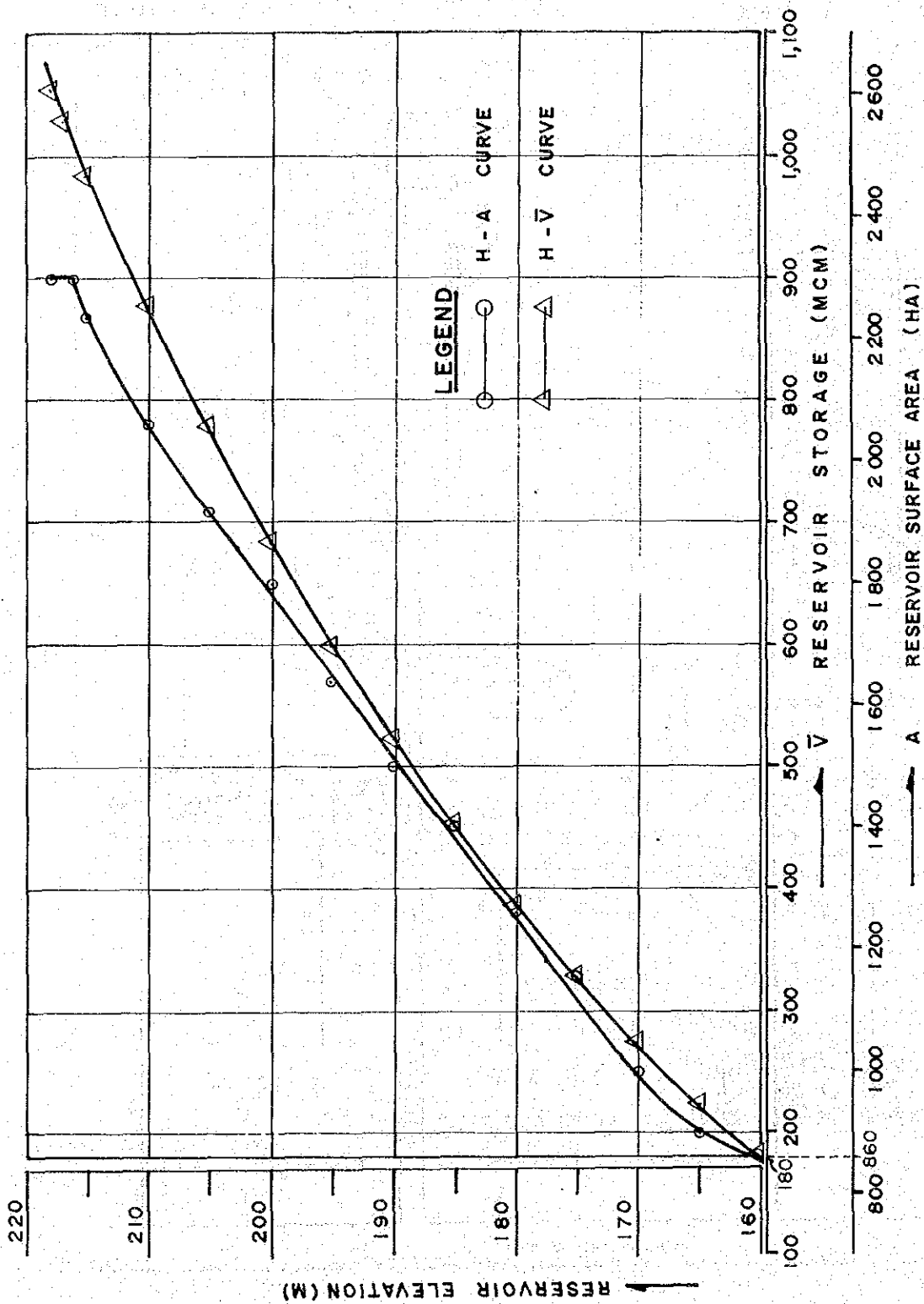


FIGURE A.3.3-7 ANGAT RESERVOIR CAPACITY CURVE

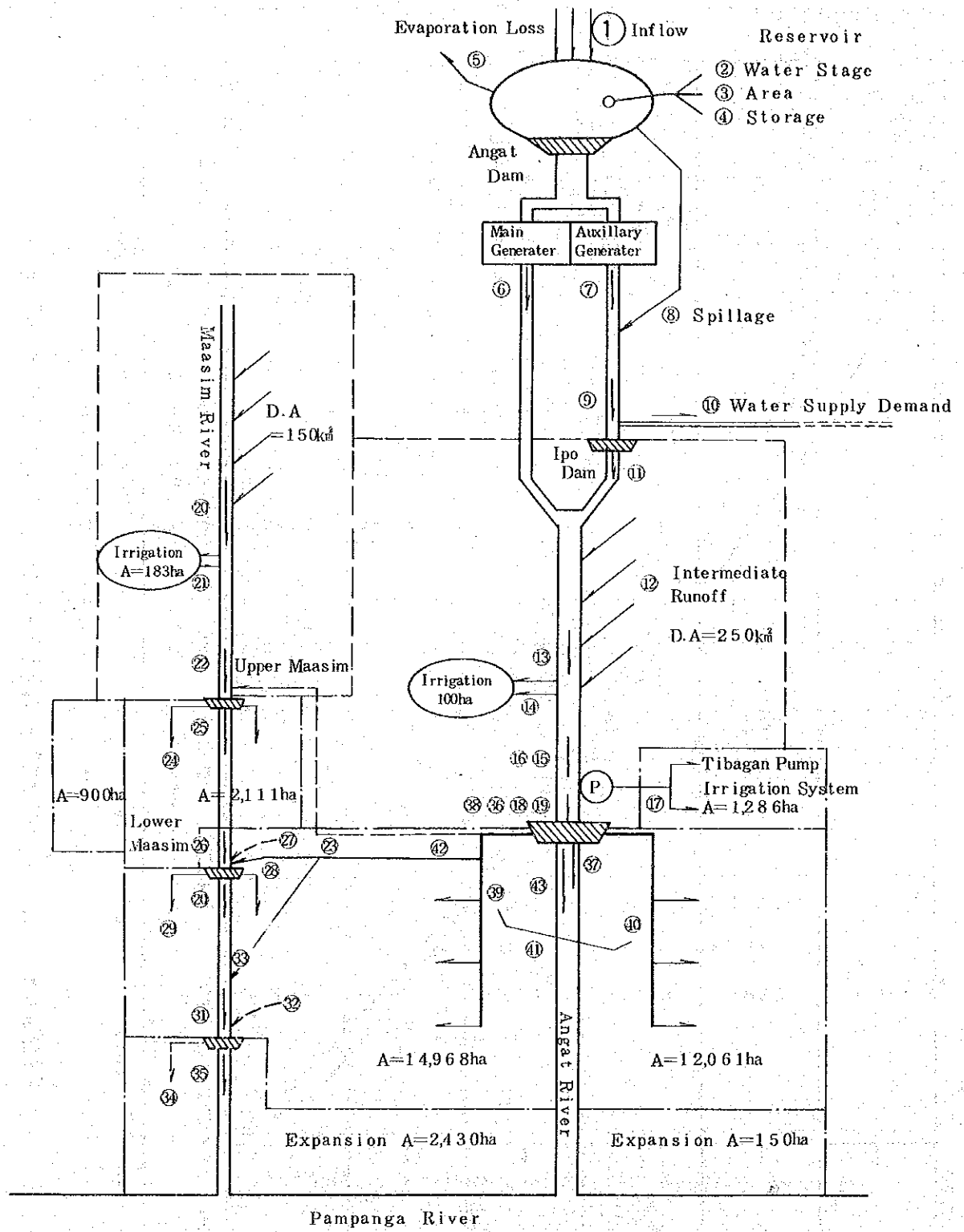
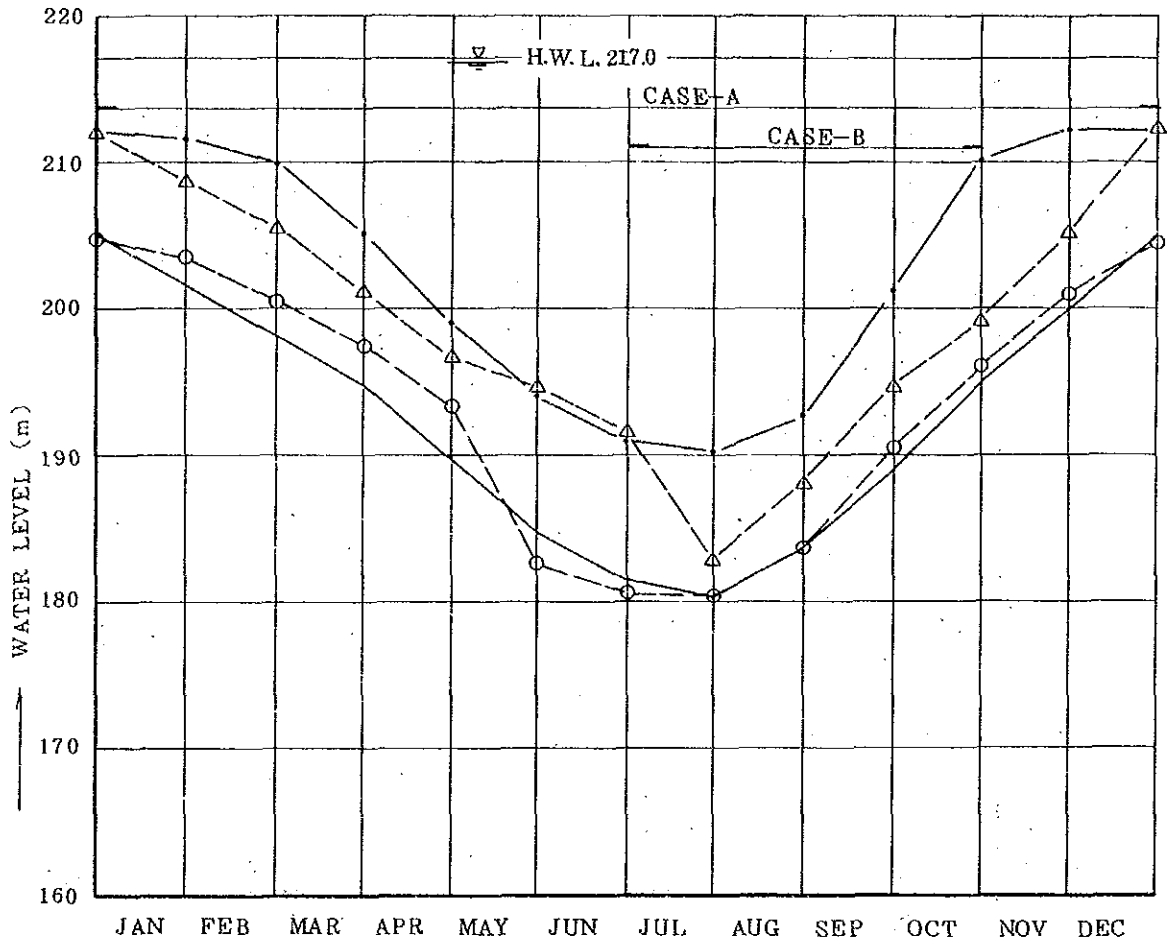


FIGURE A.3.3-8 DIAGRAM FOR WATER BALANCE STUDY



- △ - - - △ NPC RULE CURVE (1981-1982)
- - - - ○ NWRC RULE CURVE
- PROPOSED RULE CURVE (LOWER)
- — PROPOSED RULE CURVE (UPPER)

FIGURE A.3.3-9. PROPOSED RULE CURVE

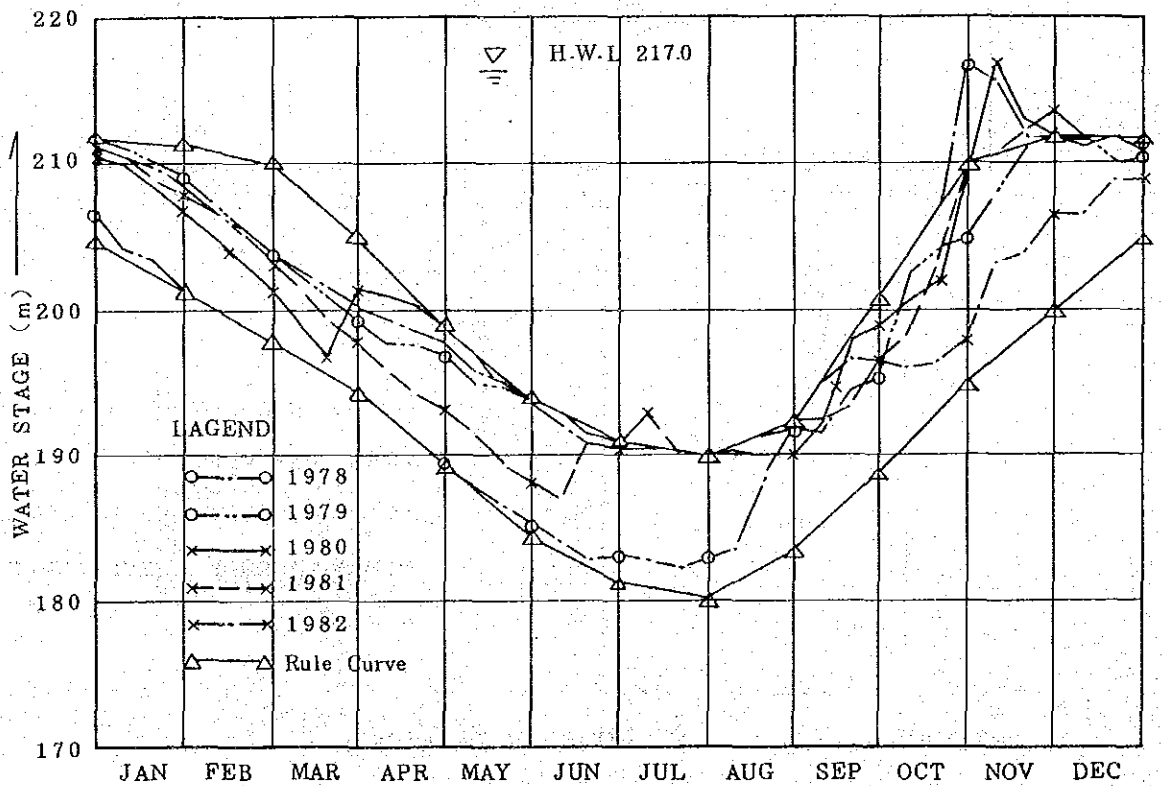
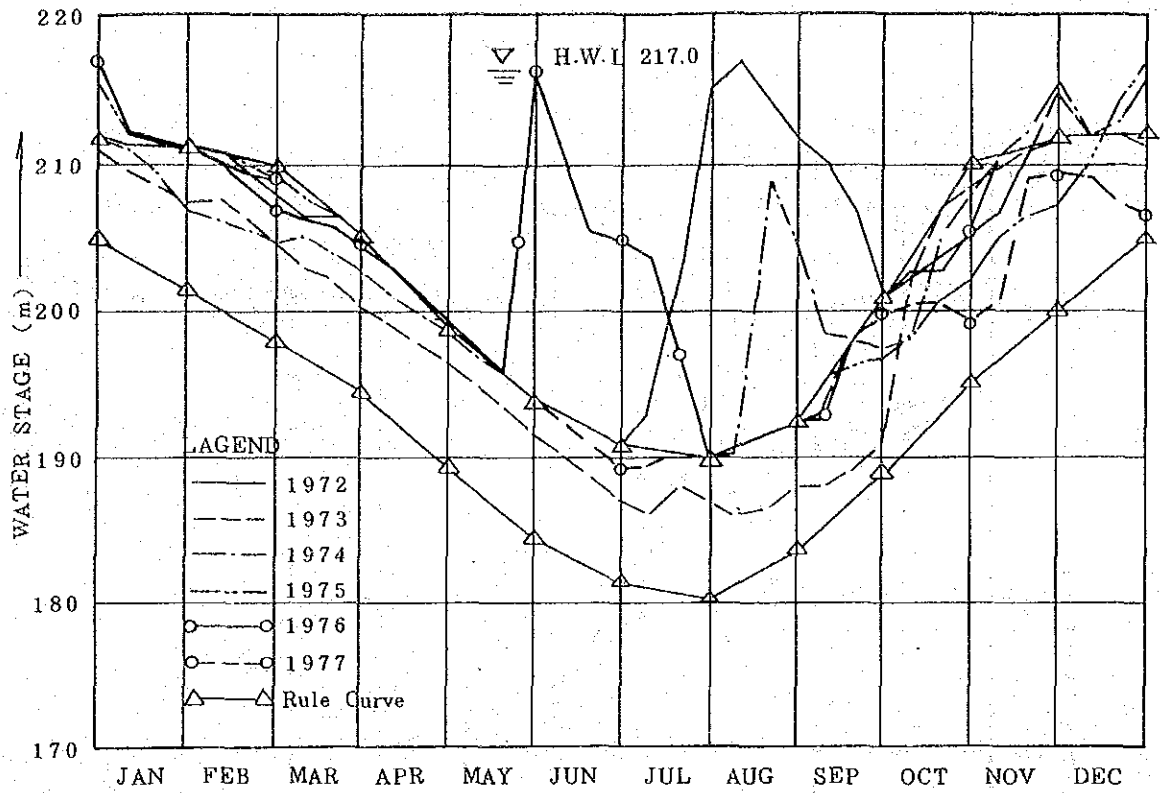


FIGURE A.3.3-10 SIMULATED WATER STAGE IN RESERVOIR

(CASE-1 + CASE-A)

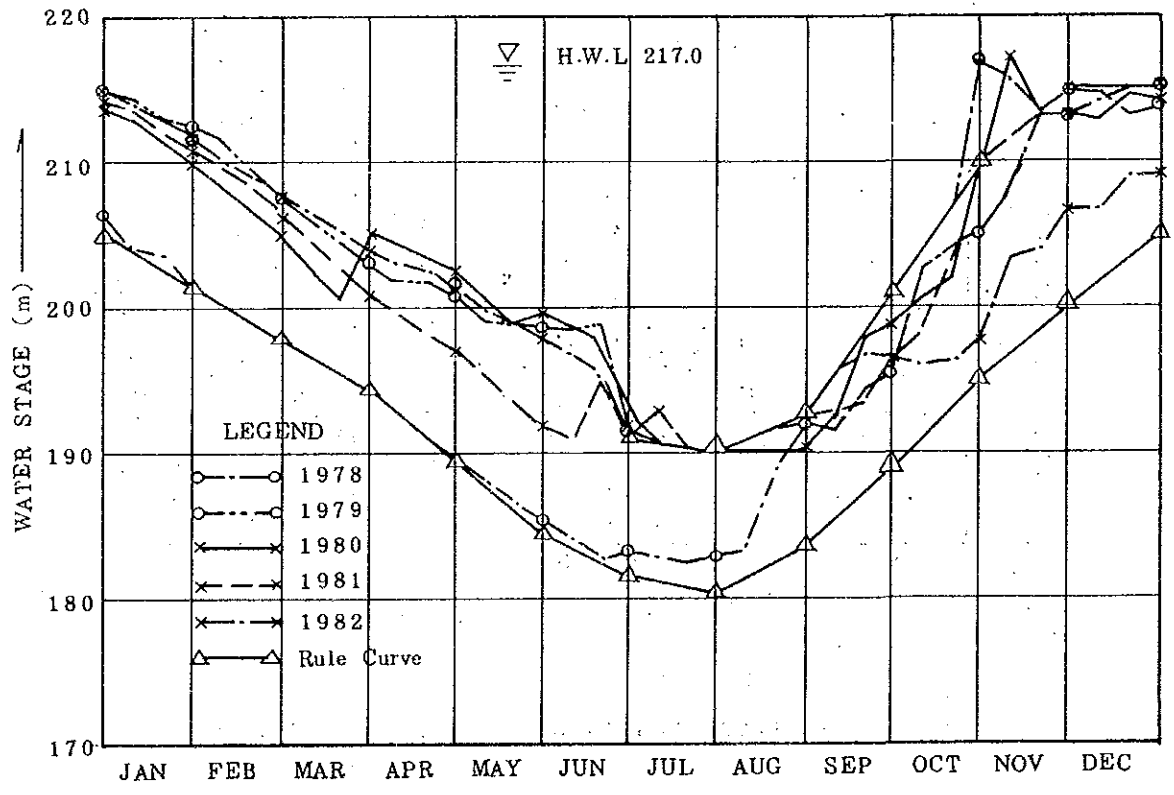
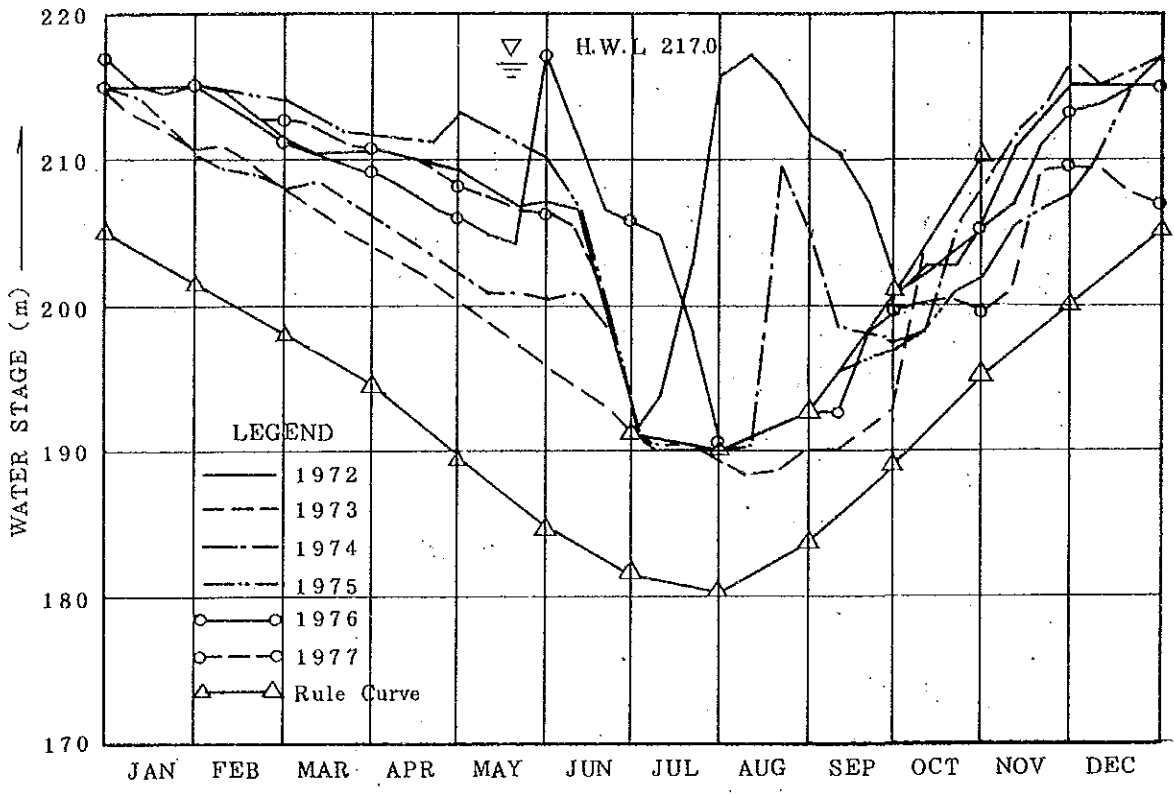
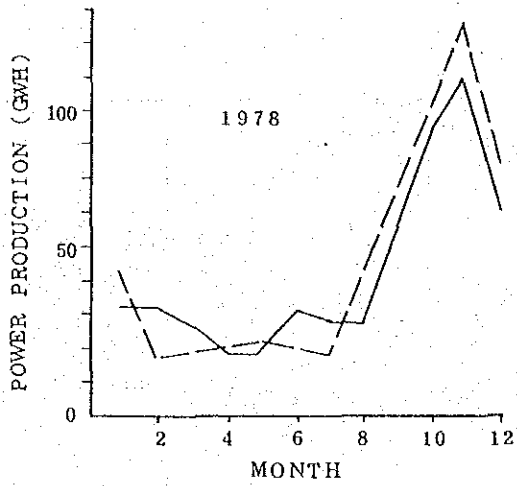
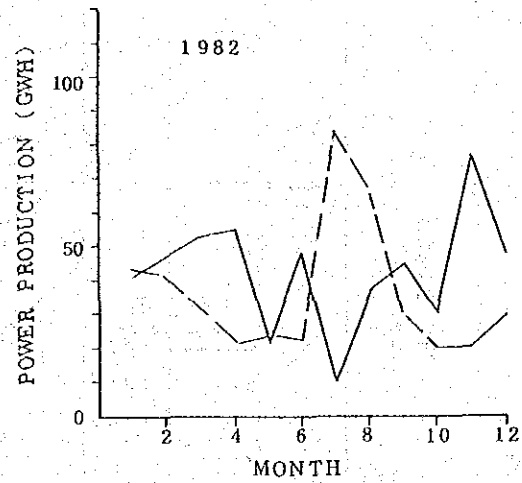
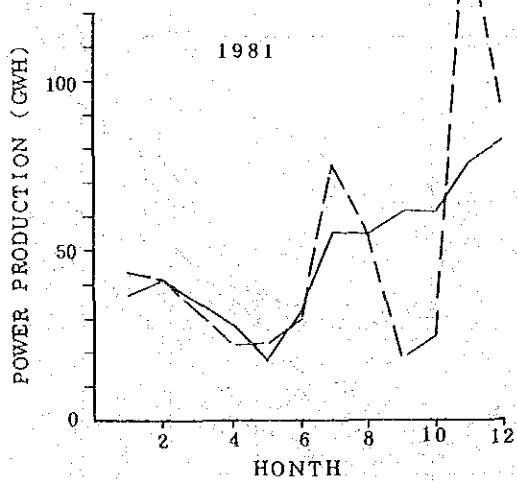
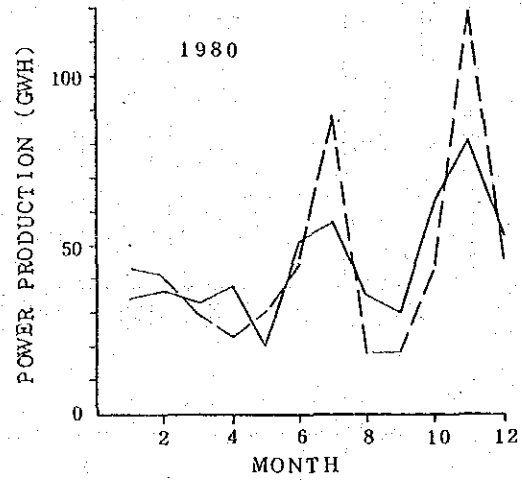
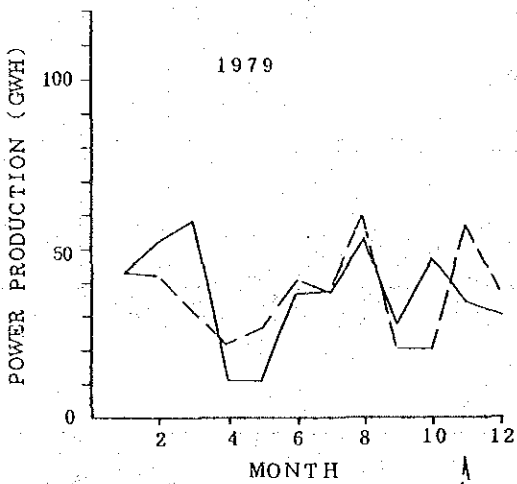


FIGURE A.3.3-11 SIMULATED WATER STAGE IN RESERVOIR  
 (CASE-1 + CASE-B)  
 A.3-161



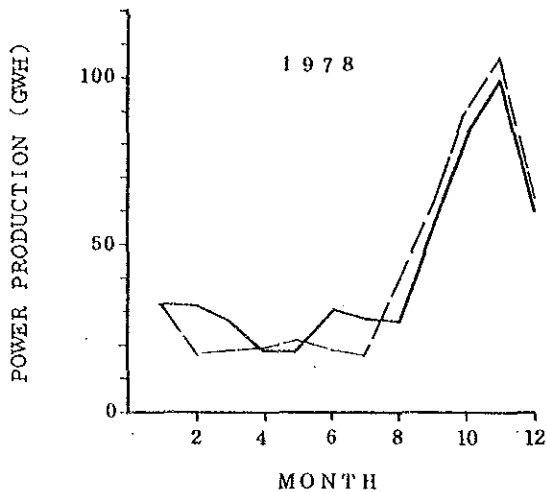
(Unit ; GWH)

YEAR	POWER PRODUCTION		RATIO
	ACTUAL	ESTIMATE	
1978	50.29	52.76	1.049
1979	47.33	42.91	0.907
1980	54.10	53.76	0.994
1981	56.79	59.44	1.047
1982	50.29	42.72	0.849



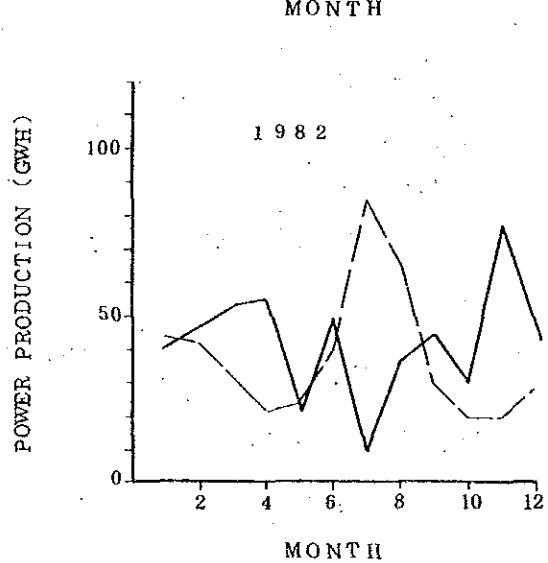
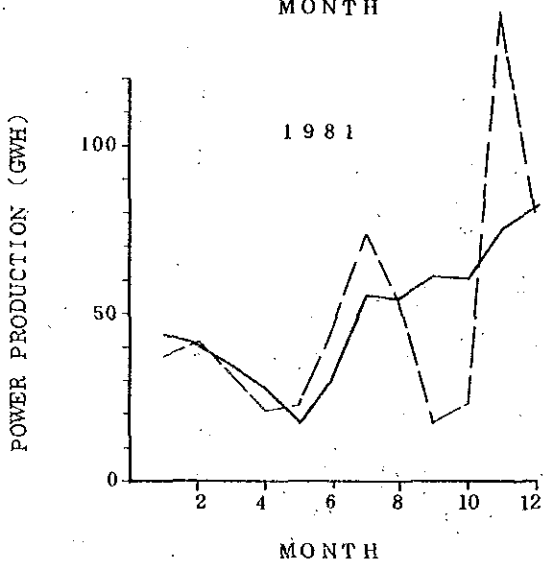
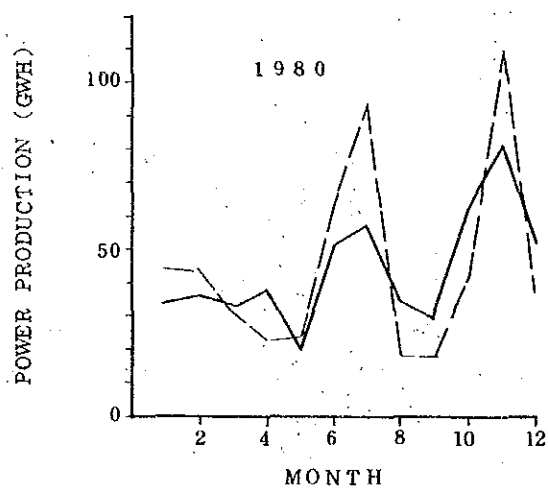
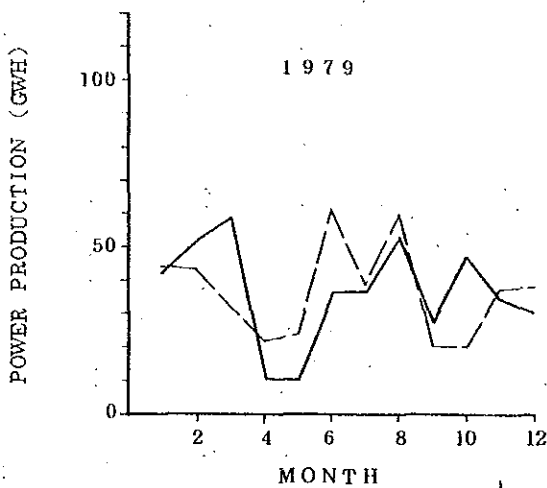
——— ACTUAL PRODUCTION  
 - - - ESTIMATE PRODUCTION

FIGURE A.3.3-12 COMPARISON OF POWER PRODUCTION  
AT ANGAT POWER STATION (CASE-1 + CASE-A)



(Unit ;GWH)

YEAR	POWER PRODUCTION		RATIO
	ACTUAL	ESTIMATE	
1978	502.9	508.3	1.011
1979	473.3	435.0	0.919
1980	541.0	544.2	1.006
1981	567.9	597.8	1.053
1982	502.9	450.7	0.896



——— ACTUAL PRODUCTION  
 - - - ESTIMATE PRODUCTION

FIGURE A.3.3-13 COMPARISON OF POWER PRODUCTION AT ANGAT POWER STATION (CASE-1 + CASE-B)



FIGURE A.3.3-14 IRRIGATION NETWORK (PROPOSED CONDITION, NORTH ZONE)

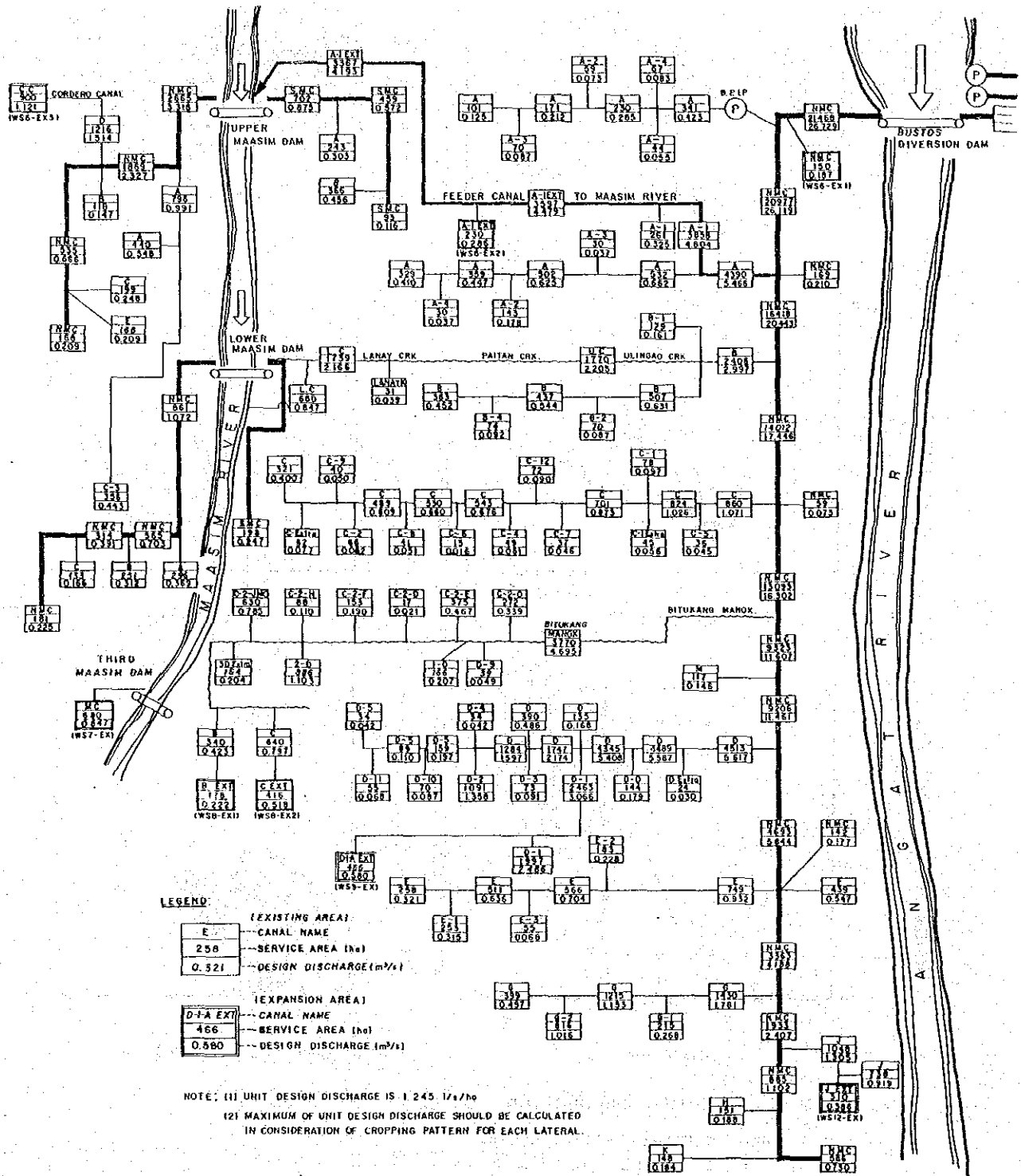
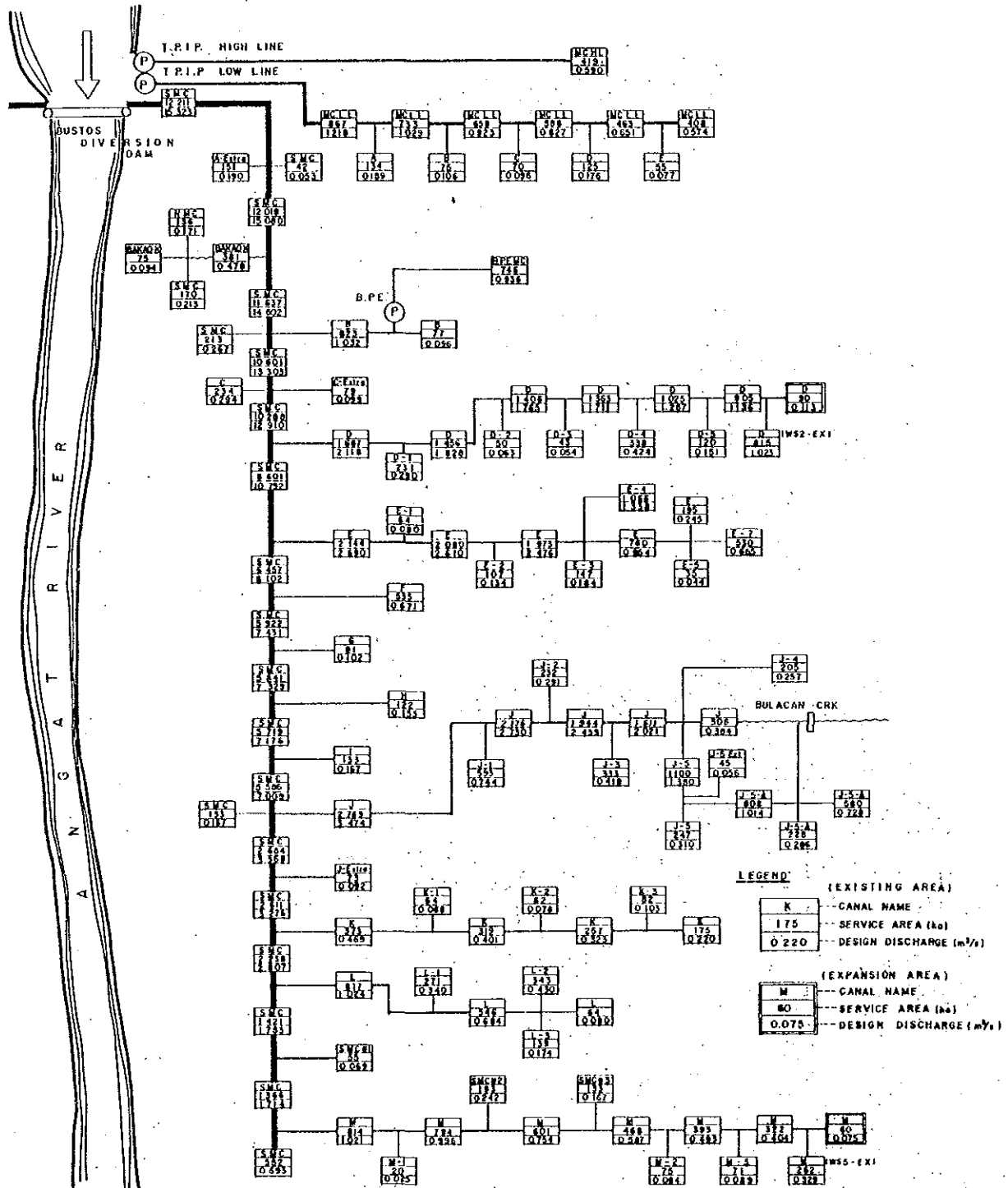


FIGURE A.3.3-15 IRRIGATION NETWORK (PROPOSED CONDITION, SOUTH ZONE)



NOTE: UNIT DESIGN DISCHARGES ARE GIVEN AS FOLLOWS  
 T.R.P.: 1.408 l/s/ha  
 S.M.C.: 1.255 l/s/ha

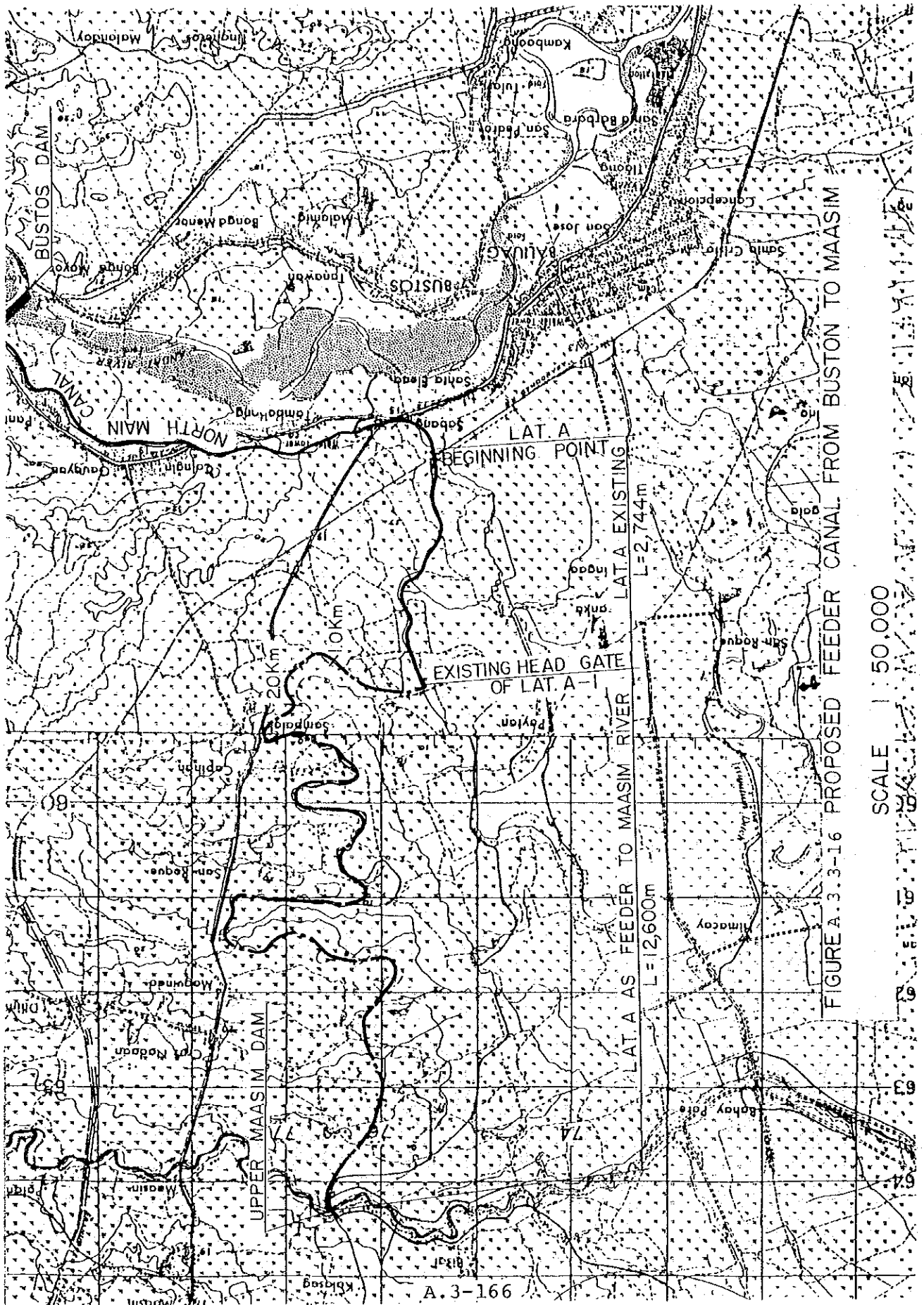


FIGURE A.3.3-16 PROPOSED FEEDER CANAL FROM BUSTON TO MAASIM

SCALE 1:50,000

FIGURE A.3.3-17 PROFILE OF MAASIM RIVER

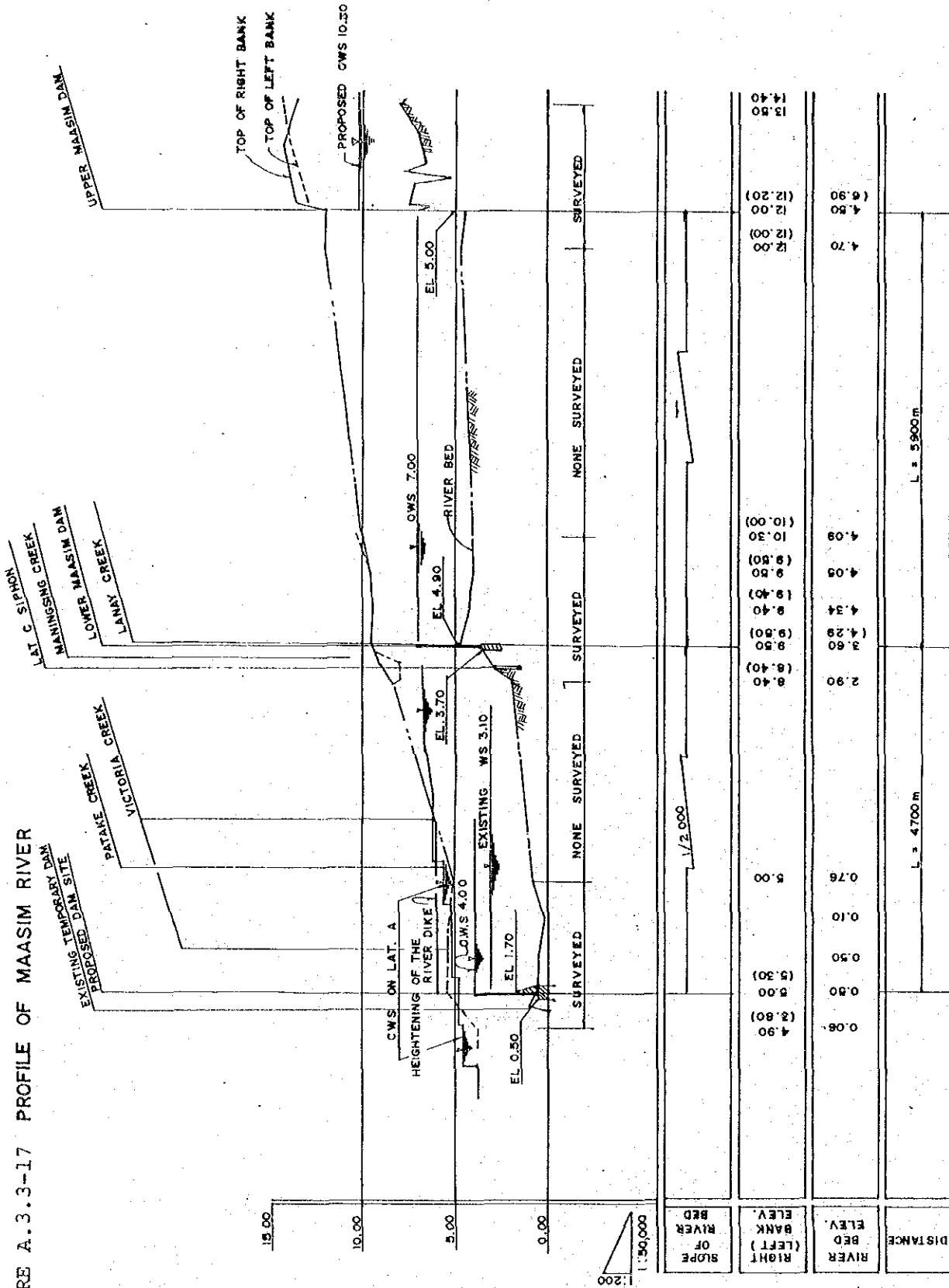


FIGURE A.3.3-18 HYDRAULIC PROFILE OF LAT. A AS FEEDER TO UPPER MAASIM DAM

