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RECOMMENDATION ON THE IMPROVEMENT OF THE BARIT RIVER IRRIGATION SYSTEM

BICOL RIVER BASIN

PHILIPPINES

VOLUME II

SUMMARY REPORT

ANNEX C DESIGN DATA AND SYSTEM LAYOUT

Final Report Submitted to the

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

In Partial Fulfillment of

CONTRACT NO. AID/EA-C-1099

Submitted by

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ANNEX C

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Table 1. Farm ditches*

Sheet 1

Farm Ditch	Area hectares	Flow m^3/sec	Farm Ditch	Area hectares	Flow m^3/sec
M1-1	2.92	0.055	M2-1,2	5.23	0.098
M1-2,1	7.23	0.136	M2-1,3	2.65	0.050
M1-2,2	7.35	0.138	M2-2	1.97	0.037
M1-3	4.53	0.085	M2-3	4.52	0.085
M1-4	3.60	0.068			
M1-5	6.40	0.120	AEX-1	2.36	0.044
M1-6	7.64	0.144	AEX-2	5.36	0.101
M1-7	1.85	0.035	AEX-3,1	0.90	0.017
M1-8	6.06	0.114	AEX-3,2	6.18	0.116
			AEX-3,3	10.93	0.206
M1B-1	8.67	0.163	AEX-4,1	2.75	0.052
M1B-2	1.62	0.030	AEX-4,2	8.68	0.163
M1B-3	2.56	0.048	AEX-5,1	5.31	0.100
M1B-4	3.15	0.059	AEX-5,2	7.26	0.137
M1B-5	3.15	0.059	AEX-6	5.04	0.095
M1B-6	2.05	0.039	AEX-7	5.36	0.101
M1B-7	7.29	0.137	AEX-8	5.52	0.104
M1B-8	4.73	0.089			
M1B-9	2.76	0.052	B-1	7.87	0.148
M1B-10	2.17	0.041	B-2	9.85	0.185
M1B-11	4.45	0.084	B-3	5.12	0.096
M1B-12	3.94	0.074	B-4	11.43	0.215
M1B-13	8.67	0.163	B-4,1	5.11	0.096
M1B-14	7.88	0.148	B-5	7.49	0.141
			B-6	9.06	0.170
M2-1	16.34	0.307	B-7	12.61	0.237
M2-1,1	5.11	0.096	B-7,1	3.07	0.058

*Assumed efficiency of 80 percent.

Table 1. Farm ditches (continued)

Sheet 2

Farm Ditch	Area hectares	Flow m^3/sec	Farm Ditch	Area hectares	Flow m^3/sec
M1-9	2.47	0.046	M1C-3	3.31	0.062
M1-10	3.35	0.063	M1C-4	15.05	0.283
M1-11	6.03	0.113	M1C-4,1	8.76	0.165
M1-12	3.56	0.067			
M1-13	2.95	0.055	CA-1	4.27	0.080
M1-14	3.56	0.067	CA-2	12.46	0.234
M1-15	15.35	0.289	CA-2,1	6.84	0.129
M1-15,1	3.46	0.065	CA-3	8.65	0.163
M1-15,2	3.14	0.059			
M1-15,3	1.81	0.034	C-1	3.85	0.072
M1-15,4	4.48	0.084	C-2	1.01	0.019
M1-16,1	4.72	0.089	C-3	5.11	0.096
M1-16,2	2.28	0,043	C-4	5.32	0.100
M1-16,3	4.68	0.088	C-5	2.71	0.051
M1-16,4	4.64	0.087	C-6	3.15	0.059
M1-17	3.55	0.067			
M1-18	2.36	0.044	M1D-1	1.81	0.034
			M1D-2	5.53	0.104
M1C-1	6.54	0.123	M1D-3	7.64	0.144
M1C-2	10.60	0.199	M1D-4	12.55	0.236
M1C-2,1	4.87	0.092	M1D-5	2.47	0.046

Table 1. Farm ditches (continued)

Sheet 3

Farm Ditch	Area hectares	Flow m^3/sec	Farm Ditch	Area hectares	Flow m^3/sec
D-0	18.78	0.353	DB-1	4.96	0.093
D-1	2.13	0.040	DB-2	8.08	0.152
D-2	4.55	0.086	DB-3	3,66	0.069
D-3	6.88	0.129	DB-4	2.29	0.043
D-4	5.50	0.103	DB-5	8.57	0.161
DA-1	0.82	0.015	DC-1	7.89	0.148
DA-2	4.32	0.081	DC-2	13.51	0.254
DA-3	1.13	0.021	DC-2,1	6.73	0.127
DA-4	1.55	0.029	DC-3	4.18	0.079
DA-5	3.31	0.062	DC-4	5.04	0.095
DA-6	6.19	0.116	DC-5	7.77	0.146
DA-7	3.92	0.074	DC-6	2.01	0.038
DA-8	4.04	0.076	DC-7	3.37	0.063
DA-9	11.08	0.208	DC-8	7.09	0.133
DA-10	14.96	0.281	DC-9	5.52	0.104
DA-11	18.18	0.342	DC-10	7.17	0.135
DA-11,1	7.58	0.143	DC-A,1	2.56	0.048
DA-12	2.08	0.039	DC-A,2	9.12	0.172
DA-13	5.43	0.102	DC-A,3	10.95	0.206
			M1-21,A	5.76	0.108

Table 1. Farm ditches (continued)

Sheet 4

Farm Ditch	Area hectares	Flow m^3/sec
E-1	5.91	0.111
E-2	5.52	0.104
M1-19	15.76	0.296
M1-19,1	3.03	0.057
M1-19,2	4.89	0.092
M1-20	16.16	0.304
M1-20,1	7.27	0.137
M1-20,2	5.49	0.103
M1-21	9.11	0.171
M1-22	3.55	0.067
M1-23	9.46	0.178
M1-24	6.23	0.117
M1-25,1	3.39	0.064
M1-25,2	10.99	0.207
M1-26	9.54	0.179
M1-27	5.44	0.102
M1-28	6.90	0.130
M1-29	1.38	0.026
M1-30	4.33	0.081
M1E-1	5.63	0.106
M1E-2	12.64	0.238
M1F-1	2.76	0.052
M1F-2	3.35	0.063
M1F-3	10.80	0.203
M1F-4	2.76	0.052
M1G-1	5.12	0.096
M1G-2	21.28	0.400
M1G-3	2.36	0.044
M1H-1	2.52	0.047
M1H-2	4.33	0.081
M1H-3	3.74	0.070
M1H-4	4.04	0.076
M1I-1	8.87	0.167
M1I-2	8.67	0.163
M1I-3	3.82	0.072

Farm Ditch	Area hectares	Flow m^3/sec
F-1	1.58	0.030
F-2	12.22	0.230
F-3	13.32	0.251
F-3,1	6.02	0.113
F-4	18.32	0.345
F-4,1	12.68	0.238
F-4,1,1	6.30	0.118
F-5	1.38	0.026
F-6	5.75	0.108
F-7	16.35	0.308
F-8	11.82	0.222
F-9	10.25	0.193
F-10	16.90	0.318
F-11	1.58	0.030
G-1	11.90	0.224
G-1,1	6.66	0.125
G-2	5.52	0.104
G-3	3.15	0.059
G-4	17.65	0.332
G-4,1	4.24	0.080
G-4,2	2.22	0.042
G-5	9.42	0.177
G-6,1	3.64	0.068
G-6,2	6.30	0.118
G-7,1	4.77	0.090
G-7,2	8.48	0.159
G-7,3	5.98	0.112
G-8	11.82	0.222
G-9	4.14	0.078
H-1	1.38	0.026
H-2	9.06	0.170
H-3	11.43	0.215
H-4	12.06	0.227
H-4,1	4.40	0.083
H-5	8.28	0.156
H-6,1	4.48	0.084
H-7	4.14	0.078
H-8	12.83	0.241

Table 1. Farm ditches (continued)

Sheet 5

Farm Ditch	Area hectares	Flow m^3/sec
A,8	4.73	0.089
A,9	7.88	0.148
A,10	8.63	0.162
A,11	1.58	0.030
A,12	7.88	0.148
A,13	13.40	0.252
A,13,1	6.39	0.120
A,14	11.90	0.224
A,15	7.88	0.148
A,16	10.76	0.202
A-3,1	2.36	0.044
A-3,2	8.28	0.156
A-3,3	3.35	0.063
A-3,4	3.43	0.065
A-3,5	1.46	0.027
A-3,6	3.78	0.071
A-3,A1	1.58	0.030
A-3,A2	3.82	0.072
A-3,A3	6.30	0.118
A-3,A4	9.85	0.185
A-5,1	9.85	0.185
A-5,2	13.40	0.252
A-5,2,1	5.55	0.104
A-5,3	6.82	0.128
A-5,4	9.46	0.178
A-5,5	12.65	0.238
A-5,5,1	4.39	0.083
A-5,6	7.49	0.141
A-5,7	10.52	0.198

Farm Ditch	Area hectares	Flow m^3/sec
AA-1	13.24	0.249
AA-2	24.23	0.456
AA-3	2.44	0.046
AA-4	15.76	0.296
AA-4,1	3.07	0.058
E-3	8.67	0.163
E-4	7.29	0.137
E-5	4.33	0.081
E-6	7.45	0.140
E-7	3.28	0.062
E-8	12.22	0.230
E-8,1	2.95	0.055
E-9	14.34	0.270
E-9,1	5.19	0.098
E-10	1.38	0.026
E-11	1.77	0.033
E-12	7.09	0.133
E-13	0.95	0.018
EA-1	10.56	0.199
EA-2	6.70	0.126
EA-3	10.64	0.200
EA-4	5.39	0.101
EB-1	4.73	0.089
EB-2	4.33	0.081
EB-3	3.59	0.068
EB-4	7.13	0.134
EB-5	1.96	0.037

Table 1. Farm ditches (continued)

Sheet 6

Farm Ditch	Area hectares	Flow m^3/sec
M2-4	1.69	0.032
M2-5	10.84	0.204
M2-5,1	2.40	0.045
M2-5,2	5.03	0.095
M2-6	2.52	0.047
M2-7	17.34	0.326
M2-7,1	1.60	0.030
M2-7,2	6.71	0.126
M2-7,3	3.59	0.068
M2-8	9.85	0.185
M2-9	1.89	0.036
M2-10	4.33	0.081
M2-11	5.12	0.096
M2-12	13.40	0.252
M2-12,1	4.63	0.087
M2-12,2	5.78	0.109
M2-13	2.76	0.052
M2-14	2.36	0.044
M2-15	1.73	0.033
M2-16	3.55	0.067
M2-17	12.61	0.237
M2-17,1	3.59	0.068
M2-18	3.94	0.074
M2-19,1	3.47	0.065
M2-19,2	6.50	0.122
M2-20	6.82	0.128
M2-21	3.55	0.067
M2-22	12.49	0.235
A,1	6.86	0.129
A,2	1.03	0.019
A,3	9.02	0.170
A,4	2.03	0.038
A,5	9.34	0.176
A,6	11.43	0.215
A,7	14.38	0.270
A,7,1	3.31	0.062
A,7,2	5.95	0.112

Farm Ditch	Area hectares	Flow m^3/sec
A-1,1	1.80	0.034
A-1,2	3.55	0.067
A-1,3	4.33	0.081
A-1,4,1	14.62	0.275
A-1,4,2	5.91	0.111
A-1,4,3	0.79	0.015
A-1,5	2.56	0.048
A-1,6	14.50	0.273
A-1,6,1	3.51	0.066
A-1,6,2	4.35	0.082
A-1,7	3.78	0.071
A-1,8,1	2.60	0.049
A-1,8,2	5.75	0.108
A-1,8,3	8.87	0.167
A-1,9	2.36	0.044
A-1,10	1.97	0.037
A-1,11	16.16	0.304
A-1,11,1	5.99	0.113
A-1,11,2	5.15	0.097
A-1,12	6.86	0.129
A-1,13	0.95	0.018
A-1,14	3.35	0.063
A-4,1	5.00	0.094
A-4,2	7.49	0.141
A-4,3	4.33	0.081
A-4,4	9.46	0.178
A-4,5	3.94	0.174
A-4,6	8.51	0.160
A-4,7	4.33	0.081
A-4,8	9.85	0.185
A-6,1	10.76	0.202
A-6,2	11.62	0.219
A-6,2,1	5.59	0.105
A-6,3	7.76	0.146
A-6,4	11.31	0.213
A-6,4,1	4.39	0.083
A-6,5	12.02	0.226
A-6,5,1	5.91	0.111

Table 1. Farm ditches (continued)

Sheet 7

Farm Ditch	Area hectares	Flow m^3/sec	Farm Ditch	Area hectares	Flow m^3/sec
M2-23	7.76	0.146	A-8,1	3.35	0.063
M2-24	12.57	0.236	A-8,2	6.11	0.115
M2-25,1	2.76	0.052	A-8,3	5,12	0.096
M2-25,2	5.91	0.111	A-8,4	11.15	0.210
M2-25,3	2.21	0.042	A-8,5	5.40	0.102
M2-25,4	2.36	0.044	A-8,6	4.73	0.089
M2-26	3.11	0.058	A-8,7	3.15	0.059
M2-27,1	5.12	0.096	A-8,8	16.55	0.311
M2-27,2	4.33	0.081	A-8,8,1	7.90	0.149
M2-28	7.09	0.133	A-8,9	14.18	0.267
M2-29	4.33	0.081	A-8,10	3.35	0.063
M2-30	4.14	0.078			
M2-31	3.94	0.074	A-9,1a	4.73	0.089
M2-32,1	2.56	0.048	A-9,1b	7.15	0.139
M2-32,2	2.13	0.040	A-9,1c	8.67	0.163
M2-32,3	4.33	0.081	A-9,2	19.96	0.375
M2-33,1	2.92	0.055	A-9,3	5.90	0.111
M2-33,2	1.85	0.035			
M2-33,3	4.33	0.081	A-10,1	8.43	0.159
M2-33,4	5.91	0.111	A-10,2	3.15	0.059
			A-10,3	11.03	0.208
A-7,1	12.61	0.237	A-10,4	7.88	0.148
A-7,2	3.55	0.067	A-10,5	3.55	0.067
A-7,3	3.94	0.074	A-10,6	11.82	0.222
A-7,4	9.65	0.182	A-10,7	13.40	0.252
A-7,5	4.49	0.084			
A-7,6	4.73	0.089	A-11,1	13.87	0.261
A-7,7	4.33	0.081	A-11,2	13.59	0.256
A-7,8	5.52	0.104	A-11,3	4.33	0.081
A-7,9	1.58	0.030			

Table 1. Farm ditches (continued)

Sheet 8

Farm Ditch	Area hectares	Flow m^3/sec	Farm Ditch	Area hectares	Flow m^3/sec
M1-31	4.18	0.079	IA-1	9.09	0.171
M1-32,1	2.99	0.056	IA-2	1.99	0.037
M1-32,2	4.46	0.084	IA-3	3.98	0.075
M1-32,3	9.55	0.180	IA-4	9.35	0.176
M1-33	1.33	0.025	IA-5	7.10	0.134
M1-34	6.88	0.129	IA-6	8.33	0.157
I-1	7.56	0.142	J-1	4.62	0.087
I-2	15.29	0.288	J-2	4.74	0.089
I-2,1	1.99	0.037	J-3	3.98	0.075
I-2,2	1.99	0.037	J-4	18.95	0.356
I-2,3	8.91	0.168	J-5	6.49	0.122
I-3	2.15	0.040	J-6	7.16	0.135
I-4	14.73	0.277	J-7	5.95	0.112
I-5	3.58	0.067	J-8	5.53	0.104
I-6	14.50	0.273	J-9	8.96	0.169
I-6,1	3.50	0.066	J-10	7.36	0.138
I-6,2	11.00	0.207	J-11	9.95	0.187
I-7	12.81	0.241			
I-8	10.55	0.198	K-1	3.58	0.067
I-9	9.49	0.178	K-2	4.38	0.082
I-10	5.97	0.112	K-3	1.45	0.027
			K-4	16.56	0.311
			K-5	12.32	0.232

Table 2. Lateral and sublateral canals*

Canal	Area hectares	Flow m^3/sec	Canal	Area hectares	Flow m^3/sec
AEx	65.65	1.412	H-6	16.56	0.356
AEx-3	18.01	0.387	I	140.28	1.126
M1B	63.09	1.135	IA	43.65	0.743
B	63.43	1.363	J	83.69	0.966
M1C	41.37	0.890	K	43.03	0.723
C	47.51	1.021	A-1	164.93	1.760
CA	26.36	0.567	A-1,4	23.25	0.500
M1D	38.03	0.779	A-1,8	26.60	0.572
M1-16	21.41	0.460	A-4	52.91	1.138
D	147.34	1.655	A	318.86	1.905
DA	77.01	1.655	A-6	53.47	0.669
DB	32.48	0.698	M2-19	24.43	0.525
DC	94.23	2.025	AA	60.87	1.309
DC-A	30.67	0.660	A-3	129.25	1.905
E	154.87	0.982	A-3,A	36.41	0.436
EA	45.71	0.982	A-5	70.19	1.121
EB	28.96	0.622	A-7	50.40	0.652
M1E	23.63	0.271	A-8	73.10	0.991
M1F	27.39	0.589	M2-25	25.38	0.545
M1G	41.21	0.886	M2-27	20.80	0.447
M1H	22.74	0.489	A-9	46.40	0.555
M1I	26.05	0.561	A-9,1	22.87	0.491
F	109.47	1.481	A-10	59.26	0.550
G	109.11	1.317	A-11	31.80	0.684
G-6	21.87	0.471	M2-32	18.72	0.402
G-7	23.64	0.311	M2-33	36.76	0.791
H	75.74	1.158			

Main Canal*

M1		M2	
Stations	Q(m^3/sec)	Stations	Q(m^3/sec)
0 → 3+193	5.247	0 → 4+420	2.077
3+193 → 13+400	3.170	4+420 → 8+020	1.067
13+400 → 15+975	1.601	8+020 → End	0.709
15+975 → End	1.375		

*Assumed efficiency of 90 percent; no distinction made between sublaterals and larger main farm ditches.

TABLE 2A. MAIN, LATERAL AND SUBLATERAL CANAL CHARACTERISTICS

CANAL	FLOW	CANAL SLOPE	BOTTOM WIDTH	WATER DEPTH	AREA	WATER VELOCITY	CANAL DEPTH	BERM WIDTH	CANAL LENGTH
M1	3.170	0.0004	2.80	1.12	5.02	0.63	1.50	1.20	10207.00
M1	1.601	0.0003	2.30	0.92	3.39	0.47	1.30	1.00	2575.00
M1	1.375	0.0003	2.20	0.88	3.10	0.44	1.20	0.90	2654.00
AEX	1.412	0.0004	2.10	0.84	2.82	0.50	1.20	0.90	1700.00
AEX-3	0.387	0.0004	1.30	0.52	1.08	0.36	0.90	0.60	660.00
M1B	1.135	0.0010	1.60	0.64	1.64	0.69	1.00	0.70	3160.00
B	1.363	0.0010	1.70	0.68	1.85	0.74	1.00	0.70	1860.00
M1C	0.890	0.0020	1.30	0.52	1.08	0.82	0.90	0.60	620.00
C	1.021	0.0005	1.80	0.72	2.07	0.49	1.10	0.80	4720.00
CA	0.567	0.0004	1.50	0.60	1.44	0.39	0.90	0.60	170.00
M1D	0.770	0.0010	1.40	0.56	1.25	0.62	0.90	0.60	1030.00
M1-16	0.460	0.0004	1.40	0.56	1.25	0.37	0.90	0.60	100.00
D	1.655	0.0004	2.20	0.88	3.10	0.53	1.20	0.90	2200.00
DA	1.655	0.0004	2.20	0.88	3.10	0.53	1.20	0.90	2600.00
DB	0.698	0.0020	1.20	0.48	0.92	0.76	0.80	0.50	1016.00
DC	2.025	0.0010	2.00	0.80	2.56	0.79	1.10	0.80	1536.00
DC-A	0.660	0.0020	1.20	0.48	0.92	0.72	0.80	0.50	750.00
E	0.982	0.0004	1.80	0.72	2.07	0.47	1.10	0.80	2840.00
EA	0.982	0.0004	1.80	0.72	2.07	0.47	1.10	0.80	1050.00
EB	0.622	0.0009	1.30	0.52	1.08	0.58	0.90	0.60	580.00
M1E	0.271	0.0010	1.00	0.40	0.64	0.42	0.70	0.40	320.00
M1F	0.589	0.0006	1.40	0.56	1.25	0.47	0.90	0.60	620.00
M1G	0.886	0.0004	1.80	0.72	2.07	0.43	1.10	0.80	780.00
M1H	0.489	0.0010	1.20	0.48	0.92	0.53	0.80	0.50	800.00
M1I	0.561	0.0010	1.30	0.52	1.08	0.52	0.90	0.60	720.00
F	1.481	0.0010	1.80	0.72	2.07	0.71	1.10	0.80	1850.00
G	1.317	0.0007	1.80	0.72	2.07	0.64	1.10	0.80	1650.00
G-6	0.471	0.0007	1.30	0.52	1.08	0.44	0.90	0.60	420.00
G-7	0.311	0.0006	1.10	0.44	0.77	0.40	0.80	0.50	300.00
H	1.158	0.0004	1.90	0.76	2.31	0.50	1.10	0.80	1180.00
H-6	0.356	0.0004	1.30	0.52	1.08	0.33	0.90	0.60	200.00
I	1.126	0.0007	1.70	0.68	1.85	0.61	1.00	0.70	1460.00
IA	0.743	0.0006	1.50	0.60	1.44	0.52	0.90	0.60	1340.00
J	0.966	0.0010	1.50	0.60	1.44	0.67	0.90	0.60	1260.00
K	0.723	0.0009	1.40	0.56	1.25	0.58	0.90	0.60	560.00
M2	2.077	0.0004	2.40	0.96	3.69	0.56	1.30	1.00	4420.00
M2	1.067	0.0004	1.90	0.76	2.31	0.46	1.10	0.80	3600.00
M2	0.709	0.0004	1.60	0.64	1.64	0.43	1.00	0.70	2478.00
A-1	1.760	0.0006	2.10	0.84	2.82	0.62	1.20	0.90	3660.00
A-1,4	0.500	0.0004	1.40	0.56	1.25	0.40	0.90	0.60	320.00
A-1,8	0.572	0.0020	1.10	0.44	0.77	0.74	0.80	0.50	720.00
A-4	1.138	0.0009	1.70	0.68	1.85	0.62	1.00	0.70	1600.00
A	1.905	0.0004	2.30	0.92	3.39	0.56	1.30	1.00	4494.00
A-6	0.009	0.0009	0.30	0.12	0.06	0.16	0.50	0.20	1736.00
M2-19	0.525	0.0004	1.50	0.60	1.44	0.36	0.90	0.60	656.00
AA	1.309	0.0004	2.00	0.80	2.56	0.51	1.10	0.80	2200.00
A-3	1.905	0.0005	2.20	0.88	3.10	0.61	1.20	0.90	3300.00
A-3,A	0.436	0.0004	1.40	0.56	1.25	0.35	0.90	0.60	770.00
A-5	1.121	0.0003	2.00	0.80	2.56	0.44	1.10	0.80	1700.00
A-7	0.652	0.0004	1.60	0.64	1.64	0.40	1.00	0.70	1740.00
A-8	0.991	0.0014	1.50	0.60	1.44	0.69	0.90	0.60	1480.00
M2-25	0.545	0.0020	1.10	0.44	0.77	0.70	0.80	0.50	620.00
A-9	0.555	0.0004	1.50	0.60	1.44	0.39	0.90	0.60	340.00
A-9,1	0.491	0.0004	1.40	0.56	1.25	0.39	0.90	0.60	300.00
A-10	0.550	0.0004	1.50	0.60	1.44	0.38	0.90	0.60	1350.00
A-11	0.684	0.0003	1.70	0.68	1.85	0.37	1.00	0.70	1440.00
M2-32	0.402	0.0004	1.30	0.52	1.08	0.37	0.90	0.60	240.00
M2-33	0.791	0.0004	1.70	0.68	1.85	0.43	1.00	0.70	1040.00

Table 3. Drainage Systems Design

Sheet No.	Ditch No.			Junction No.	Contributing Area (ha)			Design Q (m^3/sec)		
	Main	Lateral	Sub-lateral		Paddy	Other C=0.9	Other C=1.0	5 yr	7 yr	10 yr
1	DA4				23.46	37.0	-	0.462	0.518	0.585
1	DA5				20.05	32.0	-	0.398	0.446	0.504
1	DA-E1			1	15.8	11.2	-	0.192	0.215	0.243
1	DA-E1	1			12.8	0.6	-	0.099	0.111	0.125
1	DA-E1				29.0	11.8	-	0.323	0.361	0.408
1	DA-E2			1	10.4	3.2	-	0.098	0.110	0.124
1	DA-E2	1			5.4	-	-	0.040	0.045	0.051
1	DA-E2				20.79	15.21	-	0.281	0.315	0.355
1	DB1			1	4.4	-	-	0.033	0.036	0.041
1	DB1	1			2.7	4.5	-	0.050	0.056	0.063
1	DB1			2	11.58	11.3	-	0.161	0.180	0.204
1	DB1	2			5.5	4.3	-	0.069	0.078	0.088
1	DB1			3	20.88	15.6	-	0.259	0.290	0.327
1	DB1	3			4.2	-	-	0.031	0.035	0.039
1	DB1			4	28.68	15.6	-	0.316	0.354	0.400
1	DB1	4			6.8	-	-	0.050	0.056	0.064
1	DB1			5	47.28	17.8	-	0.469	0.525	0.593
1	DB1	5			4.44	2.56	-	0.050	0.056	0.063
1	DB1				61.52	20.36	-	0.650	0.728	0.823
1	DB2				10.5	-	-	0.086	0.096	0.108
2	DB3			1	10.1	50.5	-	0.411	0.461	0.521
2	DB3	1			21.7	-	-	0.161	0.180	0.203
2	DB3			2	35.9	59.5	-	0.662	0.742	0.838
2	DB3	2		21	12.2	1.4	-	0.100	0.112	0.126
2	DB3	2	1		4.1	-	-	0.030	0.034	0.038
2	DB3	2		22	19.5	-	-	0.144	0.162	0.183
2	DB3	2	2		4.0	-	-	0.030	0.033	0.037
2	DB3	2			24.4	1.4	-	0.190	0.213	0.240
2	DB3			3	60.3	67.5	-	0.896	1.004	1.135
2	DB3	3			10.84	6.66	-	0.125	0.140	0.158
2	DB3			4	71.74	74.16	-	1.026	1.149	1.298
2	DB3	4			3.86	3.0	-	0.049	0.054	0.061
2	DB3			5	75.6	77.76	-	1.078	1.208	1.364
2	DB3	5		51	6.3	1.3	-	0.055	0.062	0.070
2	DB3	5	1		45.6	20.4	-	0.474	0.530	0.599
2	DB3	5			55.0	21.7	-	0.552	0.618	0.699
2	DB3				130.6	99.46	-	1.793	2.008	2.269
2	DB4			1	8.2	2.5	-	0.077	0.087	0.098
2	DB4	1			5.6	-	-	0.041	0.046	0.052
2	DB4			2	16.9	2.5	-	0.142	0.159	0.179
2	DB4	2			14.52	0.8	-	0.113	0.126	0.143

Table 3. Drainage Systems Design (continued)

Sheet No.	Ditch No.			Junction No.	Contributing Area (ha)			Design Q (m^3/sec)		
	Main	Lateral	Sub-lateral		Paddy	Other C=0.9	Other C=1.0	5 yr	7 yr	10 yr
2	DB4			3	32.72	3.3	-	0.264	0.296	0.335
2	DB4	3			9.8	0.4	-	0.075	0.084	0.095
2	DB4	4			7.2	-	-	0.053	0.060	0.067
2	DB4				49.72	3.7	-	0.432	0.484	0.547
2	DB5				8.6	-	-	0.070	0.078	0.089
3	DD1				9.8	1.2	-	0.089	0.099	0.112
3	DD2				8.14	2.1	-	0.082	0.092	0.103
3	DD3	1			2.44	-	-	0.018	0.020	0.023
3	DD3			1	24.32	-	-	0.180	0.202	0.228
3	DD3	2			0.81	3.53	-	0.030	0.033	0.037
3	DD3			3	25.43	3.86	-	0.214	0.240	0.271
3	DD3	3			3.36	-	-	0.025	0.028	0.031
3	DD3			4	35.89	3.86	-	0.292	0.326	0.369
3	DD3	4			18.3	1.34	-	0.144	0.162	0.183
3	DD3			5	54.75	5.2	-	0.440	0.493	0.557
3	DD3	5		51	10.7	2.22	-	0.094	0.105	0.119
3	DD3	5	1		2.84	-	-	0.021	0.024	0.027
3	DD3	5	2		29.13	2.78	-	0.234	0.262	0.296
3	DD3	5			57.09	5.82	-	0.462	0.517	0.584
3	DD3	6	1		5.8	-	-	0.043	0.048	0.054
3	DD3	6		62	17.52	-	-	0.130	0.145	0.164
3	DD3	6	2		4.24	-	-	0.031	0.035	0.040
3	DD3	6			22.64	7.0	-	0.214	0.240	0.271
3	DD3	7		71	4.0	0.6	-	0.034	0.038	0.043
3	DD3	7	1		5.64	-	-	0.042	0.047	0.053
3	DD3	7	7		14.1	3.18	-	0.126	0.141	0.159
3	DD3				154.22	21.2	-	1.412	1.581	1.787
3	DD4				6.64	1.44	-	0.065	0.072	0.082
4	DF1			1	9.24	0.64	-	0.073	0.081	0.092
4	DF1	1			21.08	3.04	-	0.176	0.198	0.223
4	DF1				29.32	3.68	-	0.266	0.298	0.336
4	DF2			1	17.6	-	-	0.130	0.146	0.165
4	DF2	1			3.88	4.1	-	0.056	0.063	0.071
4	DF2				24.34	4.1	-	0.228	0.256	0.289
4	DF3			1	9.2	8.0	-	0.121	0.136	0.154
4	DF3	1			2.8	5.0	-	0.054	0.061	0.068
4	DF3				22.6	13.0	-	0.279	0.313	0.354
4	DF4			1	34.66	7.74	-	0.308	0.345	0.390
4	DF4	1			2.8	0.8	-	0.026	0.029	0.033
4	DF4			2	5.04	-	-	0.0[illegible]7	0.042	0.047
4	DF4	2			47.7	8.54	-	0.4[illegible]	0.459	0.519
4	DF4				52.64	8.54	-	0.49[illegible]	0.550	0.622

Table 3. Drainage Systems Design (continued)

Sheet No.	Ditch No.			Junction No.	Contributing Area (ha)			Design Q (m^3/sec)		
	Main	Lateral	Sub-lateral		Paddy	Other C=0.9	Other C=1.0	5 yr	7 yr	10 yr
4	DF5			1	18.6	2.0	3.4	0.176	0.197	0.223
4	DF5	1			13.33	-	-	0.099	0.111	0.125
4	DF5				57.53	2.0	3.4	0.511	0.572	0.647
4	DF6				13.2	-	-	0.108	0.120	0.136
4	DF7				14.0	-	-	0.114	0.128	0.144
4	DF8				8.0	-	-	0.065	0.073	0.082
4	DF9			1	20.68	4.4	-	0.182	0.204	0.231
4	DF9	1			9.36	-	-	0.069	0.078	0.088
4	DF9			2	44.96	4.4	-	0.362	0.406	0.459
4	DF9	2			19.84	0.8	-	0.152	0.171	0.193
4	DF9	3			19.8	-	-	0.147	0.164	0.186
4	DF9				88.6	5.2	-	0.760	0.851	0.962
4	DG			1	19.1	5.82	-	0.180	0.202	0.228
4	DG	1			12.68	1.44	-	0.104	0.116	0.131
4	DG			2	46.5	7.26	-	0.393	0.440	0.497
4	DG	2			14.2	-	-	0.105	0.118	0.133
4	DG	3			6.8	-	-	0.050	0.056	0.064
4	DG			4	75.1	7.26	-	0.605	0.677	0.765
4	DG	4			16.0	-	-	0.118	0.133	0.150
4	DG				91.1	7.26	-	0.795	0.891	1.007
4	DH	1			11.58	-	-	0.085	0.096	0.108
4	DH	2			41.36	-	-	0.306	0.343	0.387
5	DA2			1	5.28	-	-	0.039	0.044	0.049
5	DA2	1			2.5	0.3	-	0.021	0.023	0.026
5	DA2			2	10.86	0.3	-	0.082	0.092	0.104
5	DA2	2			5.52	-	-	0.041	0.046	0.052
5	DA2				40.4	0.7	-	0.334	0.374	0.423
5	DA3			1	26.5	-	-	0.196	0.220	0.248
5	DA3	1			4.46	-	-	0.033	0.037	0.042
5	DA3				30.96	-	-	0.252	0.282	0.319
5	DA-3			1	29.0	1.0	-	0.221	0.248	0.280
5	DA-3	1			12.0	-	-	0.089	0.100	0.112
5	DA-3	2			7.56	1.8	-	0.068	0.076	0.086
5	DA-3			3	51.5	2.8	-	0.400	0.448	0.506
5	DA-3	3		31	5.0	-	-	0.037	0.041	0.047
5	DA-3	3	1		9.32	-	-	0.069	0.077	0.087
5	DA-3	3			14.92	-	-	0.110	0.124	0.140
5	DA-3	4		41	13.48	-	0.6	0.104	0.117	0.132
5	DA-3	4	1		2.54	-	-	0.019	0.021	0.024
5	DA-3	4		42	21.42	-	0.6	0.163	0.183	0.206
5	DA-3	4	2		11.2	0.8	-	0.088	0.099	0.112
5	DA-3	4			40.12	0.8	0.6	0.307	0.344	0.388
5	DA-3				105.94	3.6	0.6	0.894	1.002	1.132

Table 3. Drainage Systems Design (continued)

Sheet No.	Ditch No.			Junction No.	Contributing Area (ha)			Design Q (m^3/sec)		
	Main	Lateral	Sub-lateral		Paddy	Other C=0.9	Other C=1.0	5 yr	7 yr	10 yr
5	DE1				3.4	-	-	0.028	0.031	0.035
5	DE2				4.8	1.6	-	0.051	0.057	0.064
5	DE3				6.36	-	-	0.052	0.058	0.066
5	DE4			1	5.2	-	-	0.039	0.043	0.049
5	DE4	1			2.8	-	-	0.021	0.023	0.026
5	DE4				9.8	-	-	0.080	0.089	0.101
5	DE5				3.6	-	-	0.029	0.033	0.037
5	DE6				15.96	3.84	-	0.158	0.177	0.200
5	DE7				3.6	-	-	0.029	0.033	0.037
5	DE8				6.1	-	-	0.050	0.056	0.063
5	DE9				5.0	-	-	0.041	0.046	0.052
5	DE9a				9.2	-	-	0.075	0.084	0.095
5	DE9b				16.2	0.8	-	0.138	0.154	0.174
5	DE9c				5.1	-	-	0.042	0.047	0.053
5	DE9d				25.2	-	-	0.205	0.230	0.260
6	DA1			1	21.22	-	-	0.157	0.176	0.199
6	DA1	1			25.56	-	-	0.189	0.212	0.240
6	DA1	2			5.0	-	-	0.037	0.041	0.047
6	DA1			3	73.68	-	-	0.546	0.611	0.691
6	DA1	3			10.0	-	-	0.074	0.083	0.094
6	DA1	4			8.0	-	-	0.059	0.066	0.075
6	DA1			5	96.48	-	-	0.714	0.800	0.904
6	DA1	5			7.7	-	-	0.057	0.064	0.072
6	DA1				106.74	-	-	0.870	0.974	1.100
6	DA-1			1	6.5	-	-	0.048	0.054	0.061
6	DA-1	1			14.56	-	-	0.108	0.121	0.136
6	DA-1			2	26.56	-	-	0.197	0.220	0.249
6	DA-1	2			15.6	-	-	0.116	0.129	0.146
6	DA-1			3	50.88	-	-	0.377	0.422	0.477
6	DA-1	3			21.9	-	-	0.162	0.182	0.205
6	DA-1			4	78.4	-	-	0.581	0.650	0.735
6	DA-1	4	1		3.7	-	-	0.027	0.031	0.035
6	DA-1	4			19.2	-	-	0.142	0.159	0.180
6	DA-1	5			11.2	-	-	0.083	0.093	0.105
6	DA-1			6	120.4	-	-	0.892	0.999	1.128
6	DA-1	6			20.2	2.0	-	0.163	0.182	0.206
6	DA-1			7	149.32	2.0	-	1.119	1.253	1.416
6	DA-1	7			22.6	-	-	0.167	0.187	0.212
6	DA-1			8	186.96	2.0	4.8	1.433	1.605	1.814
6	DA-1	8		81	18.72	-	-	0.139	0.155	0.175
6	DA-1	8	1		4.2	-	-	0.031	0.035	0.039

Table 3. Drainage Systems Design (continued)

Sheet No.	Ditch No.			Junction No.	Contributing Area (ha)			Design Q (m^3/sec)		
	Main	Lateral	Sub-lateral		Paddy	Other C=0.9	Other C=1.0	5 yr	7 yr	10 yr
6	DA-1	8			26.0	-	2.14	0.208	0.233	0.264
6	DA-1	9			11.88	-	-	0.088	0.099	0.111
6	DA-1			9a	226.84	-	12.38	1.772	1.984	2.242
6	DA-1	9a			14.44	-	18.0	0.240	0.269	0.304
6	DA-1				241.28	-	30.38	2.213	2.479	2.801
6	DA-21			1	9.92	-	-	0.073	0.082	0.093
6	DA-21	1		11	9.7	-	-	0.072	0.080	0.091
6	DA-21	1	1		6.4	-	-	0.047	0.053	0.060
6	DA-21	1			27.06	-	-	0.200	0.224	0.254
7	DA-21	2			3.2	-	-	0.024	0.027	0.030
7	DA-21				45.48	-	-	0.370	0.415	0.469
7	DA-22			1	10.3	-	-	0.076	0.085	0.097
7	DA-22	1			8.9	-	-	0.066	0.074	0.083
7	DA-22				42.0	-	-	0.342	0.383	0.433
7	DA-23				8.1	-	-	0.066	0.074	0.084
7	DA-24			1	7.5	-	-	0.056	0.062	0.070
7	DA-24	1			10.0	-	-	0.074	0.083	0.094
7	DA-24			2	25.5	-	-	0.189	0.212	0.239
7	DA-24	2			2.8	-	-	0.021	0.023	0.026
7	DA-24			3	47.6	-	-	0.353	0.395	0.446
7	DA-24	3			6.5	-	-	0.048	0.054	0.061
7	DA-24			4	56.98	-	-	0.422	0.473	0.534
7	DA-24	4			35.2	-	-	0.261	0.292	0.330
7	DA-24				92.18	-	-	0.751	0.841	0.950
7	DA-25			1	16.88	-	-	0.125	0.140	0.158
7	DA-25	1			5.64	-	-	0.042	0.047	0.053
7	DA-25			2	29.56	-	-	0.219	0.245	0.277
7	DA-25	2			14.7	-	-	0.109	0.122	0.138
7	DA-25				57.22	-	-	0.466	0.522	0.590
7	DA-26			1	28.6	-	-	0.212	0.237	0.268
7	DA-26	1			10.6	-	-	0.078	0.088	0.099
7	DA-26				48.94	-	-	0.399	0.447	0.505
7	DA-27			1	28.82	-	-	0.213	0.239	0.270
7	DA-27	1			4.64	-	-	0.034	0.038	0.043
7	DA-27				52.26	-	-	0.426	0.477	0.539
8	DH			1	52.76	-	-	0.391	0.438	0.494
8	DH			3	86.94	-	-	0.644	0.721	0.815
8	DH	3			38.50	-	-	0.285	0.319	0.361
8	DH				138.22	-	-	1.126	1.261	1.425

Table 3. Drainage Systems Design (continued)

Sheet No.	Ditch No.			Junction No.	Contributing Area (ha)			Design Q (m^3/sec)		
	Main	Lateral	Sub-lateral		Paddy	Other C=0.9	Other C=1.0	5 yr	7 yr	10 yr
8	DM			1	39.28	-	-	0.291	0.326	0.368
8	DM	1		1	17.52	-	-	0.130	0.145	0.164
8	DM	1	1		8.96	-	-	0.066	0.074	0.084
8	DM	1			33.36	-	-	0.247	0.277	0.313
8	DM			2	102.04	-	-	0.756	0.846	0.956
8	DM	2		1	12.24	-	-	0.091	0.102	0.115
8	DM	2	1		31.56	-	-	0.234	0.262	0.296
8	DM	2			80.06	-	-	0.593	0.664	0.750
8	DM				202.9	-	-	1.653	1.851	2.092

Table 4. Land preparation schedule

Main Canal 1

Day	Area	Farm ditches
Week 1	a_1 = 123.77 hectares	
1	123.52	M1-1 → 8; AEx; M1B-1; M1B-2
2	122.05	M1B-3 → 14; B; M1-9; M1-10
3	122.14	M1-11 → 15; M1C; C; M1D-1
4	125.29	M1D-2 → 5; M1-16 → 18; D-0 → 4: DB-1 → 4
5	123.76	DB-5; DA; M1-19; E-1; E-2; M1E to M1E-2
6	119.52	M1E-2; M1-20 → 23; M1F; M1G
7	123.20	DC; M1-24; M1H
Week 2	a_2 = 63.83 hectares	
8	66.00	E-3 → 5; EA
9	69.40	E-6 → 11; EB
10	58.01	E-12; E-13; M1I; M1-25; M1-26
11	68.92	F-1 → 7
12	63.41	F-8 → 11; M1-27; G-1; G-2
13	61.27	G-3 → 6; G-7,1 to G-7,2
14	64.90	G-7,2; G-7,3; G-8; G-9; M1-28 → 30; H-1 → 3
Week 3	a_3 = 54.83 hectares	
15	53.87	H-4 → 8
16	52.40	I-1 → 5; IA-1
17	49.06	IA-2 → 6; I-6
18	50.45	I-7 → 10; M1-31 → 32,2
19	56.54	M1-32,3 → 34; J-1 → 5
20	54.32	J-6 → 11; K-1 → 3
21	33.62	K-4; K-5

Table 4. Land preparation schedule (continued)

Main Canal 2

Day	Area	Farm ditches
Week 1	a_1 = 82.66 hectares	
1	76.60	M2-1 → 3; A-1,1 → 7
2	81.87	A-4; A-1,8; A-1,9
3	82.87	A-1,10 → 14; M2-4 → 11
4	76.12	M2-12 → 17; A,1 → 6
5	87.86	A,7 → 9; AA
6	84.65	A,10 → 16; A-3,1; A-3,A1 to A-3,A3
7	88.63	A-3,A3; A-3,A4; A-3,2 → 6; A-5,1 → 5
Week 2	a_2 = 42.56 hectares	
8	40.39	A-5,6; A-5,7; A-6,1; A-6,2
9	59.46	A-6,3 → 5; M2-18; M2-19
10	42.96	M2-20 → 22; A-7,1 → 3
11	39.76	A-7,4 → 9; A-8,1; A-8,2
12	46.10	A-8,3 → 8
13	37.86	A-8,9; A-8,10; M2-23; M2-24
14	28.49	M2-25; M2-26
Week 3	a_3 = 35.33 hectares	
21	32.72	M2-27 → 29
Week 4	a_4 = 28.26 hectares	
22	22.87	A-9,1
23	34.29	A-9,2; A-9,3; A-10,1
24	25.61	A-10,2 → 5
25	25.22	A-10,6; A-10,7
26	26.80	M2-30 → 32
27	36.76	M2-33
28	31.80	A-11

TROPICAL CYCLONES INFLUENCING WEATHER IN THE BRB

Definitions:

Tropical depression - Maximum wind speed up to 61 kph (38 mph).
Tropical storm - Maximum wind speed from 62 to 117 kph (39-73 mph).
Typhoon - Maximum wind speed exceeds 117 kph.

Cyclones, 1884-1947[1]

Year	Typhoon	Storm	Depression	Year	Typhoon	Storm	Depression
1884	8/19		12/8*	1909	10/23 11/14*		
1885	11/6			1910	11/13		
1889			10/28* 11/3	1912		9/8	7/18
1890	11/10*		10/16	1913	7/15*		
1891	11/12* 11/15*			1914	6/18-19*		
1893	5/14* 11/21			1915	10/23* 11/3*	11/10* 12/6*	
1896	8/1*	6/5*		1917		7/16	
1898			5/12	1918	6/27 12/25*		
1899		11/14*		1919	8/20	6/9* 11/16	
1900	10/30		10/13 12/4*	1921	7/4 11/10*		
1901	10/2 10/22			1922		5/23 9/23*	
1902		7/14*		1923	6/3-4* 7/18* 11/17* 12/4*		
1903	11/6*						
1904			9/8				
1905	4/28* 9/25	9/22*	10/23	1924	8/22		
1906	9/21*	5/25		1925		6/24*	
1907	12/18*			1926		7/14	
1908	11/14 11/19			1927		3/19*	
				1929	5/25		

Cyclones, 1884-1947 (continued)

Year	Typhoon	Storm	Depression	Year	Typhoon	Storm	Depression
1931	9/19 11/7 11/9			1939	5/5* 11/3-4		11/5 12/17
1932		3/6	11/27*	1940	8/12* 12/6*	11/26	
1934	10/15 10/20* 11/14*			1942	11/12		
1935		4/7 12/23*		1943		4/16 5/15* 10/25	
1936	4/22* 11/2*	11/6*		1944	11/8	10/30*	
1937	9/17			1945	7/16 8/5*		
1938	10/5	1/12* 5/10 11/29		1946	9/5*	12/16	
				1947	9/22 10/31* 11/15* 12/25		

Cyclones, 1948-1976[2]

Year	Typhoons		Storms		Depressions
1948	Rose	7/26			7/19
	Gertude	8/30			10/20
	Kit	9/25			11/3
	Beverly	12/6			11/28-29
	No name	12/14			
1949	Betty	12/5	Elaine	7/8	8/25
	Camilla	12/11	Rena	11/12	11/1
1950	Ossia	10/1			
	Delilah	11/21-22			
	Fran	12/29-30*			
1951	Louise	7/29			6/12
	Wanda	11/21			8/4
	Amy	12/12			8/11
					9/28-29

Cyclones, 1948-1976 (continued)

Year	Typhoons		Storms		Depressions	
1952	Dinah	6/19-20				6/26
	Emma	7/3*				9/9
	Mary	8/30				9/20-21
	Nona	9/3			Vae	10/16
	Trix	10/20-21*				
	Wilma	10/26-27*				
	Delia	11/23-24*				
	Faye	12/15				
	Gloria	12/21-22				
1953	Betty	10/29		6/25		10/27
	Cora	11/16				11/29
1954	Elsie	5/7		12/25		
	Ruby	11/7				
	Sally	11/17*				
	Tilda	11/28				
1955	Iris	8/23		10/30		
	Patsy	11/29*				
	Ruth	12/15				
1956	Sarah	3/28		4/9		12/28
	Thelma	4/21*	Vera	7/5		
	Gilda	9/18*		8/10		
	Lucille	11/17				
	Olive	11/28				
	Dolly	12/9*				
1957	Wendy	7/14		6/6		6/30
	Kit	11/12*		8/14		12/31
				10/13		
1958	Kathy	10/21*				9/7
	Lorna	10/29*				11/24
1959	Freda	11/16-17*	Kate	8/26		11/9
	Gilda	12/18				
	Harriet	12/30-31*				
1960	Olive	6/26-27*	Lucille	5/27		8/3
	Kit	10/6*	Gloria	9/1		
	Lola	10/13				
1961	Ellen	12/9-11*	Ruby	9/22		7/5
				11/21-22*		8/14-15

Cyclones, 1948-1976 (continued)

Year	Typhoons		Storms		Depressions	
1962	Hope	5/17-18*	Patsy	8/8		9/24
	Iris	5/28				
	Jean	11/6				
	Lucy	11/27				
1963	Luding	8/12-13*	Diding	6/26-27		
			Trining	12/16		
1964	Dading	6/28-29*	Kayang	9/29*	Ining	11/20*
	Huaning	7/9-10	Dorang	10/4		
	Lucing	7/16-17		10/20		
	Naning	12/14*				
1965	Bening	1/22	Ebiang	6/23	Daling	3/7
	Elang	5/23-24		11/19	Tesing	8/27-28
	Miling	7/11-12*				
	Pining	7/30				
1966	Klaring	5/16-17	Gading	7/12	Heling	7/16
	Aning	12/27	Uding	11/21*		
1967	Welming	11/3-4*	Bebeng	3/3-4		
1968	Sening	11/22-23				
	Toyang	11/27-28				
1969						
1970	Atang	2/26	Claring	7/1		
	Pitang	9/10	Emang	7/14*		
	Sening	10/13-14*	Heling	8/6		
	Yoling	11/18-19*	Uding	10/26*		
			Wening	10/31-1*		
1971	Herming	5/26-27*	Diding	4/24-25	Oniang	7/9
	Mameng	6/25*	Etang	5/1		
	Neneng	7/3-4*	Dedang	10/12		
	Pepang	7/14-15*				
	Barang	10/3-4				
1972	Asiang	1/8*	Edeng	7/6	Biring	1/9
	Konsing	6/24*			Nitang	9/9
	Toyang	11/5			Osang	9/12-14
1973	Nora	10/6	Ruth	10/15		
	Vera	11/21				
1974	Dinah	6/9	Tering	10/15-16	Yaning	11/1
	Ivy	7/19				
	Bidang	11/27				

Cyclones, 1948-1976 (continued

Year	Typhoons		Storms	Depressions
1975	Sisang	12/28*		
1976	Dedang	5/20-21*		

1/ Cyclones passing within approximately 180 kilometers of Naga City are listed as influencing the weather; cyclones passing within 90 kilometers are designated (*) as causing damage (2).

2/ 1948-1976 data is less conservative than for previous years as more sources are available (1, 3, 4, 5).

References

(1) Balagot, Virgilio F. "Review of Tropical Cyclones in the Philippine Area of Responsibility 1948 to 1971." Proceeding of the India-Philippines Symposium on Tropical Cyclones and Tropical Meteorology. July 1973.

(2) Chin, P.C. Tropical Cyclones in the Western Pacific and China Sea Area from 1884 to 1953. Royal Observatory, Hong Kong. 1958.

(3) Fleet Weather Central/Joint Typhoon Warning Center. Annual Typhoon Report 1960-1968, 1971, 1974. Guam.

(4) Weather Bureau, Republic of the Philippines. Tropical Cyclones 1948-1972.

(5) Philippine Daily Express, newspaper.

DAILY RAINFALL (MM) AT BUHI, 1950

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	*******	*******	0.000	0.000	0.253	47.752	2.540	4.825	1.269	66.547	45.455	3.048
2	*******	*******	0.000	1.777	0.000	0.000	0.000	13.207	36.829	5.333	8.133	0.000
3	*******	*******	0.000	0.000	0.000	2.540	7.366	0.000	18.033	6.349	8.635	1.016
4	*******	*******	0.000	1.269	0.000	0.000	43.434	0.000	10.921	0.000	14.223	0.000
5	*******	*******	0.000	0.000	0.000	0.000	32.258	1.777	42.925	0.000	10.413	0.000
6	*******	*******	0.000	0.000	0.000	21.590	2.286	4.571	116.077	11.175	19.811	0.000
7	*******	*******	0.000	0.000	0.000	0.000	7.112	0.000	2.793	0.000	13.461	0.000
8	*******	*******	0.000	0.000	0.507	0.000	0.000	0.000	98.805	16.255	0.000	0.000
9	*******	*******	0.000	0.000	0.000	0.254	0.000	0.000	0.000	0.000	0.507	0.000
10	*******	*******	0.000	0.000	0.000	2.286	3.556	0.507	54.063	81.737	6.349	3.302
11	*******	*******	0.000	0.000	18.795	0.000	13.208	0.000	0.000	7.619	6.603	2.540
12	*******	*******	0.000	0.000	3.809	0.000	11.430	0.000	53.085	5.505	22.331	11.430
13	*******	*******	0.000	0.000	0.253	5.842	4.826	0.000	18.795	0.000	3.301	3.048
14	*******	*******	0.000	0.000	0.507	0.508	0.000	0.000	46.565	7.365	81.279	0.000
15	*******	*******	0.000	0.000	34.290	2.286	12.192	0.000	98.519	9.905	164.337	0.000
16	*******	*******	5.841	0.000	4.825	0.000	7.366	0.000	98.043	1.015	1.015	0.000
17	*******	*******	1.015	0.000	4.571	2.540	0.762	0.000	63.499	21.843	0.000	0.000
18	*******	*******	8.331	1.015	0.000	9.398	1.270	0.761	19.811	17.017	33.527	0.762
19	*******	*******	21.335	1.269	1.777	16.002	0.508	1.777	13.461	10.413	52.323	4.318
20	*******	*******	33.019	9.905	1.269	1.270	3.556	10.795	0.000	0.000	74.929	0.000
21	*******	*******	0.000	9.905	32.765	0.000	1.778	6.857	0.000	8.127	0.000	1.270
22	*******	*******	0.000	3.301	0.000	11.938	1.016	1.015	4.063	20.573	0.000	44.196
23	*******	*******	2.285	0.000	0.000	43.180	0.000	0.000	0.507	11.937	0.000	0.000
24	*******	*******	0.000	0.000	0.507	18.288	9.652	0.761	9.905	16.001	0.000	0.000
25	*******	*******	0.000	0.000	1.269	19.558	0.000	0.000	0.000	1.015	0.000	0.260
26	*******	*******	0.000	0.000	11.429	16.256	0.000	0.253	14.985	0.000	0.000	0.000
27	*******	*******	0.000	1.015	0.000	0.762	0.000	27.635	2.793	7.619	9.143	0.000
28	*******	*******	0.000	0.000	30.733	10.668	0.000	10.667	0.000	10.413	0.000	3.302
29	*******		0.000	0.000	0.000	0.000	7.366	7.873	0.507	2.631	0.000	258.572
30	*******		0.000	0.000	0.000	0.000	4.318	0.000	14.985	0.000	0.000	40.132
31	*******		0.000		0.000		0.000	2.265		9.651		0.000
TOTAL	********	*******	71.876	29.456	152.638	232.918	177.800	103.616	840.460	359.854	573.104	377.196

DAILY RAINFALL (MM) AT BUHI, 1951

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	0.000	4.571	4.571	1.523	0.000	0.000	9.905	55.274	6.603	5.333	6.350
2	9.398	0.000	0.000	0.507	5.333	7.112	0.000	16.001	25.653	0.000	0.000	26.924
3	0.000	0.000	0.000	0.000	0.000	1.016	0.000	0.000	27.934	0.000	13.715	49.784
4	6.096	0.000	0.000	0.000	41.147	0.254	0.000	0.507	0.507	1.269	20.573	13.208
5	13.970	0.000	0.761	0.000	194.817	1.016	14.732	68.645	1.777	1.523	6.349	5.334
6	0.000	3.301	0.000	0.000	7.873	0.000	0.000	52.577	0.253	5.333	20.327	28.702
7	3.302	0.000	0.507	0.000	0.000	0.000	0.000	0.505	0.000	0.000	0.000	9.906
8	0.254	0.000	0.761	0.000	0.000	0.000	0.000	13.461	4.063	0.000	15.747	6.604
9	6.350	0.000	0.000	0.000	0.000	4.318	15.240	8.127	0.000	0.000	3.301	26.416
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	55.625	0.000	0.000	13.969	27.686
11	0.000	0.000	0.000	0.000	0.000	0.000	7.874	16.001	0.000	60.451	2.301	0.000
12	5.842	0.000	0.000	4.571	1.269	1.016	6.096	23.113	0.000	21.843	0.000	1.016
13	2.540	0.507	4.571	3.301	4.571	2.794	0.000	2.793	2.285	6.095	0.000	0.508
14	20.066	1.015	0.000	0.000	0.000	15.747	6.096	9.651	0.000	26.415	20.319	0.000
15	5.588	0.000	0.000	0.000	0.000	0.000	2.286	0.000	3.301	95.757	26.923	5.508
16	0.000	0.253	0.000	0.000	0.000	16.764	9.398	0.000	3.555	25.399	0.000	39.370
17	13.208	0.000	0.000	0.000	0.000	25.145	4.572	0.000	16.763	4.317	0.507	1.778
18	0.000	0.000	0.000	0.000	0.000	2.285	0.000	0.000	1.269	2.539	4.571	0.762
19	13.462	0.000	0.000	0.000	0.000	0.000	8.890	0.000	0.000	2.793	0.507	0.000
20	0.000	39.115	0.000	0.000	0.000	4.572	0.000	0.000	2.793	0.000	27.433	1.778
21	0.000	21.590	0.000	10.159	0.000	0.000	2.794	0.000	5.335	0.000	32.004	0.302
22	0.000	31.241	0.000	0.000	1.777	0.000	2.540	0.000	21.335	7.366	7.873	1.270
23	0.000	0.000	0.000	0.000	14.731	0.000	0.000	0.000	14.731	0.000	0.000	0.508
24	5.842	0.000	0.000	1.269	4.825	4.318	17.526	9.905	1.269	1.269	12.715	22.098
25	17.780	0.000	0.000	0.000	0.000	1.016	0.000	0.507	0.761	0.761	7.873	16.764
26	14.224	0.000	3.301	0.000	0.000	1.778	0.000	42.925	1.015	2.285	3.047	44.958
27	30.988	0.000	0.000	0.000	0.000	0.000	13.414	0.000	15.747	0.000	2.793	0.508
28	12.700	1.777	0.000	0.000	0.000	14.986	7.874	0.000	37.337	0.000	0.000	2.032
29	3.556	0.000	0.000	4.313	0.000	1.016	9.398	2.285	0.000	3.555	5.207	4.572
30	0.000		0.000	0.000	0.000	0.000	10.160	11.176	5.841	7.365	0.000	0.508
31	0.000		0.000		0.000		25.114	13.973		2.286		0.000
TOTAL	237.553	96.754	23.107	26.711	277.000	[illegible]	173.100	[illegible]	214.609	221.510	277.317	354.583

[illegible]

DAILY RAINFALL (MM) AT DUHI, 1952

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.762	0.000	0.000	0.000	0.000	0.000	2.794	12.191	0.000	0.000	0.000	0.000
2	5.842	0.000	0.000	0.000	0.000	0.000	19.558	13.461	0.000	0.000	0.000	0.000
3	16.256	2.539	0.000	0.761	0.000	0.000	0.508	15.747	21.081	0.000	2.235	0.000
4	18.034	1.015	0.000	0.000	0.000	0.000	0.000	138.175	9.397	6.349	0.000	0.000
5	0.000	2.793	7.619	0.000	0.000	0.000	0.000	4.825	1.015	12.953	2.031	13.716
6	0.000	37.591	16.255	0.000	0.000	0.000	0.000	41.909	2.031	0.000	8.127	3.302
7	0.000	32.003	2.031	0.000	0.000	4.064	0.000	34.289	2.539	10.413	15.77	0.000
8	37.084	0.000	0.507	0.000	4.825	3.810	0.000	10.159	0.000	0.000	0.000	0.000
9	4.572	0.000	0.761	0.000	0.507	5.842	0.000	9.143	4.825	0.000	10.413	18.542
10	30.988	5.333	2.539	0.000	3.301	1.778	0.000	1.015	56.895	0.000	9.651	46.228
11	2.540	5.333	2.539	0.000	0.000	16.002	0.000	5.841	0.000	0.000	5.333	22.098
12	0.000	0.761	2.285	0.000	0.000	0.000	0.000	2.285	0.000	0.000	0.000	36.830
13	17.526	0.000	6.349	0.761	5.841	4.318	0.000	12.953	1.015	65.785	0.000	11.176
14	6.382	0.000	21.335	0.761	3.047	3.810	0.508	7.365	20.827	0.000	0.000	35.052
15	0.762	0.000	5.333	0.761	26.923	0.000	4.826	1.269	6.349	74.421	0.000	0.000
16	0.000	0.000	0.000	6.349	2.235	3.302	0.000	2.793	0.000	60.705	4.571	0.000
17	0.000	0.000	7.365	0.000	1.015	2.286	1.270	6.857	10.921	5.841	12.953	0.000
18	0.000	3.047	10.413	0.000	17.017	0.254	6.604	0.000	0.000	0.000	0.000	0.000
19	8.128	3.555	0.000	0.761	21.335	1.778	7.620	0.000	0.000	0.761	0.000	9.398
20	30.988	5.587	1.777	0.000	6.857	14.986	2.540	0.000	0.000	185.165	0.000	65.024
21	1.778	0.000	0.000	0.000	5.333	20.828	9.398	0.000	0.000	337.311	26.923	102.108
22	24.638	0.000	3.301	0.000	0.761	18.796	11.430	0.000	34.797	0.000	33.273	0.000
23	0.000	0.507	0.000	0.761	5.333	14.478	5.334	3.047	0.000	0.000	122.935	0.000
24	0.000	19.557	0.761	0.000	6.349	16.510	41.402	44.195	0.000	0.000	134.873	0.000
25	2.540	14.731	5.587	0.000	0.000	11.430	30.226	107.187	0.000	0.000	0.000	0.762
26	10.160	3.047	1.777	0.000	1.523	15.494	102.616	14.731	8.381	0.000	0.000	0.000
27	20.574	6.349	0.000	0.000	0.000	21.336	16.764	15.747	0.000	114.299	0.000	3.810
28	5.588	1.777	0.000	0.761	0.000	11.430	5.334	1.015	0.000	0.000	0.000	24.892
29	3.302		0.000	0.000	2.031	5.334	5.334	0.000	6.603	0.000	0.000	46.228
30	1.270		1.777	0.000	0.507	9.652	9.144	162.559	0.000	0.000	0.000	25.146
31	0.000		0.000		0.000		27.940	0.000		0.000		40.640
TOTAL	246.634	145.525	100.311	11.676	114.790	207.518	311.149	668.756	186.676	874.003	375.145	504.951

DAILY RAINFALL (MM) AT DUHI, 1953

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	0.000	0.000	21.335	8.635	0.000	7.374	32.765	8.127	5.333	2.539	8.890
2	30.480	0.000	8.635	0.000	0.000	26.924	17.018	4.825	4.571	0.000	0.000	0.000
3	0.000	2.539	11.429	0.000	0.000	50.292	1.016	6.603	4.063	0.000	0.000	0.000
4	0.762	25.399	16.255	0.000	0.000	5.080	0.000	45.465	2.539	0.000	12.191	19.304
5	1.524	0.000	17.017	0.000	0.000	6.858	0.000	3.047	1.015	0.000	8.635	108.458
6	0.000	0.000	0.000	0.000	0.000	0.000	2.286	9.397	4.063	0.000	0.000	21.844
7	1.778	2.031	0.000	0.000	0.000	4.064	8.636	1.269	16.763	0.000	0.000	23.368
8	1.016	3.047	0.000	0.000	20.573	6.858	10.160	13.715	0.000	0.000	0.000	27.686
9	22.860	6.857	2.539	0.000	38.861	9.398	0.000	28.193	0.000	0.000	9.905	0.000
10	0.000	17.779	0.000	0.000	0.000	2.540	12.954	4.063	16.255	4.571	0.000	9.398
11	6.350	0.000	0.000	0.000	0.000	0.508	0.000	0.000	12.191	1.015	0.000	0.000
12	7.874	6.349	6.603	0.000	0.000	0.762	6.604	15.493	11.429	0.000	0.000	12.446
13	28.956	14.477	0.000	0.000	0.000	0.000	0.000	1.777	5.841	5.397	1.015	0.000
14	2.286	27.939	0.000	0.000	0.000	25.146	8.382	0.000	0.507	10.921	0.253	2.794
15	0.000	1.015	0.000	0.000	0.000	5.080	10.414	0.000	0.000	8.381	126.237	17.526
16	0.000	6.095	0.000	0.000	0.000	0.000	13.970	0.000	3.556	7.111	22.351	0.000
17	5.588	0.000	0.000	0.000	5.142	2.540	9.398	0.000	28.573	0.000	0.000	0.000
18	12.700	2.031	4.063	0.000	2.285	3.302	0.000	55.465	16.001	1.015	0.000	0.000
19	3.302	0.000	0.761	0.000	6.857	0.000	29.464	2.285	6.095	0.000	0.000	0.000
20	5.080	0.507	3.301	0.000	0.000	0.000	7.620	0.000	9.651	0.000	0.000	0.762
21	0.000	0.000	0.000	0.000	21.843	2.032	0.000	0.000	33.527	0.000	0.000	0.000
22	0.000	11.937	9.905	2.031	10.413	0.508	0.000	1.777	30.479	2.031	10.667	4.064
23	0.000	0.000	0.000	0.000	18.033	0.000	5.080	0.000	6.603	6.857	0.000	0.508
24	0.508	0.000	0.000	0.000	0.000	0.762	0.000	3.047	3.556	23.113	0.000	0.000
25	0.000	56.515	0.000	0.000	27.685	11.684	5.334	0.000	0.000	9.905	0.000	3.048
26	0.000	1.269	0.000	0.000	0.000	13.471	0.000	11.175	2.032	7.619	2.794	7.366
27	1.524	0.000	0.000	0.000	0.000	1.778	1.778	0.000	0.000	99.443	25.400	67.564
28	0.000	0.000	0.000	0.000	0.000	0.508	3.810	0.000	0.000	9.905	30.988	14.224
29	0.000		0.000	0.000	0.000	0.000	0.000	0.000	4.063	0.000	18.796	0.000
30	0.000		0.000	0.000	3.301	0.254	0.000	7.112	0.000	0.000	0.000	0.000
31	0.000		16.001		1.016		6.604	0.000		0.000		2.540
TOTAL	137.064	225.760	91.429	25.400	188.649	151.196	175.516	237.027	233.402	147.117	282.955	391.7[illegible]

DAILY RAINFALL (MM) AT DUHI, 1994

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	21.590	0.000	0.000	4.317	0.039	0.000	5.652	17.525	3.555	8.127	0.000	0.000
2	4.572	0.000	1.777	0.507	1.777	0.000	10.414	22.097	0.000	6.095	0.000	27.940
3	0.000	3.555	7.365	0.000	0.000	0.000	4.318	24.891	0.000	0.000	0.000	10.668
4	7.540	0.349	9.143	0.000	2.285	0.000	0.000	2.793	0.000	0.000	17.271	0.000
5	0.000	0.000	26.701	1.015	0.000	3.556	17.002	11.683	0.000	4.317	0.000	0.000
6	0.000	0.000	36.829	0.000	24.383	1.016	0.000	2.286	7.873	4.571	11.937	3.302
7	0.000	11.633	26.161	0.000	15.493	3.556	0.000	0.000	4.317	0.000	368.045	12.192
8	0.000	0.000	6.381	0.000	0.000	3.302	9.654	16.523	0.000	0.000	27.685	0.000
9	0.000	1.523	0.000	0.000	0.000	6.604	22.098	14.223	9.635	5.333	0.000	12.446
10	0.000	0.000	0.000	0.000	0.000	3.556	0.000	0.000	25.923	0.000	0.000	9.906
11	0.000	1.269	0.000	0.000	0.000	7.874	5.334	7.373	0.000	0.000	0.000	7.112
12	11.938	3.047	5.333	3.047	0.761	23.369	4.826	16.255	13.715	1.777	0.000	6.604
13	0.762	0.000	3.555	0.000	0.000	0.000	4.064	10.413	4.063	0.000	0.000	12.700
14	10.414	0.000	0.761	0.000	0.000	0.000	0.508	8.889	0.000	0.000	0.000	17.018
15	5.588	1.269	0.000	0.000	0.507	4.064	0.762	9.905	1.269	0.000	13.207	0.000
16	0.000	1.015	0.000	1.015	0.000	0.000	11.430	22.605	0.000	0.000	114.299	0.000
17	6.350	0.000	3.047	0.000	0.000	0.000	0.000	0.000	29.971	36.067	0.000	14.732
18	0.000	0.000	15.473	0.000	0.761	0.000	2.540	0.000	4.571	49.783	0.000	1.270
19	10.160	0.000	23.113	0.000	6.349	2.286	0.000	5.587	11.175	68.071	0.000	4.064
20	0.000	0.000	20.065	0.000	0.000	8.128	6.096	0.000	4.571	0.000	0.000	14.732
21	0.000	0.000	10.159	0.000	0.000	13.970	0.000	15.493	7.365	0.000	0.000	46.736
22	0.000	0.000	5.333	0.000	0.000	0.000	3.810	5.587	16.255	7.873	0.000	5.842
23	0.000	0.000	0.000	2.793	3.555	7.874	0.000	4.571	10.413	0.000	0.000	6.604
24	0.000	3.809	0.000	0.000	0.761	0.000	0.000	0.000	3.047	0.000	0.000	30.988
25	0.000	1.523	0.000	3.555	0.000	9.144	0.000	0.000	4.825	0.000	0.000	90.170
26	0.000	13.207	0.000	1.777	6.603	0.000	0.762	0.000	0.000	17.525	0.000	76.708
27	0.000	16.255	0.000	0.000	4.063	39.878	7.366	25.633	22.351	8.635	0.507	55.118
28	0.000	0.507	0.000	0.000	0.000	13.970	8.128	0.000	1.015	0.000	3.809	55.626
29	0.000		0.000	0.000	1.015	12.954	0.000	69.341	40.639	0.000	23.113	10.922
30	0.000		0.000	0.000	5.333	21.844	2.032	13.715	0.000	0.000	49.021	5.334
31	0.000		0.000		0.000		9.398	7.873		0.000		6.604
TOTAL	73.914	65.011	205.216	18.026	82.281	186.945	139.192	320.780	226.546	218.174	623.813	545.337

DAILY RAINFALL (MM) AT DUHI, 1995

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	5.080	0.000	*******	0.000	3.047	0.000	3.302	18.237	*******	9.143	67.817	*******
2	1.778	1.015	*******	0.000	14.731	0.508	4.064	33.781	*******	0.000	2.031	*******
3	2.032	1.523	*******	0.000	7.873	11.176	18.542	0.000	*******	11.937	0.000	*******
4	0.000	0.761	*******	11.429	1.269	0.000	9.652	11.937	*******	9.905	0.000	*******
5	62.992	1.777	*******	6.603	0.507	19.558	9.398	76.961	*******	16.509	0.000	*******
6	67.564	0.000	*******	0.000	0.000	20.828	26.162	0.761	*******	0.507	0.000	*******
7	51.308	0.000	*******	0.000	0.000	7.112	17.272	3.555	*******	93.057	0.000	*******
8	2.286	0.000	*******	0.000	0.000	9.906	6.096	0.000	*******	0.000	0.000	*******
9	0.000	0.000	*******	0.000	0.000	4.826	0.000	0.000	*******	11.683	5.587	*******
10	17.780	0.000	*******	4.571	0.000	9.906	4.318	0.000	*******	1.015	3.555	*******
11	30.988	0.000	*******	0.000	0.000	0.508	0.508	0.000	*******	3.555	20.827	*******
12	23.114	0.000	*******	0.000	0.000	1.016	1.524	0.000	*******	1.523	6.857	*******
13	23.366	1.269	*******	0.000	20.827	9.398	0.762	0.000	*******	32.765	6.602	*******
14	2.286	0.000	*******	0.000	8.381	10.668	1.778	0.000	*******	0.761	1.015	*******
15	5.334	0.000	*******	13.461	0.000	0.508	0.762	9.651	*******	0.507	7.874	*******
16	0.000	2.539	*******	1.015	2.031	0.000	2.286	0.000	*******	26.161	12.699	*******
17	0.000	0.000	*******	1.269	0.000	9.144	0.000	0.000	*******	4.063	20.065	*******
18	12.954	0.000	*******	1.777	45.021	0.000	[illegible]	0.000	*******	0.000	0.000	*******
19	7.366	0.000	*******	1.015	5.841	0.508	0.000	14.985	*******	0.000	0.000	*******
20	0.000	1.777	*******	3.301	0.000	16.510	[illegible]	7.111	*******	0.507	0.000	*******
21	11.938	4.317	*******	1.269	0.000	14.732	[illegible]	20.065	*******	12.446	0.000	*******
22	16.256	0.507	*******	0.000	0.000	9.842	0.000	5.143	*******	0.000	0.000	*******
23	16.256	0.000	*******	0.000	1.015	1.524	0.000	2.031	*******	6.349	23.876	*******
24	7.366	1.015	*******	0.000	1.523	14.732	0.508	0.000	*******	9.651	36.576	*******
25	13.208	4.571	*******	3.301	5.841	27.432	0.000	4.063	*******	0.000	77.724	*******
26	0.000	26.415	*******	3.301	7.365	13.462	0.000	0.000	*******	3.556	95.250	*******
27	0.000	57.149	*******	35.115	0.000	1.778	19.812	0.000	*******	0.000	124.037	*******
28	0.000	16.763	*******	1.015	4.063	7.366	0.000	53.673	*******	10.667	165.099	*******
29	2.286		*******	1.777	0.000	0.000	34.036	0.000	*******	0.000	[illegible]	*******
30	9.144		*******	2.285	24.637	0.000	0.000	0.000	*******	8.127	14.985	*******
31	0.000		*******		0.000		[illegible]	0.000		0.000		*******
TOTAL	[illegible]	[illegible]	*******	50.509	[illegible]	[illegible]	[illegible]	[illegible]	*******	[illegible]	[illegible]	*******

* * * * * MISSING * * * * * INDICATES MISSING DATA

DAILY RAINFALL (MM) AT BUHI, 1956

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	9.143	64.261	0.000	17.525	30.988	0.762	19.557	0.000	20.319	0.000	17.018
2	0.000	1.015	13.541	0.000	0.761	0.000	0.762	0.000	1.523	17.271	0.000	11.176
3	0.000	0.000	0.000	0.000	0.000	0.000	34.544	0.000	2.285	8.889	0.000	22.352
4	0.000	0.000	0.000	0.000	7.873	0.000	5.334	0.000	0.000	0.000	12.699	14.224
5	0.000	0.000	0.000	83.311	0.000	0.000	25.908	14.223	3.047	0.000	0.000	23.876
6	0.000	0.000	0.000	20.319	6.857	0.000	2.540	6.857	44.457	3.301	4.317	119.380
7	0.000	1.015	0.507	10.413	5.333	0.000	0.000	0.000	16.763	5.333	0.000	25.400
8	0.000	0.507	0.000	69.595	0.000	0.762	0.508	7.619	4.825	0.507	0.000	116.332
9	0.000	0.000	0.000	43.541	13.207	1.524	3.048	28.447	0.000	13.207	18.033	255.778
10	0.762	0.761	0.000	13.207	2.031	0.000	28.702	13.461	1.523	5.333	0.000	24.892
11	0.000	9.397	2.539	5.079	12.699	0.000	13.208	7.111	0.000	0.000	4.825	0.000
12	0.508	5.079	3.301	36.067	17.271	5.842	16.510	6.349	0.761	1.269	0.000	2.794
13	0.000	18.541	5.841	0.000	26.161	0.000	18.542	4.317	10.413	2.793	48.005	3.048
14	5.334	10.159	21.081	2.539	9.143	0.000	14.986	4.317	53.085	0.000	44.703	31.242
15	7.874	2.793	6.349	0.000	0.000	0.762	23.368	0.000	5.079	3.301	0.000	28.956
16	13.462	3.047	0.000	2.285	0.000	0.000	16.510	0.000	0.000	0.000	0.000	0.000
17	5.842	0.000	0.000	0.761	0.000	4.826	0.000	1.523	31.241	0.000	7.365	3.556
18	0.000	0.000	3.555	1.015	2.285	0.000	0.000	2.285	58.673	19.303	4.571	9.652
19	0.000	0.000	0.000	0.000	0.000	1.524	16.002	4.317	272.795	3.301	27.939	42.418
20	0.000	0.000	0.000	19.303	0.000	0.762	36.322	2.031	10.667	15.747	17.779	24.384
21	0.000	3.555	0.000	18.795	0.000	0.000	0.000	12.445	0.761	2.539	2.793	7.874
22	0.000	3.047	0.507	0.000	0.000	9.144	0.000	13.207	0.000	4.063	35.051	0.000
23	0.000	7.111	0.000	0.000	0.000	0.000	0.000	3.809	1.523	0.000	19.049	14.732
24	3.302	0.000	0.000	0.000	0.000	0.000	0.000	4.317	0.000	4.063	6.603	0.000
25	17.272	0.000	0.000	1.777	1.777	0.000	0.000	0.000	0.000	0.000	7.873	7.620
26	4.318	0.000	2.285	0.000	2.285	0.000	0.000	12.953	0.000	1.015	17.271	12.446
27	5.334	0.000	1.523	2.539	0.000	2.032	9.652	3.047	0.000	9.143	122.427	30.988
28	0.000	0.000	0.000	0.000	0.000	1.016	0.000	5.587	0.000	0.000	55.879	48.514
29	18.034	0.761	0.000	2.539	4.317	63.754	0.000	11.937	13.461	0.000	2.793	128.016
30	35.560		10.667	2.793	6.603	1.778	15.240	2.539	21.081	22.605	11.683	31.242
31	0.000		0.000		6.603		5.080	6.857		5.333		40.894
TOTAL	117.602	75.931	140.957	336.277	142.731	124.714	287.528	199.112	554.462	168.635	471.657	1098.901

DAILY RAINFALL (MM) AT BUHI, 1957

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	14.751	0.000	0.000	0.000	0.000	19.304	1.015	2.539	61.213	12.699	0.000
2	0.762	0.000	0.000	11.683	0.000	1.270	0.000	41.401	1.269	0.000	0.000	0.000
3	0.000	25.653	0.000	26.161	1.015	0.000	12.446	0.000	4.317	73.151	3.809	9.144
4	0.000	0.000	0.000	14.985	5.587	4.826	0.000	7.873	1.523	0.000	8.635	0.000
5	37.338	0.000	0.000	14.985	0.000	0.000	5.334	12.445	6.095	0.000	15.239	5.588
6	78.486	0.000	0.000	16.001	0.000	0.000	2.540	2.285	2.285	11.683	4.063	0.000
7	46.228	0.000	2.285	0.000	0.000	3.556	0.000	2.793	11.683	15.747	0.000	11.684
8	30.734	0.000	14.985	0.000	0.000	0.000	3.302	16.001	2.031	4.317	0.000	2.794
9	17.780	0.000	26.923	0.000	0.761	4.064	12.446	0.000	10.159	3.301	2.285	0.000
10	4.572	0.000	17.271	0.000	0.000	0.000	0.000	5.537	0.000	0.000	129.285	19.304
11	2.794	7.619	10.667	0.000	0.127	0.000	0.000	1.015	4.317	16.763	141.289	29.972
12	2.032	0.000	0.000	0.000	0.000	1.778	0.000	7.111	14.731	86.867	0.761	9.398
13	0.000	0.000	0.000	1.015	0.000	0.000	146.312	15.747	0.000	3.555	1.523	0.000
14	0.508	0.000	2.031	0.000	0.000	0.000	60.706	2.031	0.000	4.063	0.000	3.048
15	0.000	2.539	5.841	0.000	0.000	16.256	1.270	19.557	0.000	0.000	0.000	0.000
16	0.000	1.015	9.143	0.000	0.000	55.626	0.000	2.793	24.891	0.000	0.000	0.000
17	0.000	6.095	0.000	0.000	9.143	34.036	0.000	0.000	11.683	2.539	0.000	0.000
18	0.000	0.000	0.000	0.000	1.523	0.000	0.000	0.000	11.683	10.159	0.000	2.794
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.225	0.000	0.000	0.000
20	0.000	0.000	0.000	2.285	0.000	0.000	3.048	0.000	6.095	6.857	0.761	0.000
21	0.000	0.000	0.000	0.000	0.000	0.000	14.986	1.270	0.000	0.000	0.000	0.000
22	19.812	0.000	0.000	0.000	2.793	0.000	0.000	1.270	0.000	7.873	0.000	0.000
23	0.000	0.000	0.000	0.000	0.000	19.240	0.000	0.000	2.285	3.047	1.523	1.524
24	0.762	2.285	0.000	0.000	0.000	1.270	0.000	0.000	0.000	0.000	0.000	0.000
25	49.530	0.000	0.000	0.000	0.000	0.000	0.000	2.793	1.015	0.000	0.000	2.032
26	0.000	0.000	0.761	0.000	0.000	7.112	0.000	0.000	4.317	23.875	5.333	0.000
27	0.000	0.000	0.000	4.317	0.000	1.270	0.000	1.523	0.000	0.000	0.000	0.000
28	0.000	3.047	0.000	0.000	0.000	1.524	0.000	0.000	0.000	0.000	25.399	1.016
29	0.000		3.555	15.747	1.777	25.908	[illegible]	[illegible]	4.825	0.000	[illegible]	[illegible]
30	[illegible]		0.000	2.031	1.015	46.482	0.000	0.761	0.047	[illegible]	11.683	[illegible]
31	[illegible]		0.000		0.000		0.000	0.761		41.117		[illegible]
TOTAL	315.464	62.306	[illegible]	115.911	35.805	272.774	273.357	159.121	151.015	302.156	402.319	98.293

. . . . . NOTE . . . . . THE SYMBOLS * INDICATE MISSING DATA

DAILY RAINFALL (MM) AT BUHI, 1958

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	7.874	0.000	9.905	0.000	0.000	0.000	2.794	0.000	0.000	5.841	3.047	3.556
2	1.524	3.047	0.000	0.000	0.000	27.432	9.652	13.207	2.793	47.497	0.000	0.000
3	17.780	3.555	31.241	0.000	3.809	13.716	5.398	0.000	0.000	4.063	0.000	1.524
4	26.162	5.079	30.479	0.000	2.031	4.318	3.043	20.065	0.000	15.493	3.555	0.000
5	3.556	0.000	4.317	0.000	0.000	2.286	0.000	6.349	6.857	0.000	0.000	5.334
6	6.096	0.000	0.000	0.000	4.317	0.000	3.556	0.000	25.907	0.000	0.000	2.032
7	0.000	0.000	2.793	0.000	0.000	1.778	21.082	0.000	45.211	0.000	2.285	0.000
8	7.366	0.000	4.825	5.079	0.000	8.128	0.000	0.761	20.573	0.000	6.349	0.000
9	7.874	0.000	6.349	6.095	0.000	16.002	23.876	5.341	13.461	0.000	0.000	0.000
10	10.160	0.000	0.000	0.000	0.000	3.302	0.000	0.000	0.000	0.761	0.761	7.620
11	0.000	0.000	4.317	0.000	0.000	7.366	11.430	53.847	0.000	4.571	0.000	0.000
12	4.826	0.000	5.841	0.000	0.000	1.524	8.638	2.793	0.000	7.111	0.000	3.302
13	0.000	5.333	0.000	0.000	0.000	0.000	4.318	1.269	0.000	13.461	4.571	4.064
14	0.000	16.509	0.000	0.000	1.269	17.272	17.526	7.111	0.000	1.777	5.841	7.112
15	0.000	7.873	0.000	0.000	1.523	2.286	23.368	9.143	0.000	6.603	10.667	0.000
16	3.556	0.000	0.000	0.000	7.365	33.528	9.144	14.731	0.000	0.000	12.191	1.778
17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.603	0.000	0.000	26.923	0.000
18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.047	21.335	0.000	31.241	0.000
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	19.811	24.129	27.431	0.000
20	0.000	0.000	0.000	0.000	1.269	0.000	1.524	0.000	1.269	123.697	29.717	2.540
21	32.258	0.000	0.000	0.000	0.000	0.000	0.000	5.841	2.285	18.287	7.111	0.000
22	9.144	2.793	0.000	0.000	0.000	61.468	0.000	2.285	0.000	0.000	1.523	0.000
23	0.000	0.000	0.000	6.349	0.000	0.000	0.000	10.921	0.000	0.000	0.000	3.556
24	24.638	0.000	0.000	0.000	0.000	8.128	1.778	7.873	0.000	0.000	40.893	0.000
25	0.000	6.603	0.000	0.000	23.367	1.330	0.000	9.905	6.095	0.000	10.557	0.000
26	0.000	8.635	0.000	0.761	0.000	0.000	1.016	21.335	0.000	58.673	1.269	0.762
27	26.670	12.191	0.000	0.000	2.285	0.000	28.702	22.351	0.000	81.025	2.031	0.000
28	11.938	22.097	7.873	5.333	5.333	0.000	0.000	44.957	10.667	213.867	9.397	0.000
29	1.778		6.603	12.191	0.000	9.398	0.000	1.777	4.063	119.379	6.357	0.000
30	7.112		3.047	154.939	0.000	1.524	0.000	6.857	5.333	0.000	0.000	0.000
31	0.762		3.809		0.000		20.540	0.507		0.000		0.000
TOTAL	211.074	93.715	121.399	190.747	52.568	220.786	201.390	279.375	185.660	746.234	244.327	43.180

DAILY RAINFALL (MM) AT BUHI, 1959

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	7.873	37.845	1.015	25.146	2.794	3.043	9.905	9.143	4.317	9.143	9.652
2	1.270	1.269	28.955	0.000	102.615	0.000	1.016	10.667	0.000	0.000	0.000	0.000
3	13.208	0.000	51.053	0.000	7.873	1.778	0.000	8.635	0.000	8.889	0.000	0.000
4	0.000	1.777	0.000	0.000	2.793	15.240	0.000	18.795	0.000	57.403	6.603	14.732
5	7.874	9.651	0.000	4.317	4.063	0.000	1.524	7.111	10.667	15.493	5.537	0.000
6	5.052	0.000	1.777	3.301	0.000	3.556	0.000	0.000	5.587	0.000	20.327	5.588
7	6.096	3.555	0.000	1.523	0.000	0.000	9.398	0.000	0.000	1.523	0.000	0.000
8	0.000	11.683	1.269	0.000	7.873	0.000	6.604	0.000	0.000	1.777	6.095	0.000
9	0.000	18.795	4.825	0.000	3.047	0.000	3.302	0.000	0.000	0.000	0.000	7.620
10	5.334	1.269	0.000	0.000	1.523	0.000	0.000	0.000	0.000	0.000	0.000	11.430
11	4.318	2.539	1.777	0.000	2.285	0.000	0.000	0.000	5.841	0.000	0.000	0.000
12	0.000	8.839	5.841	0.000	0.000	0.000	2.286	0.000	0.000	1.269	0.761	8.128
13	0.000	1.777	27.686	0.000	0.000	0.000	32.258	2.285	5.079	1.777	0.000	2.286
14	0.000	1.015	24.129	7.365	0.000	0.000	42.164	0.000	0.000	0.507	27.939	0.000
15	0.000	7.873	30.479	9.905	0.000	0.000	6.352	16.001	2.793	0.000	88.391	0.000
16	6.350	0.000	0.000	1.015	0.000	0.000	0.000	12.699	0.000	0.000	128.015	0.000
17	21.336	0.000	2.031	0.761	3.555	0.000	0.000	2.793	7.873	6.857	4.063	55.024
18	0.000	2.793	16.763	0.000	0.000	0.000	0.000	3.555	16.509	2.793	0.000	103.124
19	0.000	0.000	2.031	6.349	3.047	0.000	5.334	19.303	0.000	0.000	1.777	0.000
20	0.000	0.000	0.000	0.000	20.573	0.000	22.098	2.539	9.655	0.000	6.603	3.048
21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.301	0.000	0.000	0.000	16.542
22	9.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.111	0.504
23	33.020	0.000	0.000	0.000	0.000	0.000	37.[illegible]	1.269	7.619	0.000	14.477	12.192
24	34.862	0.000	0.000	2.793	4.825	0.000	37.[illegible]	26.161	0.000	7.365	0.000	1.016
25	24.638	2.285	0.000	0.000	1.777	0.762	27.940	10.131	2.539	7.873	13.462	9.144
26	1.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.523	0.000	0.000	24.162
27	2.794	0.000	2.285	0.000	0.000	1.524	6.762	0.000	0.000	0.000	21.[illegible]	5.842
28	0.000	0.000	0.000	0.000	10.413	0.000	9.652	19.303	0.000	0.000	14.[illegible]	2.794
29	0.000		0.000	0.000	9.397	3.302	0.000	6.603	0.762	18.413	27.177	6.604
30	0.000		0.000	0.253	0.000	0.000	0.000	13.159	1.269	8.127	20.573	140.462
31	14.542		0.000		0.000		0.000	0.000		11.001		115.571
TOTAL	228.694	83.[illegible]	216.795	48.597	216.[illegible]	28.[illegible]	293.092	241.935	82.530	155.284	445.[illegible]	575.563

[illegible] INDICATE MISSING DATA

DAILY RAINFALL (MM) AT BUHI, 1960

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3.048	4.063	0.000	0.000	7.111	*******	2.032	9.905	24.129	0.000	7.619	1.016
2	9.393	0.000	2.793	0.000	0.000	*******	2.794	10.413	10.667	0.000	14.731	5.080
3	0.000	0.000	2.795	5.079	0.000	*******	12.954	37.337	6.349	0.000	0.000	2.286
4	0.000	0.000	0.000	0.000	0.000	*******	0.000	24.129	4.571	61.213	1.777	4.064
5	0.000	0.000	0.000	0.000	0.000	*******	10.414	10.159	11.429	181.863	2.793	3.556
6	5.144	0.000	1.523	0.000	0.000	*******	0.000	9.905	0.000	177.545	0.000	30.734
7	2.286	5.333	0.000	0.000	5.333	*******	29.210	34.035	0.000	0.000	21.599	0.000
8	0.000	2.285	0.000	0.000	21.031	*******	4.064	12.191	0.000	2.793	23.621	3.556
9	0.000	2.793	0.000	0.000	0.000	*******	15.748	0.000	0.000	0.000	27.177	12.954
10	0.000	30.987	3.047	0.000	0.000	*******	8.636	0.000	0.000	0.000	8.139	7.620
11	0.000	9.905	0.000	0.000	0.000	*******	1.524	0.000	4.571	34.543	8.331	0.000
12	0.000	20.573	0.000	0.000	10.921	*******	0.000	0.000	0.000	71.881	0.000	2.540
13	0.000	3.555	5.841	0.000	4.825	*******	0.000	0.000	0.000	2.793	0.000	0.000
14	2.794	0.000	9.143	0.000	5.333	*******	1.096	4.825	0.000	0.000	0.000	0.000
15	0.000	0.000	0.000	0.000	1.777	*******	5.043	12.699	1.523	0.000	2.285	0.000
16	0.000	1.523	0.000	0.000	0.000	*******	11.684	0.000	4.063	0.000	0.000	1.778
17	2.794	0.000	0.000	3.301	0.000	*******	0.000	0.000	1.269	0.000	0.000	0.000
18	0.508	1.015	12.953	9.143	0.000	*******	0.000	0.000	0.000	3.555	0.000	0.000
19	0.000	0.000	0.000	0.000	0.000	*******	0.000	0.000	8.889	0.000	0.000	3.810
20	0.000	0.000	0.000	0.000	2.793	*******	0.000	0.000	27.431	0.000	0.507	0.000
21	0.000	0.000	0.000	15.493	0.000	*******	0.762	0.000	14.731	0.000	8.127	0.000
22	4.572	4.571	0.000	85.597	0.000	*******	0.000	0.000	10.413	0.000	11.683	0.000
23	9.906	9.905	0.000	11.175	0.000	*******	8.636	0.000	0.000	0.000	8.635	0.000
24	0.000	2.031	0.000	7.365	9.397	*******	5.652	0.000	0.000	5.333	6.857	3.048
25	0.000	10.921	0.000	0.000	18.033	*******	1.524	0.000	0.000	0.000	3.809	9.906
26	10.922	0.000	0.000	0.000	103.123	*******	5.588	0.000	0.000	0.000	11.429	26.162
27	1.524	0.000	0.000	0.000	98.519	*******	0.000	1.015	6.095	2.285	24.391	3.810
28	6.858	0.000	6.095	0.000	33.019	*******	6.604	0.000	8.127	0.000	24.393	0.000
29	9.144		2.793	0.000	6.603	*******	12.192	0.000	28.955	13.461	0.761	14.224
30	5.588		1.523	5.587	3.555	*******	10.922	1.523	0.000	13.461	16.509	36.576
31	0.000		0.000		4.317		0.000	17.779		26.923		0.000
TOTAL	78.486	109.460	47.996	142.740	333.739	*******	164.084	185.915	173.212	597.648	236.453	172.720

DAILY RAINFALL (MM) AT BUHI, 1961

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	25.908	0.000	17.525	0.000	9.651	3.556	0.762	0.000	3.301	9.397	*******	0.000
2	5.080	0.000	11.175	2.285	0.000	0.000	25.146	0.000	19.303	10.921	*******	0.000
3	0.000	0.000	0.000	1.523	0.000	0.762	32.766	0.000	1.015	9.143	*******	7.112
4	0.000	0.000	1.269	0.000	0.000	0.508	18.288	8.635	104.139	0.000	*******	93.726
5	0.000	0.000	0.000	0.000	0.000	6.096	0.000	0.000	0.000	2.793	*******	0.000
6	2.082	0.000	0.000	8.127	4.063	2.794	0.000	0.000	15.747	0.000	*******	3.810
7	15.494	0.000	0.000	0.000	0.000	0.000	0.000	9.651	0.000	9.905	*******	32.766
8	6.350	0.000	0.000	0.507	0.000	0.000	0.000	30.479	0.761	17.525	*******	59.182
9	0.000	0.000	0.000	0.761	0.000	0.000	0.000	45.973	0.000	11.175	*******	115.570
10	0.000	0.000	4.317	1.015	0.000	0.000	10.061	7.619	0.000	52.577	*******	6.350
11	6.604	0.000	2.031	0.000	1.015	0.000	17.013	0.000	0.000	40.893	*******	0.000
12	44.704	0.000	0.507	0.000	0.000	0.000	0.000	0.000	15.493	6.857	*******	0.000
13	0.000	2.031	0.000	0.000	9.397	1.778	0.000	32.765	31.749	0.507	*******	0.000
14	0.762	0.000	0.253	0.000	14.477	0.000	1.524	29.209	8.635	0.000	*******	0.000
15	0.000	7.111	0.000	0.000	0.347	0.000	13.716	3.047	0.000	0.000	*******	0.508
16	0.000	0.000	0.000	0.000	2.793	2.285	7.620	2.539	0.000	6.095	*******	2.794
17	5.334	0.000	3.047	0.761	3.809	11.430	16.764	3.047	26.669	21.335	*******	0.000
18	2.794	1.523	0.000	0.000	3.555	0.000	7.874	3.301	2.285	0.000	*******	1.524
19	1.524	0.000	0.000	0.000	4.317	23.368	0.000	0.000	0.000	11.937	*******	0.000
20	0.762	0.000	0.000	0.000	[illegible]	39.878	0.000	1.015	10.921	0.000	*******	3.302
21	0.000	0.000	0.000	0.000	1.777	1.778	0.000	6.033	[illegible]	6.603	*******	0.000
22	5.842	0.000	0.000	0.000	0.000	0.000	[illegible]	6.857	[illegible]	8.889	*******	0.000
23	0.000	0.000	0.000	0.000	0.000	0.000	11.431	4.571	3.301	6.603	*******	4.064
24	0.000	0.000	[illegible]	0.000	3.301	1.016	13.211	6.857	1.015	12.191	*******	0.000
25	0.000	1.000	0.000	0.000	11.541	23.368	66.[illegible]	4.825	20.827	0.[illegible]	*******	3.556
26	4.046	1.015	[illegible]	0.000	2.031	0.000	4.826	0.000	2.793	0.000	*******	0.000
27	2.286	0.507	0.000	0.000	0.000	5.588	0.000	38.353	1.523	0.[illegible]	*******	0.000
28	0.000	0.000	0.000	0.000	0.000	2.032	0.000	0.000	3.555	0.000	*******	15.002
29	0.000		0.000	0.000	0.793	1.016	0.000	3.047	3.301	0.000	*******	0.000
30	0.000		0.000	23.367	0.000	2.[illegible]	0.000	12.191	0.761	0.761	*******	0.000
31	1.016		2.539		0.000		0.000	23.114		0.000		0.000
TOTAL	129.590	12.167	42.[illegible]	38.346	[illegible]	122.540	[illegible]	[illegible]	333.[illegible]	[illegible]	*******	318.361

. . . . . THE SYMBOLS * INDICATE MISSING DATA

DAILY RAINFALL (MM) AT BUHI, 1962

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.508	0.000	0.000	1.015	3.047	17.526	3.810	12.699	0.000	0.000	0.000	0.000
2	1.016	0.000	0.000	6.857	0.000	0.000	10.414	0.000	0.000	0.000	0.000	60.580
3	105.410	0.000	72.319	7.873	0.000	0.000	0.000	0.000	13.461	6.857	0.000	62.484
4	5.580	0.000	14.001	0.000	0.761	7.112	19.304	0.000	3.555	0.000	0.000	17.526
5	0.000	0.000	0.000	0.000	0.000	5.588	0.000	0.000	0.000	0.000	61.467	38.354
6	10.668	6.349	0.000	2.793	0.000	4.572	44.704	0.000	2.285	0.000	125.729	0.000
7	7.874	11.429	0.000	3.555	1.015	0.000	60.580	11.683	2.793	0.000	0.000	0.000
8	24.384	26.193	0.000	2.539	0.000	0.000	9.652	8.889	0.000	0.000	0.000	0.000
9	0.000	0.000	1.777	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	1.523	0.000	0.000	0.000	2.793	1.777	0.000	0.000	0.000
11	0.000	0.000	0.000	0.000	0.000	0.000	13.716	0.000	0.000	0.000	0.000	0.000
12	0.000	0.507	0.000	0.000	0.000	7.620	0.000	0.000	20.065	16.033	0.000	7.366
13	0.000	3.809	0.000	0.000	0.000	0.000	0.000	0.000	23.113	2.285	0.000	0.000
14	0.000	6.603	0.000	0.000	0.000	6.604	3.048	4.317	10.413	2.539	0.000	0.000
15	0.000	8.127	0.000	0.000	2.793	35.560	0.000	7.365	0.000	0.000	0.000	0.000
16	1.524	6.635	0.000	0.000	3.555	0.000	7.366	0.000	0.000	0.000	0.000	0.000
17	0.000	4.825	17.271	0.000	147.319	0.000	6.128	0.000	17.779	0.000	0.000	0.000
18	0.000	0.000	0.000	0.000	50.799	7.366	57.912	8.381	10.413	17.779	1.523	0.000
19	1.778	0.000	0.000	10.667	0.000	0.000	10.414	0.000	43.941	10.159	0.000	0.000
20	1.016	0.000	2.539	1.523	0.000	2.032	0.000	22.605	26.669	0.000	0.000	0.000
21	0.000	0.000	9.143	0.000	1.777	0.000	0.000	0.000	0.000	0.000	17.017	0.000
22	0.000	5.841	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.683	0.000	82.296
23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	12.446
24	0.000	0.000	0.000	0.000	0.507	0.000	0.000	0.000	33.527	0.000	0.000	2.794
25	0.000	0.000	0.000	0.000	3.301	2.540	51.562	0.000	3.809	3.809	6.857	0.000
26	0.000	11.429	0.000	0.000	0.000	0.000	0.000	0.000	4.317	0.000	0.000	0.000
27	3.810	3.809	0.761	2.793	117.347	0.000	3.556	0.000	0.000	0.000	103.631	0.000
28	0.000	7.111	0.000	0.000	0.000	5.842	0.000	10.921	0.000	0.000	0.000	0.000
29	1.524		1.523	1.269	4.063	3.302	8.382	46.481	14.731	1.523	0.000	0.000
30	4.826		0.507	0.000	1.269	0.000	15.494	11.175	0.000	0.000	0.000	0.000
31	5.588		0.000		1.777		28.194	0.000		0.000		0.000
TOTAL	175.514	106.667	128.016	42.407	339.330	105.664	364.235	147.309	232.648	74.667	316.224	291.846

DAILY RAINFALL (MM) AT BUHI, 1963

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	0.000	0.000	0.000	0.000	0.762	2.032	12.953	26.161	8.635	0.000	12.446
2	0.000	0.507	0.000	0.000	0.000	1.016	0.000	32.257	0.000	0.000	7.873	0.000
3	0.000	0.000	0.000	0.000	0.000	0.000	23.114	0.000	16.255	41.147	0.000	0.000
4	0.000	0.000	4.063	0.000	0.000	6.604	0.000	49.733	40.639	2.285	0.000	11.176
5	0.000	1.777	0.000	3.555	0.000	0.000	0.000	0.000	0.000	6.095	32.765	7.366
6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.367	0.000	16.255	0.000	0.000
7	26.416	0.000	0.000	0.000	0.000	0.000	0.000	22.859	4.825	7.619	0.000	10.812
8	0.000	20.827	0.000	3.047	0.000	0.000	0.000	0.000	17.271	0.000	0.000	7.112
9	0.000	0.000	0.000	3.809	0.000	2.032	0.000	0.000	0.000	0.000	0.000	25.654
10	0.000	0.000	0.000	0.000	0.000	9.906	7.620	0.000	0.000	0.000	41.147	11.176
11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.523	53.339	0.000
12	0.000	5.079	0.000	0.000	0.507	0.000	0.000	57.149	0.000	6.603	42.671	0.000
13	0.000	43.179	0.000	0.051	0.000	13.462	0.000	127.141	0.000	0.000	8.389	0.000
14	2.540	0.000	0.000	7.365	2.031	0.000	9.906	0.000	0.000	0.000	0.000	10.658
15	0.000	5.333	0.000	0.000	0.000	9.398	0.000	0.000	0.000	0.000	0.000	0.000
16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.112
17	0.000	0.000	0.000	0.000	1.523	5.334	0.000	9.905	21.843	0.000	7.619	0.000
18	0.000	0.000	0.000	0.000	0.000	16.256	0.000	0.000	0.000	5.587	0.000	2.540
19	0.000	0.000	0.000	0.000	2.539	6.604	0.000	0.000	0.000	0.000	0.000	15.748
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	55.880
21	0.000	0.000	0.000	0.000	0.000	0.000	16.256	0.000	12.445	0.000	0.000	13.922
22	0.000	0.000	3.301	0.000	0.000	0.000	0.000	23.375	0.000	0.000	0.000	0.000
23	4.826	0.000	0.000	0.000	0.000	0.000	0.000	0.000	49.275	0.000	0.000	0.000
24	1.778	0.000	0.000	1.015	0.000	0.000	0.000	0.000	41.147	1.523	0.000	0.000
25	0.000	0.000	0.000	0.000	0.000	11.938	1.523	0.000	0.000	0.000	0.000	0.000
26	0.000	0.000	2.793	0.761	0.761	75.184	25.146	17.017	0.000	0.000	0.000	8.890
27	0.000	12.699	0.000	1.015	0.000	114.808	0.000	15.747	12.699	0.000	0.000	0.000
28	17.526	11.683	0.000	0.000	0.000	0.000	5.334	0.000	2.031	0.000	0.000	0.000
29	2.286		1.777	0.000	0.000	0.000	0.000	0.000	4.063	0.000	0.000	0.000
30	0.000		0.000	0.000	13.715	4.572	4.064	10.160	1.523	0.000	0.000	0.000
31	0.000		0.000		31.969		0.000	0.000		12.191		0.000
TOTAL	77.474	101.084	11.[illegible]	30.218	[illegible]	277.[illegible]	94.[illegible]	[illegible]	[illegible]	116.320	219.131	[illegible]

..... NOTE ..... THE [illegible] INDICATE [illegible] DATA

DAILY RAINFALL (MM) AT BUHI, 1964

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	14.224	3.301	0.000	0.507	0.000	0.000	0.000	17.271	0.000	0.000	0.000	0.000
2	32.512	16.001	0.000	1.523	0.000	0.000	0.000	12.445	0.000	0.000	14.173	0.000
3	0.000	6.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	1.778	5.079	0.000	0.000	0.000	0.000	0.000	26.923	0.000	0.000	0.000	4.572
5	4.826	11.429	0.000	0.000	3.809	0.000	23.368	6.095	3.047	0.000	27.939	55.118
6	22.860	0.000	0.000	0.000	21.081	0.000	0.000	19.303	9.143	0.000	0.000	20.320
7	0.000	6.857	0.000	0.000	0.000	0.762	4.318	3.809	0.000	0.000	0.000	0.000
8	0.000	0.000	9.397	0.000	0.000	0.000	0.000	0.000	0.000	19.303	0.000	0.000
9	9.906	0.000	0.000	0.761	0.000	1.016	3.048	0.000	17.271	0.000	0.000	0.000
10	0.000	7.111	2.031	2.793	0.000	4.572	0.000	1.523	9.397	0.000	0.000	0.000
11	0.000	7.873	0.000	4.317	0.000	0.000	0.000	16.001	15.747	0.000	2.235	0.000
12	0.000	19.557	0.000	4.825	0.000	0.000	0.000	0.000	0.000	1.777	0.000	21.844
13	0.000	33.527	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	37.122
14	0.000	17.653	0.000	0.000	0.000	0.000	2.794	3.047	59.181	3.047	0.000	57.912
15	0.000	0.000	0.000	8.127	0.507	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	0.000	0.000	0.000	3.047	5.587	4.318	0.000	0.000	0.000	0.000	0.000	0.000
17	0.000	0.000	0.000	45.465	0.000	0.000	21.336	0.000	0.000	0.000	0.000	0.000
18	0.000	6.127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.683	18.288
19	0.000	0.000	0.000	0.000	6.095	0.000	0.000	0.000	0.000	0.000	61.467	28.956
20	29.464	2.031	0.000	0.000	0.000	0.000	10.922	0.000	0.000	6.603	62.483	0.000
21	3.048	0.000	0.000	0.000	0.000	3.048	0.000	0.000	21.335	0.000	0.000	0.000
22	0.000	0.000	0.000	0.000	0.000	2.794	0.000	0.000	46.735	0.000	0.000	0.000
23	0.000	0.000	0.000	2.031	8.127	0.000	12.700	0.000	21.589	0.000	0.000	0.000
24	4.318	9.397	0.000	0.000	0.000	0.000	0.000	0.000	17.271	2.031	27.177	6.604
25	0.000	1.777	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.429	19.558
26	7.874	0.000	4.317	0.000	0.000	3.556	0.000	26.415	0.000	42.925	7.365	0.000
27	0.000	7.873	3.555	2.539	0.000	0.000	2.540	3.555	8.635	0.000	54.355	0.000
28	0.000	0.000	0.000	5.333	3.301	77.216	0.000	0.000	95.503	0.000	0.000	0.000
29	0.000		0.000	1.523	1.015	146.304	9.144	0.000	63.499	28.955	8.381	0.000
30	0.000		0.000	2.285	4.317	1.270	0.000	14.731	0.000	26.669	0.000	0.000
31	0.000		1.015		2.285		0.000	0.000		0.000		0.000
TOTAL	130.810	158.734	20.315	85.076	62.727	244.356	90.170	151.113	388.353	131.310	288.787	320.293

DAILY RAINFALL (MM) AT BUHI, 1965

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	0.000	0.000	0.000	3.555	0.000	18.334	52.831	0.000	5.841	1.249	29.972
2	0.000	0.000	0.000	0.000	1.523	6.604	0.000	1.269	2.539	5.587	0.000	23.114
3	0.000	0.000	0.000	0.000	0.000	0.000	3.048	0.000	1.777	0.000	17.017	14.224
4	0.000	0.000	0.000	0.000	0.000	44.704	12.954	0.000	0.000	15.493	21.335	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	38.333	5.080
6	0.000	2.793	0.000	0.000	0.000	0.000	2.540	0.000	12.445	0.000	44.703	11.684
7	0.000	8.869	5.841	0.000	0.000	0.000	3.302	0.000	0.000	14.223	0.000	20.574
8	0.000	0.000	5.079	0.000	0.000	7.874	11.430	0.000	6.857	0.000	0.000	11.430
9	5.842	0.000	20.827	0.000	0.000	0.000	0.000	0.000	108.711	0.000	0.000	3.556
10	5.588	0.000	22.605	0.000	0.000	0.000	11.176	0.000	8.635	24.637	0.000	10.922
11	6.350	0.000	23.717	0.000	0.000	14.478	22.352	1.615	40.893	0.000	0.000	0.000
12	10.160	0.000	13.461	3.555	0.000	0.000	115.316	0.000	16.001	10.921	0.000	2.286
13	6.350	0.000	0.000	0.000	0.000	0.000	7.874	52.323	14.477	0.000	0.345	2.794
14	10.160	0.000	0.000	0.000	0.000	5.588	0.000	0.000	9.905	0.000	0.000	17.272
15	6.350	0.000	0.000	4.063	0.000	0.000	0.000	3.555	5.333	25.299	0.000	24.130
16	10.414	0.000	0.000	0.000	0.000	16.256	0.000	0.000	8.635	2.285	2.539	65.786
17	20.326	0.000	0.000	0.000	0.000	0.000	29.464	11.937	41.909	21.335	4.825	4.318
18	34.290	0.000	0.000	4.825	0.000	6.604	31.750	0.000	42.417	8.381	1.523	13.208
19	35.814	0.000	0.000	4.317	0.603	0.350	14.224	4.064	11.937	3.555	0.000	21.242
20	14.732	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000	5.587	0.000	4.318
21	3.810	0.000	0.000	0.000	10.413	0.000	0.000	0.000	42.941	3.047	0.000	1.778
22	0.000	0.000	1.523	2.285	52.831	59.182	2.032	15.747	11.429	6.349	25.523	0.000
23	0.000	0.000	14.732	0.000	0.000	77.216	[illegible]	6.095	4.064	1.523	0.000	2.286
24	17.526	0.603	0.603	0.000	40.385	[illegible]	[illegible]	0.000	0.000	12.699	0.000	7.334
25	10.414	5.841	[illegible]	0.000	[illegible]	[illegible]	5.080	3.301	[illegible]	[illegible]	[illegible]	[illegible]
26	0.000	8.635	[illegible]	0.000	71.081	0.000	3.556	17.271	[illegible]	[illegible]	24.131	1.270
27	0.000	7.373	0.000	0.000	2.285	0.000	[illegible]	[illegible]	0.000	0.000	71.374	0.000
28	0.000	0.000	[illegible]	0.000	0.000	1.270	5.080	22.351	13.207	[illegible]	4.317	[illegible]
29	0.000	0.000	[illegible]	1.523	0.000	0.000	19.050	17.777	1.525	0.000	12.445	[illegible]
30	0.000		0.000	0.000	2.793	[illegible]	[illegible]	7.619	0.000	[illegible]	1.015	1.016
31	0.000		0.000		0.000		[illegible]	8.635		0.000		7.366
TOTAL	[illegible]	46.635	[illegible]	26.568	170.424	[illegible]	171.073	227.577	407.635	170.758	[illegible]	317.245

[illegible]

DAILY RAINFALL (MM) AT BUHI, 1966

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	65.500	0.000	0.000	0.000	7.600	0.000	10.300	17.000	0.000	1.300	0.000	0.000
2	80.500	0.000	0.000	0.000	6.600	1.300	6.100	18.500	31.500	6.100	3.100	10.400
3	30.500	0.000	3.800	0.000	0.000	0.000	0.000	4.300	32.500	9.700	4.100	65.000
4	7.600	0.000	0.000	0.000	0.000	37.300	0.000	6.100	41.400	53.300	0.100	49.100
5	1.000	0.000	0.800	0.000	0.000	0.000	0.000	1.800	0.000	6.100	0.000	21.900
6	0.000	0.000	0.000	0.000	0.000	4.300	7.300	110.300	11.700	0.000	8.100	0.000
7	0.000	0.000	0.000	1.000	3.100	0.000	5.700	32.500	61.200	0.000	3.100	4.100
8	0.000	0.000	1.300	5.800	1.500	15.000	6.100	8.900	10.700	0.000	0.000	0.000
9	0.000	0.000	3.600	1.300	5.100	27.200	5.300	24.400	0.000	13.200	0.000	4.800
10	0.500	0.000	6.900	0.000	24.600	0.000	11.700	14.700	0.000	0.000	33.800	22.400
11	2.000	0.000	18.500	0.000	0.000	0.000	12.200	4.600	0.000	0.000	11.400	1.000
12	0.000	1.500	1.300	0.000	0.000	11.400	19.300	0.000	10.000	0.000	1.300	0.000
13	0.000	6.100	0.000	0.000	0.000	0.000	11.700	1.500	0.000	0.000	0.100	42.700
14	9.100	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000	7.400	17.100
15	6.100	2.300	0.000	22.900	60.000	12.200	0.000	0.000	0.000	0.000	25.900	0.000
16	4.300	0.000	0.000	0.000	32.800	0.000	0.000	0.000	0.000	0.000	43.000	0.000
17	5.300	0.000	8.100	0.000	2.000	6.400	10.900	6.400	24.100	11.500	0.000	0.000
18	1.500	0.000	0.000	0.000	0.000	0.000	17.000	0.000	7.400	21.600	0.000	67.600
19	0.000	0.000	0.000	0.000	2.600	0.000	3.100	0.000	0.000	7.400	215.300	38.100
20	17.300	0.000	0.000	8.100	0.000	0.000	0.000	0.000	2.500	5.100	58.700	0.000
21	11.200	0.000	0.000	0.000	0.000	0.000	18.500	0.000	11.400	3.800	0.000	0.000
22	0.000	0.000	0.000	0.000	25.900	0.000	63.500	0.000	0.000	7.100	0.000	0.000
23	0.000	0.000	0.000	0.000	0.000	0.000	48.300	0.000	0.000	9.700	2.300	0.000
24	0.000	0.000	0.000	0.000	0.000	3.600	31.500	8.900	0.000	13.700	9.100	0.000
25	3.100	5.300	0.000	2.000	0.000	48.500	0.000	6.900	1.500	7.600	0.000	0.000
26	0.000	0.000	0.000	0.000	12.500	9.500	5.300	0.000	0.000	4.600	0.000	28.200
27	7.400	0.800	0.000	0.000	3.100	10.400	10.900	0.000	0.000	0.000	8.400	215.900
28	0.000	0.000	1.500	0.000	0.000	21.100	7.100	0.000	0.000	0.000	2.300	2.500
29	0.000		1.800	0.000	0.000	1.000	17.300	10.200	0.000	8.600	0.000	1.800
30	4.100		13.500	0.000	0.000	0.000	36.300	0.000	0.000	0.000	1.300	4.600
31	0.000		0.000		4.100		1.000	70.100		0.000		4.100
TOTAL	257.000	16.000	61.100	41.100	212.500	210.400	374.699	353.099	251.900	190.880	438.839	602.099

DAILY RAINFALL (MM) AT BUHI, 1967

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4.800	0.000	7.900	0.000	0.000	1.300	0.000	0.000	25.200	21.600	7.600	14.800
2	26.500	0.000	5.400	0.000	13.700	0.000	0.000	3.800	34.300	0.000	18.900	4.600
3	18.300	0.000	29.200	0.000	0.600	2.800	72.700	1.800	57.700	6.100	123.700	3.300
4	22.100	0.000	21.300	0.000	0.000	0.000	27.200	0.000	12.700	0.000	0.100	3.800
5	19.300	0.000	12.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	4.500	0.000	129.500	0.000	0.000	0.000	8.400	178.000	0.000	0.000	0.000	1.800
7	7.100	0.000	17.300	0.000	0.000	0.000	0.000	6.400	0.000	0.000	8.300	6.100
8	6.500	1.800	5.100	0.000	7.400	15.000	0.000	9.100	11.900	0.000	0.000	0.000
9	13.700	4.600	0.000	0.000	0.000	4.700	3.300	0.000	0.000	0.000	0.100	6.600
10	8.600	0.000	0.000	0.000	0.000	0.000	6.600	0.000	0.000	0.000	0.100	0.000
11	7.400	10.500	5.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.800
12	6.900	42.600	0.000	0.000	0.000	0.000	2.300	7.400	0.000	0.000	0.100	16.000
13	60.600	10.500	0.300	0.000	0.000	2.800	2.000	135.900	2.300	0.000	0.100	0.000
14	39.500	0.000	0.000	1.800	0.000	5.600	4.300	35.500	3.000	110.500	0.000	0.000
15	138.400	3.300	0.000	0.000	0.000	0.000	0.000	0.000	7.400	5.000	0.100	4.200
16	215.400	6.100	0.000	2.300	0.000	4.100	14.500	6.400	35.000	0.000	0.100	1.800
17	10.700	6.100	0.000	85.500	0.000	0.000	28.500	6.900	2.500	0.000	0.100	0.000
18	3.800	0.000	0.000	0.000	10.200	6.400	35.100	36.100	[illegible]	22.100	0.100	0.000
19	4.300	0.000	0.000	0.000	5.000	11.900	[illegible]	4.000	[illegible]	3.100	0.100	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	37.000	0.000	0.000	7.300	5.000	0.000
21	4.000	0.000	0.000	0.000	20.200	0.000	48.000	0.000	[illegible]	0.000	11.000	0.000
22	0.000	0.000	0.000	0.000	0.000	0.000	7.100	6.100	[illegible]	0.000	0.100	0.000
23	0.000	0.000	0.000	0.300	3.500	1.500	[illegible]	[illegible]	[illegible]	0.000	8.400	0.000
24	0.000	0.000	0.000	0.000	0.000	6.400	[illegible]	5.800	[illegible]	0.000	0.100	0.000
25	0.000	0.000	4.100	0.000	[illegible]	0.000	[illegible]	25.900	[illegible]	0.000	17.[illegible]	0.000
26	0.000	0.000	1.000	10.700	[illegible]	0.000	[illegible]	21.200	[illegible]	0.000	12.100	0.000
27	0.000	30.900	0.000	0.000	13.500	12.500	9.400	7.900	[illegible]	0.000	13.100	0.300
28	0.000	0.000	0.000	0.000	24.100	[illegible]	17.000	5.000	[illegible]	0.000	1.100	7.700
29	0.000		0.000	0.000	16.700	[illegible]	15.600	0.000	[illegible]	5.400	0.100	7.600
30	2.000		0.000	0.100	[illegible]	21.300	[illegible]	[illegible]	[illegible]	0.000	0.100	17.[illegible]
31	[illegible]		0.000		[illegible]		[illegible]	[illegible]		0.000		13.400
TOTAL	648.900	123.[illegible]	218.100	[illegible]	175.100	[illegible]	[illegible]	[illegible]	[illegible]	186.100	237.100	140.[illegible]

. . . . . NOTE . . . . . THE SYMBOLS . INDICATE MISSING DATA

DAILY RAINFALL (MM) AT BUHI, 1968

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	37.900	25.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.000	0.000	0.000	0.000	17.300	0.000	23.400	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000	2.300	15.800	0.000	4.800	0.000	0.000	0.000	4.300
4	0.000	0.000	0.000	0.000	3.100	0.000	0.000	5.300	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000	3.900	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	2.500	11.700	0.000	0.000	0.000	10.400	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	2.000	0.000	20.800	5.100	0.000	0.000	0.000	0.000	1.800
8	0.000	0.000	0.000	0.000	0.000	0.000	6.100	36.100	0.000	0.000	0.000	3.800
9	0.000	0.000	1.600	0.000	0.000	0.000	7.400	66.500	0.000	0.000	0.000	0.000
10	0.000	0.000	3.100	0.000	0.000	1.800	6.100	8.100	0.000	0.000	7.300	0.000
11	0.000	0.000	6.900	0.000	0.000	0.000	0.000	3.900	0.000	2.300	4.600	0.000
12	8.400	0.000	0.000	0.000	11.900	1.500	0.000	7.400	9.900	6.100	0.000	0.000
13	23.900	6.100	0.000	0.000	0.000	0.000	7.900	6.900	15.200	0.000	0.000	0.000
14	7.900	0.000	0.000	0.000	0.000	6.600	26.700	28.200	3.300	12.500	0.000	0.000
15	11.700	0.000	0.000	0.500	2.300	0.000	14.500	16.300	30.500	9.400	1.300	0.000
16	0.000	0.000	0.000	0.000	0.000	0.300	32.500	0.000	9.400	6.400	2.300	0.000
17	0.000	0.000	0.000	0.000	7.600	0.000	2.000	30.700	2.300	0.000	15.300	1.000
18	0.000	0.000	0.000	0.000	0.000	8.100	0.000	6.100	0.000	0.000	27.500	0.000
19	0.000	0.000	0.000	0.000	0.000	9.700	0.000	46.400	38.900	0.000	14.300	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	17.500	0.000	26.400	0.000	0.000	0.000
21	0.000	8.100	0.000	0.000	0.000	0.000	8.100	0.000	0.000	0.000	0.000	0.000
22	0.000	0.000	0.000	5.600	6.400	0.000	18.300	0.000	0.000	0.000	7.400	24.700
23	0.000	0.000	0.000	9.200	0.000	0.000	17.300	0.000	7.100	0.000	24.700	0.000
24	0.000	9.700	0.000	0.000	0.000	0.000	0.000	0.000	7.500	0.000	14.700	0.000
25	0.000	12.700	0.000	0.000	11.900	0.000	0.000	0.000	27.400	0.000	0.000	9.700
26	0.080	1.600	0.000	0.000	0.000	16.500	5.100	0.000	221.000	0.000	0.000	10.100
27	2.800	1.300	0.000	0.000	0.000	9.700	0.000	0.000	114.000	6.100	5.300	9.100
28	48.800	0.000	0.000	7.900	0.000	5.100	0.000	0.000	11.900	9.400	13.300	0.000
29	25.700	0.000	17.300	0.000	4.800	35.100	7.600	2.800	4.100	0.000	0.000	0.000
30	10.200		0.000	0.000	3.300	11.200	0.000	0.000	0.000	0.000	0.000	0.000
31	1.300		0.000		0.030		0.000	0.000		0.000		0.000
TOTAL	178.680	65.600	31.400	36.900	53.630	159.200	186.500	353.199	530.100	54.200	148.900	65.300

DAILY RAINFALL (MM) AT BUHI, 1969

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	0.600	*******	0.000	0.000	11.400	6.400	0.000	*******	0.000	0.000	0.000
2	0.000	3.600	*******	0.000	0.000	3.600	0.000	0.000	*******	0.000	0.000	0.000
3	0.000	0.000	*******	0.000	0.000	4.100	9.400	0.000	*******	0.000	0.100	0.030
4	0.000	0.000	*******	0.000	0.000	8.600	4.100	0.000	*******	7.400	0.000	1.500
5	0.600	13.500	*******	0.000	0.000	0.000	3.600	4.300	*******	32.500	2.400	0.000
6	0.000	4.300	*******	0.000	0.000	0.000	30.700	11.100	*******	8.900	0.100	0.000
7	11.400	0.000	*******	0.000	0.000	0.000	27.700	0.000	*******	0.000	0.000	11.700
8	4.600	0.000	*******	0.000	0.000	9.100	0.000	0.000	*******	0.000	0.000	0.000
9	9.500	0.000	*******	0.000	0.000	0.000	0.000	51.300	*******	0.000	0.000	24.600
10	0.000	0.000	*******	12.500	0.000	26.700	7.400	0.000	*******	0.000	0.000	44.200
11	0.000	0.000	*******	0.000	0.000	0.000	5.000	7.400	*******	5.800	0.000	45.000
12	11.900	0.000	*******	4.900	7.400	0.000	39.100	0.000	*******	7.600	4.100	28.500
13	0.000	0.000	*******	2.300	0.000	0.000	0.000	0.000	*******	4.100	16.200	0.000
14	0.000	5.800	*******	3.100	0.000	0.000	0.000	3.300	*******	0.000	25.100	10.200
15	0.000	0.000	*******	0.000	0.000	22.400	0.000	13.500	*******	0.000	11.700	20.600
16	0.000	0.300	*******	0.000	0.000	21.800	35.000	6.100	*******	7.900	30.200	14.700
17	0.000	0.000	*******	0.000	0.000	2.800	0.000	0.000	*******	0.000	30.500	10.100
18	0.000	0.000	*******	0.000	0.000	0.000	0.000	7.500	*******	13.200	30.200	0.000
19	0.000	0.000	*******	0.000	0.000	4.100	55.100	0.000	*******	0.000	84.600	0.000
20	0.000	0.000	*******	0.000	0.000	0.000	0.000	0.000	*******	0.000	14.700	0.000
21	0.000	0.000	*******	0.000	20.500	0.000	12.000	0.000	*******	0.000	4.600	0.000
22	0.000	0.000	*******	7.300	2.300	0.000	13.000	0.000	*******	4.100	0.000	0.000
23	0.000	0.000	*******	4.100	0.000	1.300	1.000	0.000	*******	12.000	0.000	0.000
24	0.000	0.000	*******	11.000	0.000	6.800	0.000	0.100	*******	0.000	4.600	3.100
25	0.000	0.000	*******	0.000	0.000	0.000	0.000	0.000	*******	0.000	15.000	8.000
26	0.000	0.000	*******	0.000	0.000	32.500	25.000	0.800	*******	0.000	0.100	0.000
27	0.000	0.000	*******	0.000	0.000	13.700	4.000	0.000	*******	0.000	0.000	0.000
28	0.000	0.000	*******	0.000	2.000	19.300	0.000	0.000	*******	5.200	18.000	35.100
29	0.000		*******	0.000	27.600	0.000	0.000	31.000	*******	3.000	6.000	26.000
30	0.000		*******	0.000	0.000	0.000	9.100	17.000	*******	0.000	0.100	7.300
31	0.000		*******		0.000		0.000	2.500		0.000		0.100
TOTAL	37.400	28.000	*******	[illegible]	[illegible]	[illegible]	[illegible]	175.600	*******	[illegible]	[illegible]	297.200

* * * * * NOTE * * * * * THE SYMBOLS *** INDICATE MISSING DATA

DAILY RAINFALL (MM) AT BUHI, 1971

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	0.000	0.000	0.000	72.100	0.000	0.000	0.000	44.200	0.000	3.900	6.400
2	7.100	0.000	0.000	0.000	0.000	21.100	0.000	0.000	7.600	0.000	0.000	4.600
3	0.000	15.800	0.000	0.000	4.300	0.000	0.000	0.000	0.000	86.900	0.000	0.000
4	64.800	44.000	0.000	0.000	0.000	0.000	0.000	0.000	33.400	18.900	29.300	0.000
5	48.000	36.300	0.000	0.000	10.900	8.400	0.000	0.000	0.000	21.600	0.000	7.500
6	3.800	10.700	0.000	0.000	6.600	13.600	0.000	0.000	0.000	8.600	0.000	4.000
7	0.000	18.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.300	5.100
8	0.000	23.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	12.200	19.000
9	0.000	31.000	0.000	0.000	0.000	0.000	0.000	11.700	5.300	15.000	13.700	58.100
10	0.000	10.400	36.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	56.700
11	0.000	24.400	53.100	0.000	12.700	0.000	0.000	13.500	0.000	4.100	0.100	0.000
12	0.000	7.700	10.300	0.000	44.400	0.000	0.000	0.000	12.500	0.000	14.700	0.000
13	0.000	8.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	0.000	11.200	3.800	0.000	0.000	0.000	22.000	0.000	9.900	0.000	0.000	14.200
15	0.000	12.200	27.400	0.000	11.700	0.000	1.500	0.000	7.900	7.600	0.000	47.000
16	0.000	0.000	10.900	0.000	5.100	0.000	0.000	0.000	0.000	14.700	0.000	0.000
17	0.000	0.000	0.000	0.000	5.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	0.000	7.900	0.000	0.000	0.000	0.000	5.100	0.000	0.000	0.000	15.500	0.000
19	0.000	39.100	0.000	0.000	0.000	0.000	15.200	0.000	0.000	0.000	0.000	58.200
20	0.000	12.700	0.000	0.000	0.000	0.000	16.100	0.000	0.000	60.000	16.300	31.100
21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	5.300
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	20.100	0.000	0.000	0.000	0.000	0.000	8.600	0.000	0.000	0.000	32.500	10.400
24	0.000	0.000	0.000	32.500	0.000	0.000	0.000	0.000	0.000	0.000	6.400	0.000
25	0.000	0.000	0.000	0.000	57.000	0.000	0.000	0.000	0.000	0.000	15.500	0.000
26	0.000	0.000	0.000	11.400	44.400	0.000	0.000	0.000	8.600	0.000	17.800	0.000
27	5.300	0.000	0.000	0.000	13.200	0.000	0.000	0.000	15.800	0.000	0.000	0.300
28	19.600	0.000	0.000	0.000	0.000	0.000	0.000	7.100	12.700	0.000	4.100	94.000
29	3.600		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.300	26.400
30	4.300		0.000	0.000	3.300	0.000	0.000	0.000	8.100	0.000	5.800	0.000
31	15.700		0.000		0.000		0.000	17.300		0.000		0.000
TOTAL	187.300	313.300	148.100	43.900	295.500	43.000	78.500	49.600	165.900	237.300	207.900	451.499

DAILY RAINFALL (MM) AT BUHI, 1972

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	0.000	0.000	0.000	0.000	30.700	8.400	24.900	0.000	14.700	13.700	41.100
2	17.300	0.000	0.000	0.000	0.000	0.000	10.400	0.000	5.300	19.800	0.000	26.200
3	8.900	2.800	0.000	0.000	0.000	4.000	0.000	0.000	0.000	0.000	0.000	44.200
4	4.100	3.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.800	17.300
5	24.700	3.100	0.000	0.000	0.000	9.400	32.200	2.300	0.000	0.000	36.900	0.030
6	9.600	0.000	0.000	0.000	0.000	0.000	41.000	2.000	0.000	0.000	14.700	0.000
7	60.200	0.000	0.000	0.000	5.300	0.000	0.000	0.000	0.000	0.000	10.700	0.000
8	122.700	0.000	0.000	4.900	9.100	9.700	4.300	2.800	2.800	0.000	0.000	0.000
9	19.300	0.000	0.000	0.000	0.000	0.000	0.000	26.400	4.100	0.000	12.780	0.080
10	11.200	0.000	0.000	0.000	0.000	31.000	0.000	45.000	6.400	0.000	2.500	0.000
11	0.000	0.000	0.000	0.000	12.500	11.700	0.000	57.900	32.500	8.400	5.300	0.000
12	13.000	0.000	0.000	0.000	0.000	12.500	0.000	53.100	51.100	0.000	4.400	5.300
13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	34.000	25.100	0.000	10.700	4.100
14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	21.100	24.900	0.000	12.500	26.200
15	6.400	0.000	0.000	0.000	11.200	15.000	0.000	0.000	7.100	0.000	19.100	8.600
16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.700	0.000	0.000	14.700	0.000
17	0.000	0.000	14.200	0.000	0.000	12.700	0.000	0.000	0.000	0.000	25.100	0.000
18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.300	0.000	17.300	1.300
19	0.000	0.000	0.000	0.000	0.000	0.000	32.000	22.600	10.900	0.000	0.000	0.000
20	0.000	0.000	11.400	0.000	13.700	0.000	12.000	30.500	0.000	7.400	3.400	0.000
21	0.000	0.000	6.400	0.000	0.000	14.700	0.000	31.000	0.000	30.500	19.000	0.000
22	7.100	0.000	5.100	0.000	0.400	0.000	0.000	20.000	0.000	0.000	7.300	12.200
23	0.000	21.600	7.600	0.000	0.000	0.000	0.000	0.000	31.500	8.400	0.000	0.000
24	3.100	0.000	0.000	0.000	0.000	173.000	0.000	0.000	0.000	8.000	0.000	0.000
25	0.000	7.000	0.000	14.700	50.000	0.000	0.000	0.000	0.000	3.100	0.000	8.400
26	0.000	0.000	0.000	0.000	12.200	0.000	10.600	0.000	0.000	24.500	13.700	24.900
27	7.700	0.000	0.000	0.000	37.000	0.000	11.000	0.000	0.000	20.400	21.100	0.000
28	0.400	0.000	5.100	9.000	0.000	73.000	3.000	44.600	0.000	0.000	20.000	0.000
29	0.000		7.600	0.100	0.000	0.000	0.000	20.400	0.000	0.600	41.400	0.000
30	39.700		0.000	0.000	4.600	0.000	0.000	5.400	0.000	8.700	24.000	1.000
31	1.300		1.300		15.000		17.000	12.700		0.000		0.000
TOTAL	405.429	33.100	54.900	31.900	273.000	350.000	197.000	404.300	204.000	154.100	350.300	221.010

. . . . . NOTE . . . . . IN SYMBOLS * INDICATE MISSING DATA

DAILY RAINFALL (MM) AT BUHI, 1973

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1.800	11.200	0.000	0.000	0.000	0.000	0.000	0.000	15.000	25.900	10.200	0.000
2	0.000	24.400	0.000	0.000	2.000	4.800	0.000	3.100	0.000	10.500	0.000	44.300
3	0.000	0.000	0.000	0.000	0.000	3.100	0.000	8.400	10.400	0.000	0.000	5.300
4	0.000	0.000	0.000	0.000	0.000	22.400	4.500	14.000	0.000	5.300	9.100	0.000
5	1.000	0.000	0.000	0.000	9.100	11.500	2.000	5.300	0.000	13.200	14.200	0.000
6	1.300	0.000	3.100	0.000	0.000	5.600	9.400	0.000	0.000	177.300	1.500	17.500
7	0.000	0.000	0.000	0.000	0.000	5.100	0.000	0.050	9.400	51.600	15.500	5.100
8	0.000	0.000	0.000	0.700	0.000	0.000	0.000	13.300	0.000	0.000	0.000	10.400
9	19.600	0.000	10.600	0.000	0.000	0.000	11.700	0.000	0.000	0.000	0.000	19.600
10	0.000	0.600	0.000	0.000	0.000	0.000	21.100	0.000	39.100	0.000	0.000	34.100
11	0.600	5.300	0.000	2.000	5.300	0.000	40.400	0.000	9.900	0.000	17.300	9.100
12	9.100	0.000	0.000	0.000	11.200	0.000	0.000	25.900	29.000	0.000	2.000	32.000
13	12.500	0.000	0.000	16.600	0.000	4.300	4.600	12.700	0.000	34.600	24.900	29.500
14	0.000	0.000	0.000	0.000	0.000	1.800	11.700	2.800	11.900	55.900	12.500	19.300
15	0.000	0.000	0.000	5.300	0.000	2.000	4.300	2.000	16.800	151.400	1.000	11.700
16	0.000	0.000	0.000	0.000	36.600	0.000	0.000	3.400	0.000	0.000	0.000	8.400
17	0.000	0.400	0.000	0.000	0.000	0.000	0.000	10.200	77.600	0.000	9.900	52.100
18	0.000	0.000	0.000	0.000	2.300	23.600	0.000	10.400	44.800	0.000	16.800	72.900
19	0.000	0.000	0.000	0.000	0.000	2.300	0.000	8.400	2.000	4.800	138.000	60.000
20	0.000	0.000	0.000	0.000	0.000	5.100	0.000	35.100	8.400	5.900	114.500	14.400
21	0.000	0.000	0.000	0.000	0.000	0.000	17.000	29.000	24.100	0.000	13.200	13.300
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.000	0.000	1.800	0.000	6.300
23	0.000	0.000	4.600	0.000	0.000	9.400	29.500	0.000	4.800	10.400	5.300	41.700
24	0.000	0.000	0.000	0.000	13.000	0.000	36.600	8.900	0.000	16.100	0.000	38.900
25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.300	0.000	28.400
26	3.000	0.000	0.000	0.000	0.000	0.000	0.000	3.100	0.000	6.900	10.200	11.500
27	0.000	0.000	3.800	3.800	0.000	10.700	0.000	4.800	0.000	6.000	0.000	5.800
28	2.800	0.000	4.800	0.000	0.000	15.400	29.700	0.000	6.100	0.000	41.200	7.100
29	0.000		9.100	0.000	8.600	1.600	0.000	4.100	0.000	0.000	14.500	11.200
30	0.000		0.000	0.000	0.000	0.000	3.600	17.000	12.700	2.300	0.000	11.900
31	5.300		0.000		1.800		0.000	7.400		0.000		0.000
TOTAL	56.800	55.900	36.000	27.700	91.900	128.900	226.500	254.430	321.999	583.298	471.800	625.198

DAILY RAINFALL (MM) AT BUHI, 1974

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.000	0.000	5.900	0.000	0.000	0.000	11.200	3.500	0.000	10.900	95.900	0.000
2	3.300	2.500	2.500	0.000	0.000	0.000	9.700	14.000	0.000	5.600	0.000	0.000
3	8.400	3.100	0.000	6.800	0.000	0.000	18.000	10.900	0.000	7.100	2.000	0.000
4	2.300	0.000	3.600	1.500	0.000	2.800	16.000	1.800	0.000	11.500	0.000	0.000
5	4.600	0.000	0.000	0.000	0.000	2.000	14.700	6.800	0.000	28.200	28.200	0.000
6	4.300	0.000	0.000	0.000	0.000	0.000	6.100	15.200	0.000	9.400	70.100	5.000
7	1.800	13.200	0.000	0.000	0.000	26.700	12.300	14.000	0.000	7.400	0.000	11.700
8	0.000	2.100	0.000	2.000	0.000	114.500	0.000	5.100	23.200	6.100	1.500	43.200
9	0.000	2.100	3.100	0.000	0.000	505.800	13.200	12.200	3.800	11.400	26.600	48.000
10	2.500	3.800	0.000	0.000	10.400	9.900	0.000	15.200	9.500	2.800	0.000	2.000
11	0.000	16.500	0.000	3.300	2.500	3.500	15.900	5.300	0.000	8.400	11.900	0.000
12	8.200	7.100	0.000	4.800	0.000	0.000	22.100	3.100	0.000	3.100	54.100	2.500
13	0.000	16.800	0.000	0.000	1.800	18.900	0.000	2.600	0.000	23.600	3.300	7.100
14	4.300	19.600	8.900	0.000	0.000	0.000	0.000	6.600	2.800	11.700	9.100	92.500
15	4.100	14.200	0.000	0.000	4.500	0.000	0.000	12.200	0.000	72.500	10.400	14.900
16	0.000	3.500	0.000	0.000	6.100	10.400	15.000	0.000	9.700	89.900	4.400	4.000
17	0.000	1.600	3.300	0.000	0.000	0.000	0.000	37.900	40.200	0.000	8.100	0.000
18	0.000	0.000	0.000	0.000	2.800	0.000	9.900	7.100	14.800	6.300	10.000	5.400
19	5.300	0.600	1.500	0.000	7.100	0.000	145.000	5.600	7.400	1.300	11.000	0.000
20	0.600	0.000	1.500	0.600	9.100	0.000	13.500	0.000	3.500	1.500	15.500	226.500
21	6.100	0.000	0.000	0.000	0.000	0.000	11.900	0.000	0.000	0.000	15.300	38.600
22	5.100	0.000	0.000	0.000	0.000	10.500	[illegible]	0.000	0.000	0.000	0.100	1.800
23	0.000	0.000	0.000	0.100	0.000	0.000	[illegible]	0.000	1.000	0.000	0.100	0.000
24	0.600	0.000	0.300	0.000	0.000	0.000	[illegible]	0.000	0.000	11.200	2.000	4.300
25	0.000	0.000	0.000	0.000	13.200	0.000	2.500	0.000	0.000	35.100	0.000	1.000
26	0.100	0.000	0.000	0.000	26.200	0.000	0.700	0.000	4.100	0.000	0.100	5.300
27	0.000	1.600	17.200	0.000	4.500	0.000	0.000	0.000	2.300	0.000	102.700	0.000
28	5.100	2.500	0.000	3.300	3.500	0.000	[illegible]	0.000	21.000	0.000	7.000	0.000
29	0.000		0.000	0.000	12.700	13.700	[illegible]	0.000	11.300	0.000	0.100	2.000
30	0.000		0.000	0.000	0.100	11.200	0.000	0.000	[illegible]	16.300	2.100	1.100
31	0.000		0.000		0.000		12.000	0.000		83.300		0.100
TOTAL	65.400	117.400	54.300	21.700	102.000	734.100	357.700	161.100	17[illegible]	465.600	402.600	363.000

. . . . . NOTE . . . . . THE SYMBOLS [illegible] INDICATE MISSING DATA

DAILY RAINFALL (MM) AT BUNI, 1975

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3.000	1.000	0.000	0.000	0.000	37.300	33.500	26.900	19.000	3.500	12.700	0.000
2	35.100	0.000	0.000	0.000	6.100	1.300	0.000	141.900	11.000	6.800	0.100	0.000
3	58.900	3.500	0.000	3.100	1.500	0.000	0.000	7.400	17.300	47.200	5.100	0.000
4	9.700	7.100	0.000	31.700	0.000	0.000	0.000	3.300	24.900	0.000	1.300	0.000
5	4.300	0.000	0.000	27.000	0.000	0.000	0.000	2.800	6.300	8.100	22.600	1.000
6	15.300	0.000	0.000	0.000	3.500	2.000	0.000	32.300	15.500	2.500	18.900	48.500
7	17.600	0.000	0.000	2.000	0.000	0.000	6.100	42.500	9.900	0.000	10.900	2.300
8	2.300	3.100	0.000	0.000	0.000	0.000	0.000	20.100	3.700	0.000	0.000	6.900
9	2.000	2.000	0.000	0.000	0.000	0.000	2.300	4.100	0.000	0.000	4.100	8.700
10	2.500	0.000	0.000	0.000	5.100	0.000	0.000	4.300	8.900	0.000	0.000	4.300
11	9.400	4.800	3.600	0.000	0.000	0.000	29.200	0.000	4.300	0.000	0.000	3.000
12	0.050	0.000	0.000	4.300	0.000	10.700	3.100	0.000	12.200	0.000	0.000	2.800
13	0.000	0.000	0.000	3.500	0.000	26.400	0.000	0.000	24.100	59.200	2.000	3.800
14	1.800	0.000	3.100	6.100	0.000	10.700	0.000	2.500	2.300	5.100	0.000	16.300
15	0.000	0.000	0.000	7.900	1.500	59.400	3.500	0.000	3.300	4.300	2.800	24.900
16	0.000	4.100	0.000	8.800	10.900	8.600	1.500	0.000	16.300	2.300	0.000	4.600
17	0.000	2.500	0.000	1.300	0.000	0.000	3.300	0.000	32.500	1.800	8.900	67.300
18	0.000	0.000	2.500	2.800	0.000	0.000	1.000	0.000	0.000	56.400	9.100	31.700
19	0.000	0.000	0.000	4.300	0.000	1.000	0.000	0.000	8.100	20.600	6.600	83.300
20	0.000	14.000	1.000	1.000	4.300	16.300	0.000	0.000	0.000	11.700	0.000	27.900
21	5.900	22.600	41.500	18.300	8.100	67.600	11.200	3.100	0.000	0.000	0.000	2.800
22	0.000	6.600	0.000	16.500	5.100	11.700	0.000	0.000	7.600	0.000	5.300	0.000
23	4.000	1.500	0.000	37.600	0.000	3.500	7.400	8.400	8.600	0.000	10.600	107.200
24	22.400	0.000	0.000	18.200	0.000	2.000	3.500	8.100	6.300	3.800	4.300	46.500
25	3.800	0.000	1.800	2.500	0.000	1.800	0.000	11.700	10.400	0.000	3.300	22.100
26	0.000	0.000	2.500	0.000	3.500	0.000	2.300	3.100	2.800	0.000	3.800	119.400
27	0.000	3.100	0.000	4.100	2.000	0.000	0.000	0.000	7.500	1.300	2.300	55.600
28	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.100	0.000	4.500
29	0.000		0.000	0.000	0.000	3.500	9.100	0.000	10.200	12.700	0.000	0.050
30	0.000		0.000	0.000	0.000	0.000	0.000	1.000	4.800	0.000	21.100	1.000
31	4.100		0.000		0.000		0.000	12.700		38.500		2.300
TOTAL	201.550	75.900	57.400	201.000	51.600	263.800	119.500	336.809	282.496	322.300	156.200	698.829

DAILY RAINFALL (MM) AT BUNI, 1976

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	20.500	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
2	20.100	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
3	93.600	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
4	0.000	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
5	1.300	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
6	8.600	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
7	15.800	1.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
8	14.000	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
9	15.200	2.500	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
10	0.000	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
11	57.400	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
12	21.000	2.300	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
13	13.700	3.300	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
14	0.000	2.800	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
15	0.000	7.400	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
16	0.000	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
17	2.800	8.400	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
18	0.000	2.600	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
19	0.000	2.600	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
20	0.050	7.900	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
21	1.000	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
22	30.500	33.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
23	36.900	0.500	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
24	0.000	15.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
25	5.100	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
26	0.000	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
27	0.000	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
28	4.300	0.000	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
29	14.800		*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
30	4.100		*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
31	0.000		*******		*******		*******	*******		*******		*******
TOTAL	181.600	83.700	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******

* * * * * NOTE * * * * * THE SYMBOLS * INDICATE MISSING DATA

Table 5. List of gaging stations whose records are used to establish the drainage area and peak discharge relationship

No.	Gaging Station	Drainage Area km^2	Peak Discharge, cms				
			5 year	7 year	10 year	13 year	25 year
1	Agus River, Agus, Polangui, Albay	111	140	154	172	184	212
2	Cabilogan River, Bobongsuran, Ligao, Albay	164	248	271	294	310	352
3	Irraya River, Obaliw, Oas, Albay	217	324	358	393	421	480
4	San Agustin River, San Agustin, Libon, Albay	262	126	131	136	139	148
5	San Francisco River, Bobongsuran, Ligao, Albay	131	146	162	180	192	220
6	Talisay River, Alliang, Ligao, Albay	90	136	155	176	190	224
7	Ugsong River, Binanuanan, Ligao, Albay	11	30	33	37	40	45
8	Aslong River, San Isidro, Libmanan, C.S.	12	93	110	118	129	152
9	Barit River, Sto. Niño, Iriga City, C.S.	142	322	355	390	420	479
10	Bicol River, Ombao, Bula, C.S.	1630	600	655	712	748	854
11	Bicol River, Sto. Domingo, Nabua, C.S.	905	209	228	249	265	300
12	Culacling River, Del Rosario, Lupi, C.S.	64	77	84	92	98	111
13	Pawili River, San Rogue, Bula, C.S.	540	605	655	700	740	825
14	Pulantuna River, Napolidan, Lupi, C.S.	172	388	435	482	520	603
15	Yabo River, San Isidro, Naga City	20	51	56	61	65	74

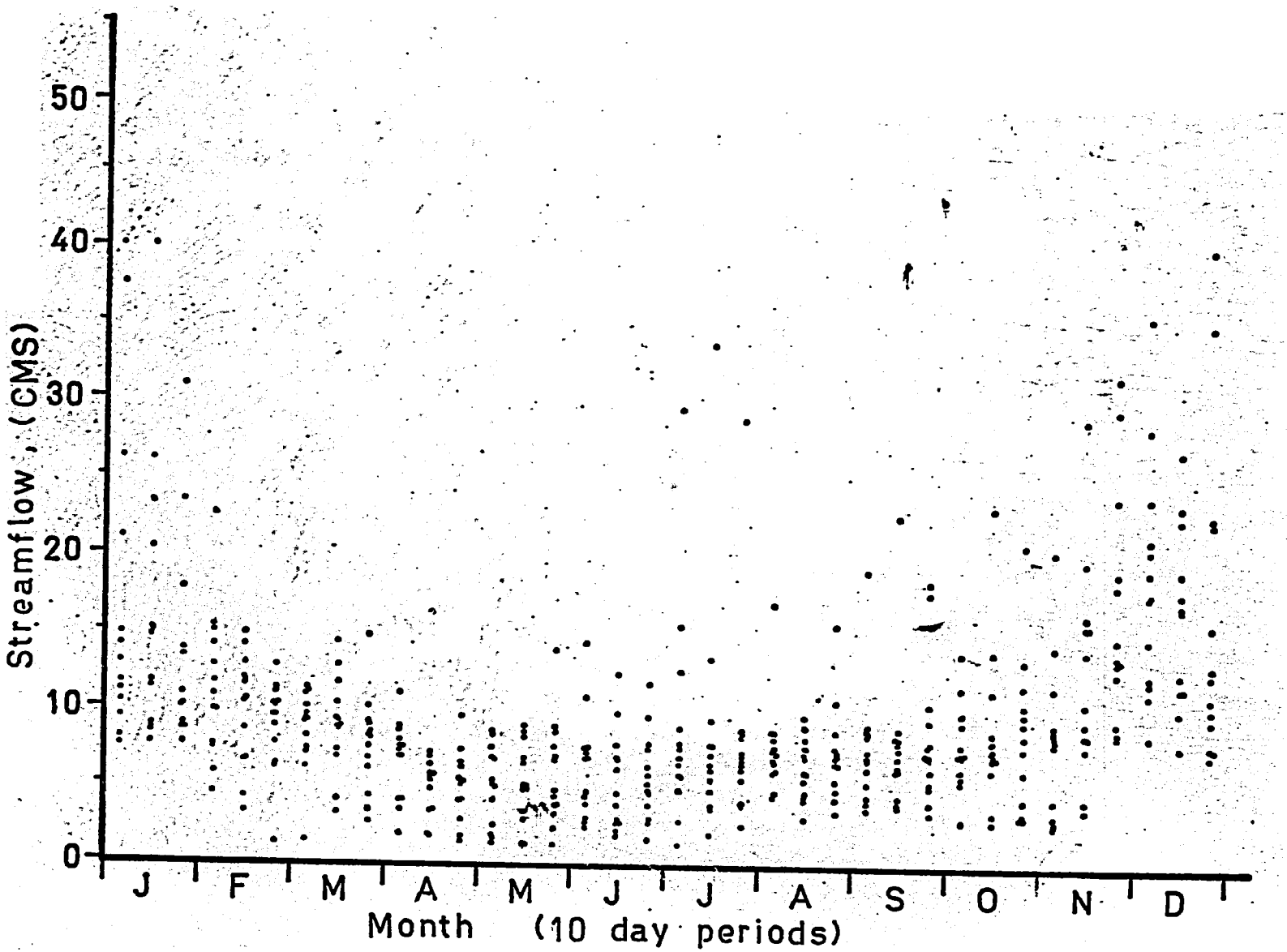


Figure 16. Scattergram, Barit River 10 day minimum streamflow 1954-1966

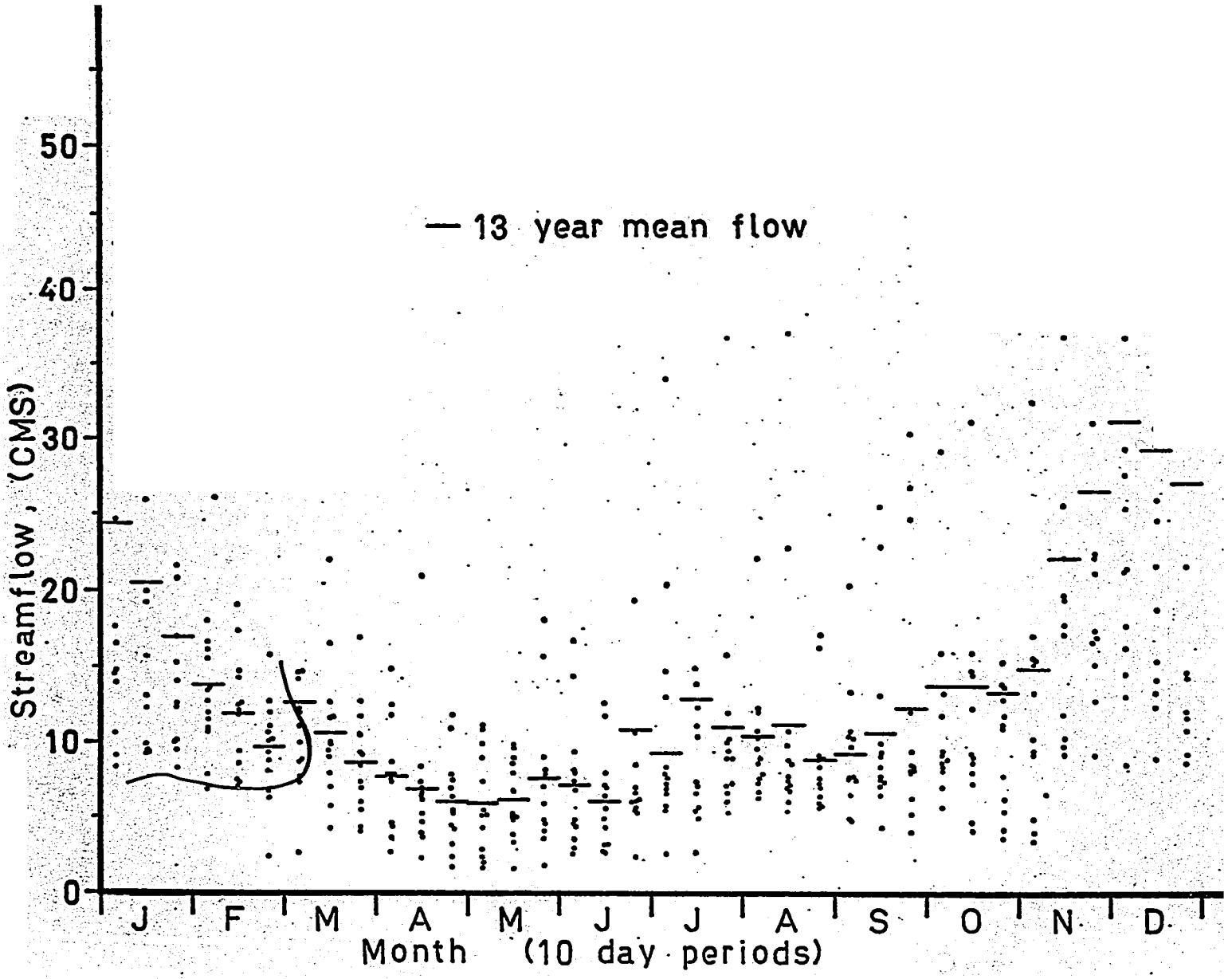


Figure 17. Scattergram, Barit River 10 day mean streamflow 1954-1966

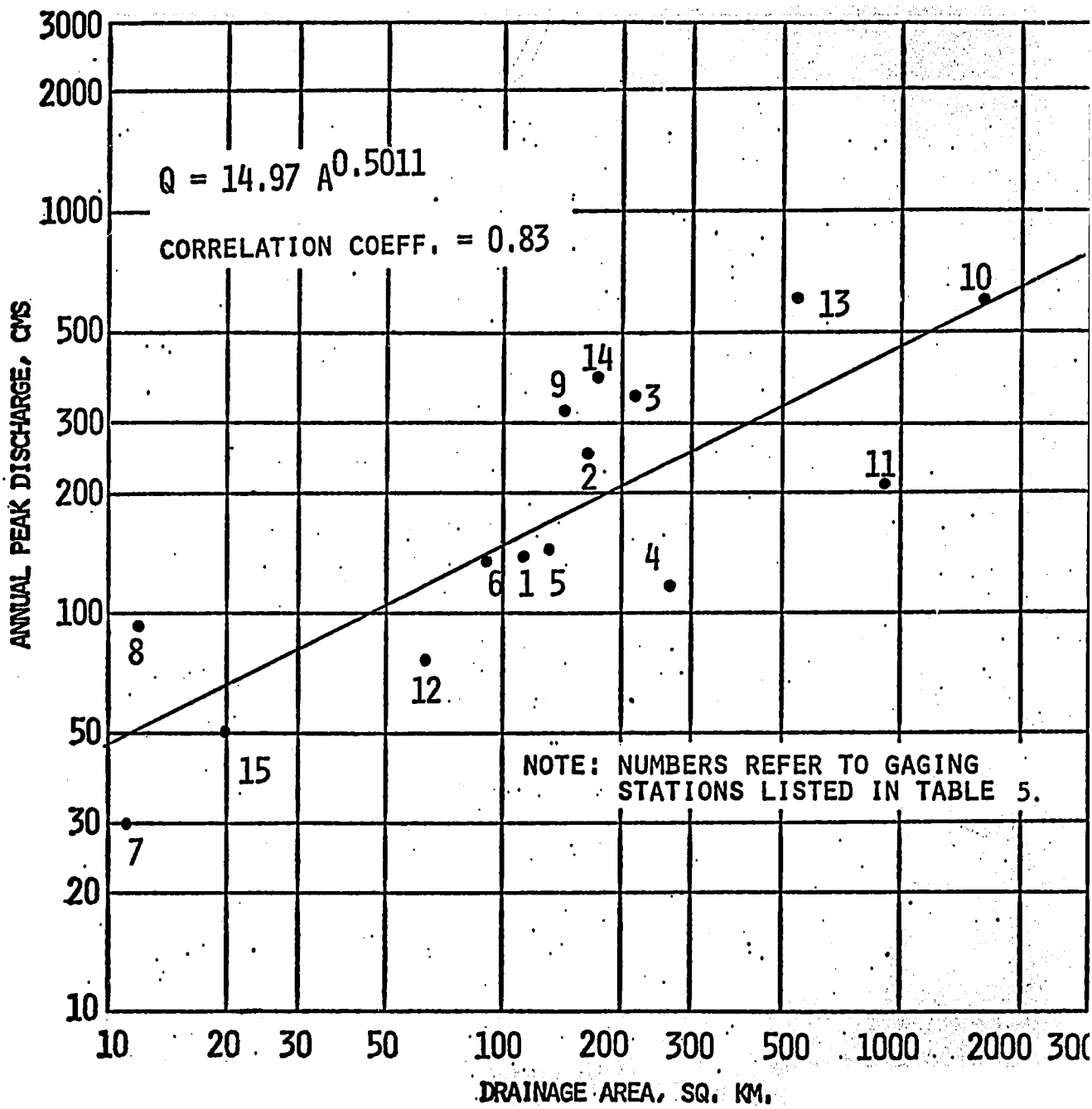


FIG. 18. ANNUAL SERIES PEAK DISCHARGE OF 5-YR RETURN PERIOD AND DRAINAGE AREA RELATIONSHIP, BICOL RIVER BASIN

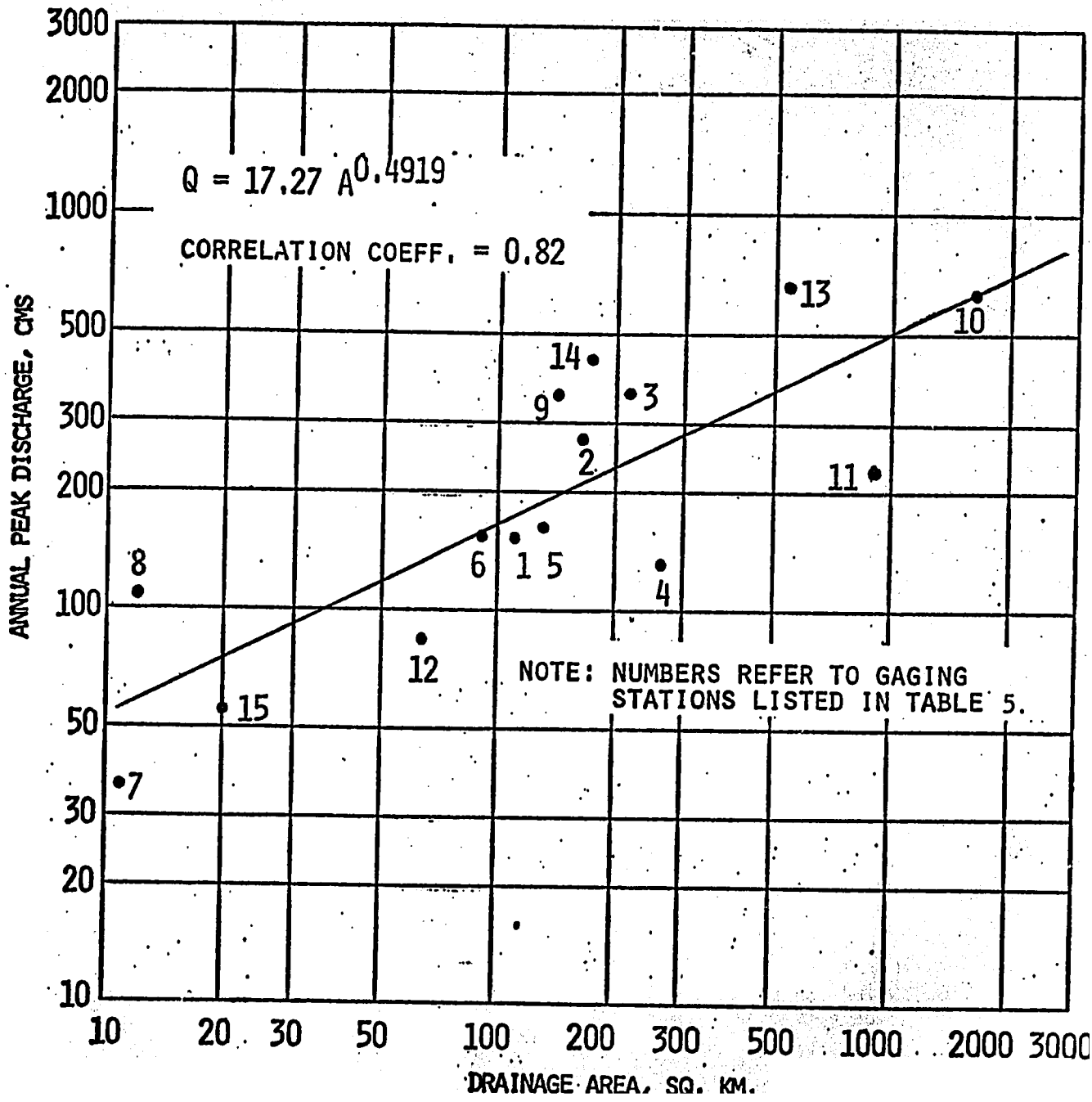


FIG. 19. ANNUAL SERIES PEAK DISCHARGE OF 7-YR RETURN PERIOD AND DRAINAGE AREA RELATIONSHIP, BICOL RIVER BASIN

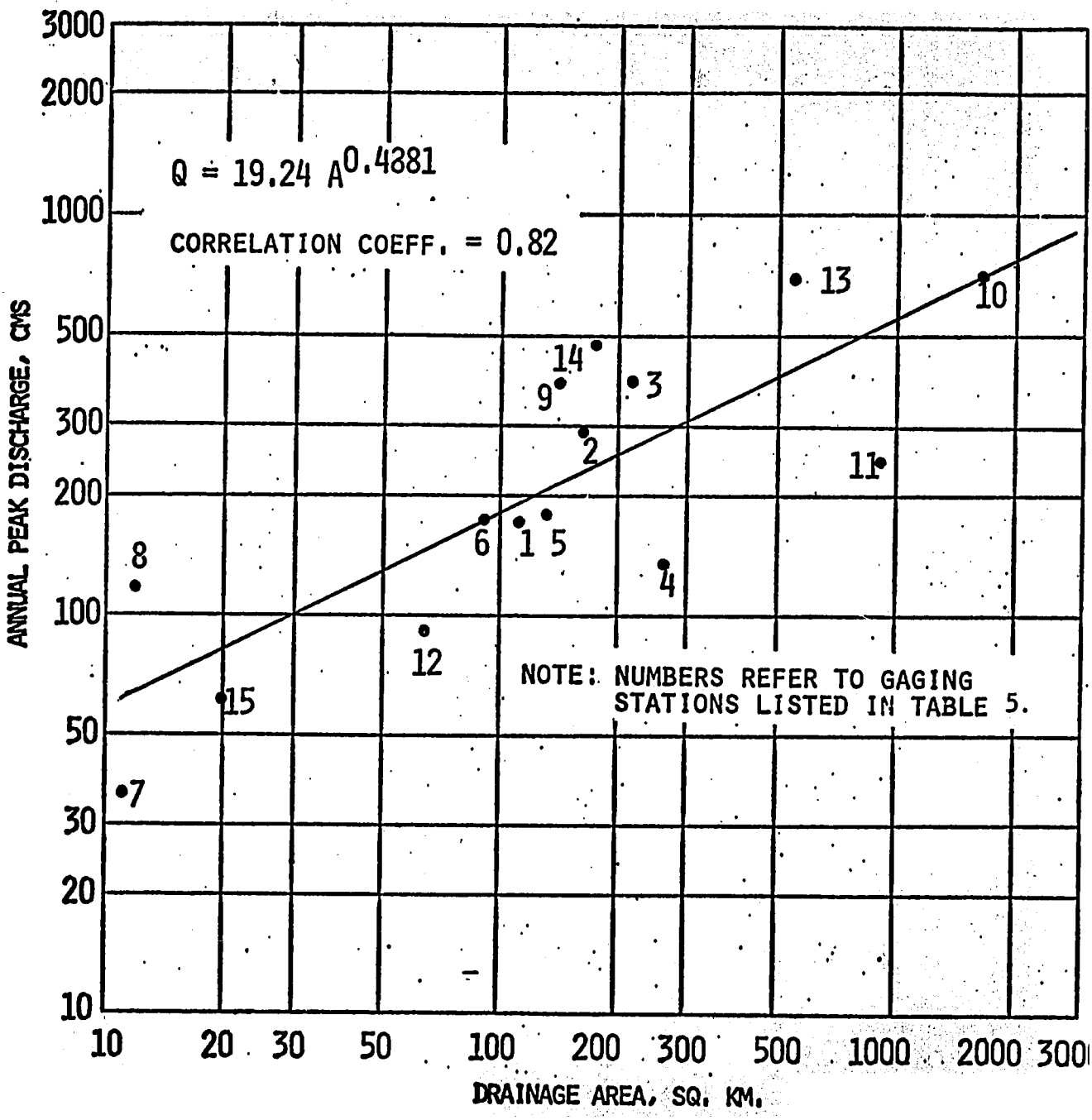


FIG. 20. ANNUAL SERIES PEAK DISCHARGE OF 10-YR RETURN PERIOD AND DRAINAGE AREA RELATIONSHIP, BICOL RIVER BASIN

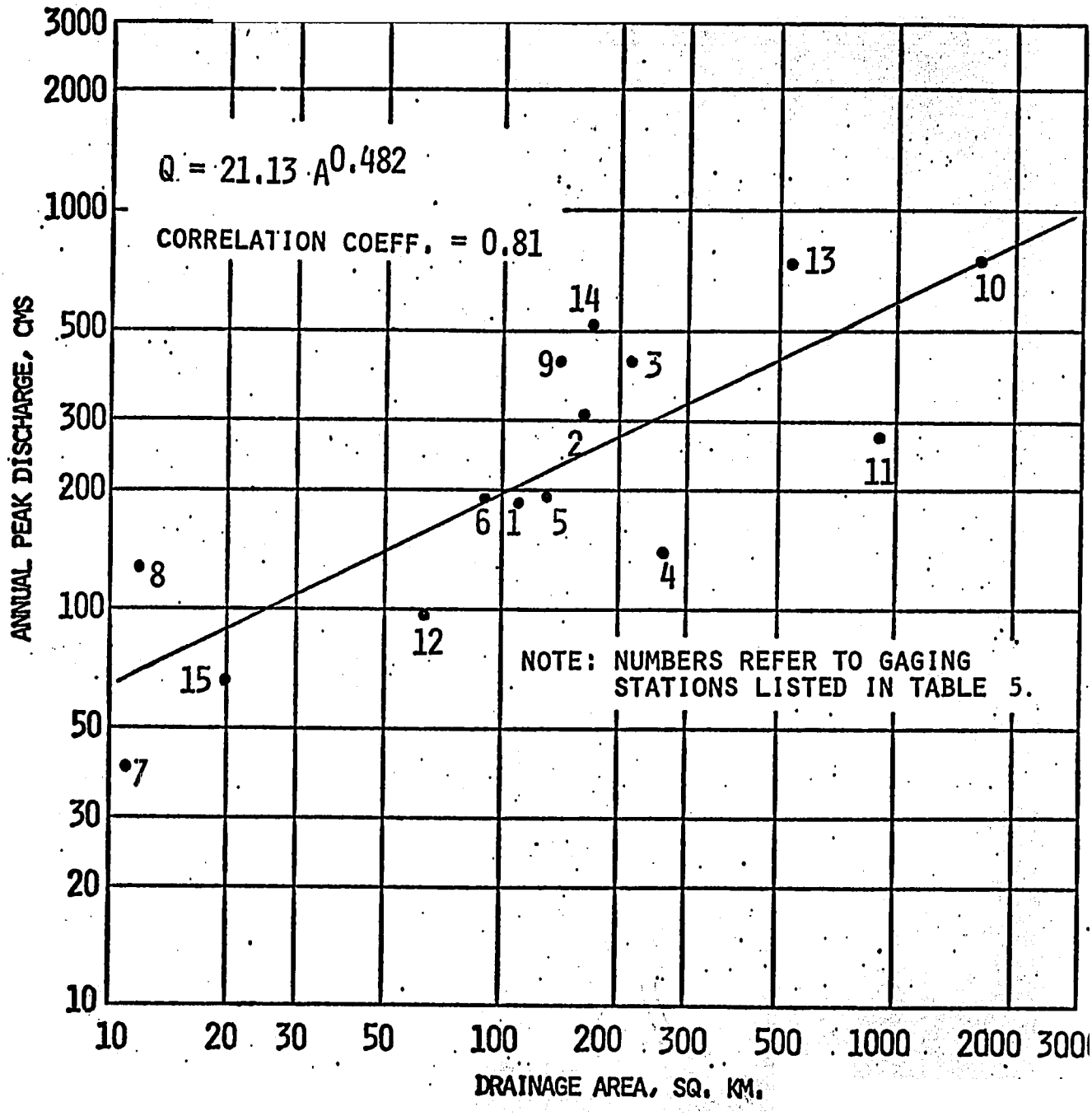


FIG. 21. ANNUAL SERIES PEAK DISCHARGE OF 13-YR RETURN PERIOD AND DRAINAGE AREA RELATIONSHIP, BICOL RIVER BASIN

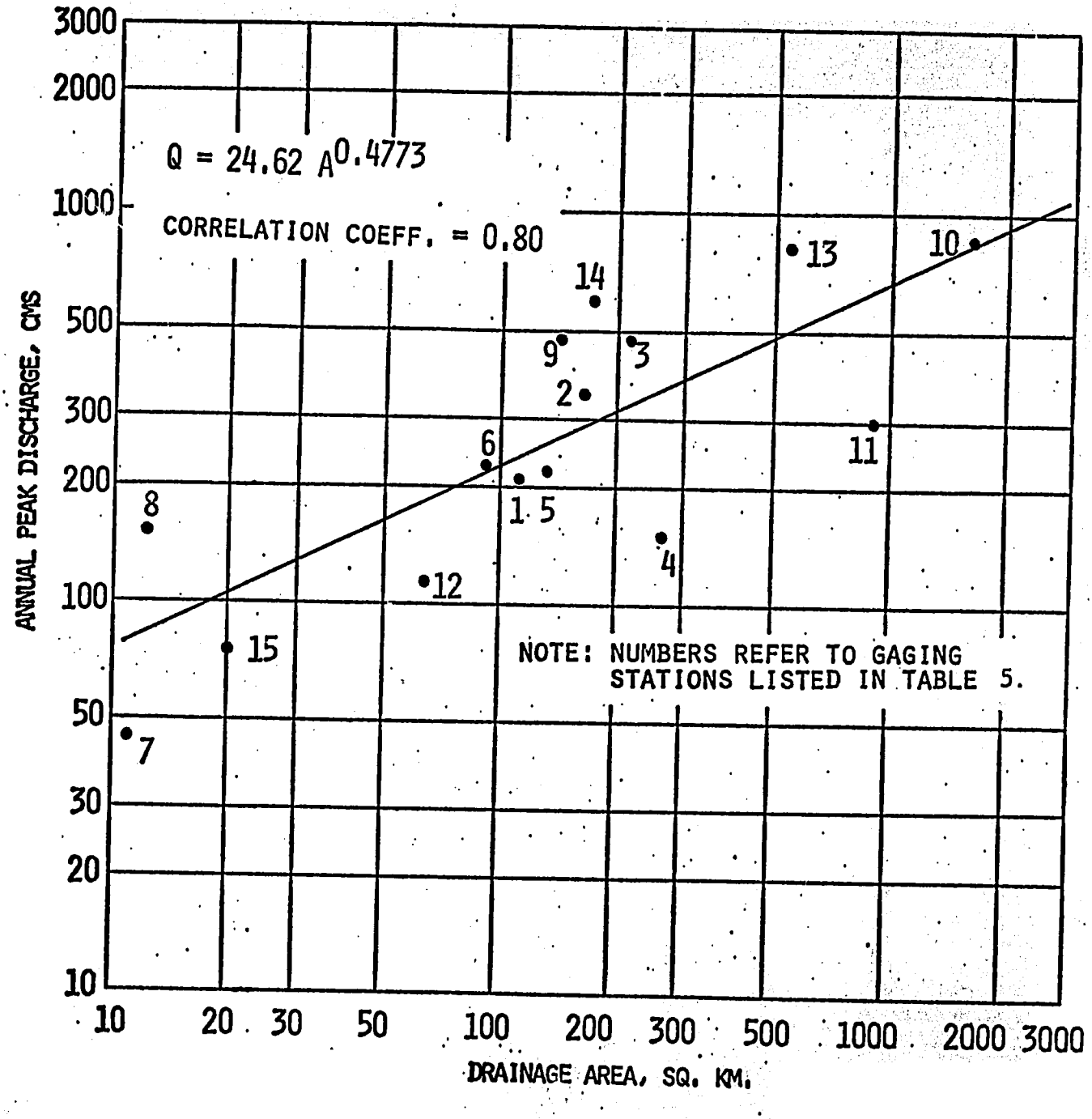


FIG. 22. ANNUAL SERIES PEAK DISCHARGE OF 25-YR RETURN PERIOD AND DRAINAGE AREA RELATIONSHIP, BICOL RIVER BASIN

Table 6. Capacities of the Barit and Waras Rivers.

Station Barit River	Capacity (cms)	Station Waras River	Capacity (cms)
2+540	238	2+000	22
5+360	69	3+000	9
6+710	74	4+000	4
8+410	50	5+000	15
9+160	35	6+000	9
10+420	22		
11+720	28		

Note: There is no existing channel between stations 4+000 and 5+000 of the Waras River.

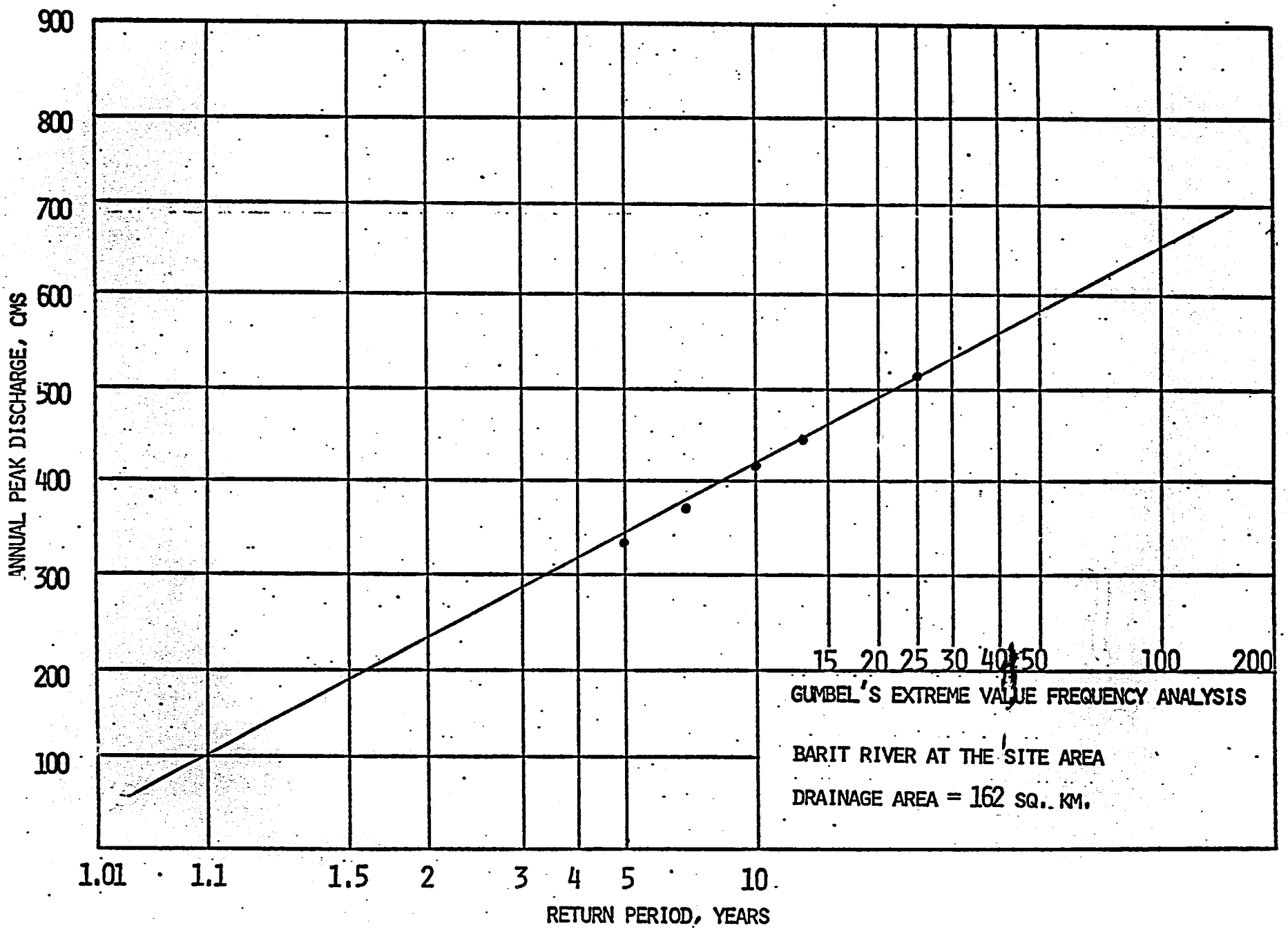
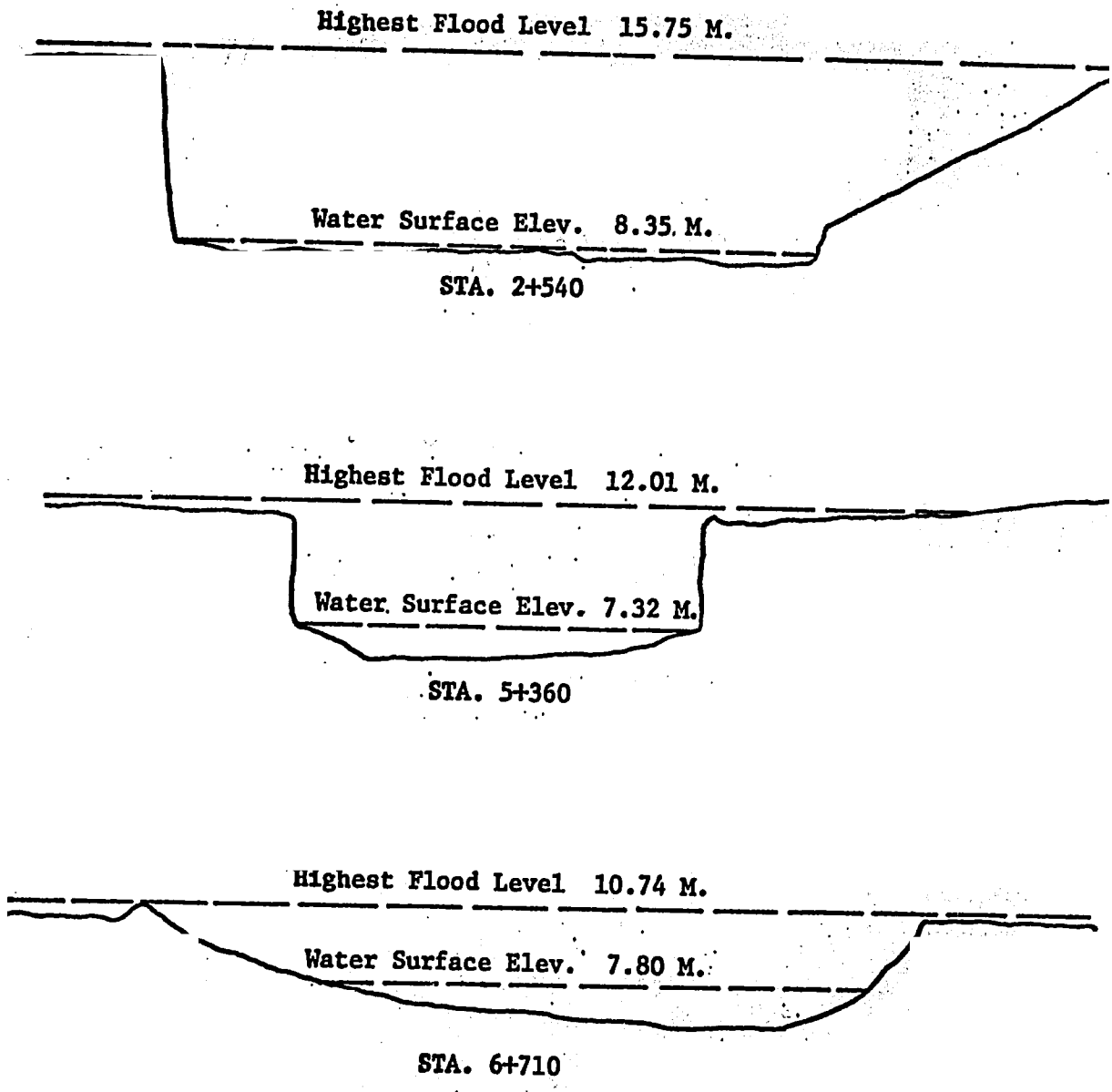


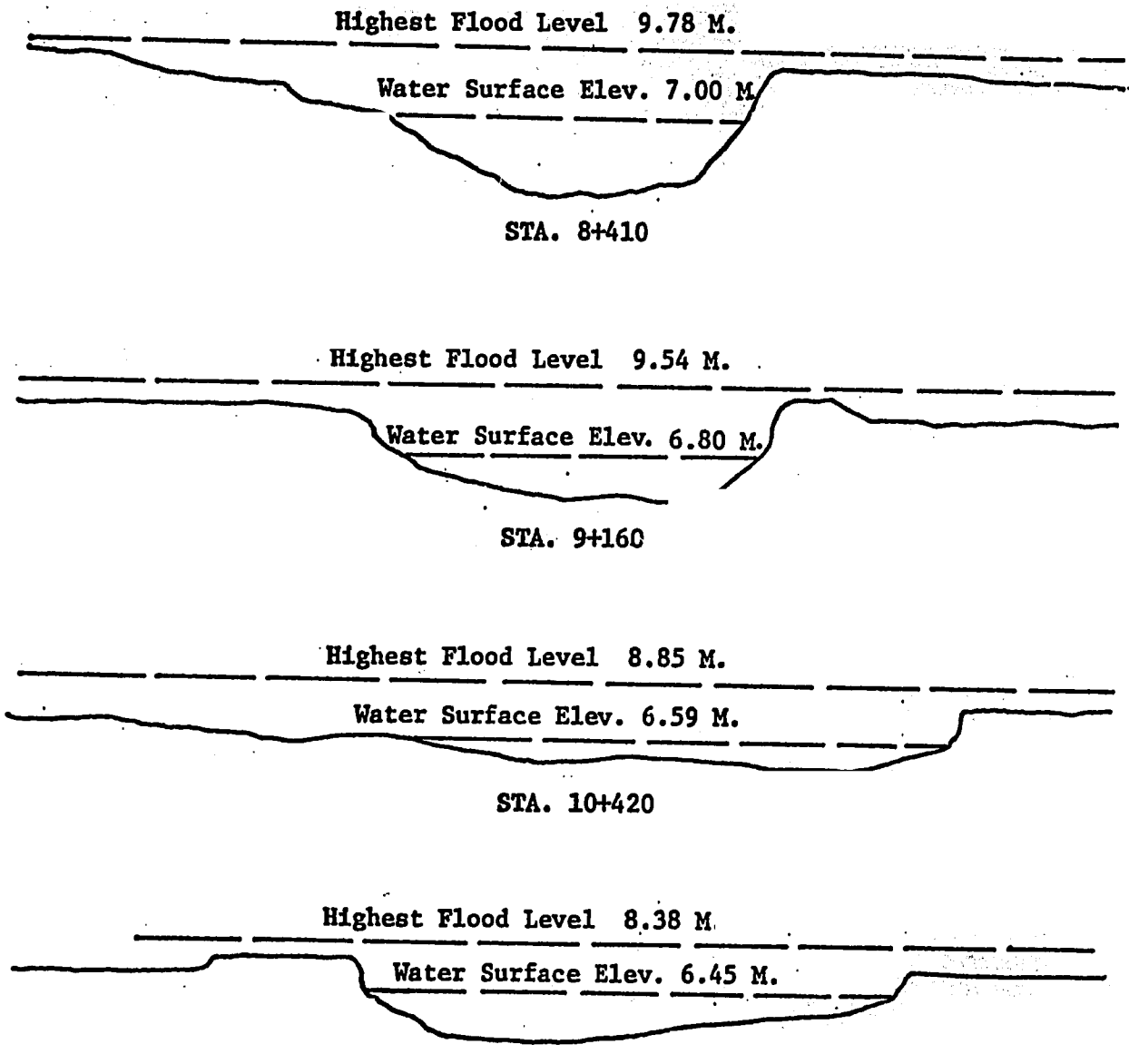
FIG. 23. FREQUENCY ANALYSIS OF ANNUAL PEAK DISCHARGE, BARIT RIVER, NABUA, C.S.



Scale - Hor. 3:800, Vert. 3:800

Note: Date surveyed - Dec. 2-24, 1975. Error in water surface elevation exists in either Sta. 5+360 or Sta. 6+710.

Fig. 24. Cross section of Barit River at various stations.



Scale - Hor. 3:800. Vert. 3:800

Note: Date surveyed - Dec. 2-24, 1975.

Fig. 25. Cross section of Barit River at various stations

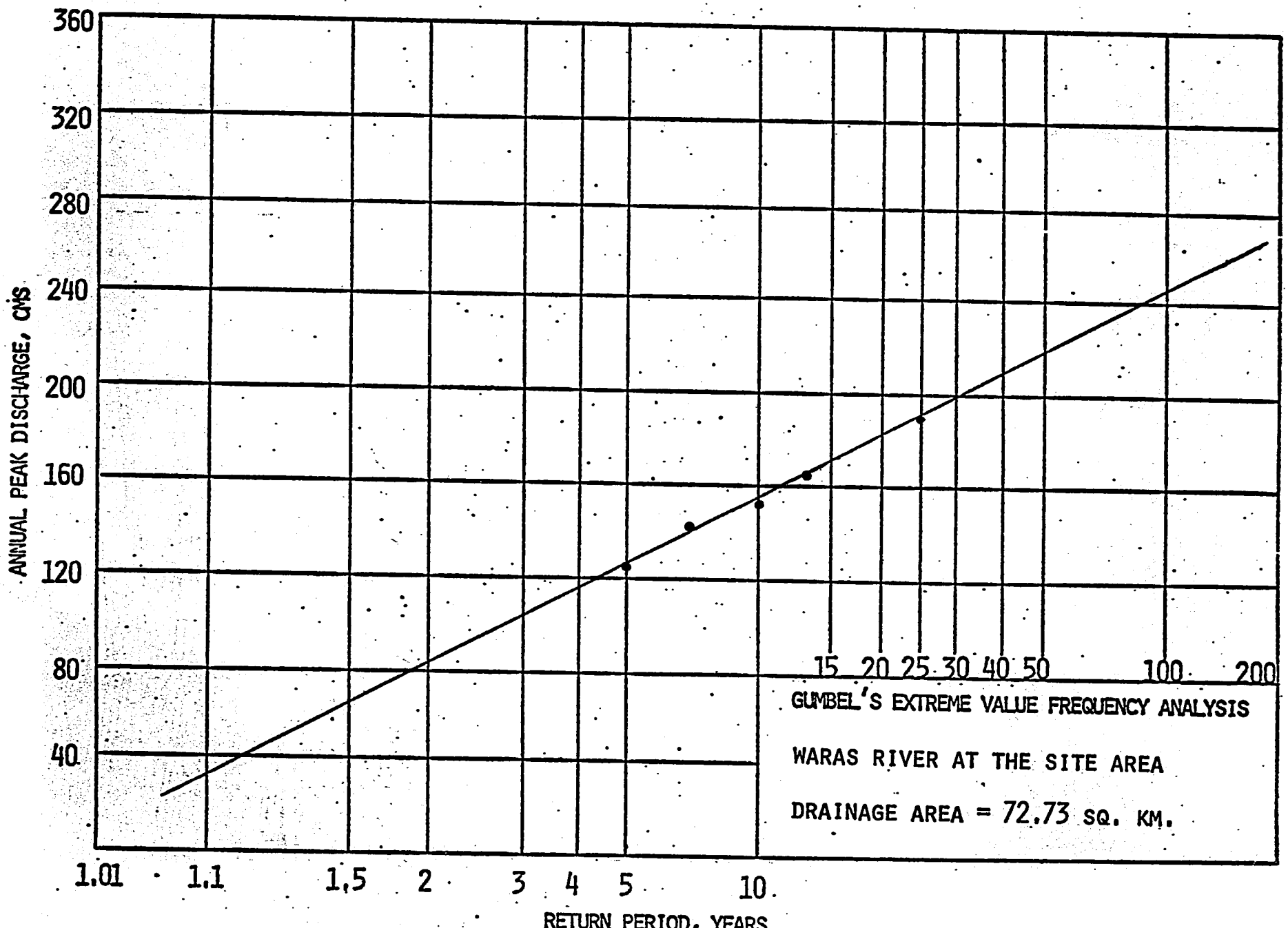
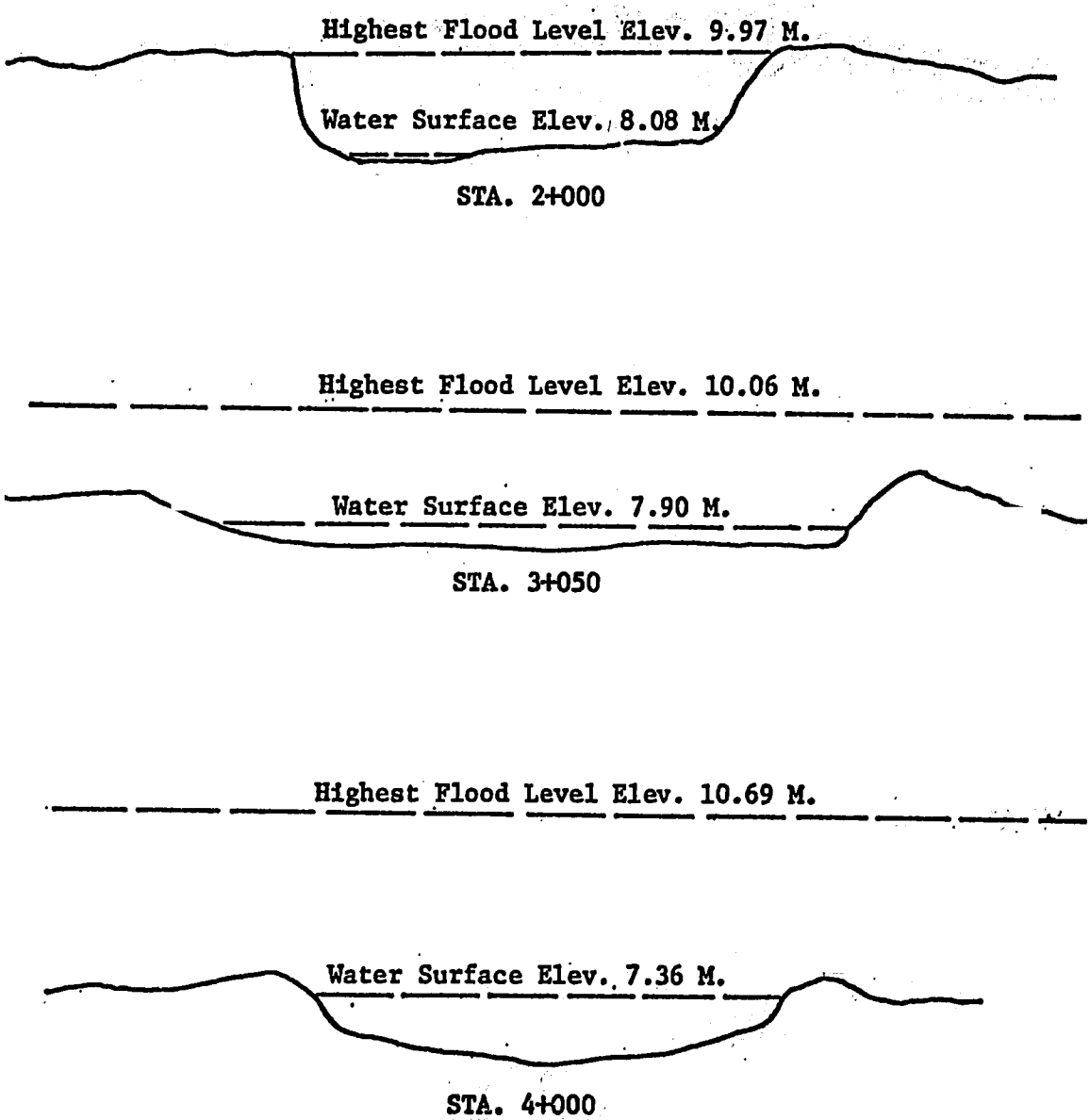
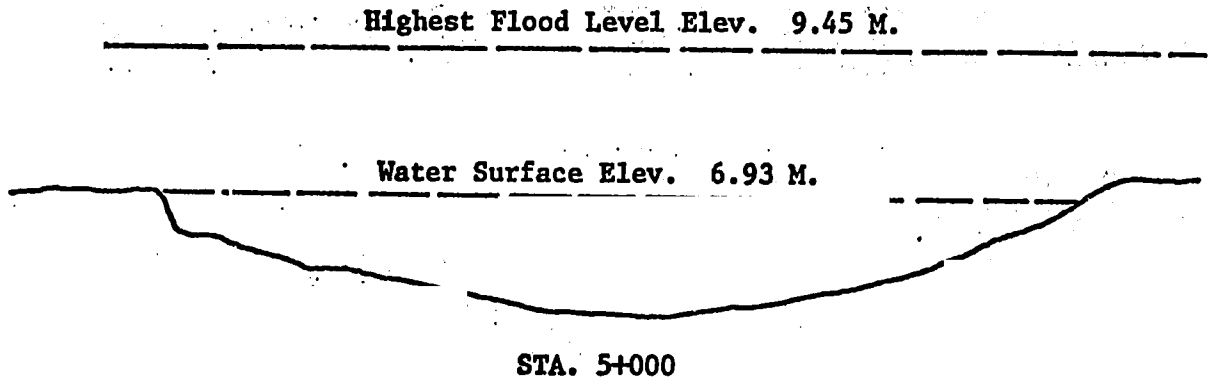


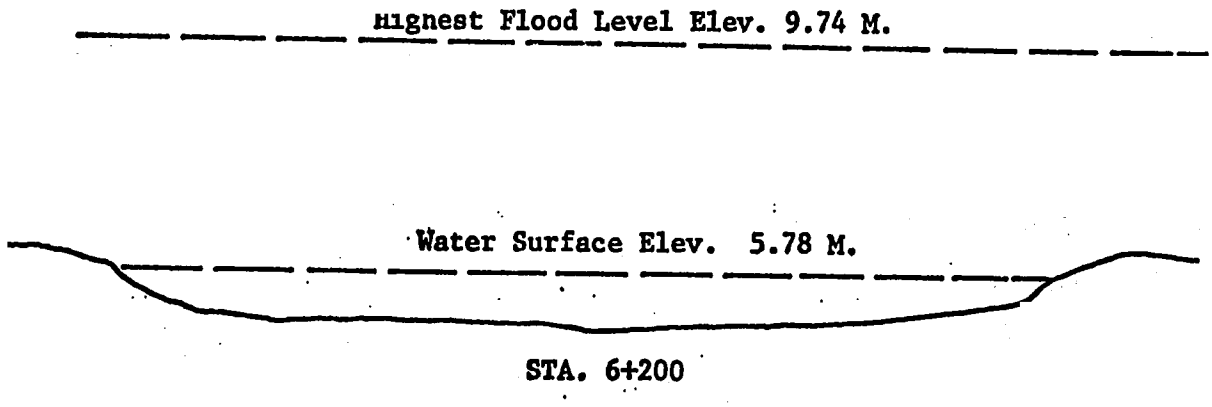
FIG. 26 FREQUENCY ANALYSIS OF ANNUAL PEAK DISCHARGE. WARAS RIVER NABIIA



Scale - Hor. 3;400, Vert. 3:400

Fig. 27. Cross section of Waras River at various stations.





Scale - Hor. 3:400, Vert. 3:400

Fig. 28. Cross section of Waras River at various stations.

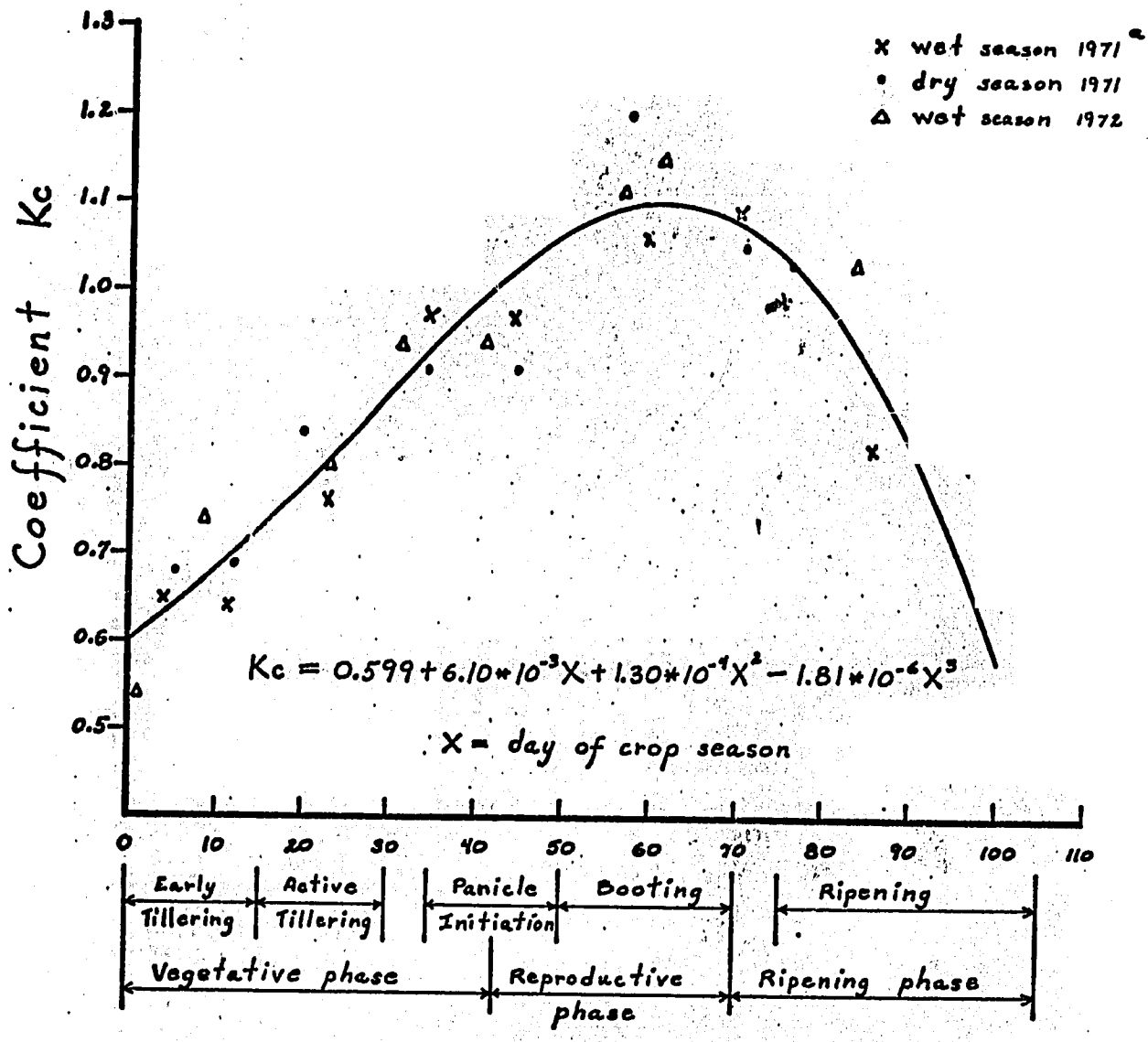


Figure 29. Crop coefficient Kc in different growth stages.

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a. Data from tests conducted at the pilot farm of ARIS by the tank method.

Table 7. Consumptive use calculations.

Modified Blaney-Criddle formula: $U = K*P\frac{(45.7t + 813)}{100}$ = monthly consumptive use, mm

t = mean monthly temperature °C.

P = monthly percentage of annual daytime hours.

u = daily consumptive use, mm
= U/(Number of days in that month)

$K = k_c k_t$

$k_t = 0.0311t + 0.24$

k_c = crop coefficient, figure 7.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
P	8.00	7.40	8.43	8.42	8.92	8.75	8.98	8.79	8.27	8.28	7.81	7.95
t	24.67	24.77	25.50	27.10	28.23	27.97	27.17	27.20	26.93	26.57	26.07	25.13
k_t	1.01	1.01	1.03	1.08	1.12	1.11	1.08	1.09	1.08	1.07	1.05	1.02
k_c	0.72	1.03	1.09	0.33	0.72	1.03	1.09	0.33	0.72	1.03	1.09	0.33
K	0.73	1.04	1.12	0.36	0.81	1.14	1.18	0.36	0.78	1.10	1.14	0.34
U	113.32	149.69	186.79	62.18	151.95	208.60	217.72	65.06	131.83	184.64	178.46	53.02
u	3.66	5.35	6.03	2.07	4.90	6.95	7.02	2.10	4.39	5.96	5.95	1.71

Lateral A-5

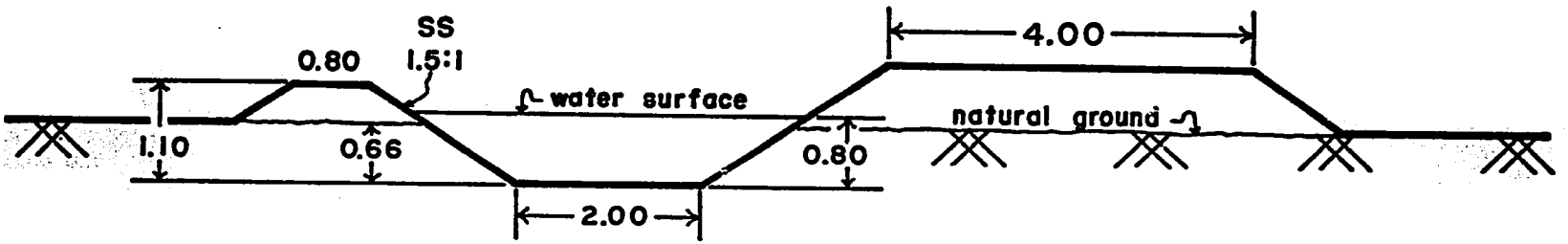


Figure 30. Typical main and lateral canal cross section with roadway

Farm Ditch M1F2

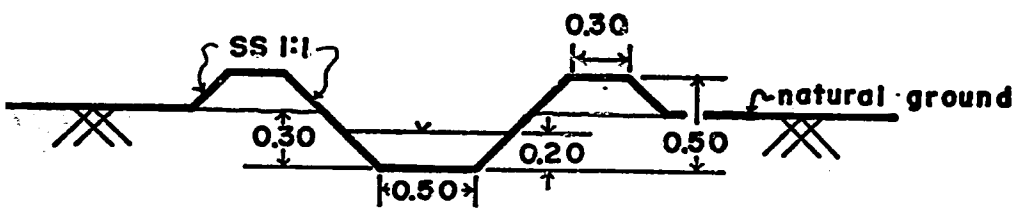


Figure 31. Typical farm ditch cross section

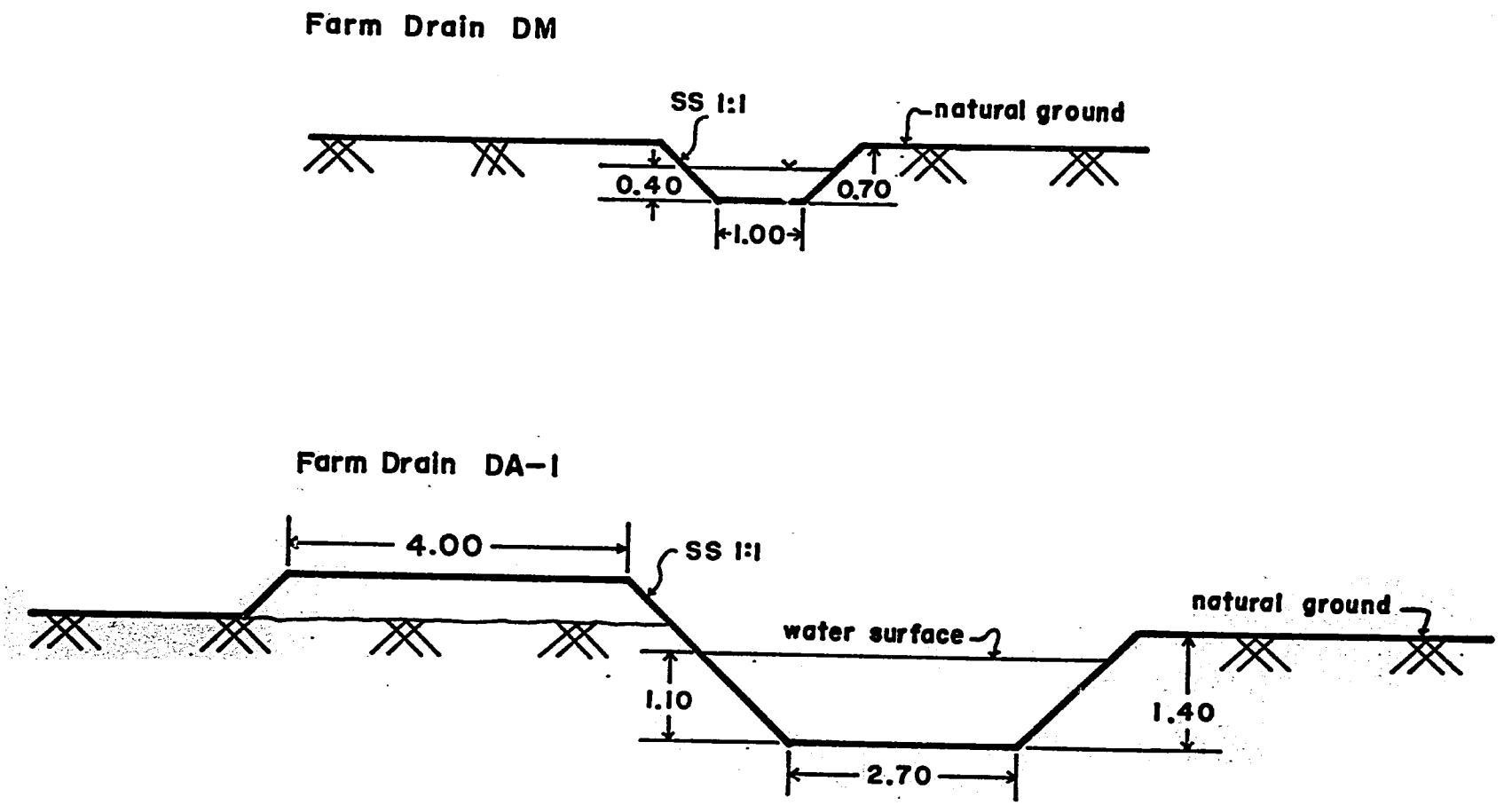
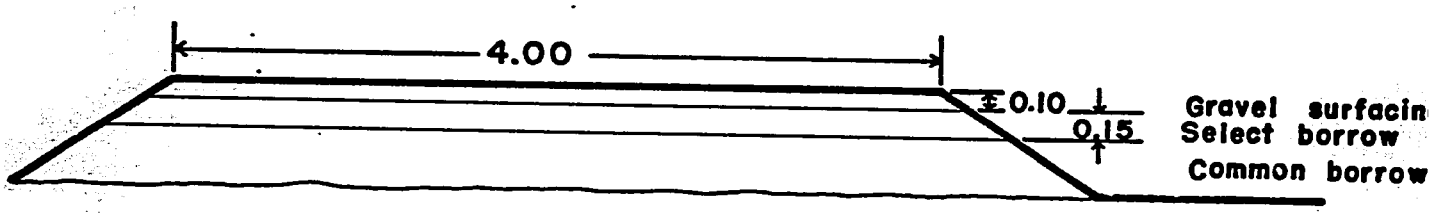
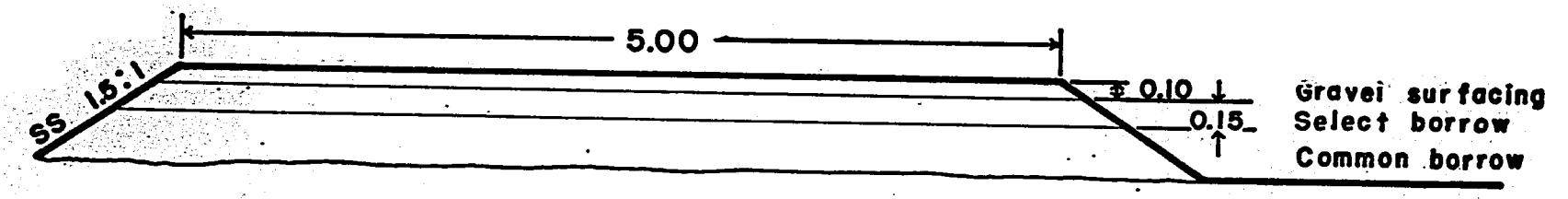


Figure 32. Typical farm drainage ditch cross sections and roadway



Cross section of a 4.00 meter roadway



Cross section of a 5.00 meter roadway

Figure 33. Typical roadway cross sections

Description of Soils:

BAAO SERIES (Bo)

The Baao Series is a member of the clayey family. These soils have very dark gray (Chroma 1 or less), light clay or clay loam Ag horizons extending to a depth of 50 to 100 cm. The Bg horizon is a transitional, very weakly developed layer of gray, very dark gray clay and silty clay loam mixed with partly decayed plant matter. Cg horizon is a stratified layer of gray, greenish gray or bluish gray silt loam, very fine sandy loam, and sandy clay loam mixed with few to common partly decayed plant tissues. Baao soils occur on slightly elevated backswamp landscapes.

Typifying Pedon: Baao clay loam - cultivated paddy rice (Field description BRB Land Classification Project; Rinconada Profile No. FL9 - 310 - P-5).

Profile Description:

Horizon	Depth (cm.)	Description
A11pg	0 - 13	Dark gray (10YR 4/1) moist, clay loam; few medium prominent yellowish red mottles; medium moderate breaking to subangular blocky; sticky, plastic, few fine interstitial and frequent open pores; few small fragments; abundant fine roots; clear wavy boundary; pH 6.5.
A12g	13 - 36	Very dark gray (5Y 3/1) moist, clay loam; weak subangular blocky; sticky, plastic; common fine random continuous and discontinuous open tubular pores; few fine roots; clear smooth boundary; pH 6.0.
IIC1g	36 - 41	Dark olive gray (5Y 3/2) moist, loamy sand; single grain; non-sticky, non-plastic; many fine random interstitial open pores; few fine decaying plant debris; clear wavy boundary; pH 6.0.
B	41 - 80	Dark grayish brown (10YR 4/2) wet, silt loam; very weak fine subangular blocky; slightly sticky, non-plastic; fine and medium decaying root channels; common partly decaying plant materials; clear smooth boundary; pH 7.0.
IIC2g	80 - 86	Very dark gray (5YR 3/1) wet; loamy fine sand; structureless; single grain; non-sticky, non-plastic; few fine interstitial pores; few decaying plant residues; clear smooth boundary; pH 6.5.
IIC3g	86 - 91	Gray (5Y 5/1) wet, loamy coarse sand; single grain; non-sticky, non-plastic, loose; few decomposed plant residues; abrupt smooth boundary; pH 7.0.

Abg	91 - 150	Dark brown (7.5YR 3/2) wet, silt loam; very weak granular to structureless; slightly sticky, non-plastic, few very fine pores; many partly decomposed organic materials and plant roots; pH 6.5.
Bb	150 - 250	Grayish brown (10YR 4/2) wet, silty clay loam; few fine and medium distinct clear very dark gray (5YR 3/1) mottles; sticky, plastic; pH 7.0.
C4g	250 - 300	Dark gray (5Y 4/1) wet; sandy loam; slightly sticky, non-plastic; pH 7.0.

Range in Characteristics: Solum thickness varies from 100 to 150 cms.

Ag horizons with moist chroma of 1 or less, values of 3 to 4 and hues from 10YR to 5Y are very dark gray, dark gray and occasionally very dark grayish brown or dark grayish brown clay, clay loam, silty clay loam. Few soft and hard fine volcanic ash fragments are usually present in the lower A horizons.

B horizons with chroma 2 or less, values 4 to 6 and hues from 10YR to 2.5Y are dark gray, gray, light gray to gray or grayish brown silty clay loam, clay loam or clay with few partly decayed plant tissues and occasionally with thin stratification of lighter textures. B horizons extend from 100 to 150 cm.

C horizons are greenish gray, dark gray, olive gray, stratified silt loam, sandy clay loam, sandy loam, fine sandy loam and loamy fine sand with mixture of partially decomposed plant tissues.

Abg horizons, which may occur below 100 to 150 cms, are dark gray, very dark gray clay loam or silty clay loam.

Setting: The Baao soils occur on the slightly elevated backswamp landscape along Baao Lake in Camarines Sur. Alluvium from the higher landscapes and reworked volcanic ejecta which buried former vegetations and obliterated the lake provided the material on which the Baao soils were formed. Areas along the lake's periphery are subject to severe flooding during the rainy seasons but, are planted to paddy rice after the recession of the lake water during the dry season. Slopes range from 0 to 1 percent.

Principal Associated Soils: These are the Maahas and San Vicente series on medium alluvial terraces.

Use and Vegetation: Most of the area is grown to paddy rice. The uncultivated portion, mainly adjacent to the lake, is covered with water-tolerant reeds and sedges.

Drainage and Permeability: Poorly drained. Internal infiltration is slow to moderately slow.

Soil Series Established: Baao Municipality, Camarines Sur, 1975.

Remarks: These soils were included in areas mapped as Pili-Macolod Complex in the Reconnaissance Soil Surveys. Buried horizons may not be present in some areas.

SAN VICENTE SERIES (Vi)

The San Vicente series is a member of the clayey family. These soils have dark grayish brown clay loam and silty clay loam. A horizons 20 to 50 cm thick. IIC is on slightly hard layer of brown and dark brown sandy clay and sandy clay loam with few to common volcanic mineral fragments, and few Mn concretions. San Vicente soils occur on low alluvial fan terrace landscapes.

Typifying pedon: San Vicente, clay loam-cultivated paddy rice (Field description BRBC Land Classification Project; Profile No. FL9 - 312 - P - 1 (Rinconada).

Profile Description:

Horizon	Depth (cm.)	Description
A11p	0 - 15	Dark grayish brown (10YR 4/2) moist, clay loam; few fine distinct clear yellowish red (5YR 4/6) mottles; moderately weak angular breaking to granular structure; slightly sticky, slightly plastic, slightly friable; few fine discontinuous and continuous exped and inped random tubular open pores; many fine and medium roots; clear diffuse boundary; pH 6.5.
A12	15 - 39	Very dark gray (10YR 3/1) moist, clay loam; few fine distinct clear very dark grayish brown (10YR 3/2) mottles; moderately weak subangular breaking to granular structure; slightly sticky, non-plastic, friable; few fine discontinuous exped random tubular simple open pores; few small mineral rock fragments; few fine roots; clear smooth boundary; pH 7.0.
IIC1	39 - 69	Brown to dark brown (10YR 4/3) moist, sandy loam; few fine distinct clear yellowish brown (10YR 5/6) few fine and very dark gray (10YR 3/1) mottles; moderately strong massive breaking to angular blocky structure; non-sticky, non-plastic, friable; few fine discontinuous exped random tubular simple open pores; few small soft black Mn concretion; clear wavy boundary; pH 6.5.
IIC2	69 - 84	Dark yellowish brown (10YR 3/4) moist, coarse sand and no mottles; single grain like structure; non-sticky, non-plastic; present of partially weathered rock fragment; clear wavy boundary; pH 6.5.
IIC3	84 - 142	Dark yellowish brown (10YR 4/4) wet, heavy silt loam; few fine distinct clear reddish brown (5YR 4/4) mottles; moderately weak granular structure; slightly sticky, non-plastic, wet, friable; moist, few faint to medium discontinuous and continuous exped and inped random tubular simple open pores; clear wavy boundary; pH 5.0.

IIC4	142 - 150	Very dark grayish brown (10YR 3/2) moist, fine sand; few fine distinct clear yellowish brown (10YR 5/4) mottles; non-sticky, non-plastic, very friable; single grain structure; no pores; pH 6.0.

USBR Land Classification: $\frac{1R}{Pr11AZ}$

Range in Characteristics: Solum thickness varies from 30-50 cm

A horizon with moist, chroma of 1 to 2, values 3-4 and hues of 7.5YR to 10YR are very dark grayish brown, dark grayish brown, grayish brown, dark gray and very dark gray clay, silty clay, clay loam and silty clay loam. Structure is subangular to granular; friable.

Upper IIC horizon are brown to dark brown, brown, dark grayish brown, grayish brown sandy clay loam, loam and clay loam with few to common small volcanic fragments, slightly compact breaking to granular. Lower IIC horizon is stratified brown, dark brown and yellowish brown sandy loam, silt loam, loamy fine sand and fine sand, with partially weathered volcanic fragments.

Setting: The San Vicente series occurs on the low alluvial fan terrace landscapes between the broad plain near Baao Lake and foot of Mt. Iriga in Camarines Sur. The area is influenced by volcanic ash deposits.

Principal Associated Soils: San Vicente soils are associated with the lower lying Baao series on the broad slightly elevated backswamp landscape.

Use and Vegetation: The soils adjacent to the elevated backswamp are devoted to paddy rice farming. Other areas are covered with coconut trees with a small portion intercropped with other crops.

Remarks: These soils were included in areas mapped as Pili-Macolod Complex in the reconnaissance soil surveys.

IRIGA SERIES (Ir)

The Iriga series is a member of the clayey family. These soils have very dark gray, silty clay loam or clay mixed with amorphous deposits. A horizons extending to a depth of 50 - 70 cm. B horizons are dark brown to dark reddish brown clay or silty clay extending to a depth of 200 cms. Few small soft and hard tuffaceous fragments may occur in the lower B horizons. C horizons are yellowish brown, dark brown or grayish brown, silty clay loam and clay loam with few to common fragments of probably volcanic materials. Iriga soils occur on moderately to highly dissected fan terrace landscapes.

Typifying pedon: Iriga silty clay; coconut plantation (Field Description BS-BRBC Land Classification Project; Profile No. FLIO-640 - P - 1 (Rinconada).

Profile Description:

Horizon	Depth (cm.)	Description
A11	0 - 20	Black (10YR 8/1) moist, silty clay; few fine faint diffused dark yellowish brown (10YR 4/4) mottles; sticky, plastic, firm; moderately weak fine to medium angular to subangular blocky structure; very few fine discontinuous and continuous random tubular simple open pores; clear smooth boundary; many fine and medium roots.
A12	20 - 55	Black (2.5Y N2/) moist, clay; few fine faint diffused very dark grayish brown (10YR 3/2) mottles; sticky, plastic, firm; weak to moderate fine and medium angular to subangular blocky structure; common fine to medium continuous and discontinuous random tubular simple open pores; few fine roots; clear smooth boundary.
B21	55 - 78	Grayish brown (10YR 5/2) moist, silty clay; common fine and medium prominent clear yellowish brown (10YR 5/4) and few fine and medium very dark gray (10YR 3/1) mottles; slightly sticky, slightly plastic, slightly firm; moderately strong prismatic breaking into angular to subangular blocky structure; common fine and medium continuous random tubular simple open pores; few (7%) small soft and hard spherical and irregular black and brown Mn concretion; abrupt wavy boundary.
B22	78 - 150	Mottled strong brown (7.5YR 5/8) and yellowish brown (10YR 5/6) moist, light clay; sticky, plastic, firm; weak to moderate breaking to medium subangular blocky structure; few fine continuous and discontinuous random tubular simple open pores; few small soft and hard black Mn concretion and few white CaCo3 nodules; few (5%) small hard irregular gravel.
B3	150 - 190	Mottled yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) moist, gravelly clay; slightly sticky, slightly plastic, firm; common (25%) small hard gravel.
C	190 - 300	Light yellowish brown (2.5Y 6/4) moist, gravelly clay; common small irregular and rounded gravel (30%) slightly sticky, slightly plastic, firm.

Range in Characteristics: Solum thickness varies from 100 to 200 cms. A horizons with moist, chroma of 1 or less, values of 2.5 to 4 and hues of 10YR to 2.5Y are black, very dark gray or dark gray and silty clay loam, clay loam, silty clay or clay, textures. Black amorphous deposits impart the dark color of the surface layer.

B horizons with moist chroma of 2 - 6 values from 4 to 6 and hues from 5YR to 10YR are grayish brown, brown to dark brown, dark reddish brown, or mottled yellowish brown strong brown and gray clay, silty clay and occasionally slightly

compact heavy clay with gray or dark gray mottles; few black Mn concretions and small soft and hard tuffaceous fragments present; B horizon extends from 100 to 200 cm deep. C horizons are brown to dark brown, or yellowish brown slightly compact clay, silty clay, or sandy clay with mixture of few to common soft and hard irregular tuffaceous rock fragmants.

Similar series and their Differences: This is the Pili series which has a shallower and lighter - colored A horizon and heavier - textured solum.

Setting: The Iriga soils occur on the moderately to highly dissected fan terrace between Mt. Iriga and Lake Bato in Camarines Sur. They occupy the erosional remnants of the dissected landscape.

Principal Associated Soils: Iriga series is associated with Salvacion series in the local valleys.

Use and Vegetation: Iriga soils are presently used for growing coconut, bananas and other permanent trees, and residential area because of its elevated landscape position. Some areas are cleared and intercropped with upland crops such as corn, cassava, camote, etc.

Drainage and Permeability: Somewhat poorly to moderately well drained.

Soil Series Established: Bo. La Purisima, Iriga City, 1975.

Remarks: Isolated hills with steep slopes and rock outcrops were included in mapping of these soils in the BRBC Project.

NABUA SERIES (Nb)

The Nabua series is a member of the clayey family. These soils have dark gray and very dark, grayish brown amorphous clay and silty clay A horizons extending from 50 to 100 cm depth. B horizons extending from 150 to 200 cm are dark brown and dark reddish brown clay and silty clay with few soft tuffaceous fragments. C horizons are mottled dark brown, grayish brown and olive brown clay loam, silty clay loam, and silt loam with common to many mixed tuffaceous fragments. The Nabua soils occur on continental river levees, formed on mixed water laid volcanic materials.

Typifying pedon: Nabua clay loam - cultivated diversified crops in between coconut plantation (Field description BS-BRBC Land Classification Project Profile No. FL 7 - 564 - P - 1 (Rinconada Area).

Profile Description:

Horizon	Depth (cm.)	Description
A11pg	0 - 18	Very dark gray (10YR 3/1) moist, clay loam; few fine distinct clear very dark grayish brown (10YR 3/2) mottles; moderately weak medium to fine angular blocky breaking to granular structure; slightly sticky, slightly plastic, wet and slightly firm; few fine continuous discontinuous inped exped random oblique tubular simple open pores; common fine to medium coconut roots; diffuse smooth horizon boundary.

A12g	18 - 36	Very dark gray (10YR 3/1) moist, clay loam; few fine faint diffuse very dark grayish brown (10YR 3/2) mottles; moderately weak fine to medium angular blocky breaking to granular structure; slightly sticky, slightly plastic, wet and slightly firm; few fine to medium discontinuous inped random tubular simple open pores; few earthworm cast; presence of white rock fragments; few fine roots; diffuse smooth horizon boundary.
A3g	39 - 65	Very dark grayish brown (10YR 3/2) moist, clay loam; few fine distinct clear dark brown (7.5YR 3/2) mottles; moderately weak fine to medium angular breaking to fine subangular blocky structure; slightly sticky, slightly plastic, wet and slightly firm; few fine to medium discontinuous exped random and oblique tubular close pores; few small earthworm cast; few fine roots; clear smooth horizon boundary.
B21	65 - 103	Dark brown (7.5YR 3/2) moist, clay loam; few fine distinct clear brown to dark brown (7.5YR 4/4) mottles; moderately strong fine to medium angular and subangular blocky structure; slightly sticky, slightly plastic, wet and slightly firm, few fine discontinuous exped random tubular closed pores; few small earthworm cast; few small soft probably white Caco3 nodules; diffuse smooth horizon boundary.
B22	103 - 125	Dark brown (7.5YR 3/2) moist, clay loam few fine to medium distinct clear dark yellowish brown (10YR 4/4) mottles; moderately strong medium to coarse angular breaking to subangular blocky structure; slightly sticky, slightly plastic, wet and slightly firm; few fine discontinuous exped random and oblique simple close pores; few small earthworm cast; clear wavy horizon boundary.
B3	125 - 150	Brown to dark brown (7.5YR 5/4) moist, clay loam; few fine distinct clear brown (7.5YR 5/4) mottles moderately strong medium to coarse angular blocky structure; slightly sticky, slightly plastic, wet and slightly firm; few fine and medium discontinuous continuous inped exped random oblique tubular simple open pores; few small soft probably white CaC03 nodules.
C1	150 - 190	Distinctly mottled dark brown (7.5YR 3/2) reddish yellow (7.5YR 6/6) and very dark gray (10YR 3/1) moist, heavy silt loam; slightly sticky, non-plastic, wet and friable.
C2	190 - 250	Brown to dark brown (10YR 4/3) moist, silt loam; few fine distinct clear light olive brown (2.5YR 5/4) mottles; slightly sticky, non-plastic, wet and friable.

C3	250 - 300	Brown to dark brown (7.5YR 4/4) moist, silty clay loam; common fine distinct clear light olive brown (2.5YR 5/4) and yellowish brown (10YR 5/4) mottles; slightly sticky, slightly plastic, wet and slightly friable.

Range in Characteristics: Solum thickness varies from 150 to 200 cms. A horizons, with moist chroma of 2 or less value from 3-4 and hues of 7.5YR to 10YR are very dark gray, dark gray, very dark grayish brown, and occasionally brown in the Apg with clay, clay loam and silty clay loam texture and black amorphous deposits, extending from 50 to 100 cm depth.

B horizons with moist chroma of 2-4 value from 3-5 and hues of 5YR to 10YR are brown, dark brown, brown to dark brown, dark reddish brown and occasionally grayish brown clay, silty clay and clay loam with partly weathered soft and hard tuffaceous fragments which increases in the lower B horizons.

C horizons are a layer of mixed weathered volcanic material with textures of silt loam, clay loam, silty clay loam and sandy clay loam; with colors ranging from mottled dark brown, yellowish brown, strong brown, pale brown and olive gray.

Similar Series and their Differentiae: This is the Quingua series, which has dominantly brown profile and Bt horizon over stratified sandy materials.

Setting: The Nabua series occur on the natural levees of the Bicol River and its major tributaries in areas dominantly influenced by volcanic materials in the southeastern portion of Camarines Sur.

Principal Associated Soils: The Nabua series is associated with the Baao soils on the broad plain.

Use and Vegetation: Coconut intercropped with row crops such as vegetable, camote, cassava, bananas and other fruit trees are grown on Nabua soils. Other areas are developed for paddy rice production.

Drainage and Permeability: Moderately well drained.

Soil Series Established: Bo. La Purisima, Nabua Municipality, Camarines Sur.

SALVACION SERIES

The Salvacion series is a member of the fine clayey family. These soils have black, very dark gray, dark gray or very dark grayish brown Ag horizons extending to 50 to 100 cms. with clay, silty clay or clay loam textures mixed with emorphous deposits. B horizons are gray, olive gray, grayish brown or dark brown, clay, silty clay or clay loam, extending to the depth of 150 or 200 cms. The C horizon is a layer of olive gray, greenish gray, soft and weathered mixed tuffaceous fragments. Salvacion soils occur on narrow localized valleys, within moderately to highly dissected, medium to high alluvial fan terraces.

Typifying pedon: Salvacion clay - cultivated paddy rice (Field Description, BRS Land Classification project, Camarines Sur, Profile No. PL7 - 262 - P - 2 or FL5 - 0036 - P - 1).

Profile Description:

Horizon	Depth (cm)	Description
Apg	0 - 15	Very dark gray (10YR 3/1) moist, clay; few fine distinct clear dark brown (7.5YR 3/3) mottles; sticky, plastic, firm; massive in place; many very fine discontinuous and continuous inped simple close and open tubular pores; common fine roots; clear smooth boundary; pH 6.6.
A3	15 - 48	Dark grayish brown (10YR 4/2) moist, clay; common fine distinct clear brown to dark brown (7.5YR 4/4) and very dark gray (10YR 3/1) mottles; sticky, plastic, firm; moderately strong medium angular blocky breaking to sub-angular blocky structures; many very fine and few medium continuous and discontinuous random exped and inped simple closed tubular pores; few small soft and hard black Mn concretions; very few fine roots; diffused smooth boundary; pH 6.8.
Blon	48 - 92	Mottled strong brown (7.5YR 5/6) dark gray (10YR 4/1) and brown (10YR 5/3) moist, clay; sticky, plastic, firm; moderately strong medium angular blocky breaking to sub-angular blocky structures; common very and few medium continuous discontinuous random inped and exped simple closed and open tubular pores; common small and large soft and hard black Mn concretions; common partially weathered tuffaceous materials; diffused smooth boundary; pH 7.0.
B2	92 - 107	Light brownish gray (10YR 6/2) moist, heavy silty clay; common fine and medium prominent clear strong brown (7.5YR 5/6) and dark gray (10YR 4/1) mottles; sticky, plastic, firm; moderately strong medium angular breaking to sub-angular blocky structure; common fine continuous and discontinuous random exped and inped simple and closed tubular pores; few small soft black Mn concretions; diffused smooth boundary; pH 6.2.
B3	107 - 150	Light brownish gray (10YR 6/2) wet, light silty clay; few fine distinct clear light yellowish brown (2.5Y 6/4) and yellowish brown (10YR 5/6) mottles; sticky and plastic; weak, fine to medium angular structure with evidence of illuviated clay cutans; few very fine continuous and discontinuous random inped and exped simple closed tubular pores; common weathered and partially weathered tuffaceous materials; common small and medium soft and hard black Mn concretions; pH 7.0.

C1	150 - 210	Pale olive (5Y 6/3) moist, heavy silty clay; few fine distinct clear light olive brown (2.5Y 5/4) and gray (10YR 5/1) mottles; sticky, plastic, firm; common small and medium soft and hard black Mn concretions; common weathered tuffaceous material; pH 7.0
C2	210 - 250	Light brownish gray (2.5Y 6/2) moist, silty clay; few fine and medium distinct clear light olive brown (2.5Y 5/4) and few fine distinct clear gray (10YR 5/1) mottles; sticky, plastic, firm; few small soft black Mn concretions; pH 7.6.
C3	250 - 300	Light gray to gray (5Y 6/1) moist, silty clay; common fine and medium distinct clear light olive brown (2.5Y 5/4) mottles; sticky, plastic, firm; few weathered tuffaceous materials;

Range in Characteristics: Solum thickness ranges from 150 to 200 cm.

Ag horizons have moist chroma of 1 or less, values from 2.5 to 5 and hues from 10YR to 5Y, and clay, silty clay, clay loam; silty clay loam textures; mixed with amorphous deposits and fine volcanic fragments. Structure is angular breaking to sub-angular blocky.

B horizons extend from 100 to 150 cms. depth with chroma 2 to 4, values 4 to 6, and hues of 7.5YR to 2.5Y are olive, olive gray, light brownish gray, grayish brown, and occasionally mottled brown or yellowish brown and gray clay, silty clay, clay loam or heavy silty clay loam textures; commonly weathered and partially weathered tuffaceous fragments and few small soft Mn concretions are usually present in the upper B horizons.

C horizons are pale olive, light brownish gray, greenish gray, weathered and partially weathered soft tuffaceous fragments, with textures of silty clay, clay loam and sandy clay loam.

Similar Series and their Differentiae: This is the Iriga series which has Ag horizons influenced by black amorphous deposits, but with predominantly dark brown subsoil, and Maahas series which is also underlain by tuff but darker and heavier textured solum.

Setting: The Salvacion series occurs in localized valleys on moderately to highly dissected alluvial fan terraces between Mt. Iriga and Lake Bato in Camarines Sur. The strata of volcanic ash and similar materials which are either directly deposited or reworked by water provides the mantle from which these soils are derived. Slopes range from level or nearly level to slightly undulating, or about 0 to 2 percent.

Principal Associated Soils: The Iriga series occupies the erosional or higher areas, while the Salvacion soils are formed on the depositional areas (valleys) within the dissected fan terrace.

Drainage and Permeability: Poorly to somewhat poorly drained. Permeability ranges from slow to moderately slow.

Use and Vegetation: The areas are developed to wetland rice culture.

Series Established: Barrio Salvacion, Iriga City, 1975.

Remarks: These soils were included in areas mapped as Pili-Macolod complex in the reconnaissance soil surveys.

MAAHAS SERIES (Mh)

These soils are poorly drained, very fine, deep over tuff strata, and occuring on level or broad low lying alluvial terrace landscapes. Solum thickness varies from 100 to 150 cms. Ag horizons extending to a depth of 50 cms are very dark gray, dark gray or gray clay or silty clay. Bg horizons extending to a depth of 150 cms. are gray, light gray, olive gray with few to many yellowish brown or strong brown mottles, heavy clay, few to common Fe-Mn, $CaCo_3$ concretions. C horizons are grayish brown, light yellowish brown, brown, dark brown or pale brown sandy clay loam or silty clay loam with few brown, yellowish brown mottles.

Remarks: Mapped in the DAR Pili Project, the following soil map units are:

MhB - Maahas silty clay; 0.25 to 1.0 percent slopes.
MhC - Maahas silty clay; 1.0 to 2.0 percent slopes.

BIGAA SERIES

Bigaa are very deep, poorly drained, gray very fine clayey soils developed on low slightly dissected broad continental alluvial terraces below alluvial fans and geormophologically set over tuff materials, 3 to 10 meters deep. Strong coarse prismatic structures form during dry season. Cracks are wide and remain open for more than 90 cummulative days except when irrigated. The soils of Bigaa series are members of the very fine clayey family of the soil Texonomy.

Typifying pedon: Bigaa clay - paddy rice, non-irrigated (field description BRBC Land Classification project, Profile No. FL11-186 - Pit 1).

Profile Description:

Horizon	Depth (cm)	Description
Aplg	0 - 16	Very dark gray (10YR 3/1) moist, clay; common fine distinct clear dark reddish brown (5YR 3/4) mottles; weak fine and medium angular and sub-angular blocky structures; sticky, plastic, wet and firm; few fine continuous inped exped oblique tubular simple open pores; many fine and medium roots; diffused smooth horizon boundary; pH 6.6.
A3g	16 - 51	Dark gray (2.5Y N4/) moist, clay; no mottles; weak fine and medium angular and sub-angular blocky structures; sticky, plastic, wet and firm; few fine and medium continuous discontinuous inped exped random tubular simple open pores; few fine and medium roots; clear wavy horizon boundary; pH 6.8.

B1g	51 - 80	Olive gray (5Y 5/2) moist, heavy clay; few fine distinct clear dark gray (10YR 4/1) and few fine greenish gray (5BG 6/1) mottles; moderately weak coarse angular breaking to fine and medium angular and sub-angular blocky structure; very sticky, very plastic, wet and firm; thin patchy probably clay cutans along ped faces; few fine continuous random inped exped tubular simple open pores; few small soft spherical black Mn concretions; few fine roots; clear wavy horizon boundary; pH 7.0.
B21g	80 - 107	Light olive gray (5Y 6/2) moist, clay; few fine distinct clear pale olive (5Y 6/3) mottles; moderately strong prismatic breaking to coarse and medium angular and sub-angular blocky structures; sticky, plastic, wet and firm; thin patchy discontinuous exped vertical stickensides; few fine and medium continuous discontinuous random inped exped tubular simple open pores; few small soft and hard spherical black Mn concretions; few fine roots; abrupt smooth horizon boundary; pH 7.0.
B22g	107 - 150	Dark gray (10YR 4/1) moist, clay; few fine distinct clear olive gray (5Y 5/2) mottles; moderately strong prismatic breaking to coarse columnar structure; sticky, plastic, wet and firm; few coarse continuous discontinuous random inped exped tubular open pores; few small soft probably white CaCo3 nodules; few small soft black Mn conretions; pH 7.6.
B3g	150 - 200	Light brownish gray (2.5Y 6/2) moist, silty clay; few medium distinct clear dark grayish brown (10YR 4/2) and few fine strong brown (7.5YR 5/6) mottles; sticky, slightly plastic, wet and slightly firm; few small soft probably white CaCO3 nodules; pH 6.8.
C1	200 - 270	Brown (10YR 5/3) moist, silty clay loam; few fine distinct clear dark gray (10YR 4/1) and few fine strong brown (7.5YR 5/6) mottles; slightly sticky, slightly plastic, wet and slightly firm; pH 6.8.
C2	270 - 310	Dark brown (10YR 3/3) moist, silty clay; few fine distinct clear light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/6) mottles; sticky, plastic, wet and slightly firm; pH 6.8.

Range in Characteristics: Solum thickness ranges from 100 to 150 cm or more. Ag horizons have moist chromas less than 1.5, values from 3.5 to 6.0 hues from 5Y to 10YR extending from 50 to 100 cm depth, and very fine clay or fine clay textures. Few common dark reddish brown, yellowish brown mottles, moderately strong fine to medium angular blocky structure. When wet, Ag horizons are puddled, structureless (massive), very sticky and very plastic. When dry, Ag horizons are extremely hard with prismatic structures which break under pressure forming coarse medium and fine angular blocks.

Bg horizons, with hues of 10YR, 2.5Y to 5Y, moist chromas of 2.0 and values of 3.5 to 6.0, extending to 100 to 150 cm. depths, are grayish brown, brownish gray or olive gray, very sticky and very plastic, expanding very fine clay.

Cg horizons are olive, brown to dark brown, light yellowish brown, brownish yellow, pale yellow, very dark gray, very sticky, very plastic, very fine clay with few small soft black Mn concretions;

Similar Series and their Differentiae: These are the Bantog and Maahas series. Bantog series has thinner Ag horizon and Maahas series has shallower solum over tuff materials.

Setting: These soils occur in very slight depressions on the level or nearly level low lying alluvial floodplain in the Bicol Region. Slopes ranges from 0 to 3 percent.

Principal Associated Soils: The Bigaa soils are associated with the Maahas series, and Bantog series which lies on a slightly higher landscape.

Drainage and Permeability: Poorly drained. Permeability is extremely slow or very slow.

Use and Vegetation: Bigaa soils are used for the production of paddy rice.

Remarks: In the Bicol Region. Bigaa series was mapped in the Pili DAR Project, 1973.

Index to Soils Map:

BoA - Baao clay loam, 0.0 to 1.0 percent slopes.

BoAf1 - Baao clay loam, 0.0 to 1.0 percent slopes, subject to slight seasonal flooding.

BoAf2 - Baao clay loam, 0.0 to 1.0 percent slopes, subject to moderate seasonal flooding.

BoAf3 - Baao clay loam, 0.0 to 1.0 percent slopes, subject to severe seasonal flooding.

BoAf4 - Baao clay loam, 0.0 to 1.0 percent slopes, subject to very severe seasonal flooding.

BoB - Baao clay loam, 1.0 to 2.0 percent slopes.

BoC - Baao clay loam, 2.0 to 5.0 percent slopes.

Cte - Creek terrace escarpments.

IrA - Iriga silty clay loam, 0.0 to 1.0 percent slopes.

IrB - Iriga silty clay loam, 1.0 to 2.0 percent slopes.

IrC - Iriga silty clay loam, 2.0 to 5.0 percent slopes.

IrD - Iriga silty clay loam, 5.0 to 8.0 percent slopes.

IrE - Iriga silty clay loam, 8.0 to 15.0 percent slopes.

IrE1 - Iriga silty clay loam, 8.0 to 15.0 percent slopes, slightly eroded.

IrF - Iriga silty clay loam, 15.0 to 25.0 percent slopes.

NbA - Nabua clay loam, 0.0 to 1.0 percent slopes.

NbAf1 - Nabua clay loam, 0.0 to 1.0 percent slopes, subject to slight seasonal flooding.

NbB - Nabua clay loam, 1.0 to 2.0 percent slopes.

SvA - Salvacion clay, 0.0 to 1.0 percent slopes.

SvAf1 - Salvacion clay, 0.0 to 1.0 percent slopes, subject to slight seasonal flooding.

SvAf2 - Salvacion clay, 0.0 to 1.0 percent slopes, subject to moderate seasonal flooding.

SvAf4 - Salvacion clay, 0.0 to 1.0 percent slopes, subject to very severe seasonal flooding.

SvB - Salvacion clay, 1.0 to 2.0 percent slopes.

ViA - San Vicente clay loam, 0.0 to 1.0 percent slopes.

ViAf1 - San Vicente clay loam, 0.0 to 1.0 percent slopes, subject to slight seasonal flooding.

ViB - San Vicente clay loam, 1.0 to 2.0 percent slopes.

ViC - San Vicente clay loam, 2.0 to 5.0 percent slopes.

Field Infiltration Test:

Location	Land-Use	Soil Series	Infiltration Rate cm/hr	Infiltration Rate Class
1. San Vicente, Baao	Coconut	Vi	1.31	Mod. slow
2. Sagrada, Baao	Rice	Vi	0.025	Very slow
3. San Juan, Baao	Coconut	Vi	8.03	Mod. rapid
4. Sta. Cruz, Baao; approx. 100 m east of Baao Central School	Tomatoes and Rice	Vi	0.21	Slow
5. Sta. Cruz, Baao; approx. 1.5 km southwest of Municipal Hall	Rice	Vi	1.60	Mod. slow
6. Bulaang, Baao	"	Bo	0.02	Very slow
7. Sta. Teresita, Baao	"	Bo	0.118	"
8. San Miguel, Iriga City	Cabbage	Bo	0.03	"
9. Sagrada, Baao	Rice	Bo	0.02	"
10. San Jose, Iriga City	"	Bo	0.0*	"
11. San Francisco, Nabua	"	Bo	0.09	"
12. San Rogue, Nabua	"	Bo	0.0*	"
13. Eulalia, Baao	Corn (dry) Rice (wet)	Bo	"	"
14. Dolorosa, Nabua	Rice	Mh	0.318	Slow
15. La Purisima, Nabua	Corn & coconut	Nb	5.80	Moderate
16. Inapatan, Nabua	Corn (dry) Rice (wet)	Nb	0.19	Slow
17. Sto. Domingo, Iriga City	Coconut	Ir	11.6	Mod. rapid
18. San Ramon, Nabua	Rice	Ir	0.006	Very slow
19. Sta. Cruz, Nabua	"	Sv	0.0*	"
20. Sta. Teresita, Baao	"	Sv	0.034	"
21. Paloyon, Nabua	"	Sv	0.58	Slow
22. San Juan, Iriga City	"	Sv	0.0*	"
23. La Anunciacion, Iriga City	Corn & coconut	Sv	1.08	Mod. slow
24. Del Rosario, Banao, Iriga City	Corn (dry) Rice (wet)	Sv	0.023	Very slow
25. San Vicente, Bato	Rice	Sv	1.918	Mod. slow
26. Sta. Cruz, Iriga City	"	Sv	0.083	Very slow
27. Salvacion, Iriga City	Upland Rice	Sv	0.041	"

*Approaching zero.

Hydraulic Conductivity Test:

Location	Soil Series	Depth (cm)	Texture	Rate m/day	Class
1. San Juan, Baao	Vi	40- 80	Scl	46.26	Very rapid
		80-120	Sl	57.28	"
		120-150	Sil	15.27	"
2 San Juan, Baao*	Vi	60-100	Loam	24.566	"
		100-150	Scl	16.758	"
3. San Vicente, Baao*	Vi	100	Sicl	9.44	"
		150		13.04	"
4. Sta. Cruz, Baao	Vi	120	Cl	1.40	Moderate
		150	Scl	3.00	Mod. rapid
5. San Jose, Iriga City*	Vi	0- 50	Loam	8.924	Very rapid
		50- 95	Silt loam	10.262	"
6. Dolorosa, Nabua	Mh	10- 60	Clay	0.188	Slow
		150	Sicl	2.44	Mod. rapid
7. La Purisima, Nabua*	Nb	10- 60	Loam	86.378	Very rapid
		60-110	Sicl	59.689	"
		110-150	Cl	3.628	Rapid
8. La Purisima, Nabua*	Nb	0- 60	Cl	105.587	Very rapid
		60-100	Sicl	54.137	"
		100-150	Sic	6.332	"
9. Buluang, Baao	Bo	60	Sicl	0.184	Slow
		100	Sicl w/conc.	0.554	Moderate
10. Sta. Teresita, Baao*	Bo	0- 90	Sicl	5.325	Rapid
		90-120	Sic	1.315	Moderate
11. San Nicolas, Iriga City	Bo	40	Sic	0.443	"
		90	Sicl	60.80	Very rapid
12. San Miguel, Iriga City	Bo	60	Sic	0.253	Mod. slow
		110	Sic w/conc	1.016	Moderate
13. Sagrada, Baao	Bo	50	Sic	1.064	"
		100	Sl	41.18	Very rapid
14. San Francisco, Nabua	Bo	60	Sic	2.08	Mod. rapid
		100	Scl	6.182	Very rapid
15. San Jose, Iriga City	Bo	50	Cl	1.612	Mod. rapid
		90	Sic w/conc.	12.153	Very rapid

*Pump-in method

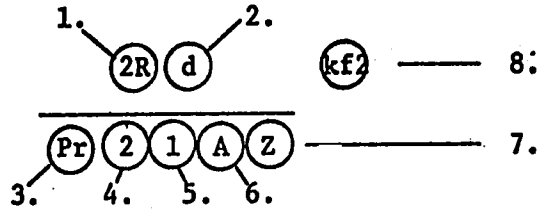
Hydraulic Conductivity Test (continued)

Location	Soil Series	Depth (cm)	Texture	Rate m/day	Class
16. San Rogue, Nabua	Bo	70	Sic w/tuff	7.6	Very rapid
		110	Loamy sand	37.56	"
17. La Anunciacion, Iriga City*	Ir	20- 60	Sicl	6.063	"
		60-100	Sic	1.75	Mod. rapid
		100-150	Sicl	11.33	Very rapid
18. Del Rosario, Banao, Iriga City	Ir	110	Scl	5.1	Rapid
		150	Sl w/tuff	2.315	Mod. rapid
19. Del Rosario, Banao, Iriga City*	Ir	10- 50	Loam	10.795	Very rapid
		50-100	Sicl	9.629	"
		100-150	Sic w/conc.	12.89	"
20. La Anunciacion, Iriga City*	Ir	20- 60	Sicl	55.757	"
		60-100	Sic	1.737	Mod. rapid
		100-150	Sicl	11.327	Very rapid
21. Old Santiago, Nabua*	Ir	0- 60	Cl	26.669	"
		60-110	Sicl	61.72	"
		110-150	Sicl w/tuff	39.20	"
22. Sta. Teresita, Baao	Sv	0- 90	Cl	1.074	Moderate
		90-120	Sic w/conc.	1.66	Mod. rapid
23. Paloyon, Nabua	Sv	0- 60	Sic	0.588	Moderate
		60-110	Sicl	8.015	Very rapid
		110-150	Scl	0.164	Moderate
24. La Anunciacion, Iriga City	Sv	110	Sic w/conc.	1.241	"
		150	Sicl	1.50	"
25. San Vicente, Bato	Sv	80	Lt. clay	0.207	Mod. slow
		150	Sicl	4.11	Rapid
26. Salvacion, Iriga City	Sv	20- 80	Clay	0.527	Mod. slow
		150	Clay	0.13	Slow
27. Sta. Cruz, Nabua	Sv	90	Clay w/conc.	0.592	Moderate
		120	Sicl w/tuff	6.20	Very rapid
28. Sta. Cruz, Iriga City	Sv	100	Sic	15.00	"
		150	Sicl w/conc.	87.83	"

*Pump-in method.

Land Classification Symbols:

Standard Mapping Symbols



Definitions

1. Land class

   1R - Highly suitable riceland
   2R - Moderately suitable riceland
   3R - Marginally suitable riceland
   4 - Special use or areas with excessive deficiencies
   6 - Not suitable for irrigation

2. Deficiency

   s - Soil deficiency (shallow soils)
   d - Drainage (flooding hazard)
   t - Topography
   sd - Combined soil and drainage deficiency
   std - Combined soil, topography and drainage deficiency

3. Present land use

   Prp - Pump irrigated paddy rice
   Pr - Rainfed paddy rice
   Pri - Irrigated paddy rice
   Po - Open grassland and/or riceland left fallow for the previous 5 years
   Bo - Bamboo
   Co - Coconut
   Sc - Sugar cane

4. Potential productiivty class

   1 - High
   2 - Moderate
   3 - Low

5. Land development cost

   1 - Low
   2 - Moderate
   3 - High

6. Farm water requirement

   A - Low
   B - Medium
   C - High

7. Land drainability
   - X - Good
   - Y - Restricted
   - Z - Poor

8. Specific deficiencies
   - c - Brush or tree cover, clearings
   - e - Salinity
   - f - Flooding[1]
   - i - Isolated from irrigation
   - j - Irrigation pattern
   - k - Shallow depth to coarse materials such as marine shells and loamy sands (within 45 cm of the surface).
   - o - Sub-surface drainage, correctible
   - u - Undulations, leveling required

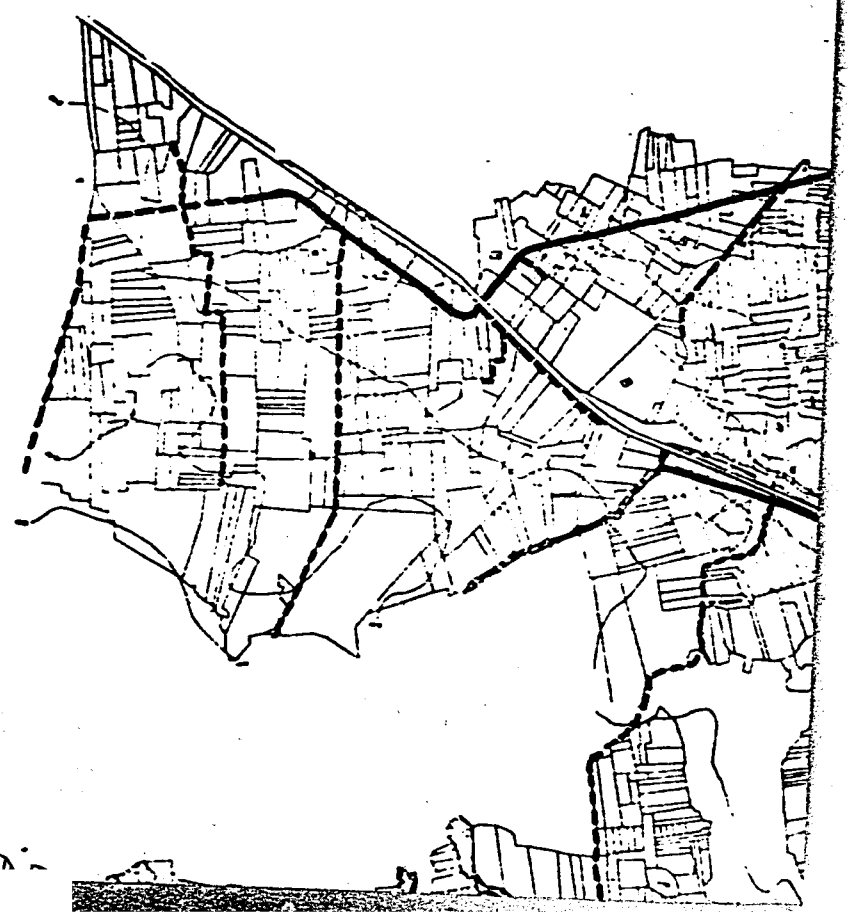
9. H - Urban area, housing

---

1. Flooding classes and definitions:
   - f1 - Slight flooding, about 30 cm depth during heavy rainfall receding to less than 20 cm in 1-3 days.
   - f2 - Moderate flooding, about 40-60 cm depth during heavy rainfall receding to 20-30 cm or less in 1 week.
   - f3 - Severe flooding, about 100 cm depth during heavy rainfall receding to 30-60 cm within 1 week and remains at this depth for weeks or months at a time, dried in January or February.
   - f4 - Flooding by river water or local runoff to more than 100 cm depth for lengthy periods, flooded for most of the dry season.

FIGURE 2. IRRIGATION S

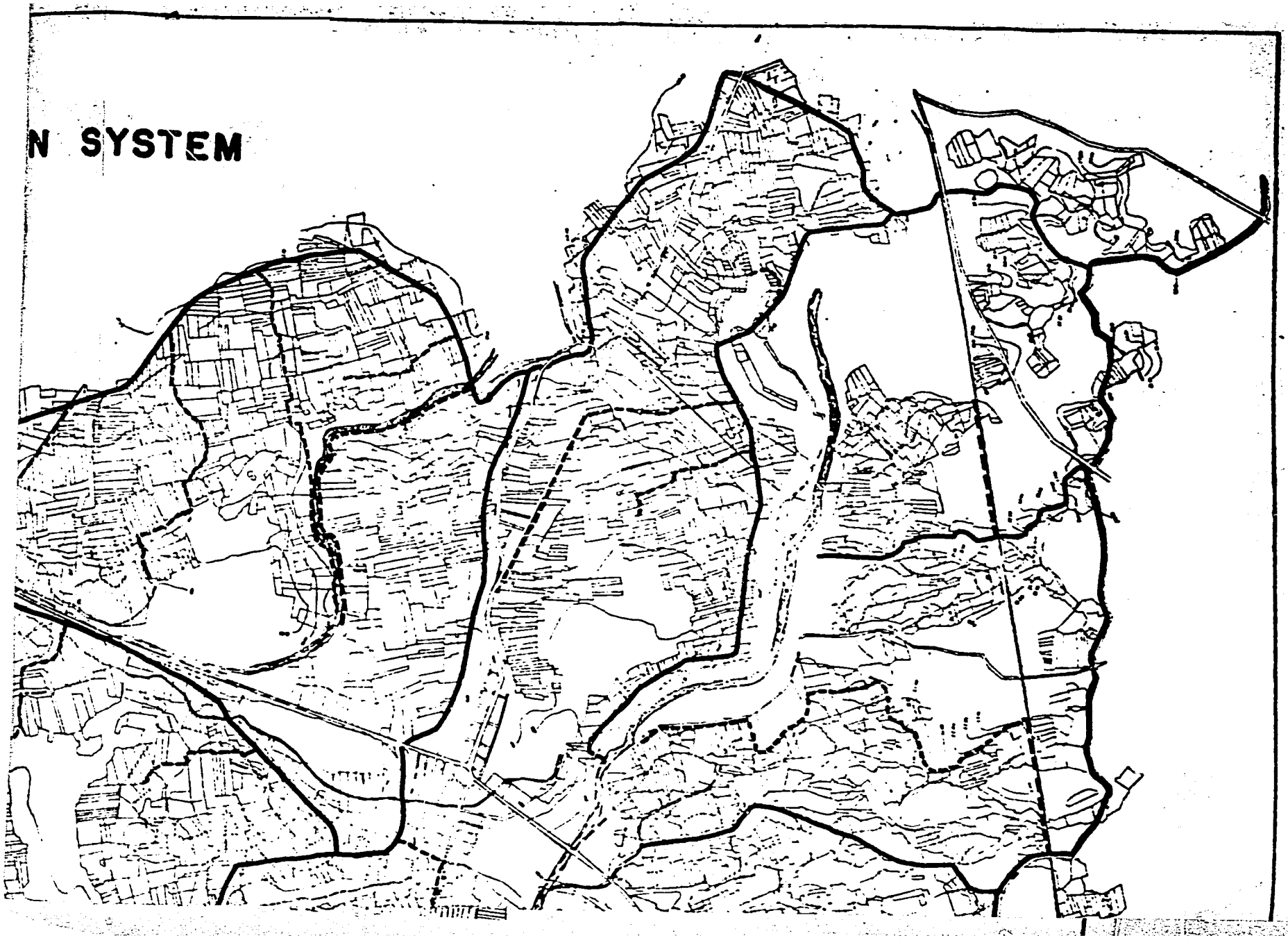
SCALE 1:25500

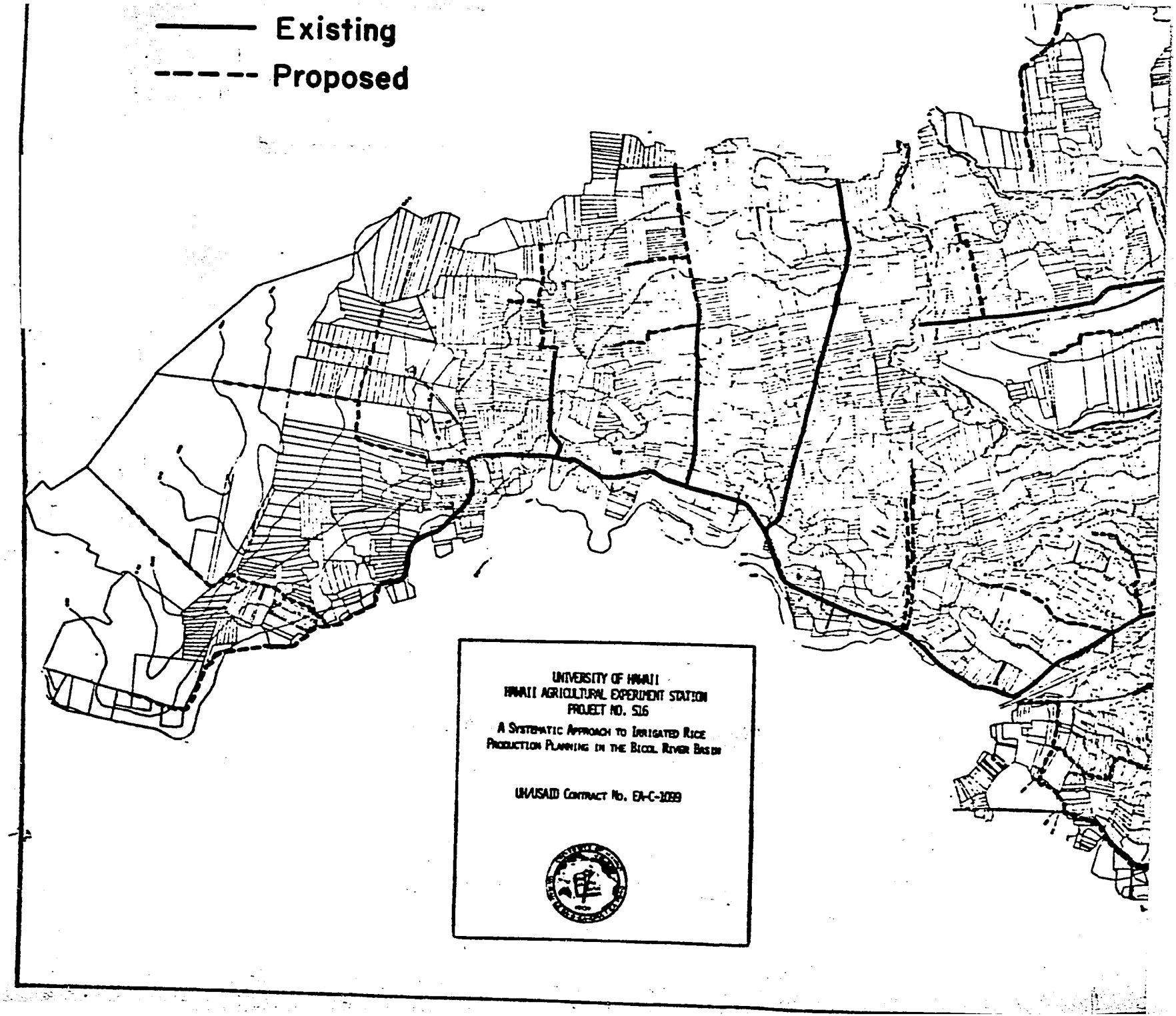


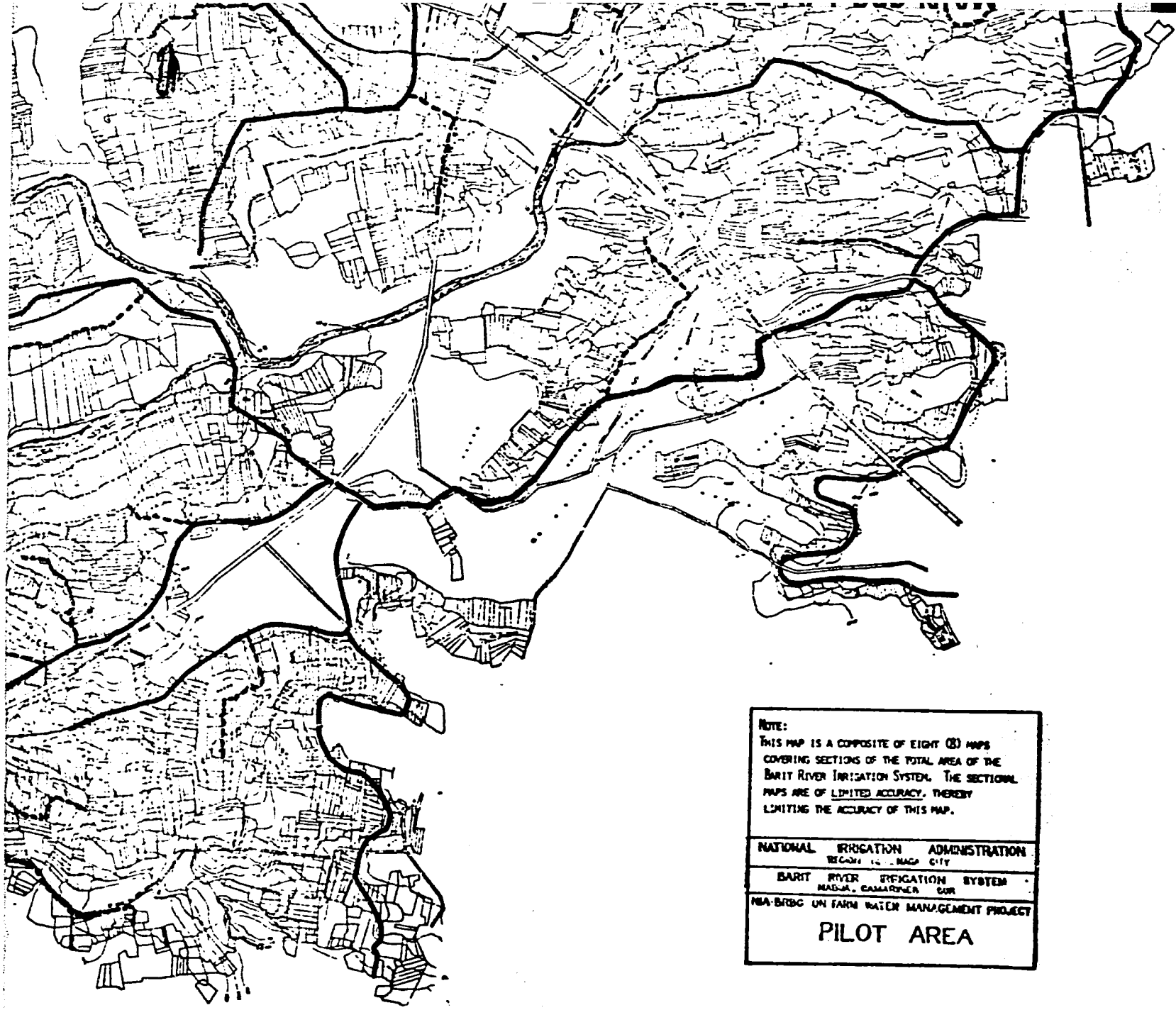
MAIN and LATERAL CANALS

——— Existing

- - - - - Proposed


N SYSTEM


Existing
Proposed
UNIVERSITY OF HAWAII
HAWAII AGRICULTURAL EXPERIMENT STATION
PROJECT NO. 516
A SYSTEMATIC APPROACH TO IRRIGATED RICE
PRODUCTION PLANNING IN THE BICOL RIVER BASIN
UH/USAID CONTRACT NO. EA-C-1089



NOTE:
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NATIONAL IRRIGATION ADMINISTRATION
REGION [illegible] NAGA CITY

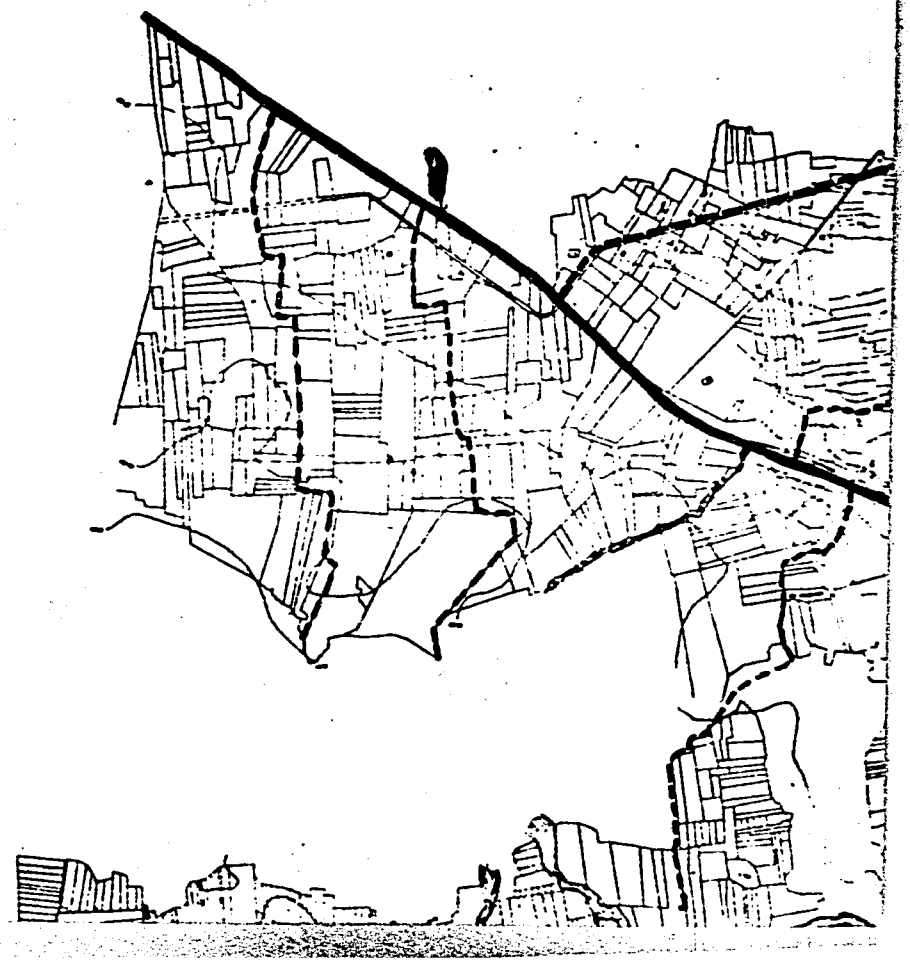
BARIT RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR

NIA-BRIDG ON FARM WATER MANAGEMENT PROJECT

PILOT AREA

FIGURE I. ROAD SYSTEM

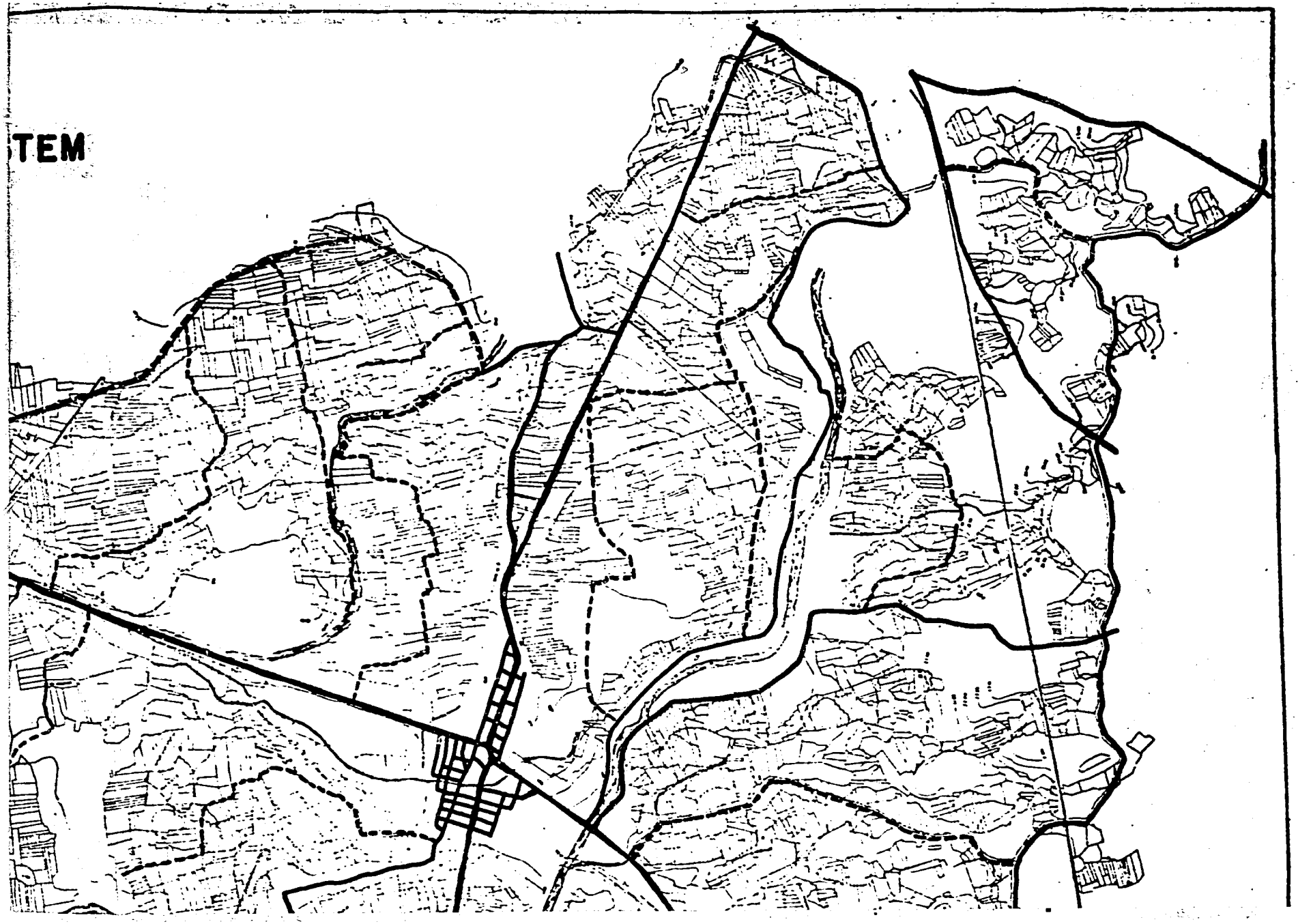
SCALE 1:25500

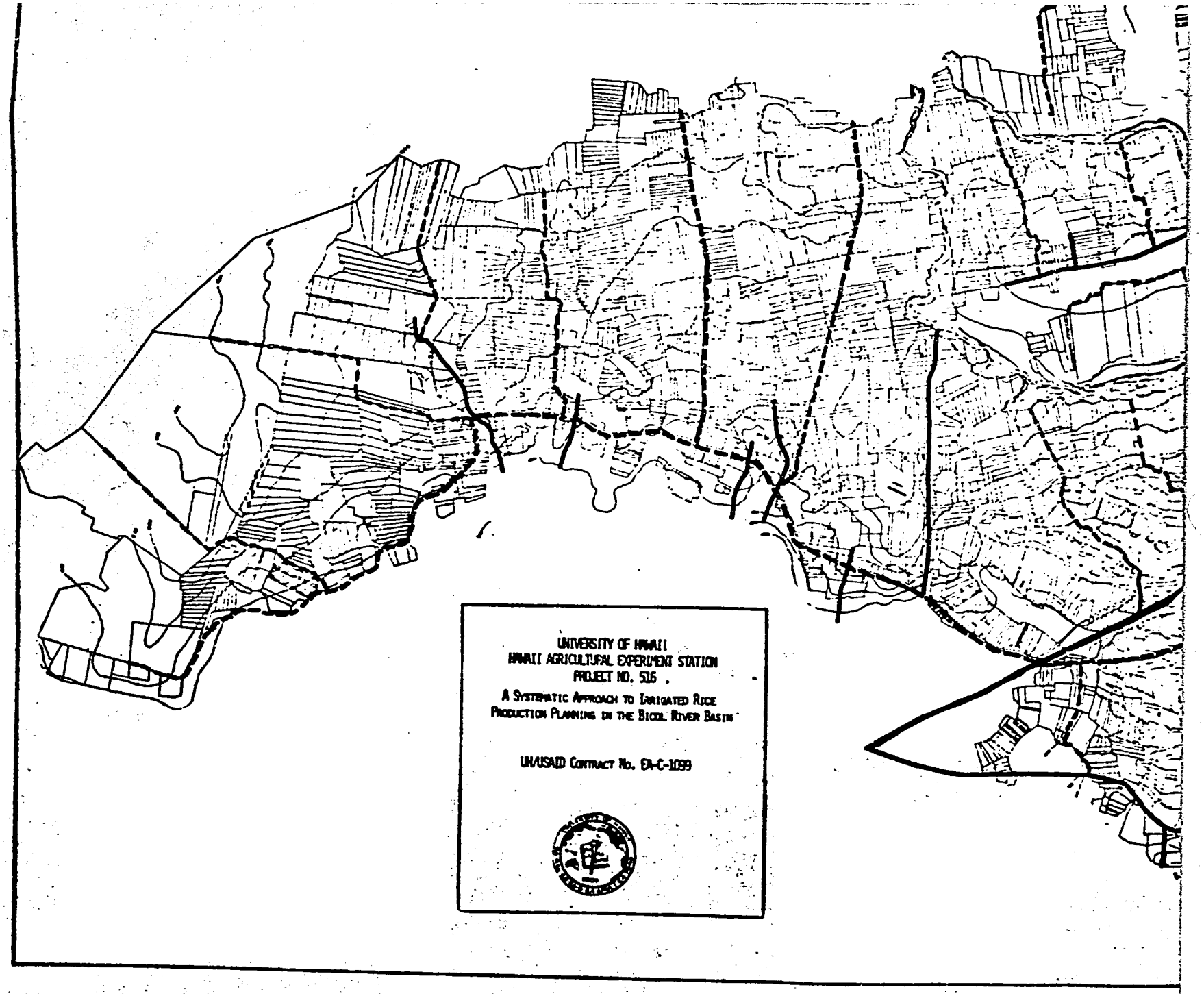


ROADS

——— Existing

- - - - Proposed

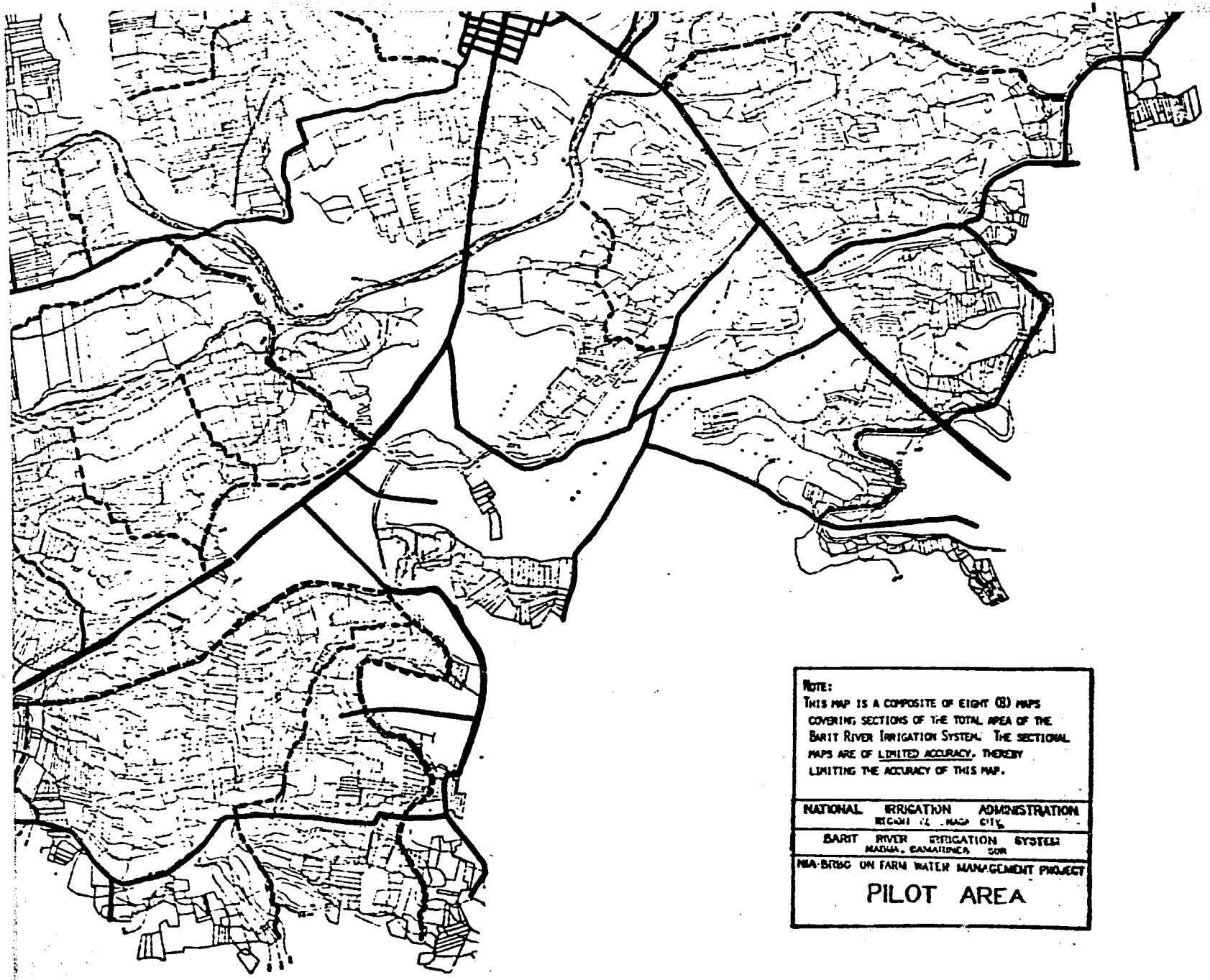

TEM



UNIVERSITY OF HAWAII
HAWAII AGRICULTURAL EXPERIMENT STATION
PROJECT NO. 516

A SYSTEMATIC APPROACH TO IRRIGATED RICE PRODUCTION PLANNING IN THE BICOL RIVER BASIN

UH/USAID CONTRACT NO. EA-C-1099



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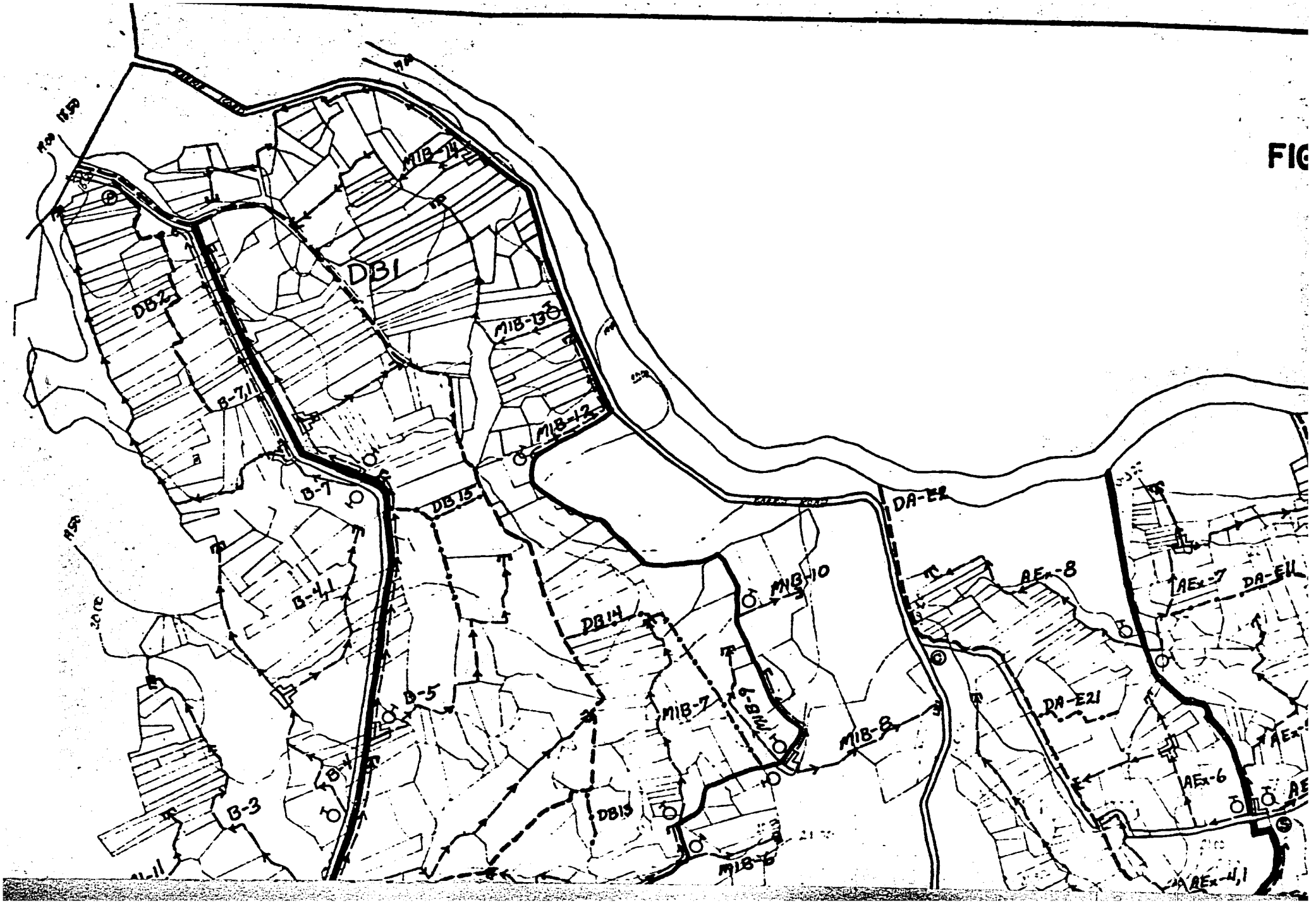
NATIONAL IRRIGATION ADMINISTRATION
REGION IX, NAGA CITY

BARIT RIVER IRRIGATION SYSTEM
MABINI, CAMARINES SUR

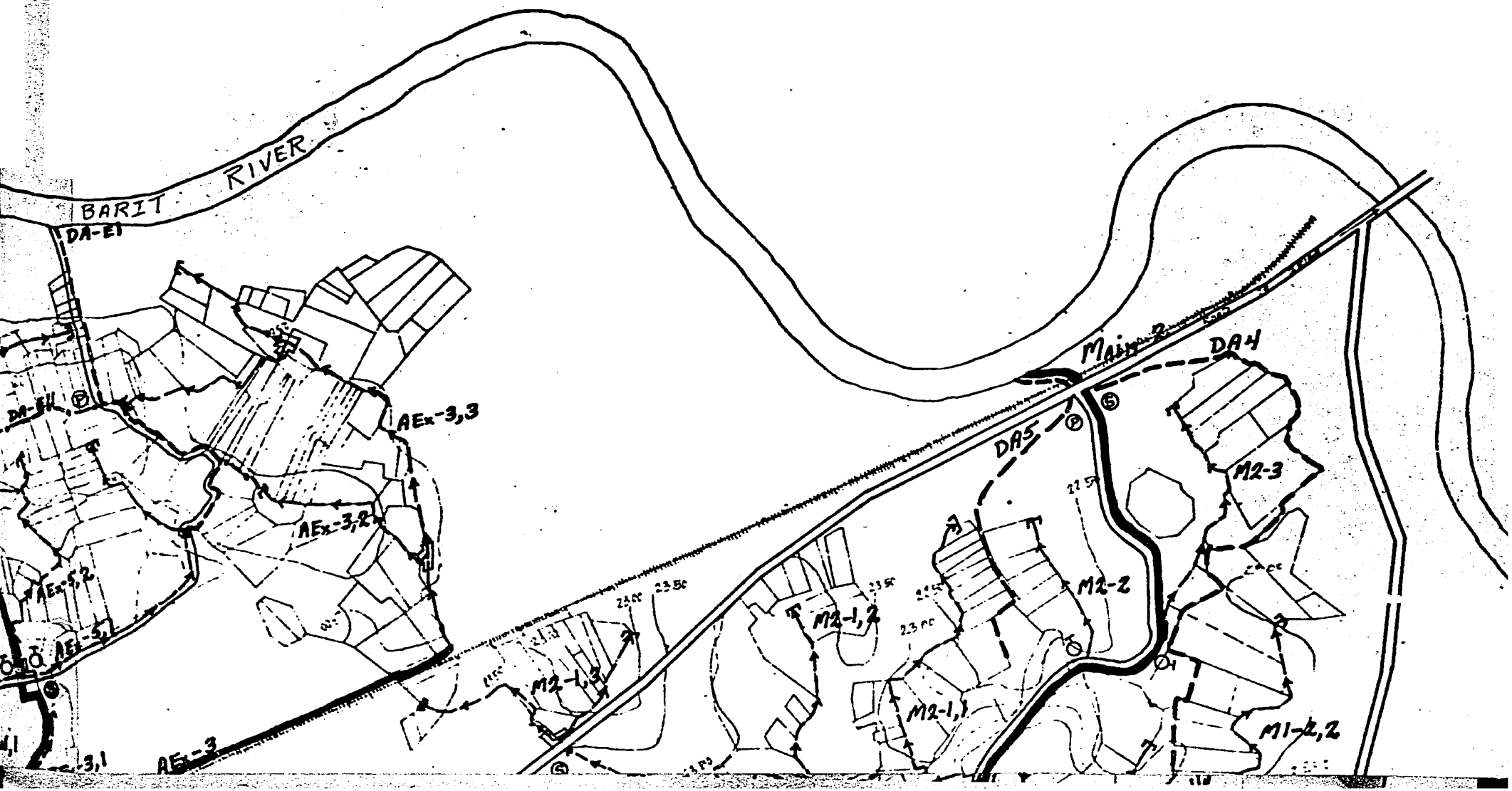
NIA-BTDC ON FARM WATER MANAGEMENT PROJECT

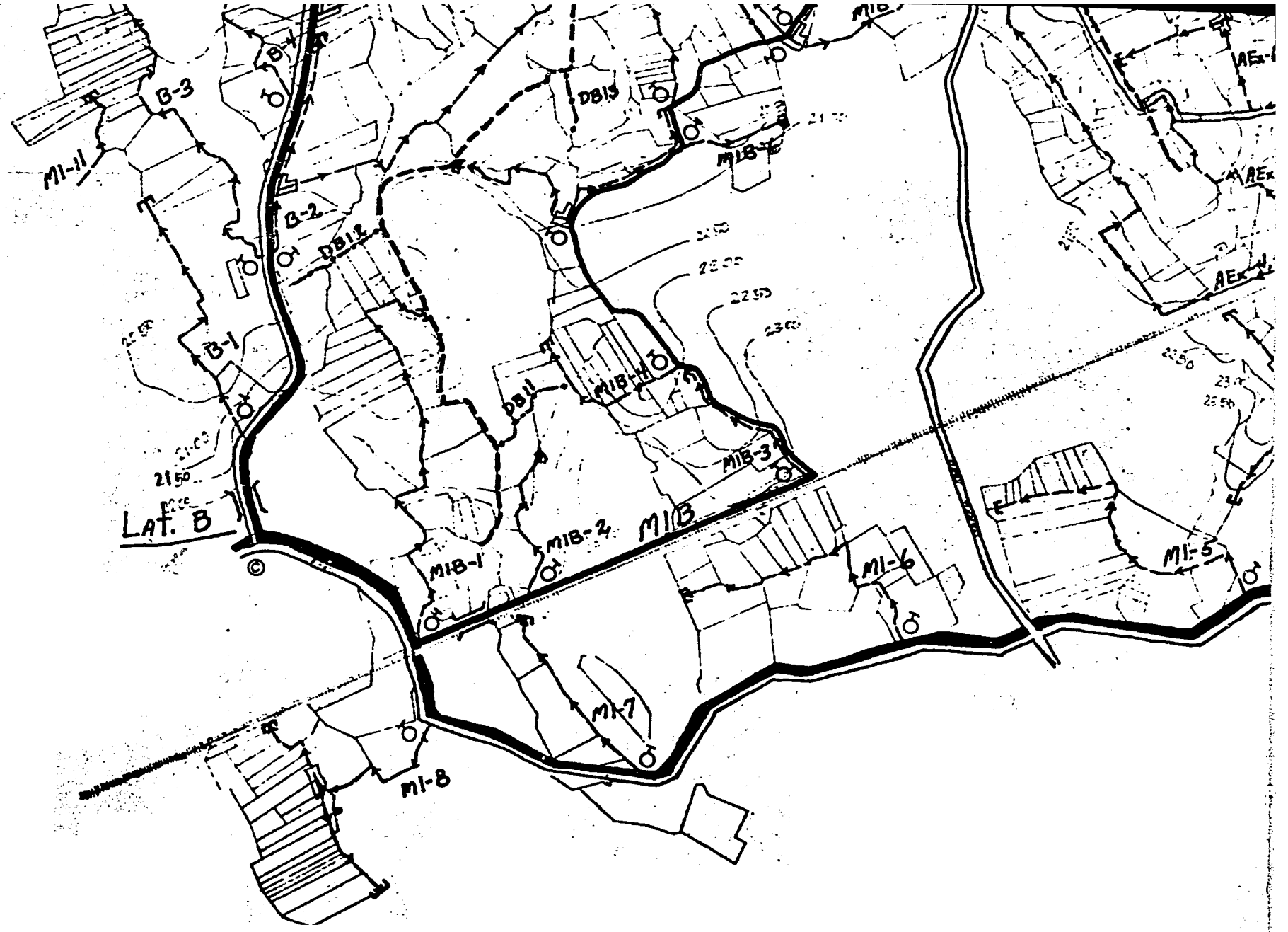
PILOT AREA

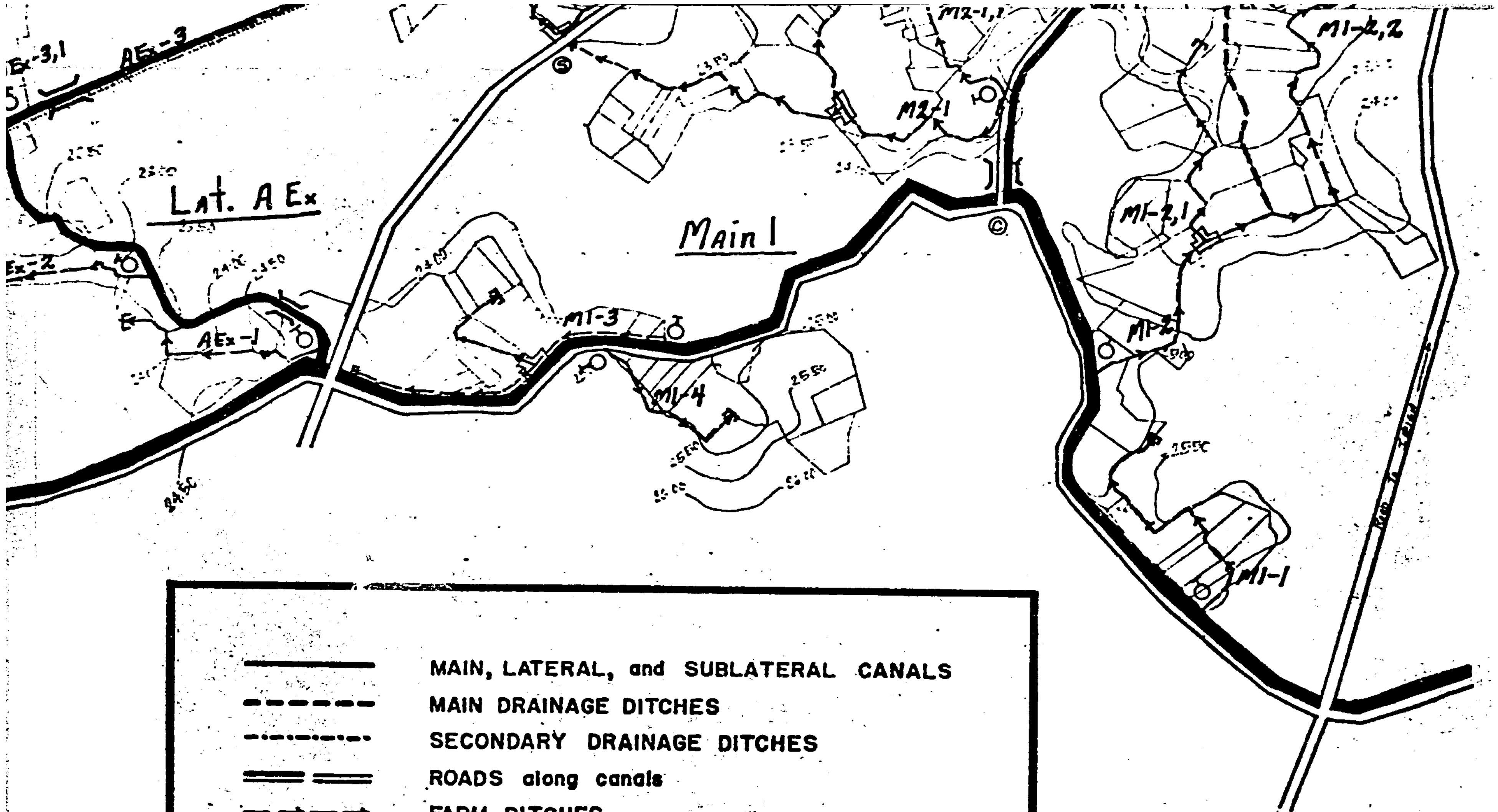

DB1
DB2
MIB-14
MIB-13
MIB-12
B-7.1
B-7
B-4.1
B-5
B-4
B-3
DB15
DB14
DB13
MIB-10
MIB-9
MIB-8
MIB-7
MIB-6
DA-E2
DA-E21
DA-E11
AEx-8
AEx-7
AEx-6
AEx-4.1

FIG

FIGURE 6. Map section I




B-3
M1-11
B-4
B-2
DB13
DB12
B-1
21.50
Lat. B
DB11
M1B-4
M1B-3
M1B-2
M1B
M1B-1
M1-6
M1-5
M1-7
M1-8
AE-1
AE-2
22.50
23.00



MAIN, LATERAL, and SUBLATERAL CANALS
MAIN DRAINAGE DITCHES
SECONDARY DRAINAGE DITCHES
ROADS along canals
FARM DITCHES
TURNOUTS
BULLCART CROSSINGS
PARSHALL FLUMES
DIVISION BOXES
END CHECKS
SIPHON and PIPE CROSSINGS

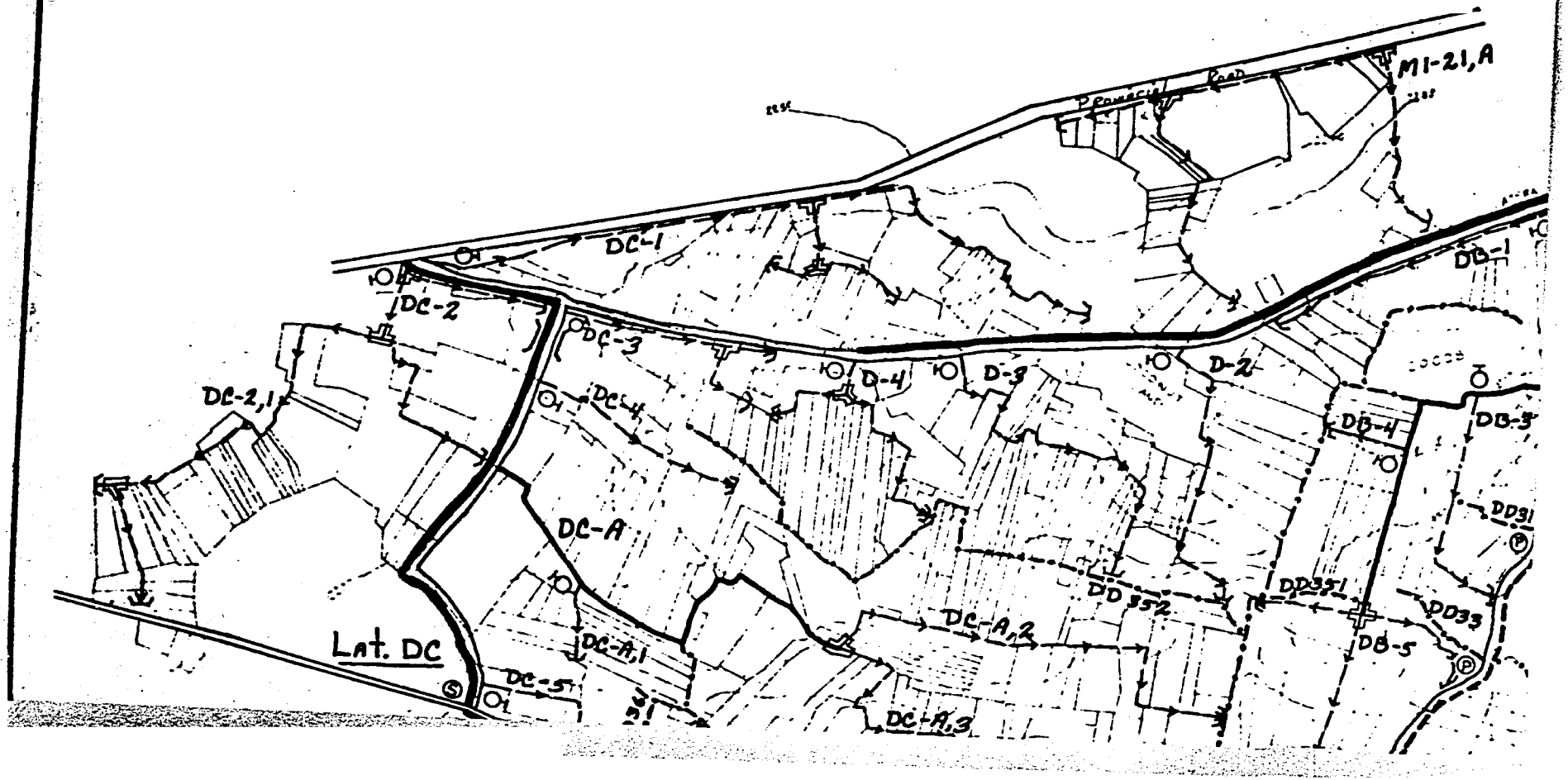
NATIONAL IRRIGATION ADMINISTRATION
REGION IV, NAGA CITY
BARIT RIVER IRRIGATION SYGTEM
NABUA, CAMARINES SUR
NIA-BRBC ON FARM WATER MANAGEMENT PROJECT

PILOT AREA

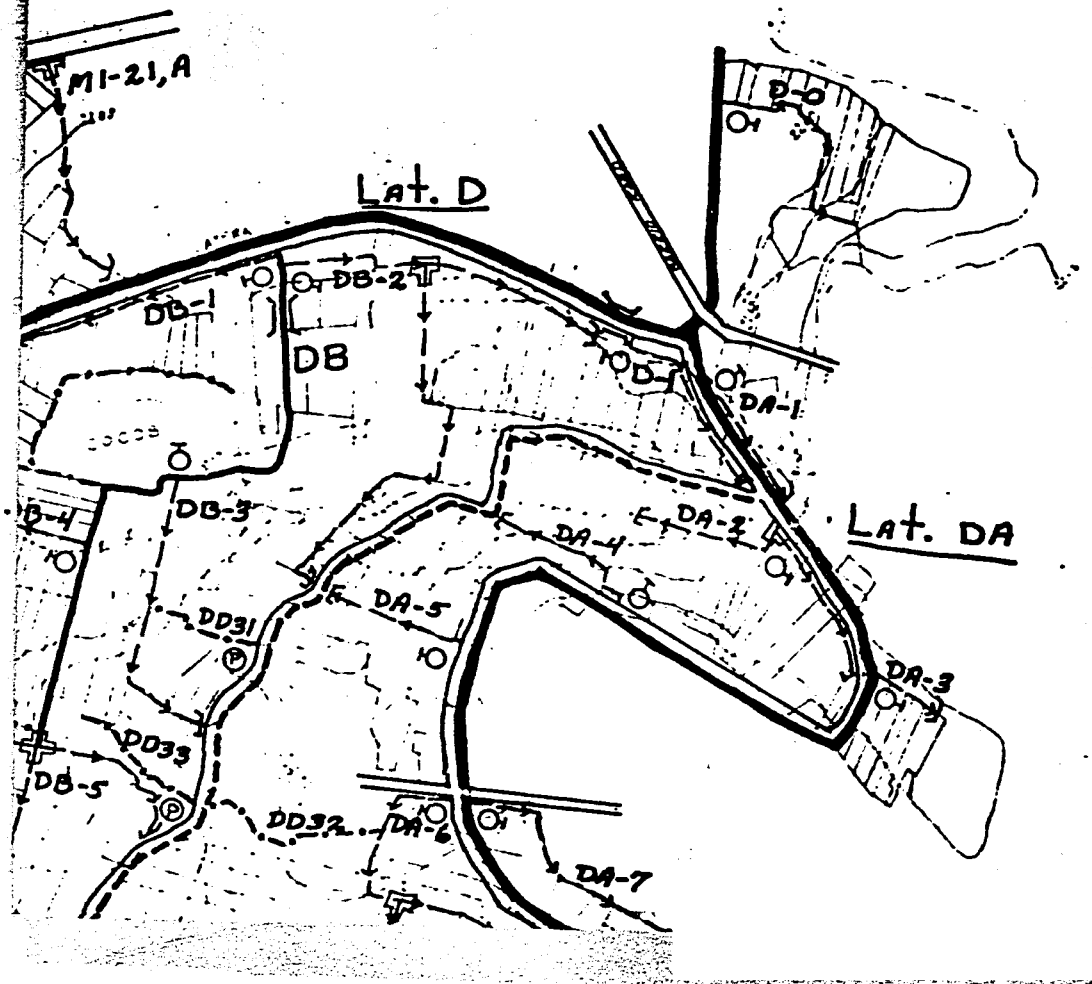
SCALE 1:8000

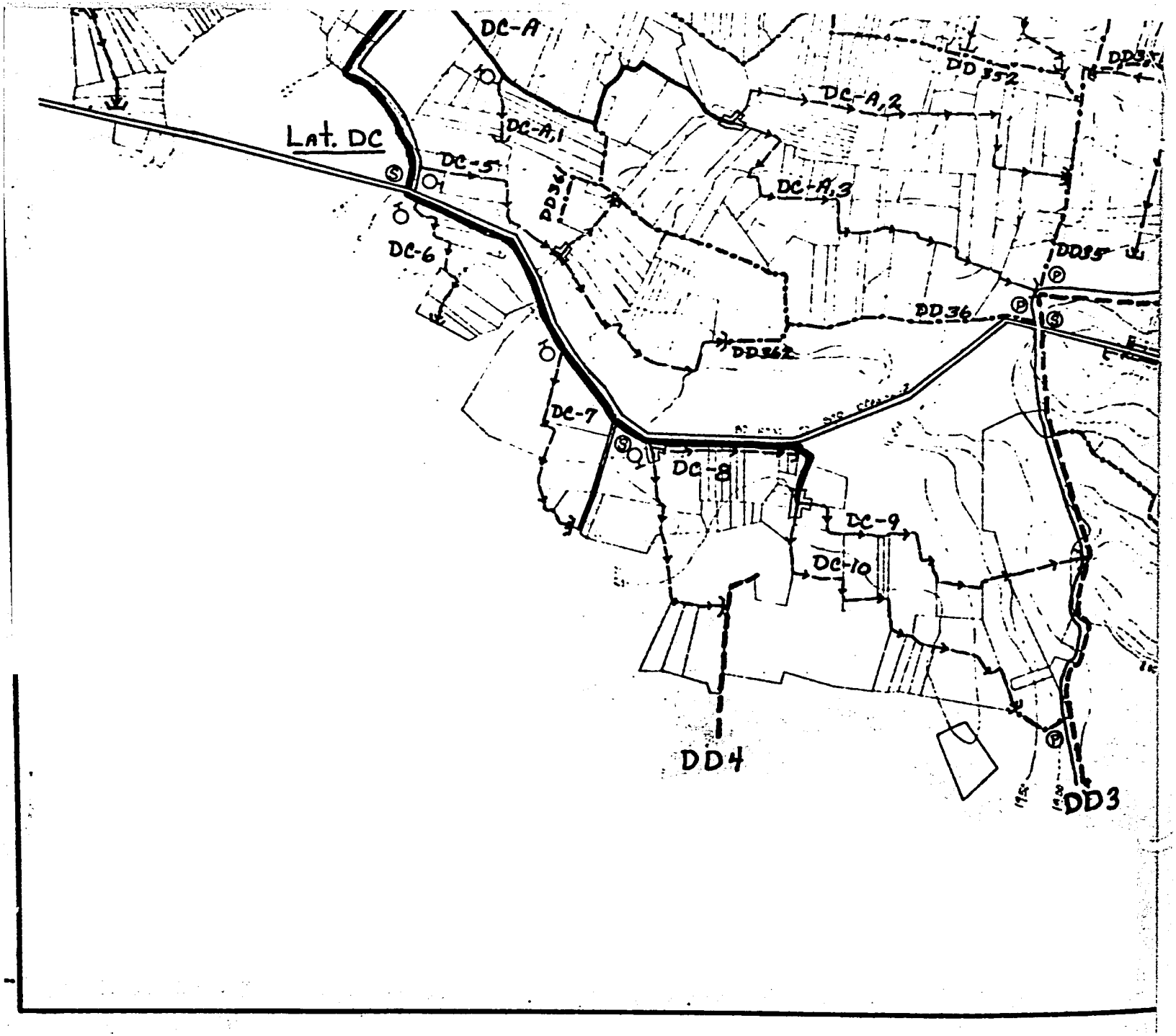
SHEET 1 of 8 DATE

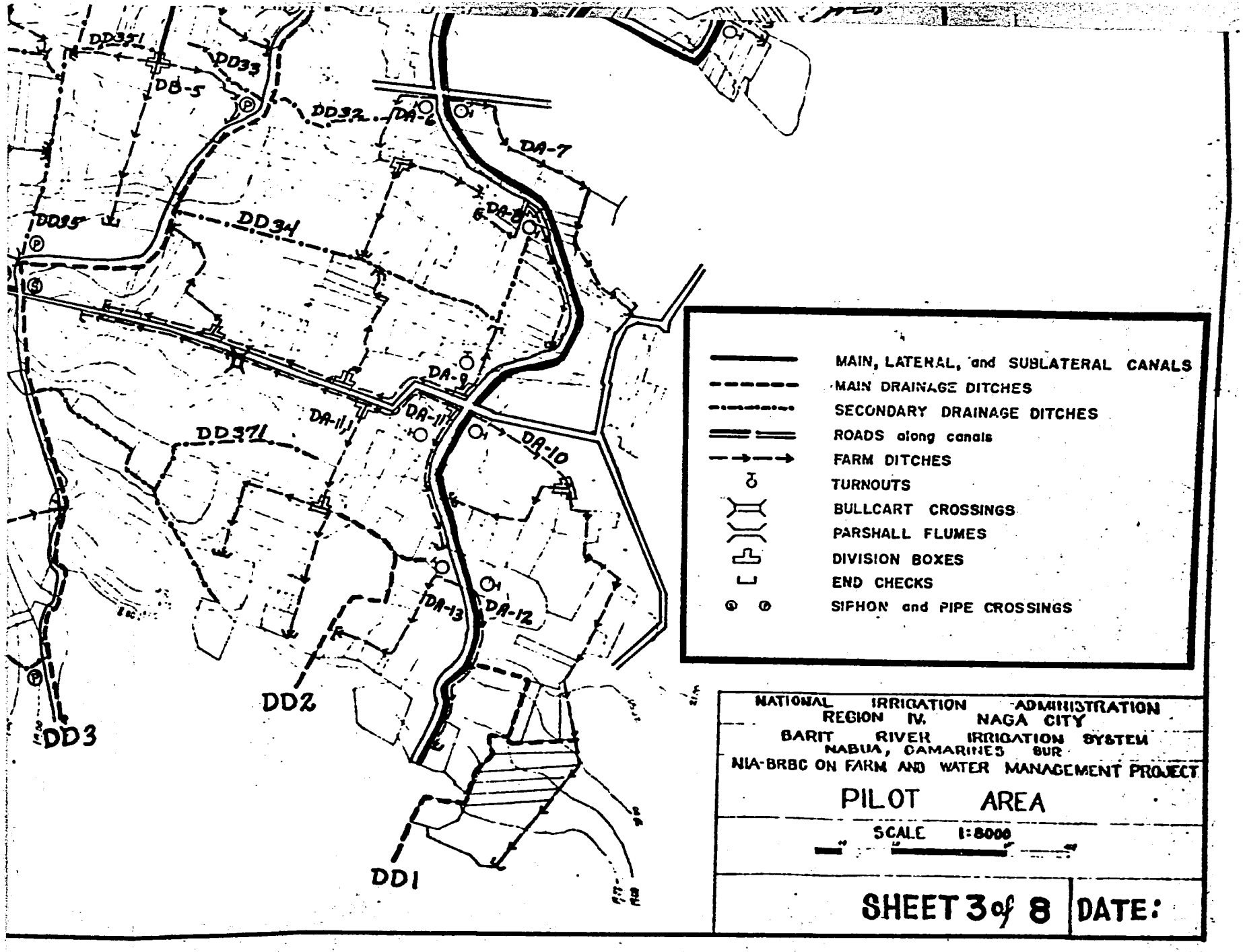
FIGURE 8. Map

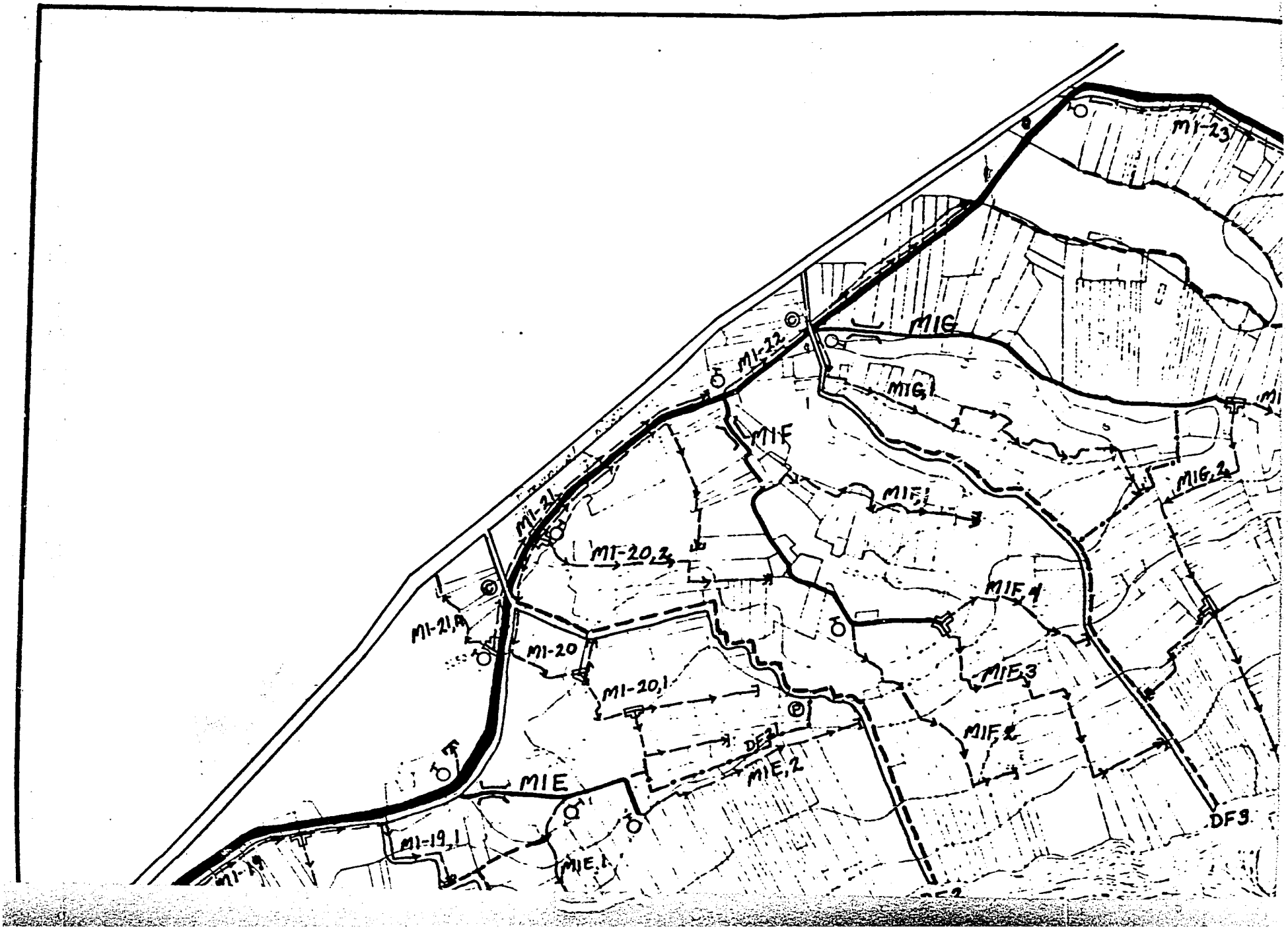

M1-21,A
DC-1
DC-2
DC-3
DC-4
DC-2,1
DC-A
DC-A,1
DC-A,2
DC-A,3
DC-5
Lat. DC
D-4
D-3
D-2
DB-1
DB-3
DB-4
DB-5
DD31
DD33
DD351
DD352

8. Map section 3




DC-A
DC-A,1
DC-A,2
DC-A,3
DD 352
DD35
DD36
DD362
Lat. DC
DC-5
DC-6
DD34
DC-7
DC-8
DC-9
DC-10
DD4
DD3


DD371
DD33
DB-5
DD32
DA-6
DA-7
DD35
DD34
DA-8
DA-9
DA-11
DA-11
DD371
DA-10
DA-13
DA-12
DD2
DD3
DD1
MAIN, LATERAL, and SUBLATERAL CANALS
MAIN DRAINAGE DITCHES
SECONDARY DRAINAGE DITCHES
ROADS along canals
FARM DITCHES
TURNOUTS
BULLCART CROSSINGS
PARSHALL FLUMES
DIVISION BOXES
END CHECKS
SIPHON and PIPE CROSSINGS
NATIONAL IRRIGATION ADMINISTRATION
REGION IV. NAGA CITY
BARIT RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR
NIA-BRBC ON FARM AND WATER MANAGEMENT PROJECT
PILOT AREA
SCALE 1:8000
SHEET 3 of 8
DATE:


M1-23
M1G
M1-22
M1G,1
M1F
M1-21
M1F,1
M1G,2
M1-20,2
M1F,4
M1-21,A
M1-20
M1F,3
M1-20,1
DF3,1
M1F,2
M1E,2
M1E
M1-19,1
M1E,1
DF3

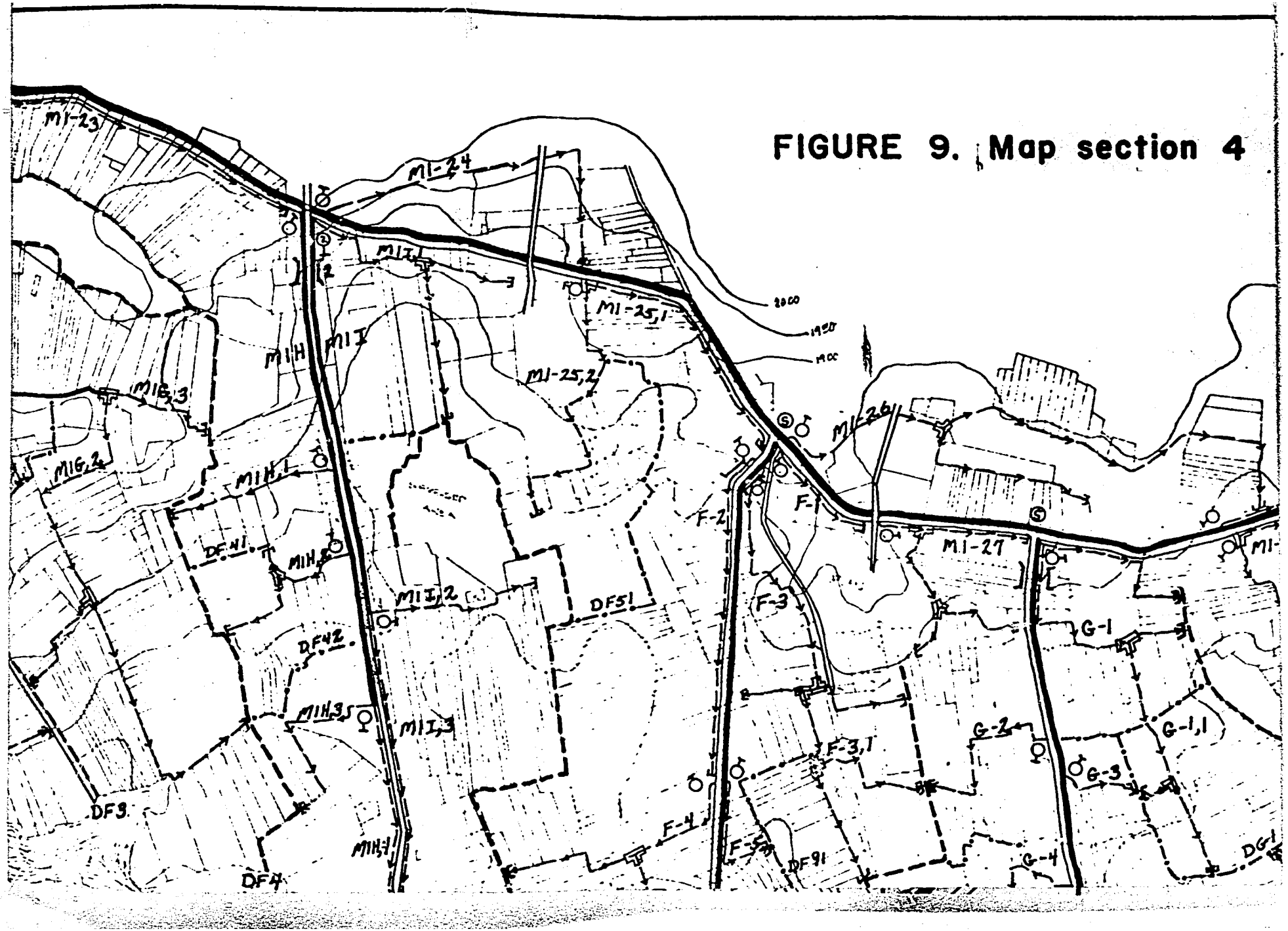
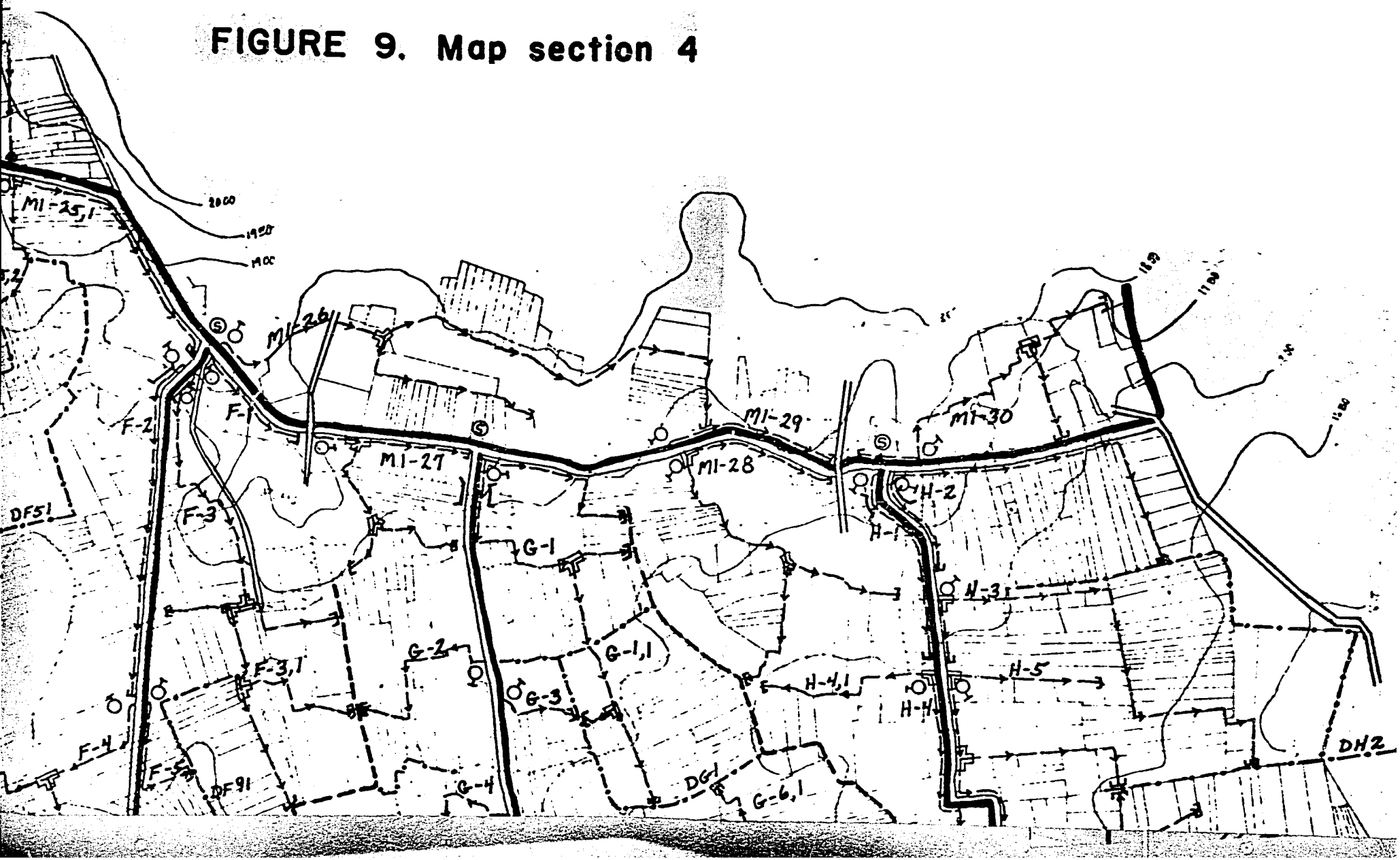
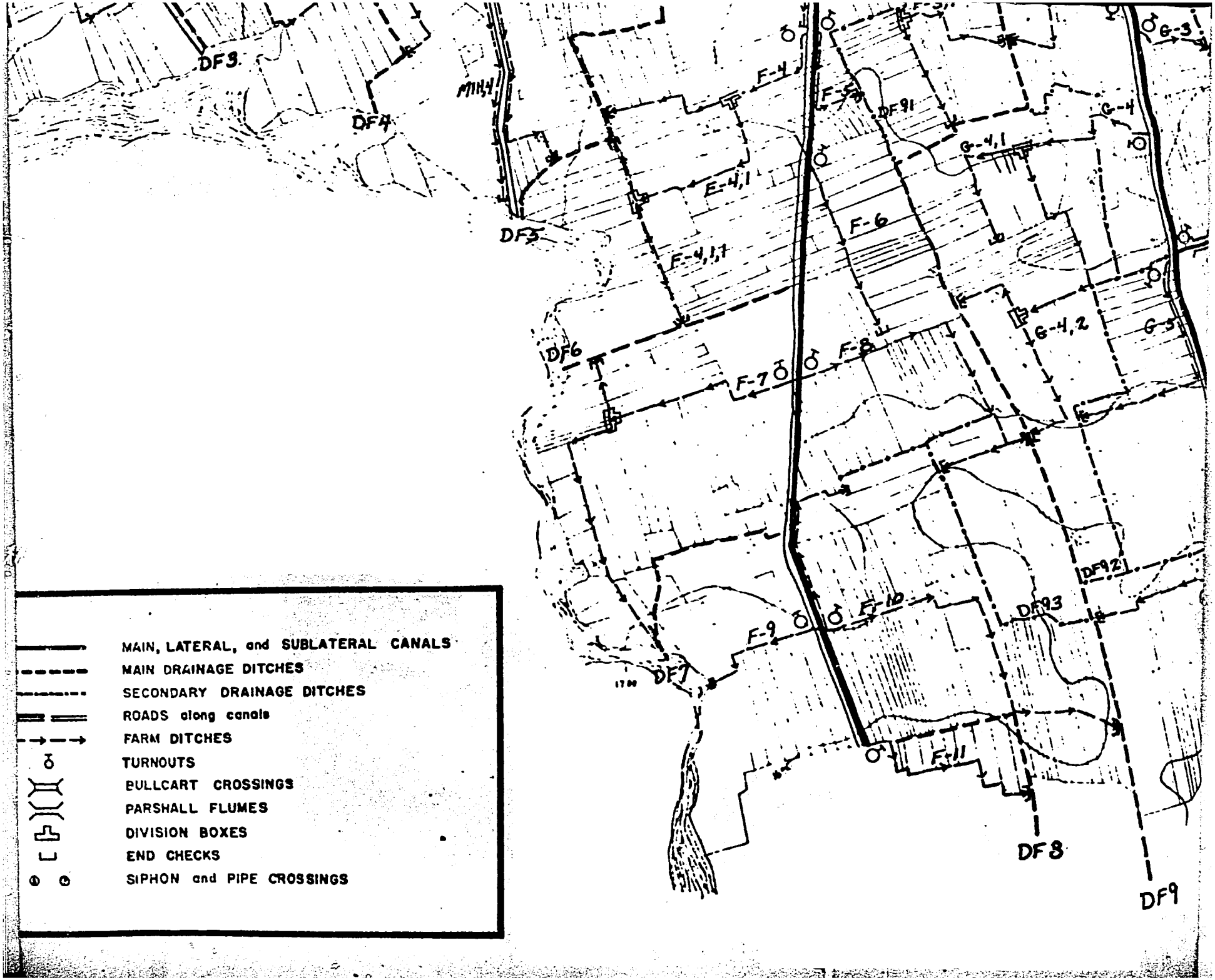


FIGURE 9. Map section 4

FIGURE 9. Map section 4

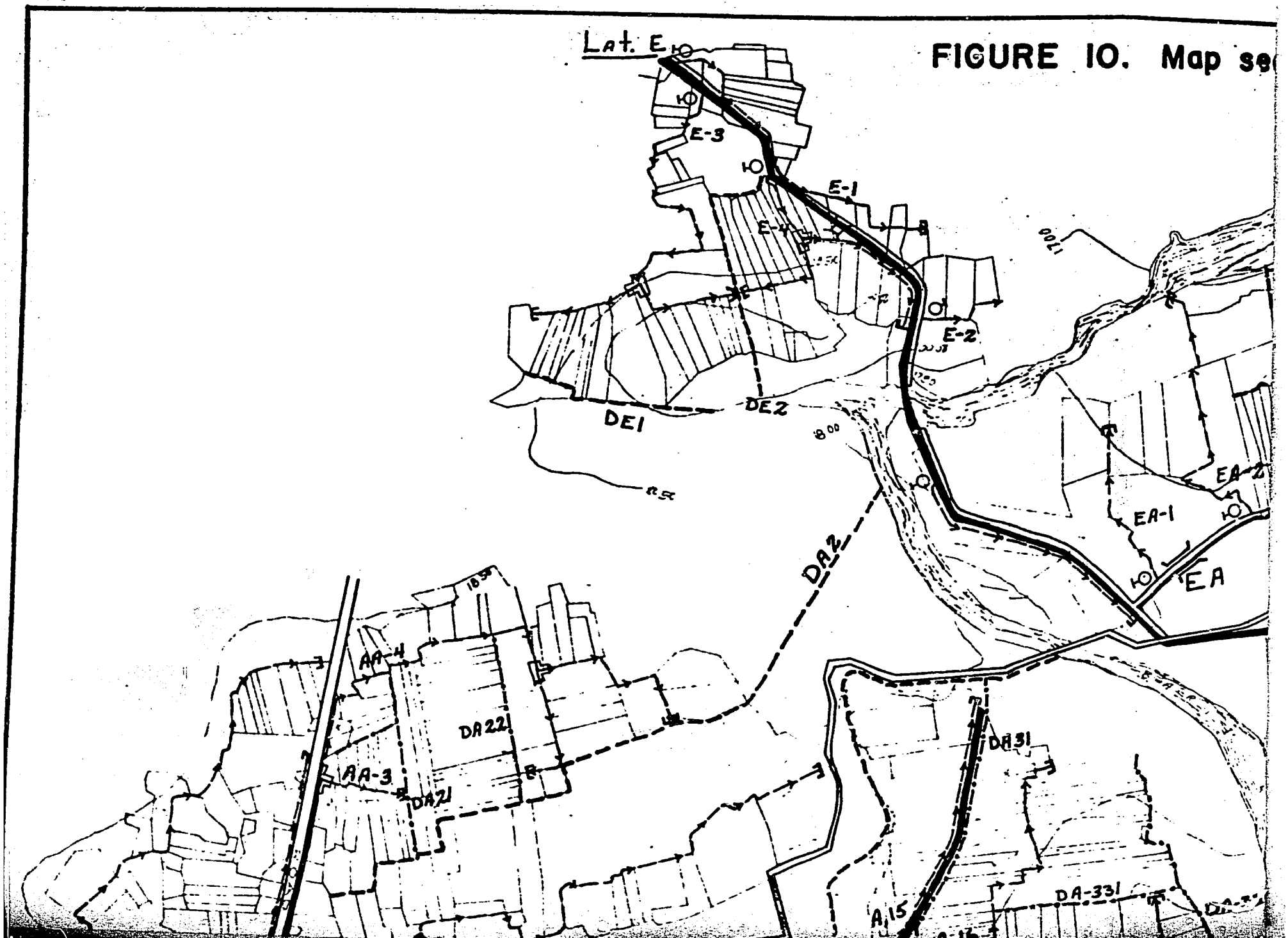


MIE
MIE,2
MIE,1
M1-19,1
M1-19
M1-19,2
E-1
E-2
DF.2
DF.1
DF.1L
MAIN
MAIN
SECO
ROAD
FARM
TURN
BULL
PARS
DIVIS
END
SIPHO

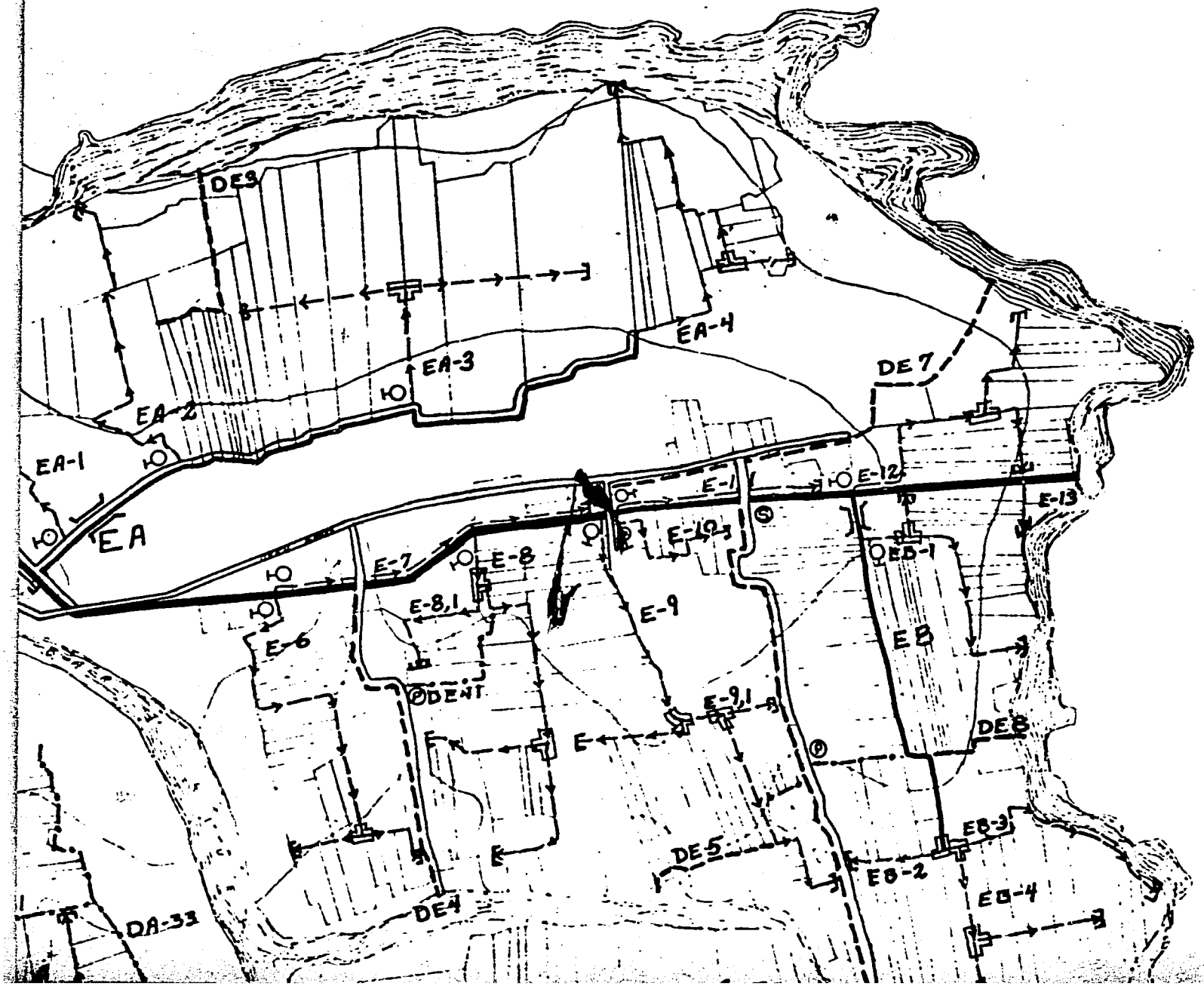

DF3
DF4
M1H,4
DF5
DF6
DF7
DF8
DF9
DF91
DF92
DF93
F-3
F-4
F-5
F-6
F-7
F-8
F-9
F-10
F-11
E-4,1
F-4,1,1
G-3
G-4
G-4,1
G-4,2
G-5
MAIN, LATERAL, and SUBLATERAL CANALS
MAIN DRAINAGE DITCHES
SECONDARY DRAINAGE DITCHES
ROADS along canals
FARM DITCHES
TURNOUTS
BULLCART CROSSINGS
PARSHALL FLUMES
DIVISION BOXES
END CHECKS
SIPHON and PIPE CROSSINGS

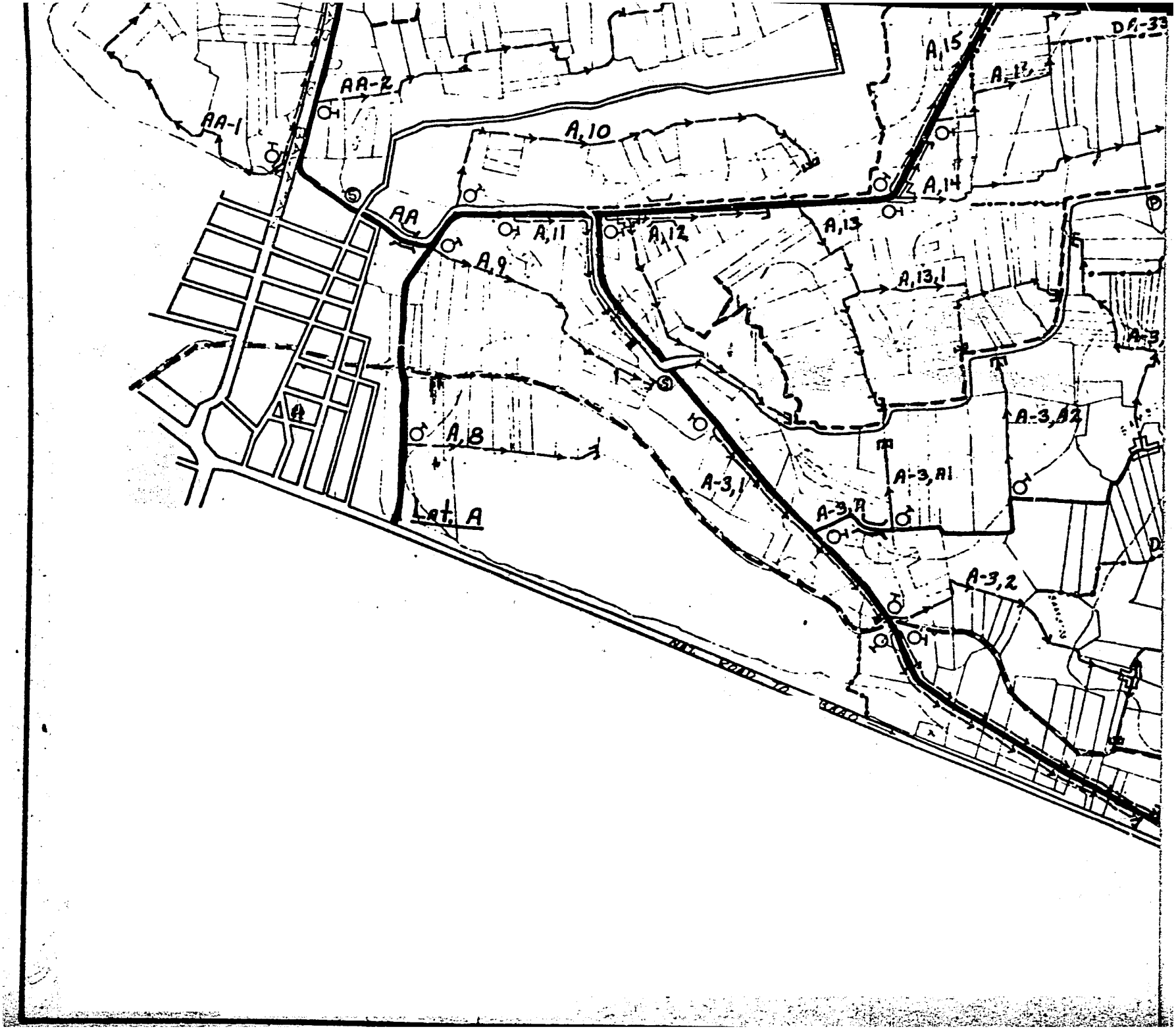
G-3
H-H
DH2
DF91
G-4
DG1
G-6,1
G-4,1
H-6,1
F-6
G-6
G-6,2
H-6
DH1
DG2
G-4,2
G-5
F-8
G-7,1
H-8
G-7
H-7
G-7,2
G-7,3
DG3
DF92
DG4
G-8
F-10
DF93
G-9
DG
F-11
DF8
DF9
NATIONAL IRRIGATION ADMINISTRATION
REGION IV, NAGA CITY
BARIT RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR
NIA-BRBC ON FARM AND WATER MANAGEMENT PROJECT
PILOT AREA
SCALE : 1:8000
SHEET 4 of 8

FIGURE 10. Map se



Map section 5




AA-1
AA-2
AA
A,8
A,9
A,10
A,11
A,12
A,13
A,13,1
A,14
A,15
A-3
A-3,A2
A-3,A1
A-3,A
A-3,1
A-3,2
Lat. A
DA-33

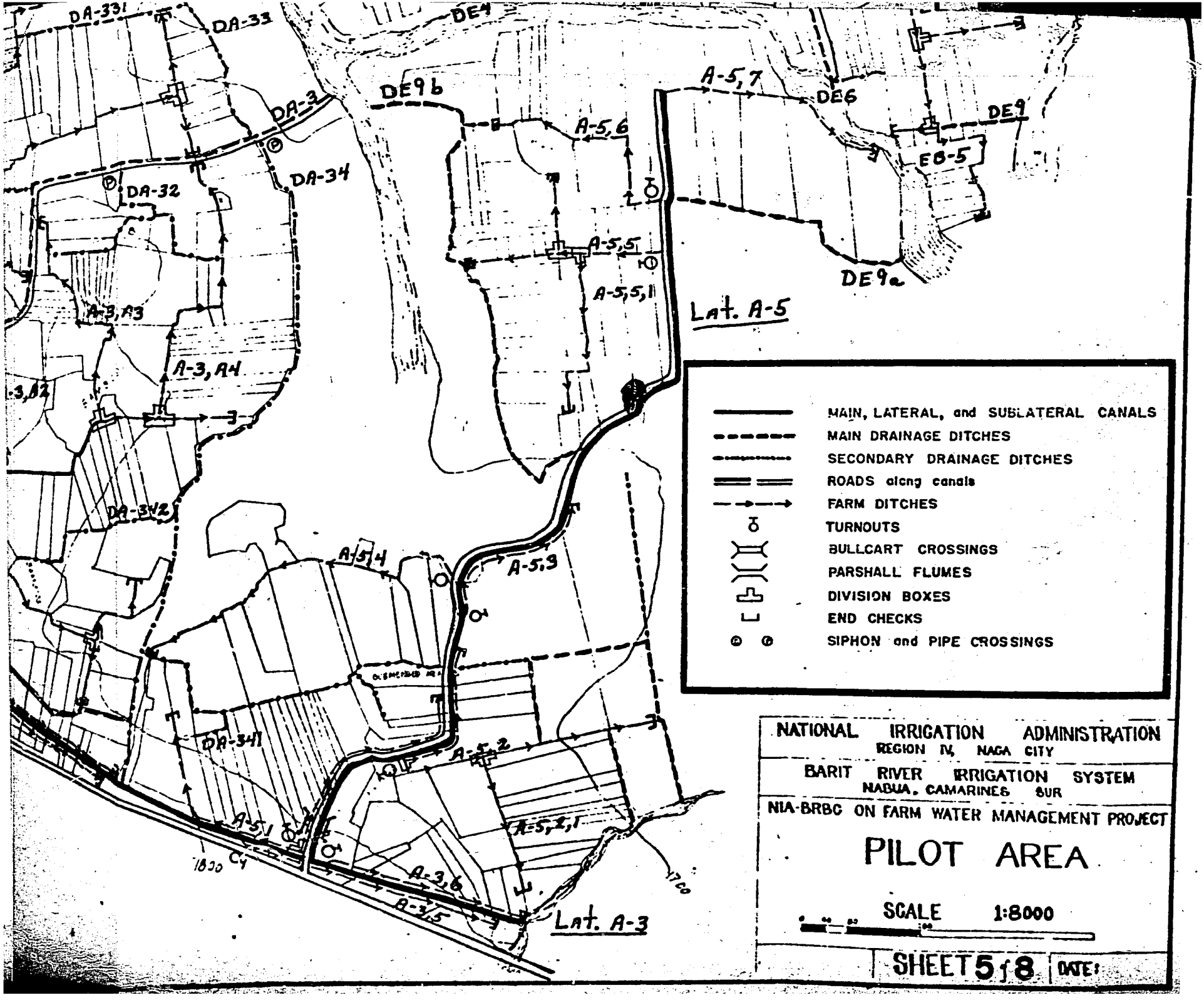
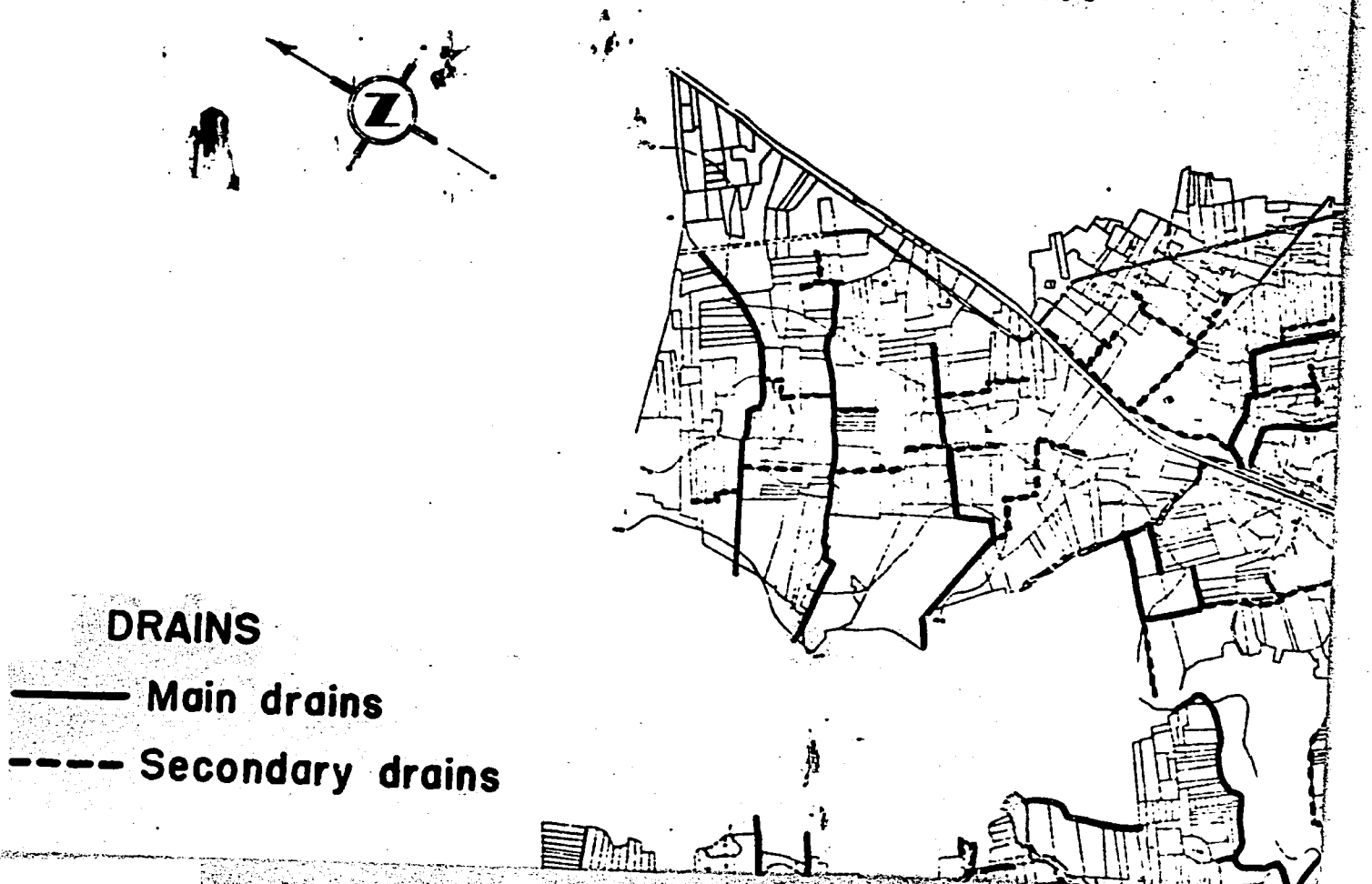
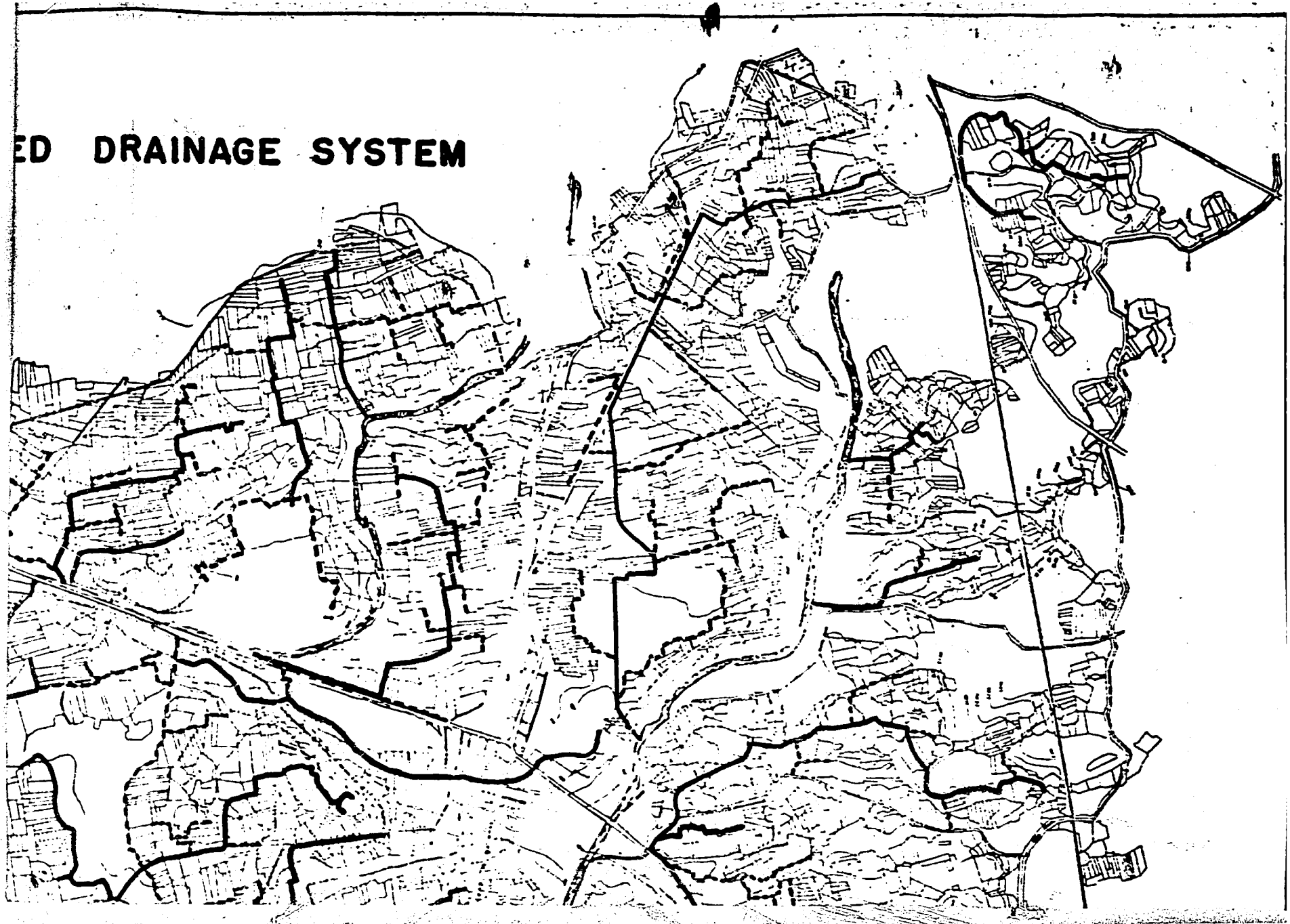

DA-331
DA-33
DE4
DE9b
DA-3
DA-34
DA-32
A-5,7
DE6
DE9
EB-5
A-5,6
A-5,5
A-5,5,1
DE9a
Lat. A-5
A-3,A3
A-3,A4
A-3,A2
DA-342
A-5,4
A-5,3
DA-341
A-5,2
A-5,1
A-5,2,1
A-3,6
A-3,5
Lat. A-3
1800
1700
MAIN, LATERAL, and SUBLATERAL CANALS
MAIN DRAINAGE DITCHES
SECONDARY DRAINAGE DITCHES
ROADS along canals
FARM DITCHES
TURNOUTS
BULLCART CROSSINGS
PARSHALL FLUMES
DIVISION BOXES
END CHECKS
SIPHON and PIPE CROSSINGS
NATIONAL IRRIGATION ADMINISTRATION
REGION IV, NAGA CITY
BARIT RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR
NIA-BRBC ON FARM WATER MANAGEMENT PROJECT
PILOT AREA
SCALE 1:8000
SHEET 5 of 8
DATE:

FIGURE 3. PROPOSED DR

SCALE 1:25500

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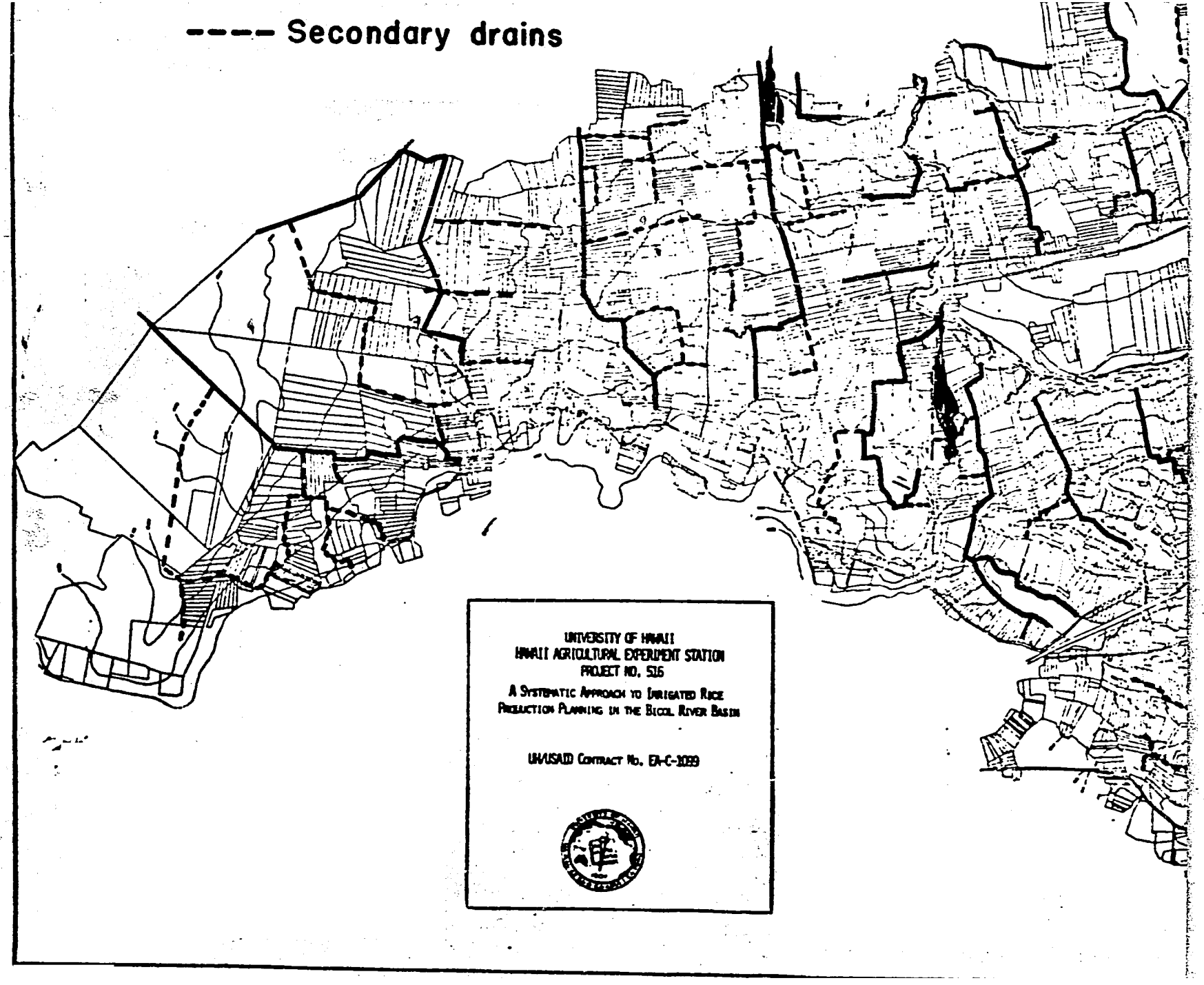
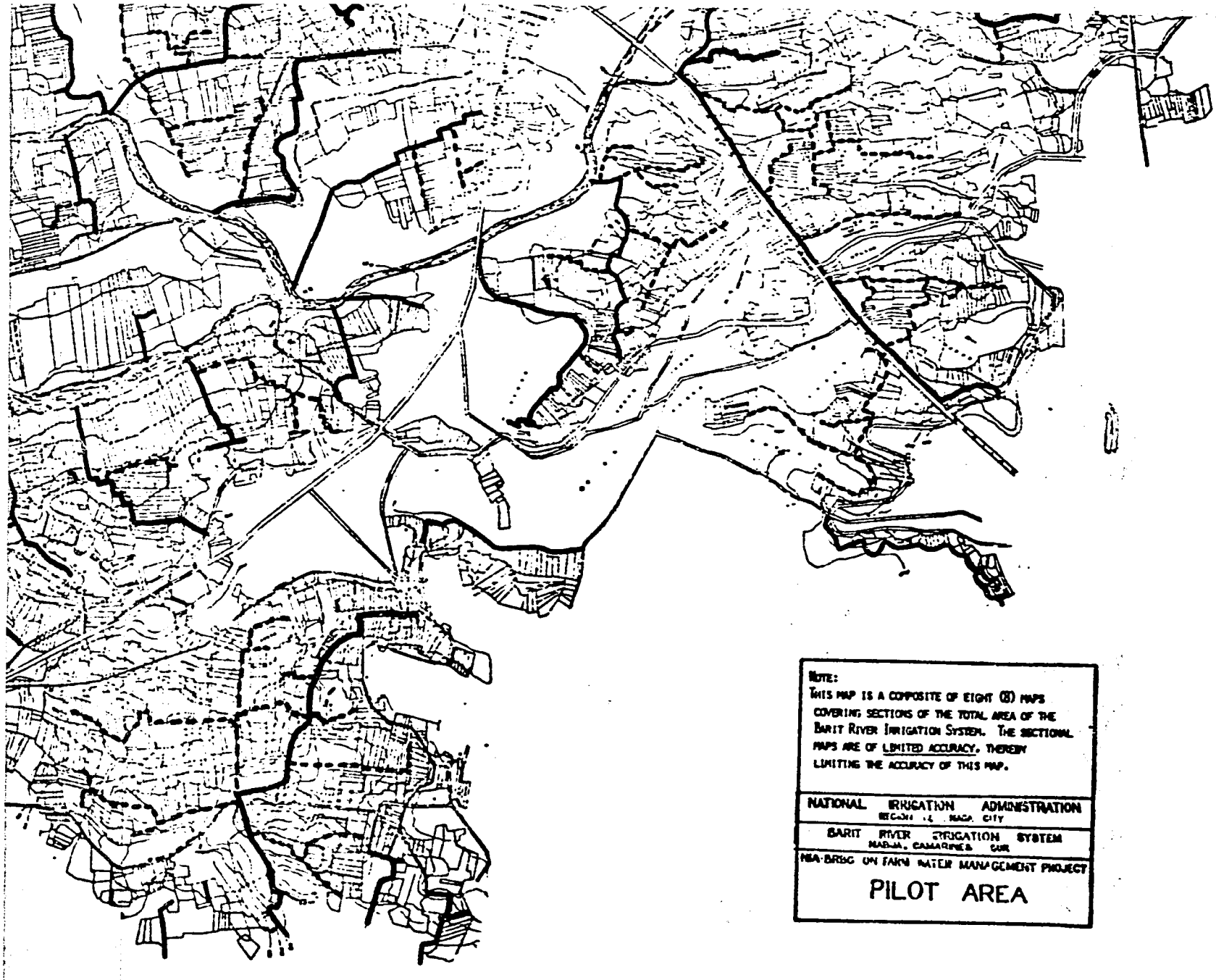

---- Secondary drains
UNIVERSITY OF HAWAII
HAWAII AGRICULTURAL EXPERIMENT STATION
PROJECT NO. 516
A SYSTEMATIC APPROACH TO IRRIGATED RICE
PRODUCTION PLANNING IN THE BICOL RIVER BASIN
UH/USAID CONTRACT NO. EA-C-1099



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NATIONAL IRRIGATION ADMINISTRATION
REGION 5, NAGA CITY

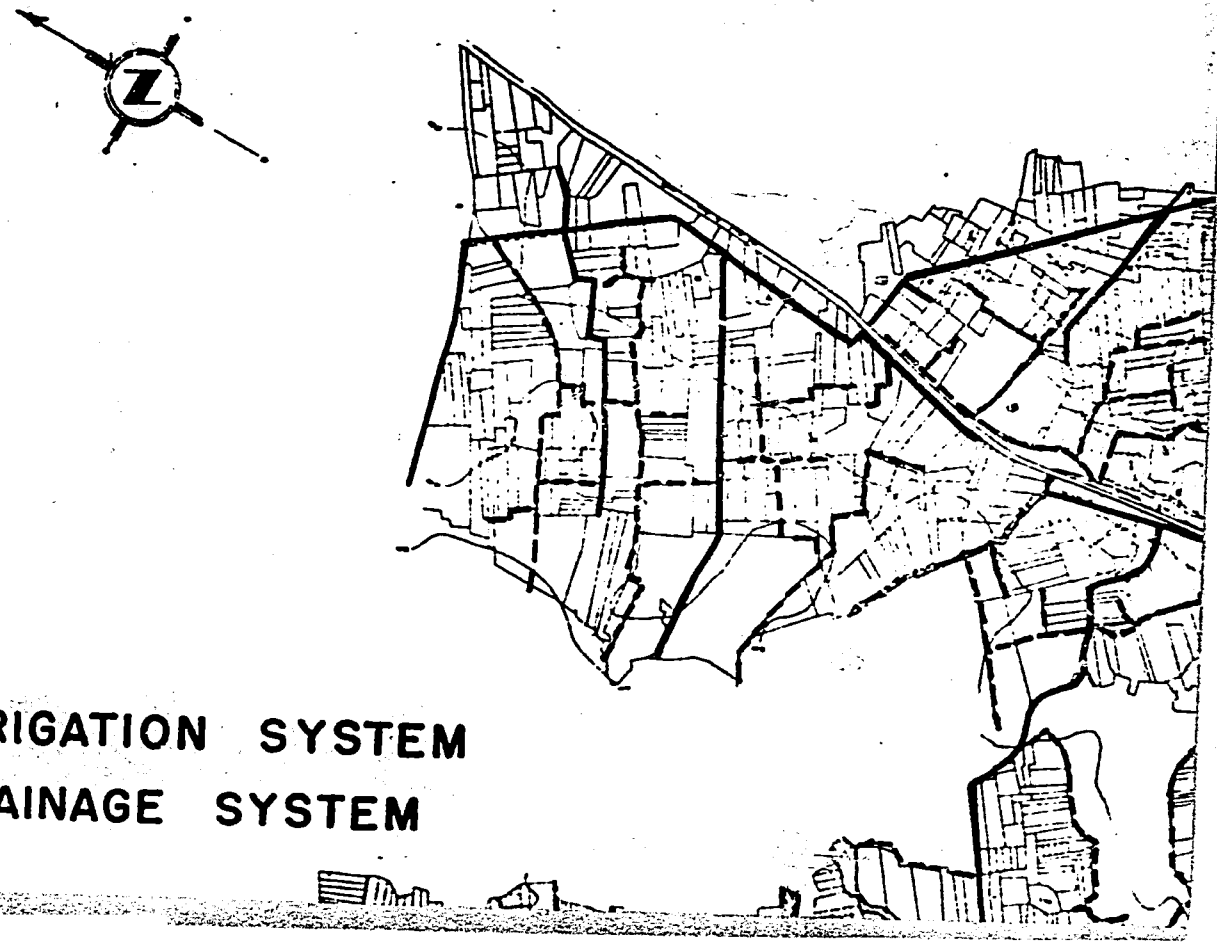
BARIT RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR

NIA-BRISC ON FARM WATER MANAGEMENT PROJECT

PILOT AREA

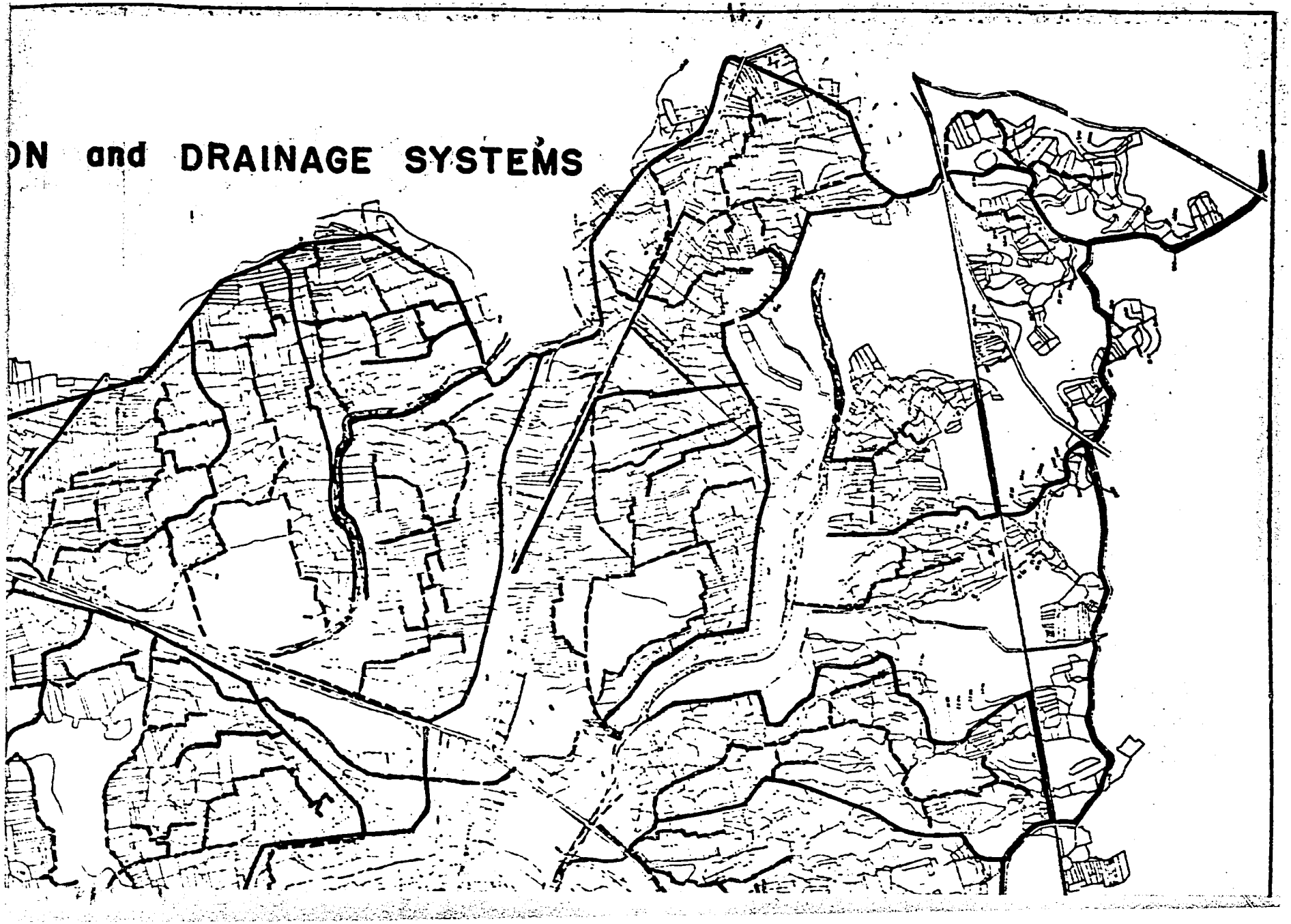
FIGURE 4. IRRIGATION an

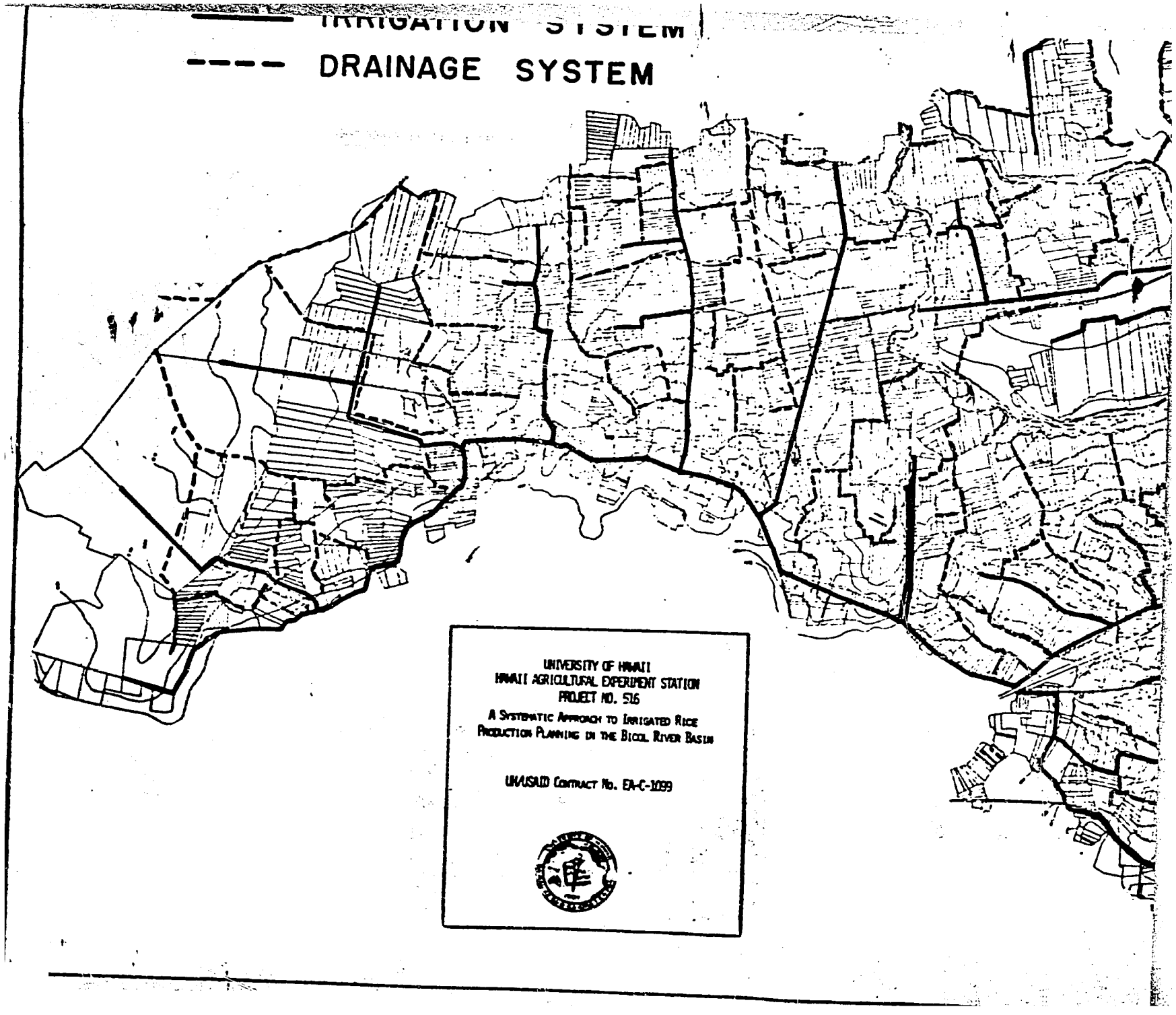
SCALE 1:25500

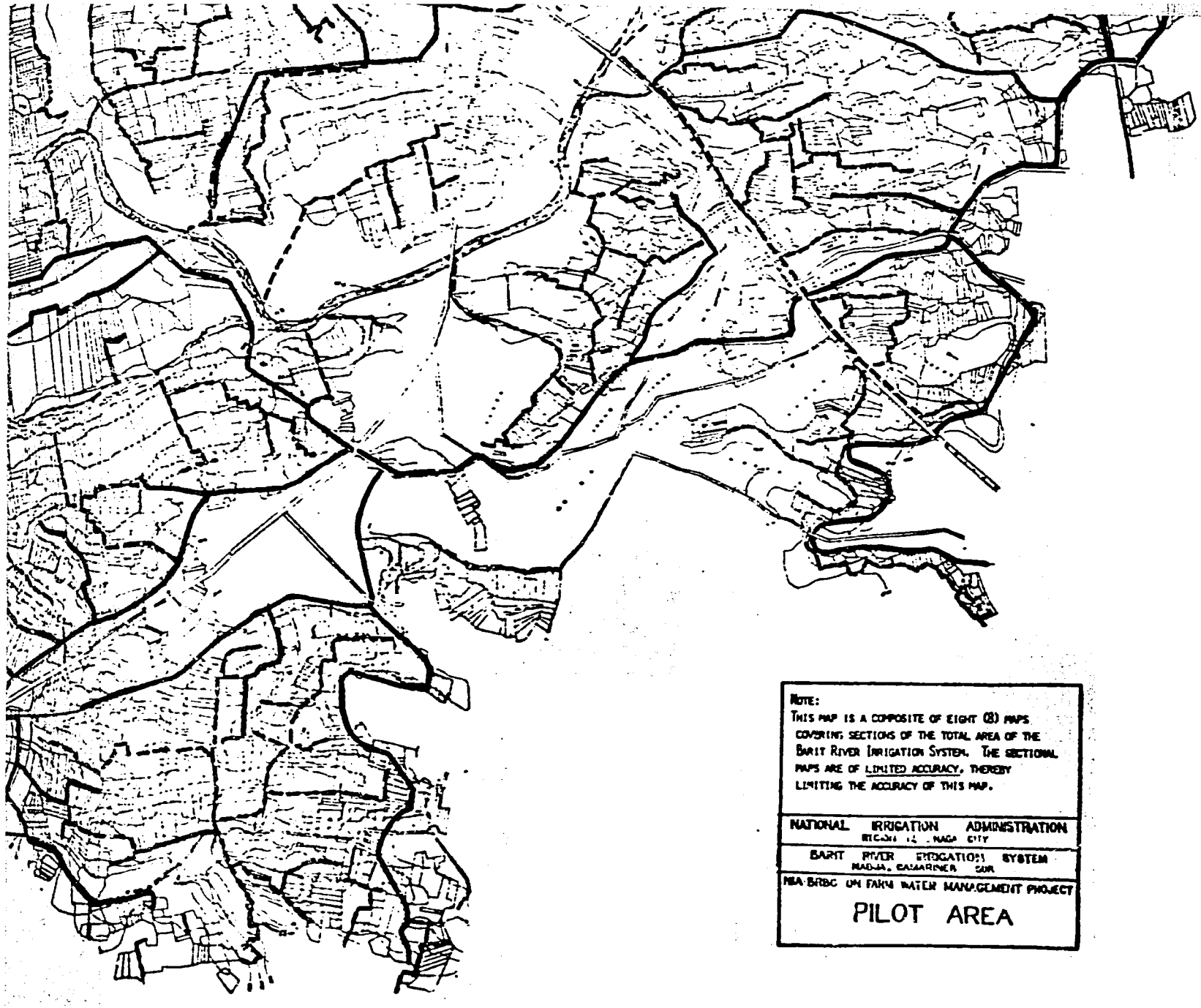


IRRIGATION SYSTEM

DRAINAGE SYSTEM


ON and DRAINAGE SYSTEMS


IRRIGATION SYSTEM
DRAINAGE SYSTEM
UNIVERSITY OF HAWAII
HAWAII AGRICULTURAL EXPERIMENT STATION
PROJECT NO. 516
A SYSTEMATIC APPROACH TO IRRIGATED RICE
PRODUCTION PLANNING IN THE BICOL RIVER BASIN
UH/USAID CONTRACT No. EA-C-1099



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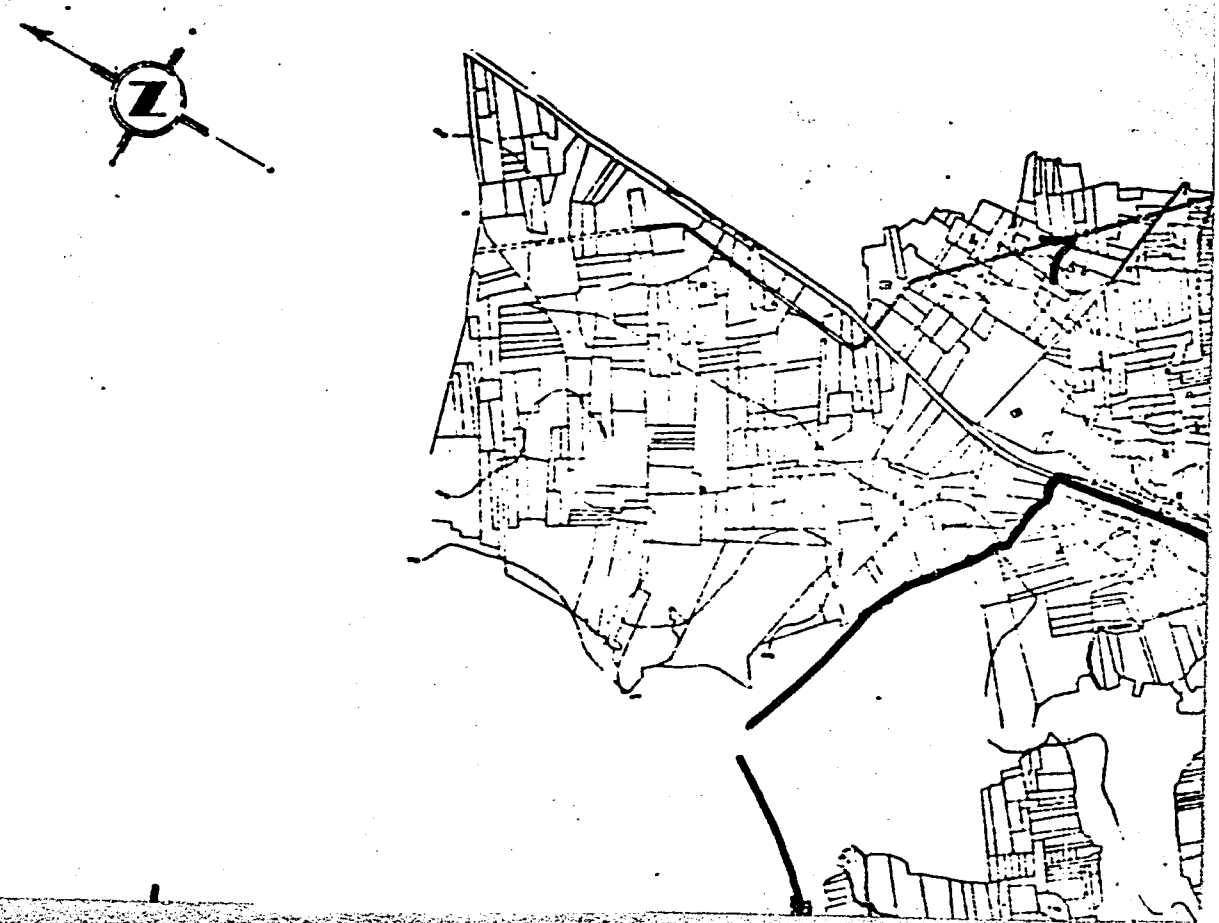
NATIONAL IRRIGATION ADMINISTRATION
REGION 5 - NAGA CITY

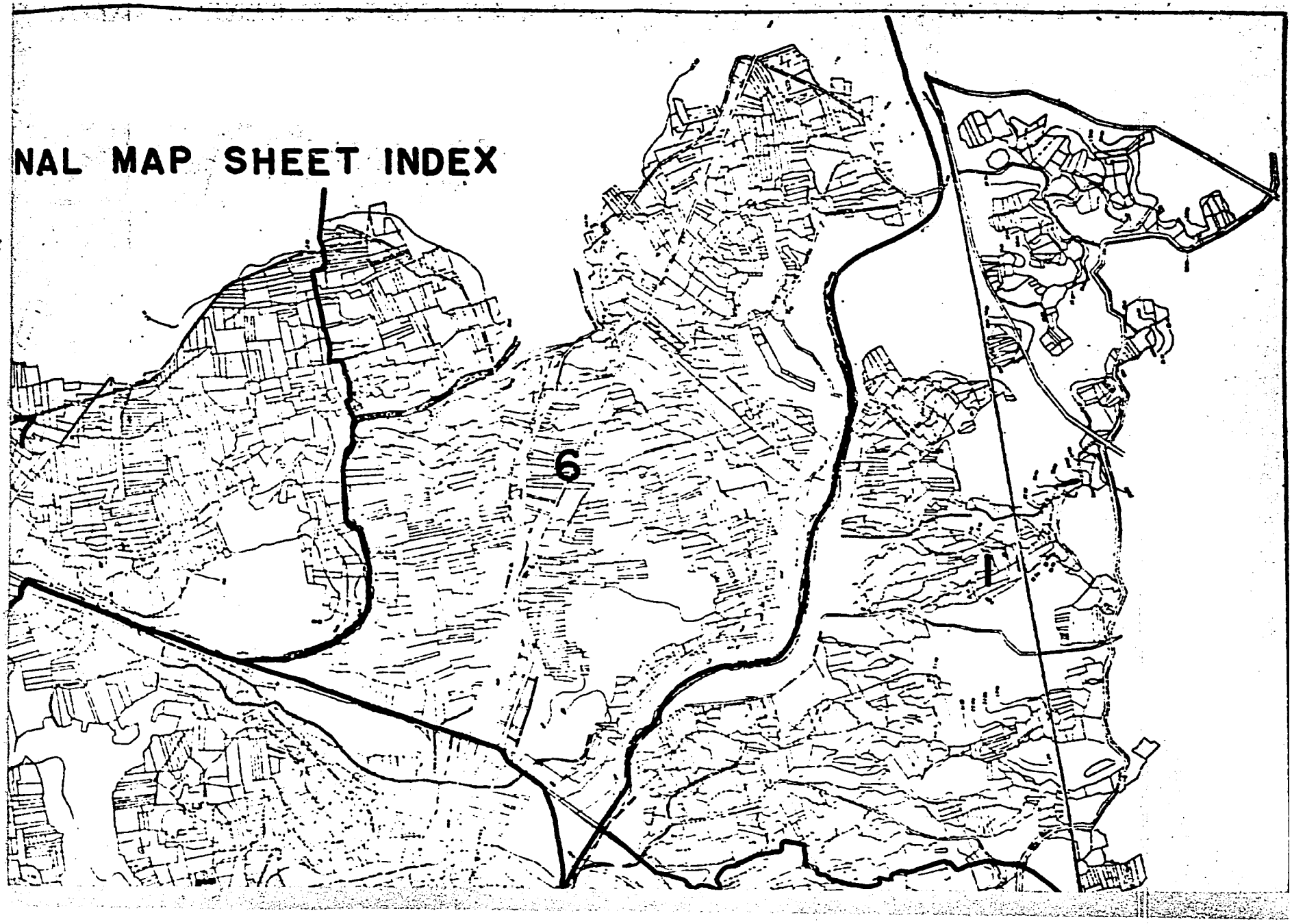
BARIT RIVER IRRIGATION SYSTEM
MADJA, CAMARINES SUR

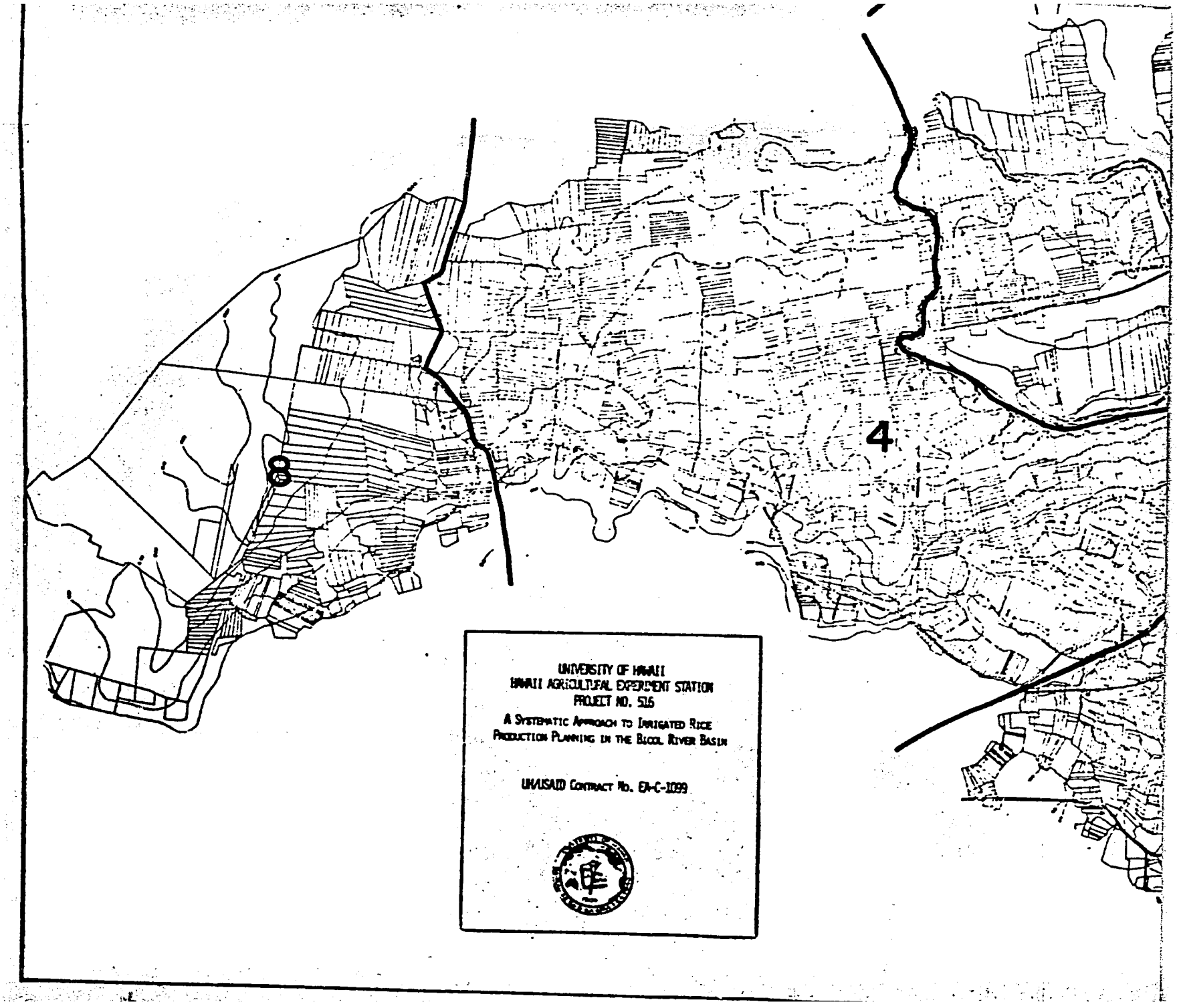
NIA-BRBC ON FARM WATER MANAGEMENT PROJECT

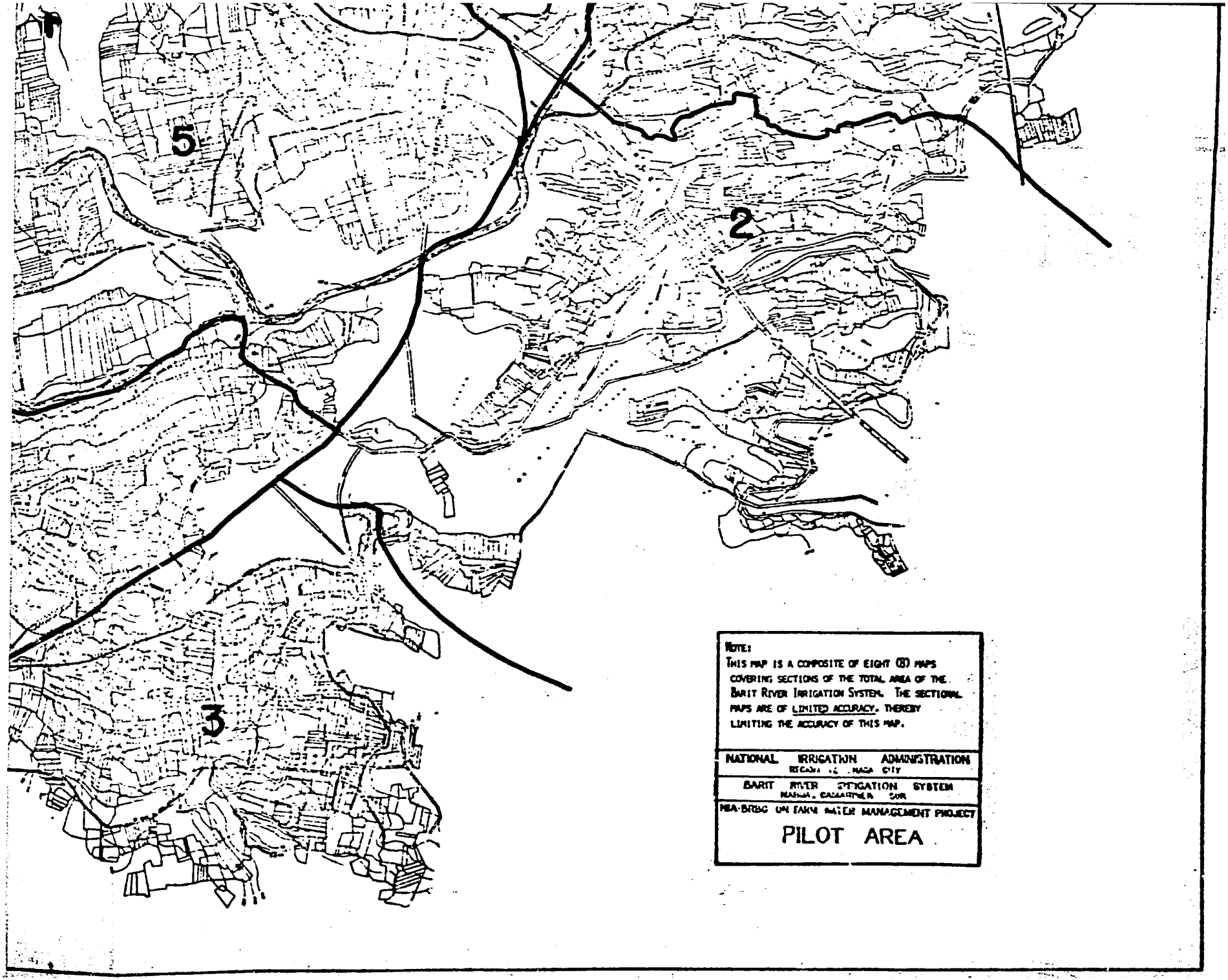
PILOT AREA

FIGURE 5. SECTIONAL M




NAL MAP SHEET INDEX
6
1


8
4
UNIVERSITY OF HAWAII
HAWAII AGRICULTURAL EXPERIMENT STATION
PROJECT NO. 516
A SYSTEMATIC APPROACH TO IRRIGATED RICE
PRODUCTION PLANNING IN THE BICOL RIVER BASIN
UH/USAID CONTRACT NO. EA-C-1099


5
2
3
NOTE:
THIS MAP IS A COMPOSITE OF EIGHT (8) MAPS COVERING SECTIONS OF THE TOTAL AREA OF THE BARIT RIVER IRRIGATION SYSTEM. THE SECTIONAL MAPS ARE OF LIMITED ACCURACY, THEREBY LIMITING THE ACCURACY OF THIS MAP.
NATIONAL IRRIGATION ADMINISTRATION
BARIT RIVER IRRIGATION SYSTEM
NEA-BRBC ON FARM WATER MANAGEMENT PROJECT
PILOT AREA

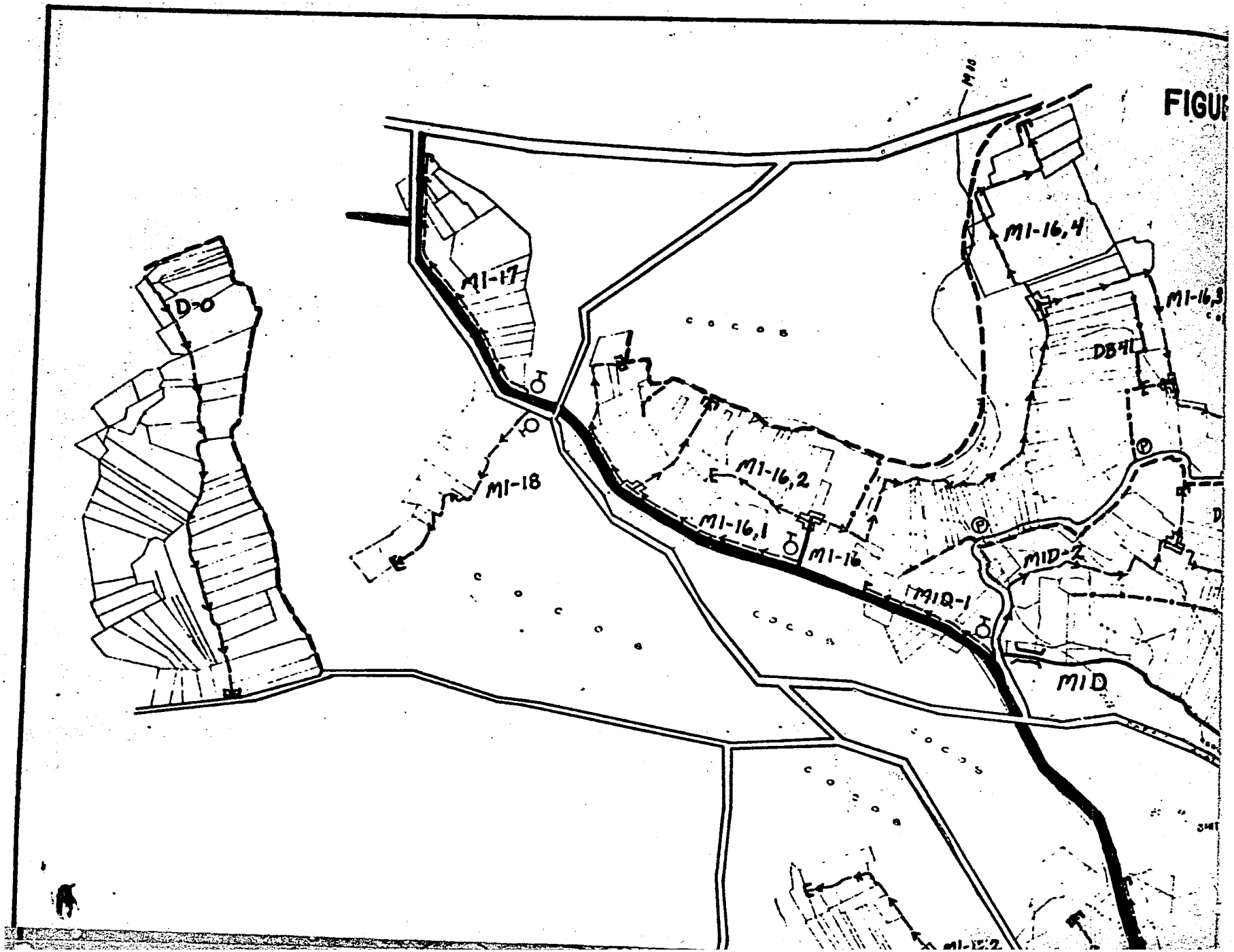
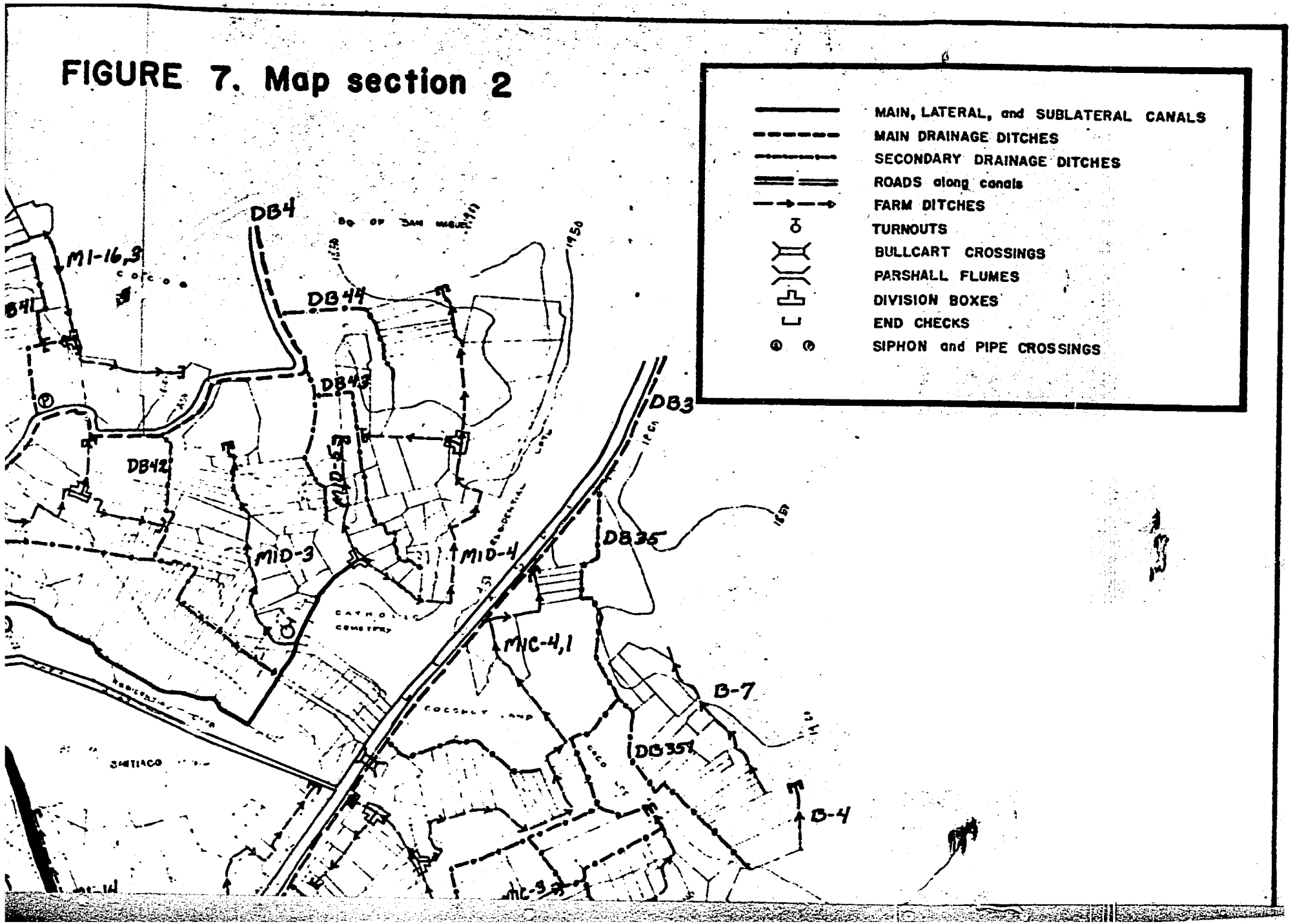
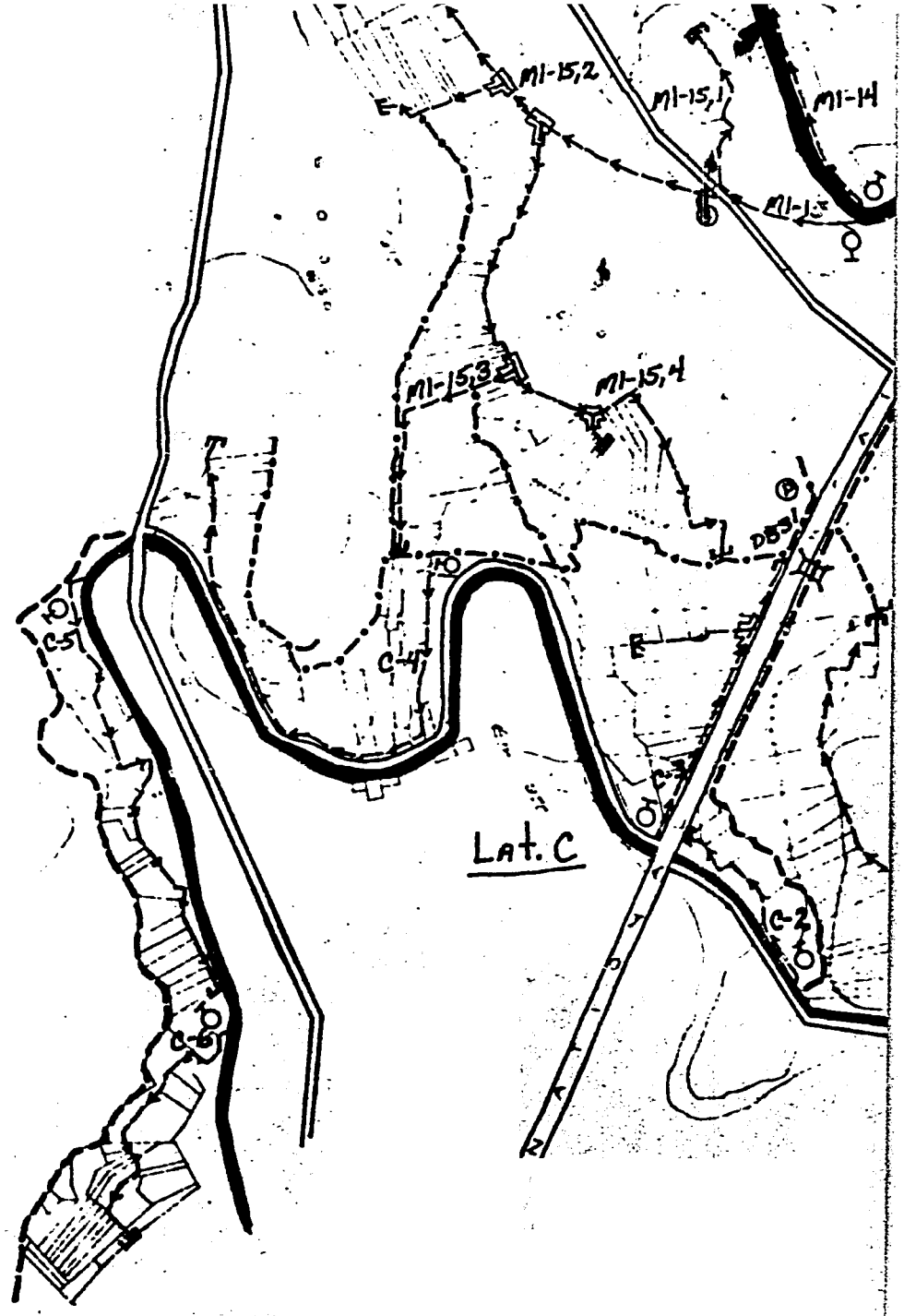
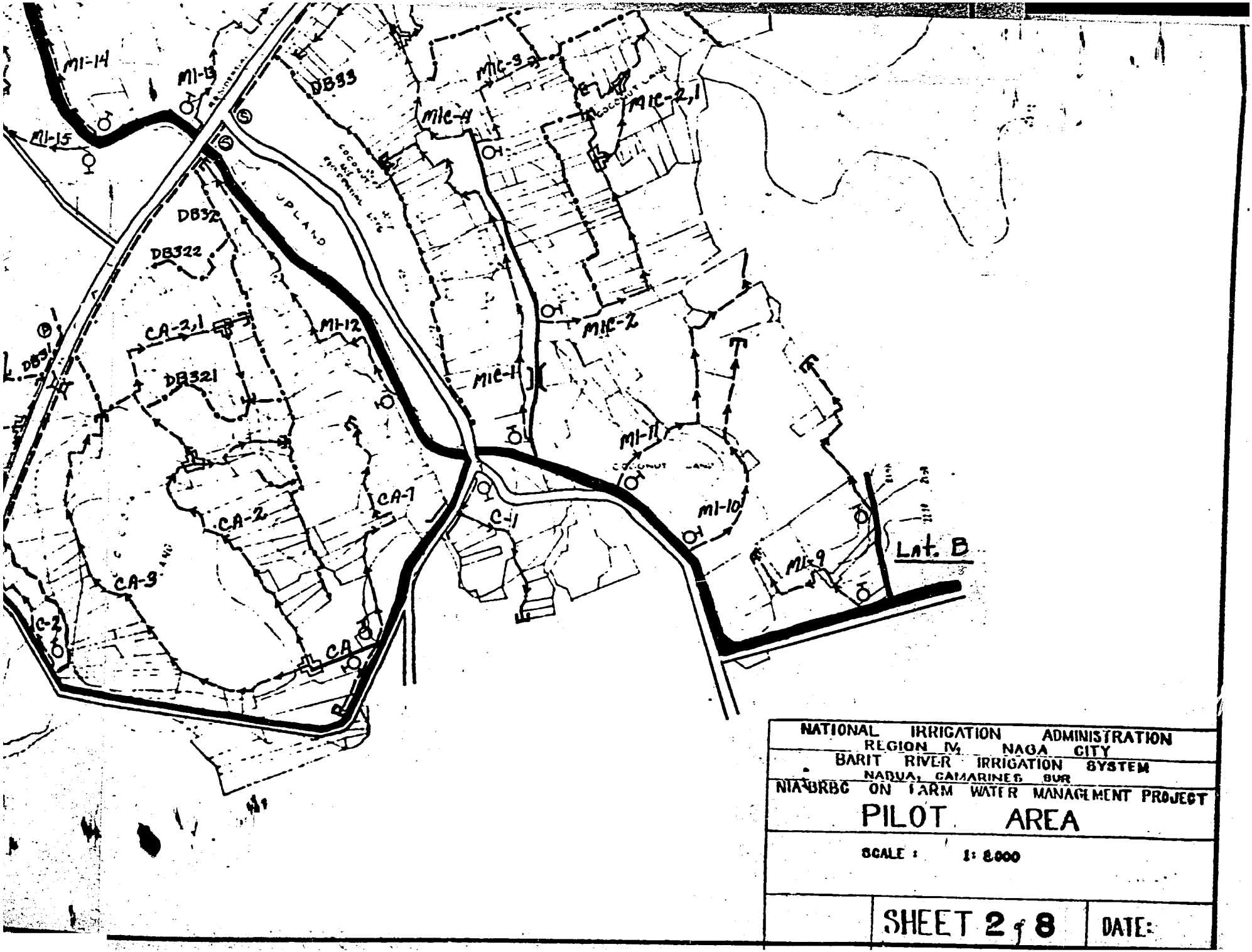

FIGU
M1-16,4
M1-16,3
DB41
M1-17
D-0
M1-18
M1-16,2
M1-16,1
M1-16
MID-2
MID-1
MID
M1-15,2

FIGURE 7. Map section 2




M1-15,2
M1-15,1
M1-14
M1-15,3
M1-15,4
C-4
C-5
C-2
Lat. C



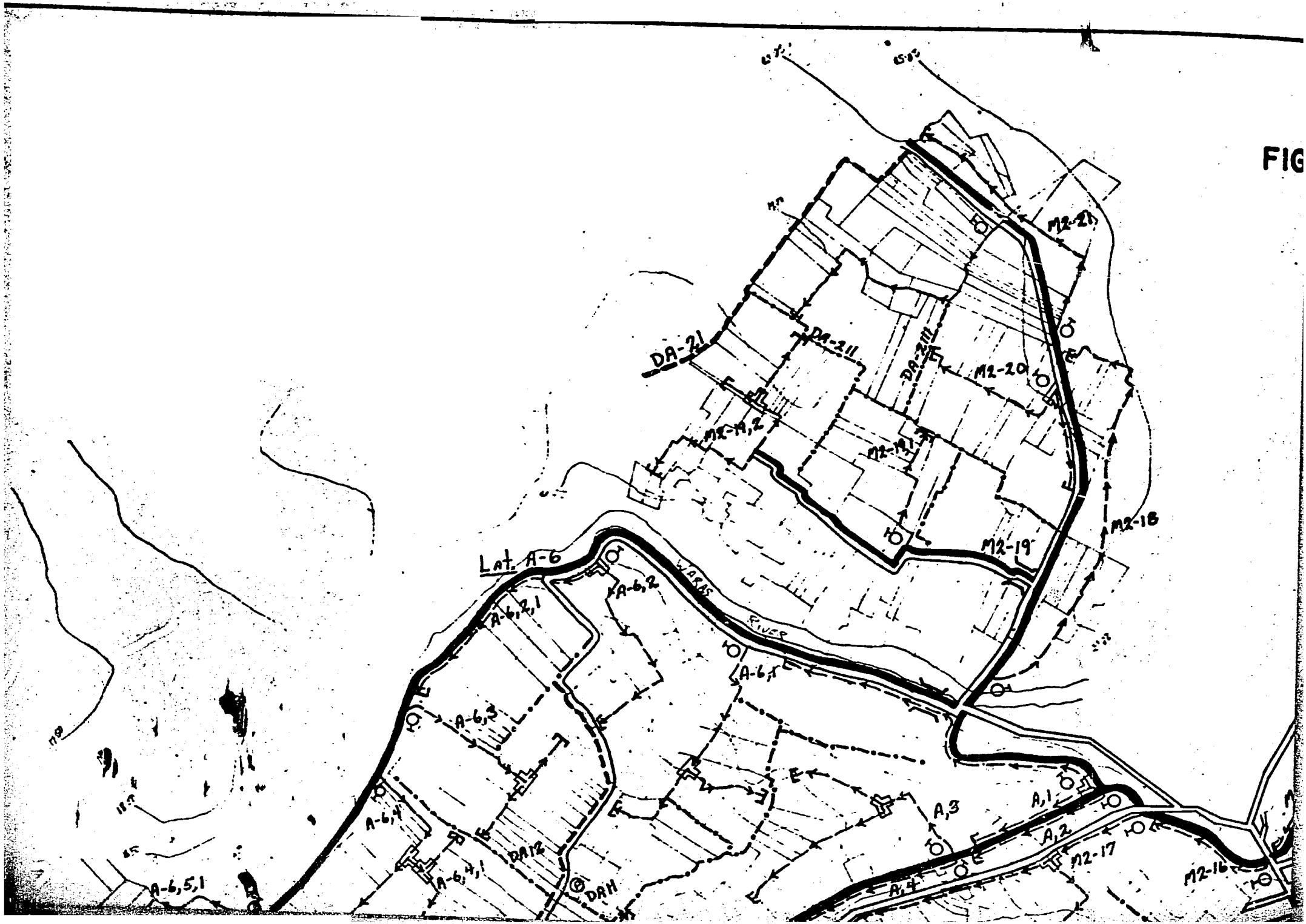
NATIONAL IRRIGATION ADMINISTRATION
REGION IV, NAGA CITY
BARIT RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR
NIA-BRBC ON FARM WATER MANAGEMENT PROJECT

PILOT AREA

SCALE : 1: 8,000

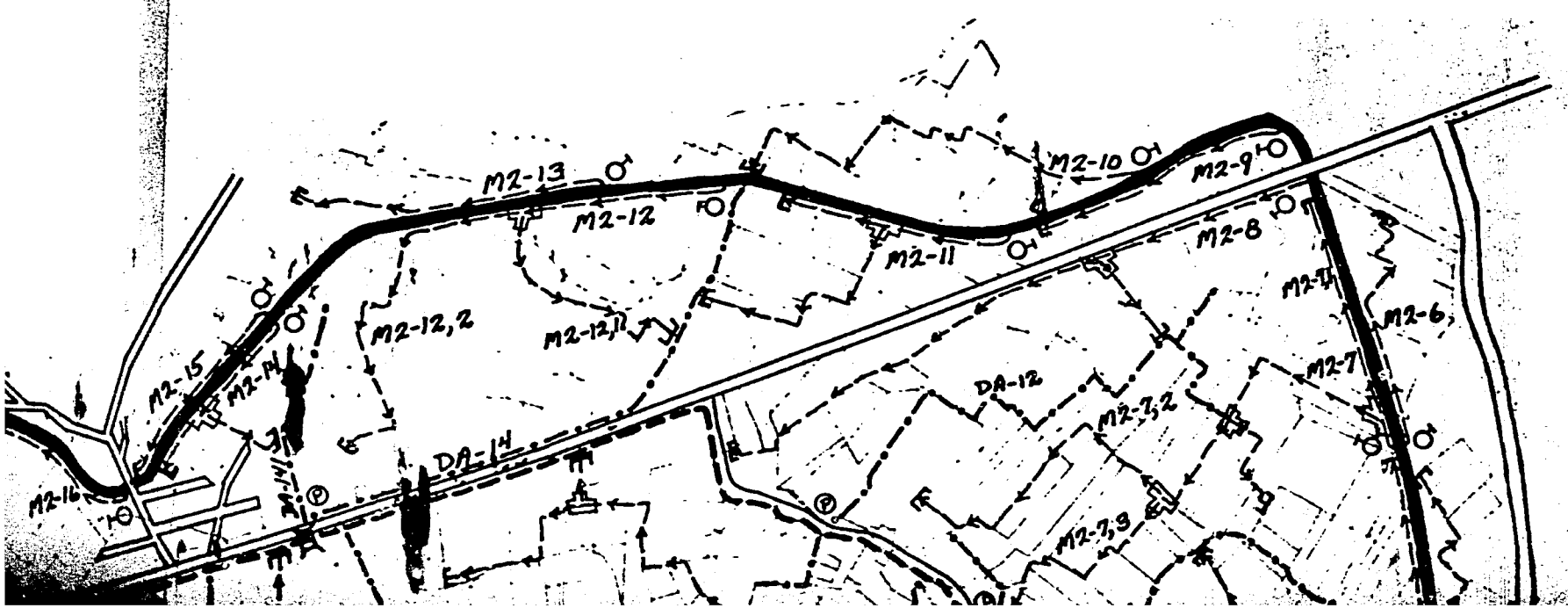
SHEET 2 of 8

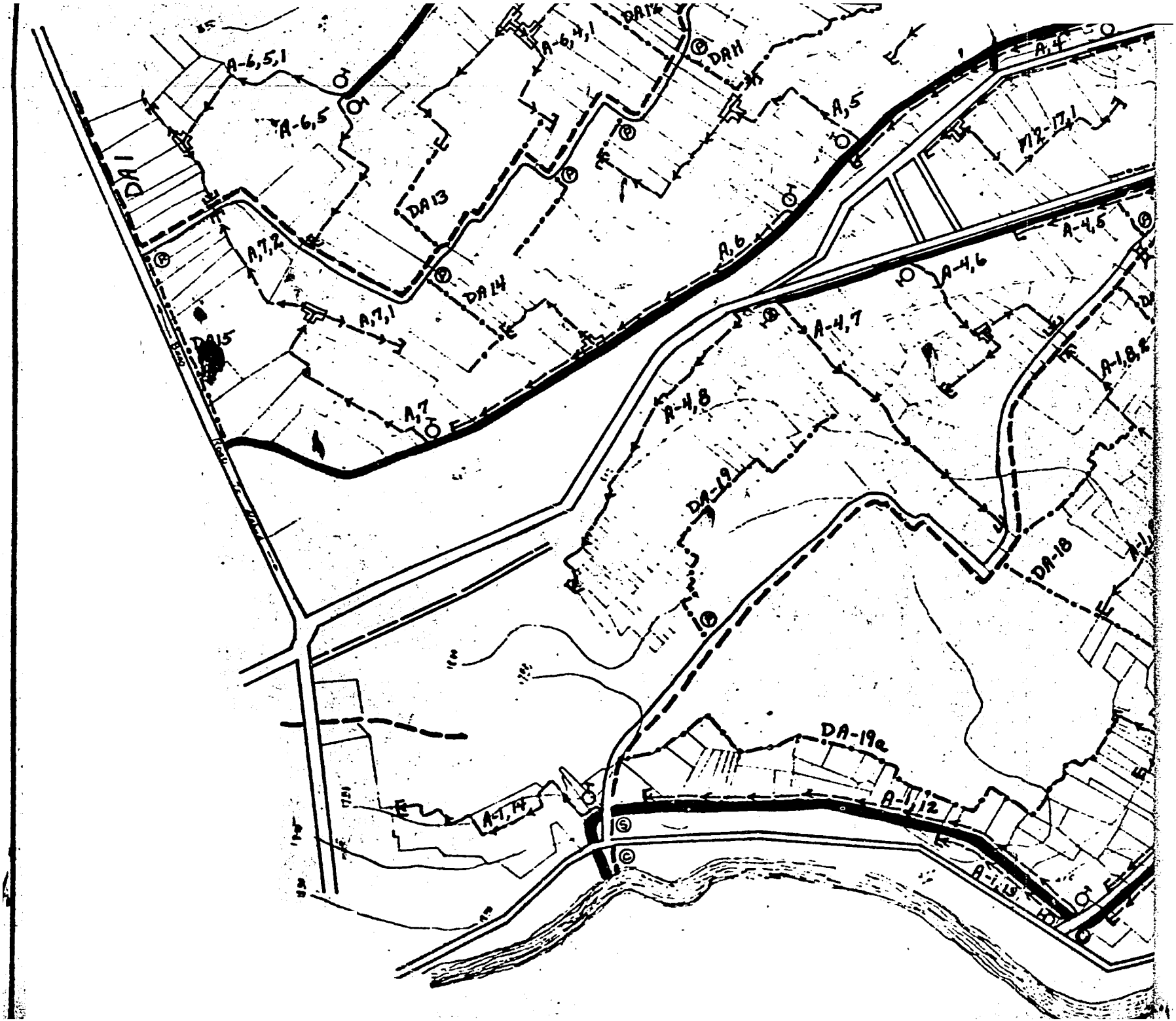
DATE:

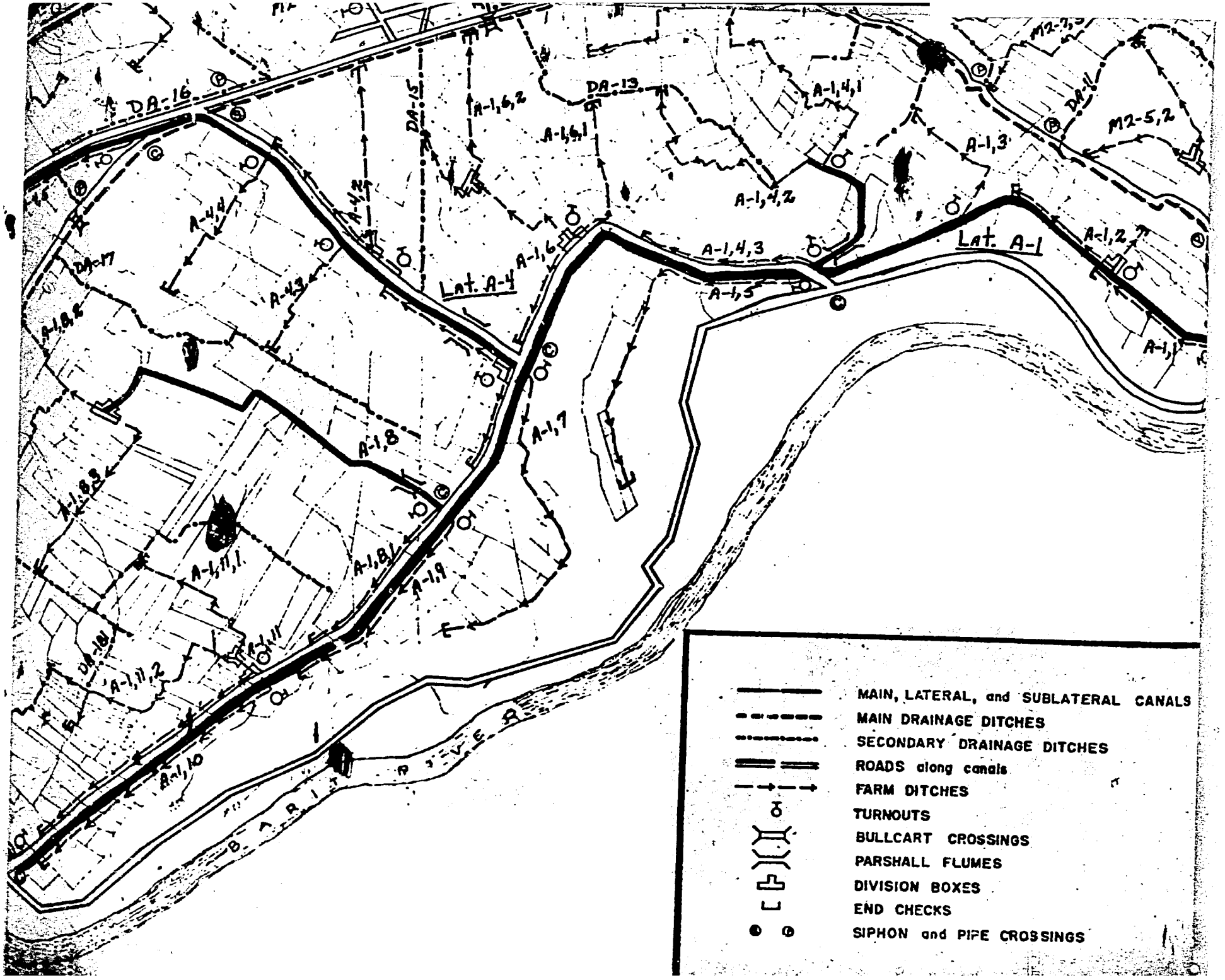

DA-21
DA-211
DA-211
M2-21
M2-20
M2-19
M2-18
M2-19,2
M2-19,1
Lat. A-6
A-6,2
A-6,2,1
A-6,1
A-6,3
A-6,4
A-6,4,1
A-6,5,1
DA12
DA11
WARAS
RIVER
A,1
A,2
A,3
A,4
M2-17
M2-16

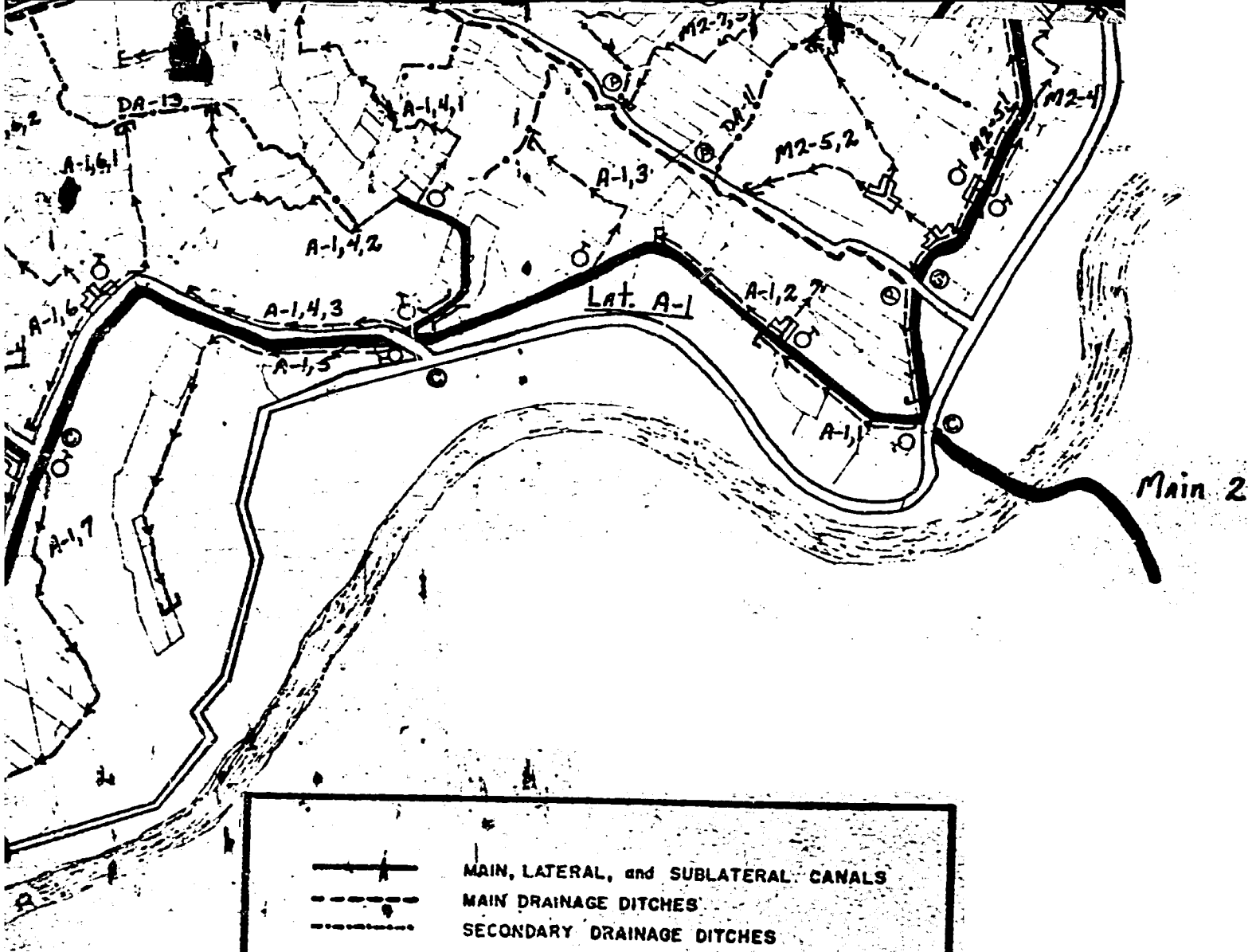
FIG

FIGURE 11. Map section 6




A-6,5,1
A-6,5
A-6,4,1
DA12
DA11
A,5
A,4
A-12-17,1
DA13
A,7,2
A,6
A-4,5
A-4,6
DA14
A,7,1
A-4,7
DA15
A-1,8,2
A,7
A-4,8
DA-19
DA-18
DA-19a
A-1,14
A-1,12
A-1,13


DA-16
DA-15
DA-13
DA-11
DA-17
DA-18
A-1,6,2
A-1,6,1
A-1,4,1
A-1,4,2
A-1,4,3
A-1,4,4
A-1,4,5
A-1,3
A-1,2
A-1,1
A-1,6
A-1,7
A-1,8
A-1,8,1
A-1,8,2
A-1,8,3
A-1,9
A-1,10
A-1,11
A-1,11,1
A-1,11,2
M2-5,2
Lat. A-4
Lat. A-1
B A R I T A R I V E R
MAIN, LATERAL, and SUBLATERAL CANALS
MAIN DRAINAGE DITCHES
SECONDARY DRAINAGE DITCHES
ROADS along canals
FARM DITCHES
TURNOUTS
BULLCART CROSSINGS
PARSHALL FLUMES
DIVISION BOXES
END CHECKS
SIPHON and PIPE CROSSINGS



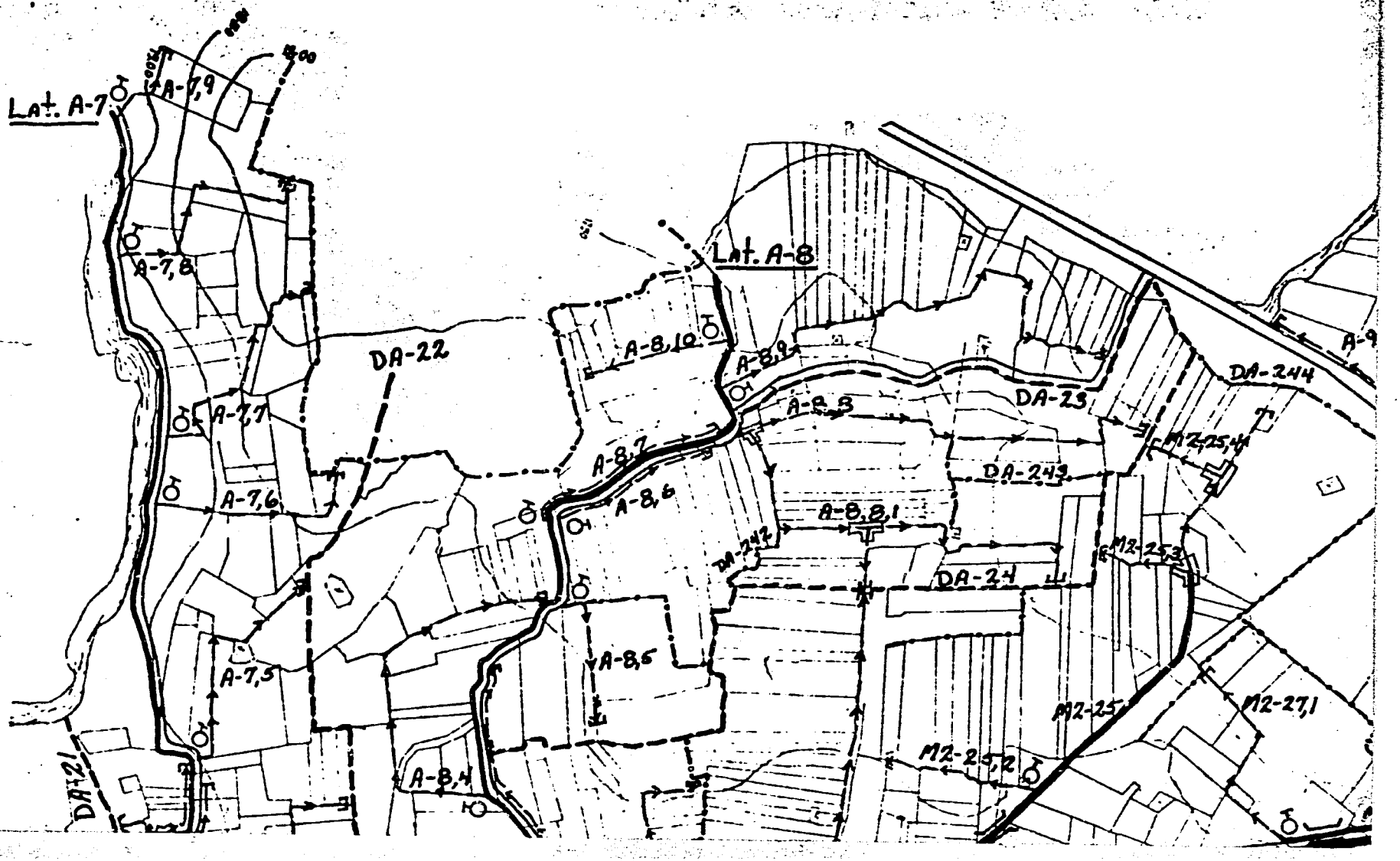
MAIN, LATERAL, and SUBLATERAL CANALS
MAIN DRAINAGE DITCHES
SECONDARY DRAINAGE DITCHES
ROADS along canals
FARM DITCHES
TURNOUTS
BULLCART CROSSINGS
PARSHALL FLUMES
DIVISION BOXES
END CHECKS
SIPHON and PIPE CROSSINGS

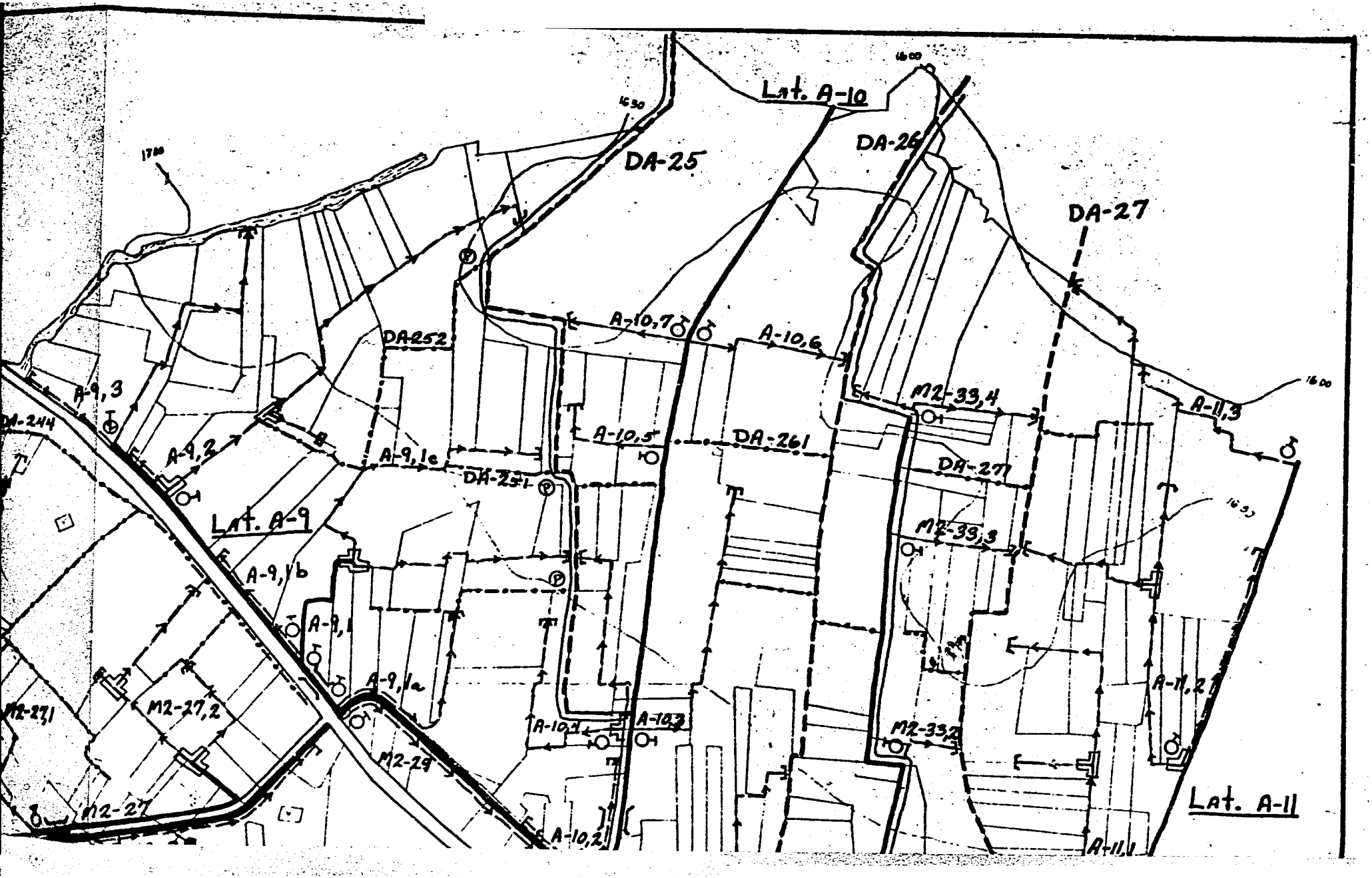
NATIONAL IRRIGATION ADMINISTRATION
REGION IV NAGA CITY
BARIT RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR
NIA-BRBC ON FARM WATER MANAGEMENT PROJECT

PILOT AREA

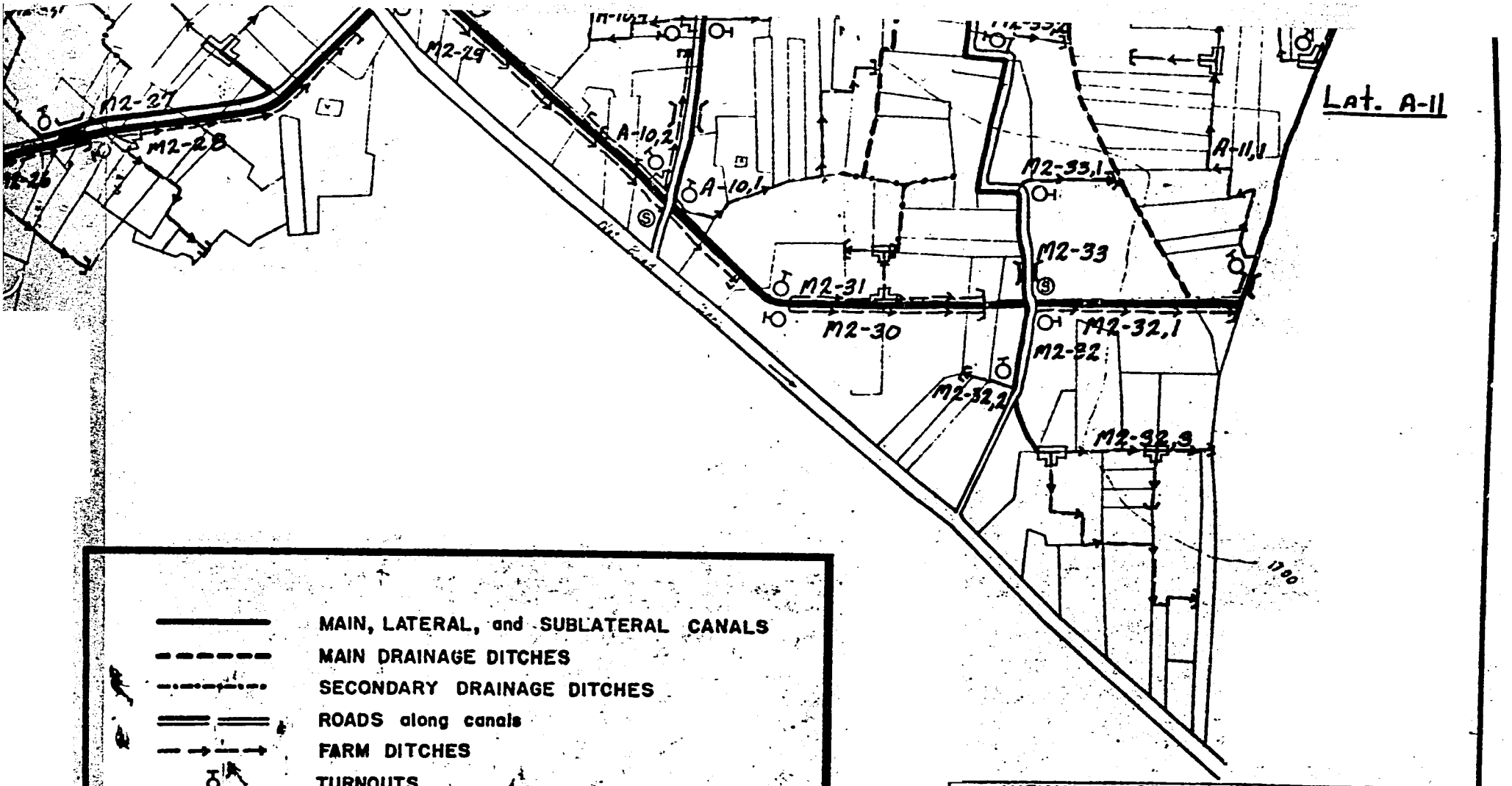
SCALE 1:8000

FIGURE 12. Map section 7




Lat. A-10
DA-25
DA-26
DA-27
1700
1650
1600
A-10,7
A-10,6
DA252
A-9,3
A-9,2
A-9,1c
DA-251
A-10,5
DA-261
M2-33,4
A-11,3
DA-271
M2-33,3
Lat. A-9
A-9,1b
A-9,1
A-9,1a
M2-27,2
M2-27,1
M2-29
M2-27
A-10,4
A-10,3
A-10,2
M2-33,2
A-11,2
A-11,1
Lat. A-11

DA-21
A-8,4
A-8,3
DA-211
M2-25,2
M2-25
M2-25,1
M2-26
M2-24
M2-23
A-7,4
A-8,2
A-7,3
DA-22
A-8,1
DA-212
A-7,2
A-7,1



MAIN, LATERAL, and SUBLATERAL CANALS
MAIN DRAINAGE DITCHES
SECONDARY DRAINAGE DITCHES
ROADS along canals
FARM DITCHES
TURNOUTS
BULLCART CROSSINGS
PARSHALL FLUMES
DIVISION BOXES
END CHECKS
SIPHON and PIPE CROSSINGS

NATIONAL IRRIGATION ADMINISTRATION
REGION IV, NAGA CITY
BARIT RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR
NIA-BRBC ON FARM WATER MANAGEMENT PROJECT

PILOT AREA

SCALE: 1:8000

SHEET 7 of 8 DATE:

FIGURE

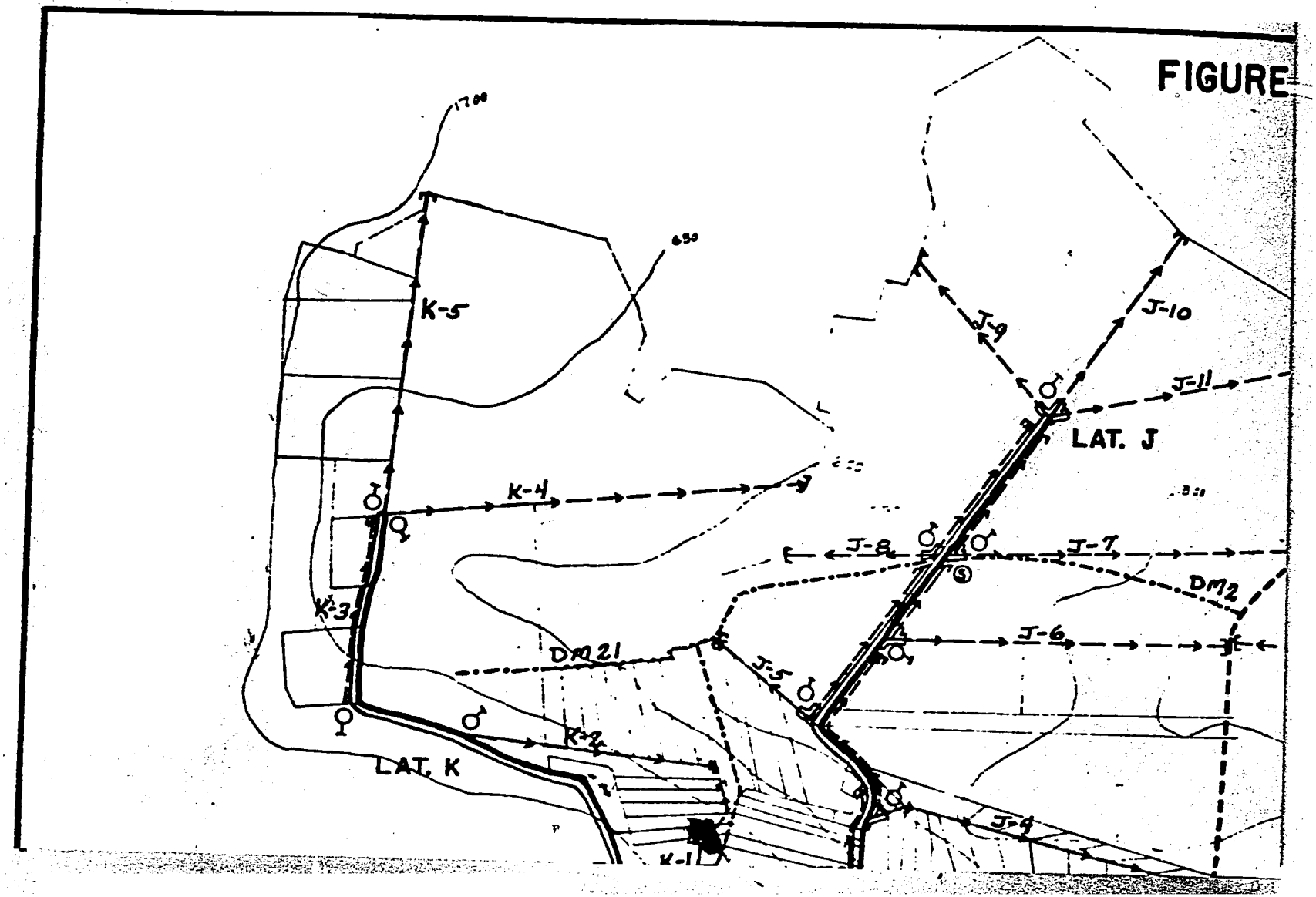
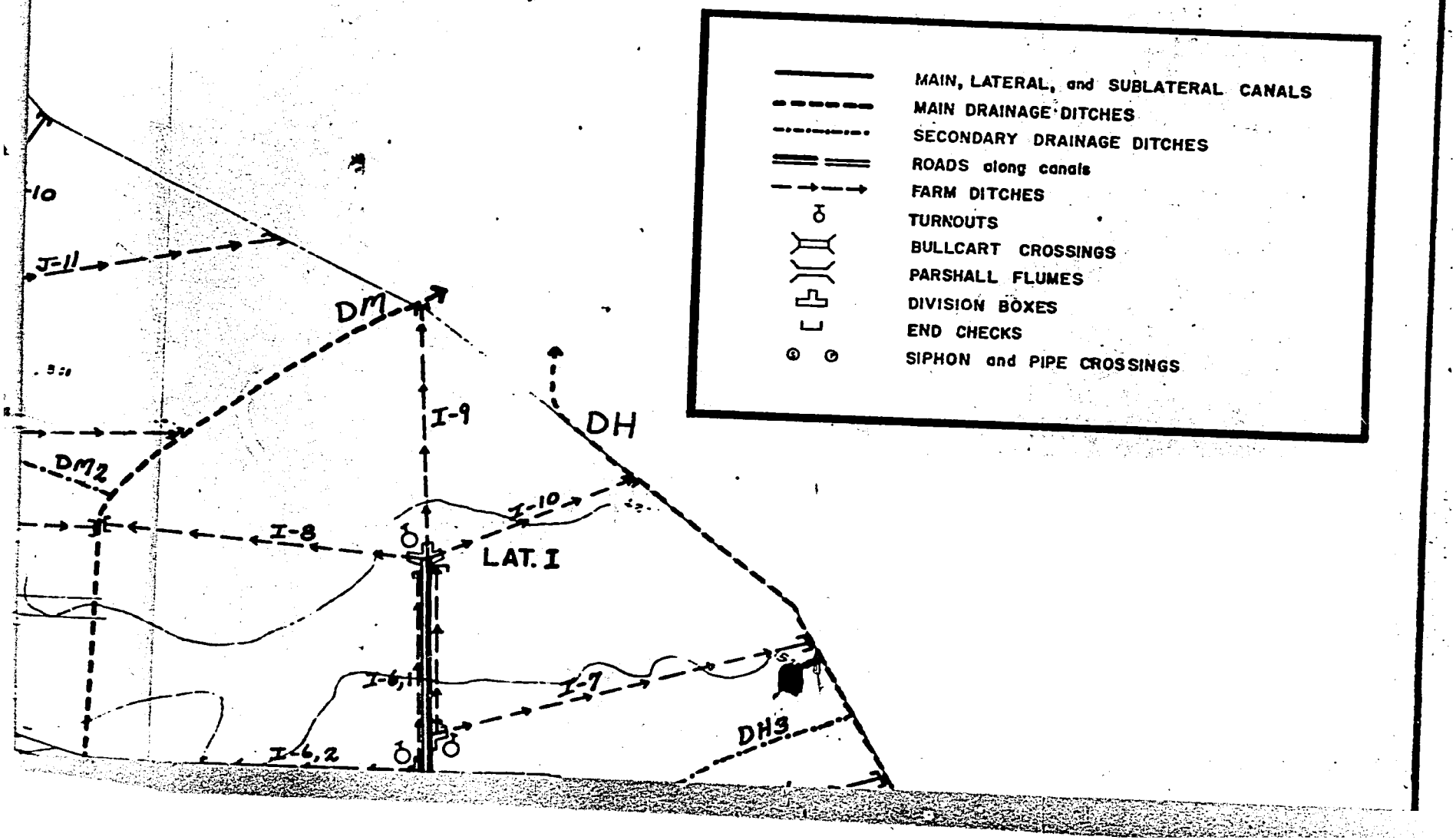
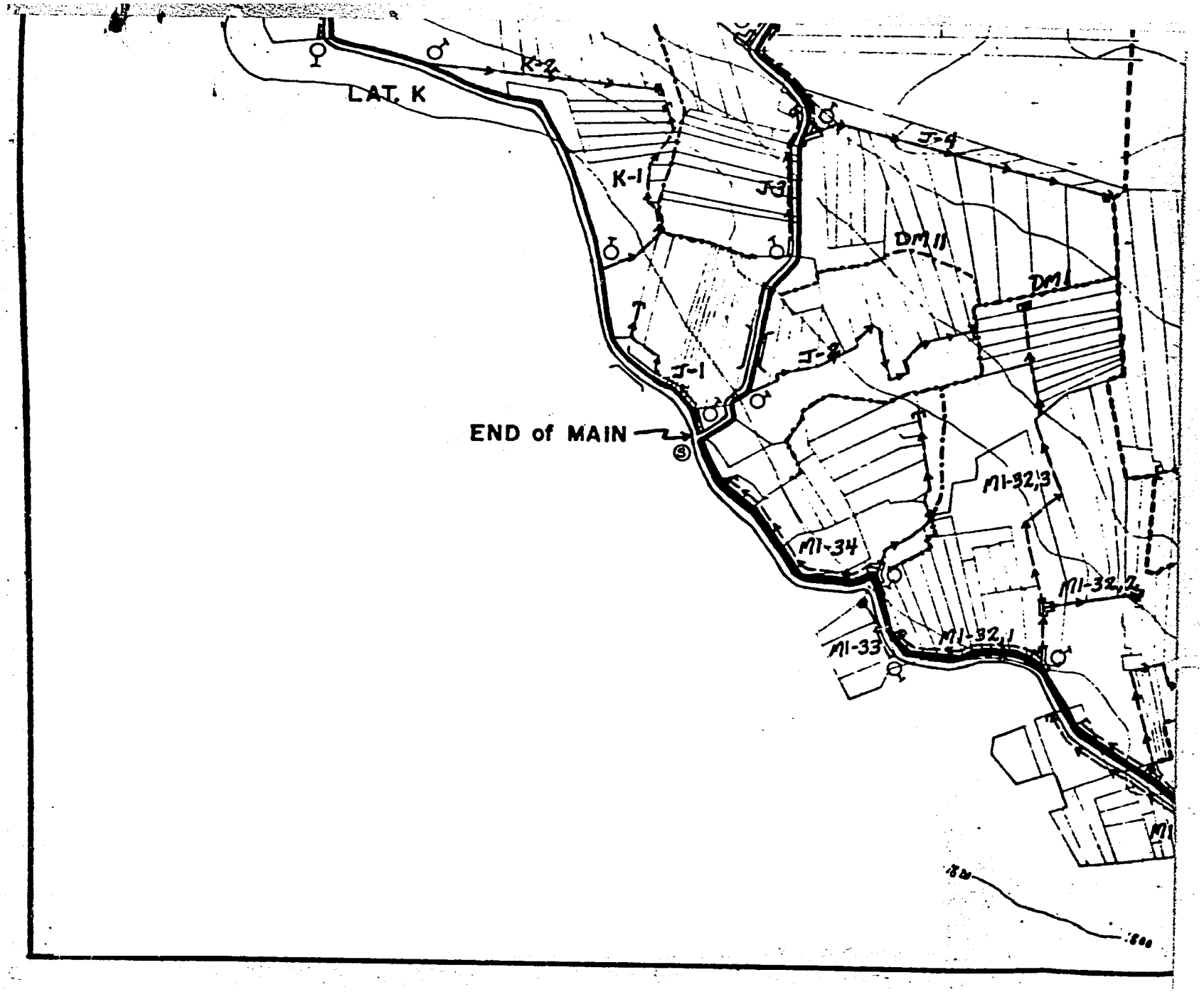


FIGURE 13. Map section 8




LAT. K
K-2
K-1
J-3
J-4
DM 11
DM
J-2
J-1
END of MAIN
M1-32,3
M1-34
M1-32,2
M1-33
M1-32,1
800

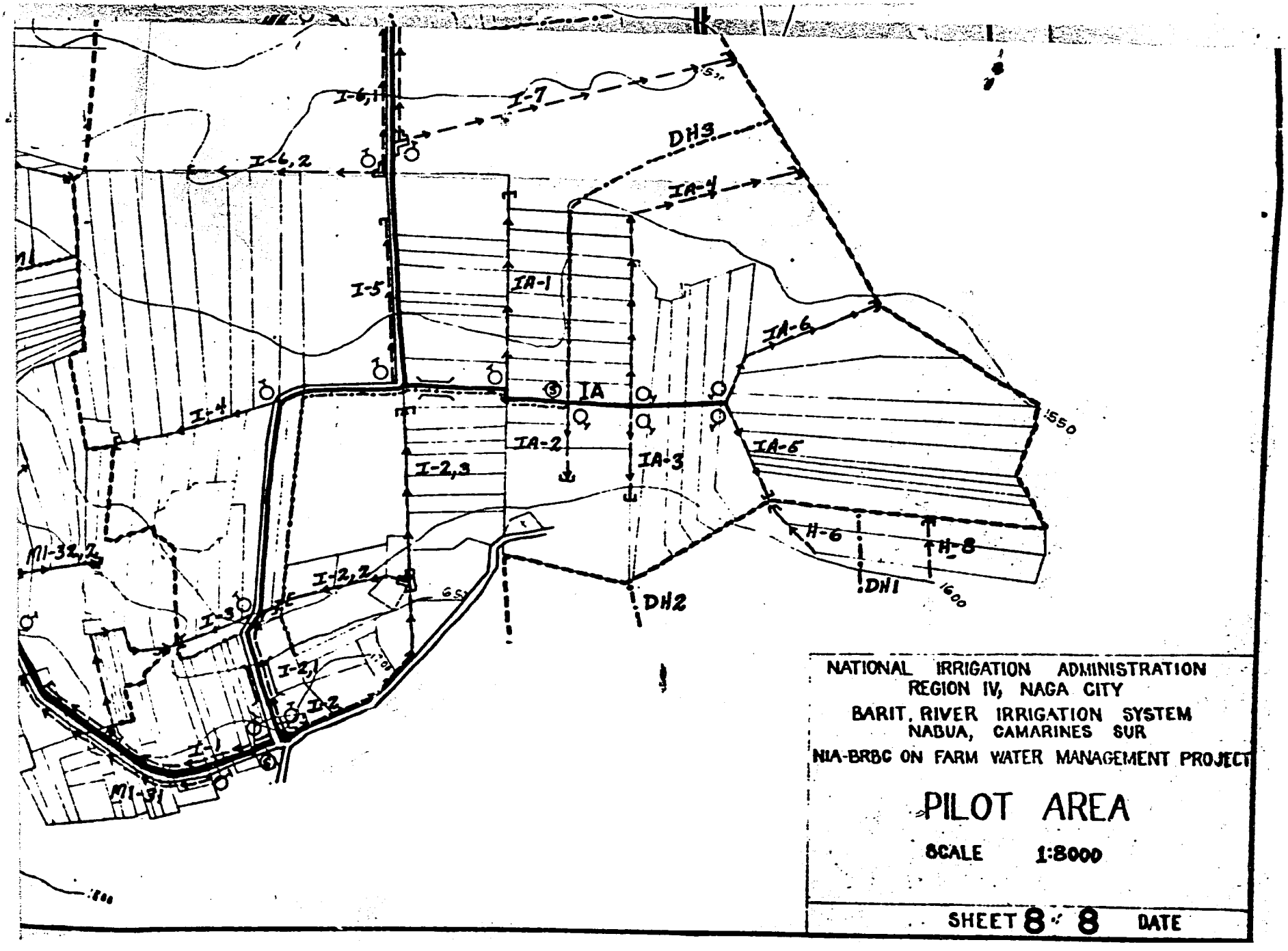
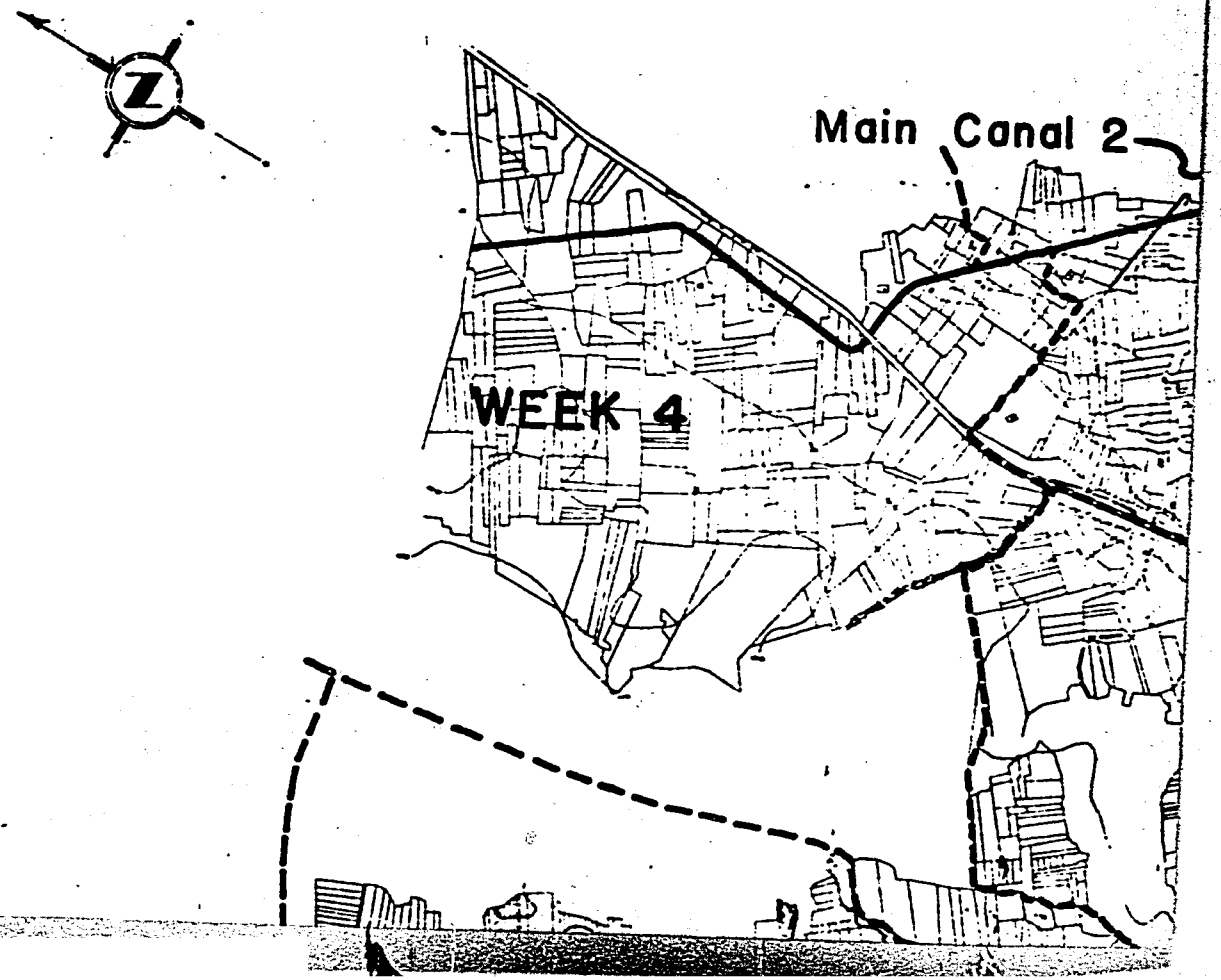
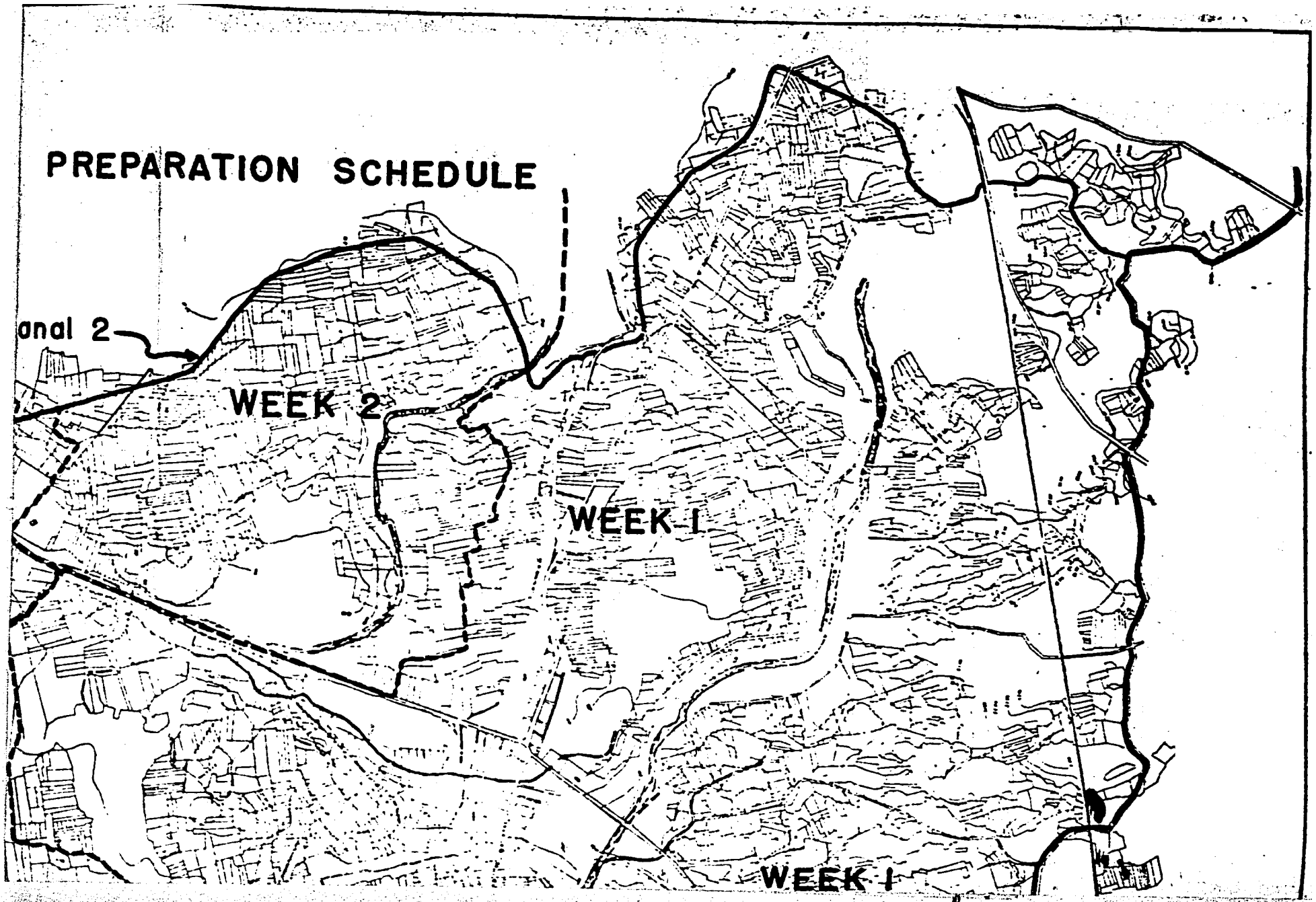
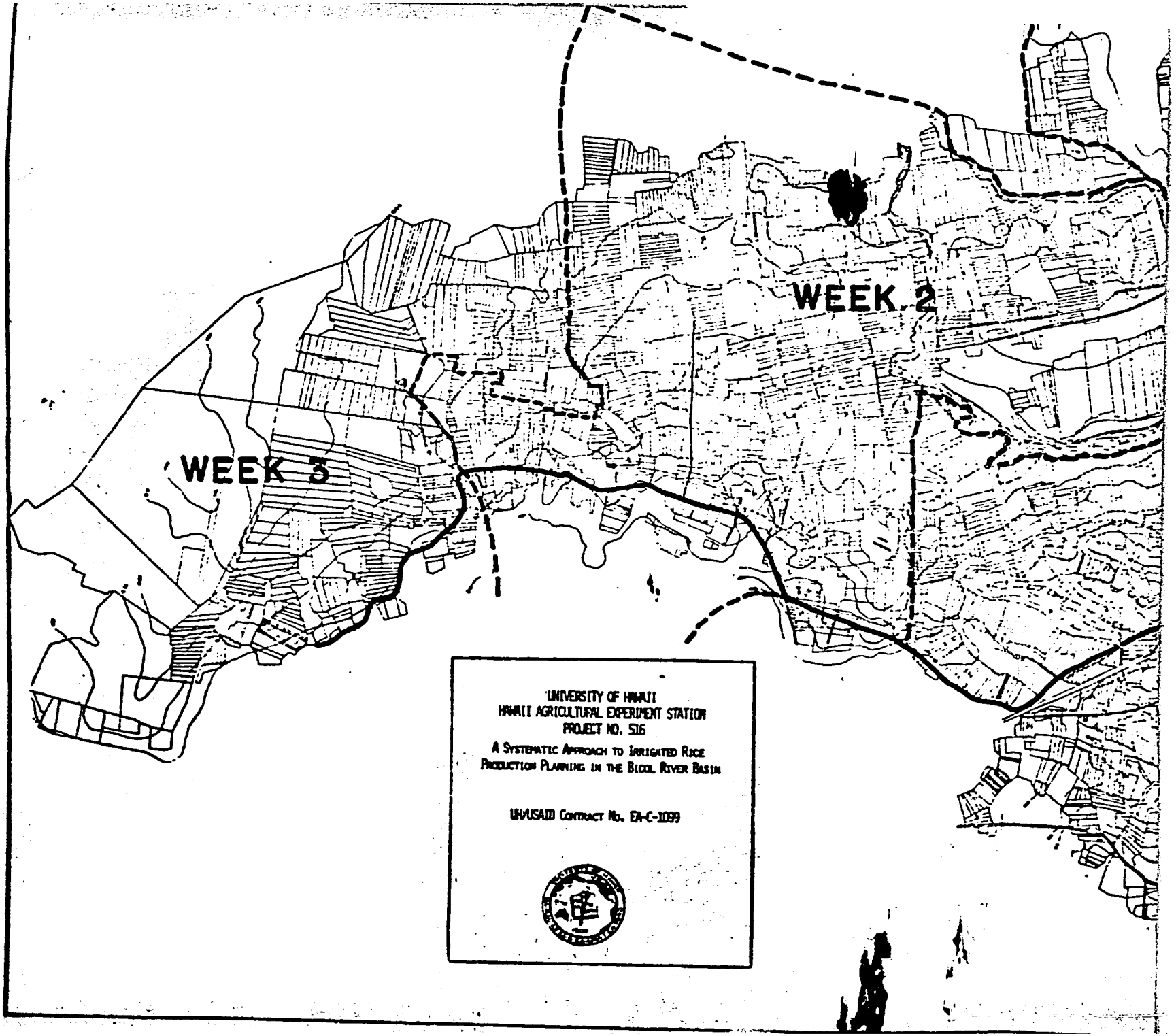

I-6,1
I-7
DH3
I-6,2
IA-4
I-5
IA-1
IA-6
IA
I-4
IA-2
IA-3
IA-5
I-2,3
1550
H-6
H-8
M1-32,2
I-2,2
DH1
DH2
1600
I-3
I-2,1
I-2
I-1
M1-31
NATIONAL IRRIGATION ADMINISTRATION
REGION IV, NAGA CITY
BARIT, RIVER IRRIGATION SYSTEM
NABUA, CAMARINES SUR
NIA-BRBC ON FARM WATER MANAGEMENT PROJECT
PILOT AREA
SCALE 1:8000
SHEET 8 : 8
DATE

FIGURE 14. FOUR WEEK LAND PREPA




PREPARATION SCHEDULE
anal 2
WEEK 2
WEEK 1
WEEK 1



UNIVERSITY OF HAWAII
HAWAII AGRICULTURAL EXPERIMENT STATION
PROJECT NO. 516

A SYSTEMATIC APPROACH TO IRRIGATED RICE PRODUCTION PLANNING IN THE BICOL RIVER BASIN

UH/USAID CONTRACT NO. EA-C-1099

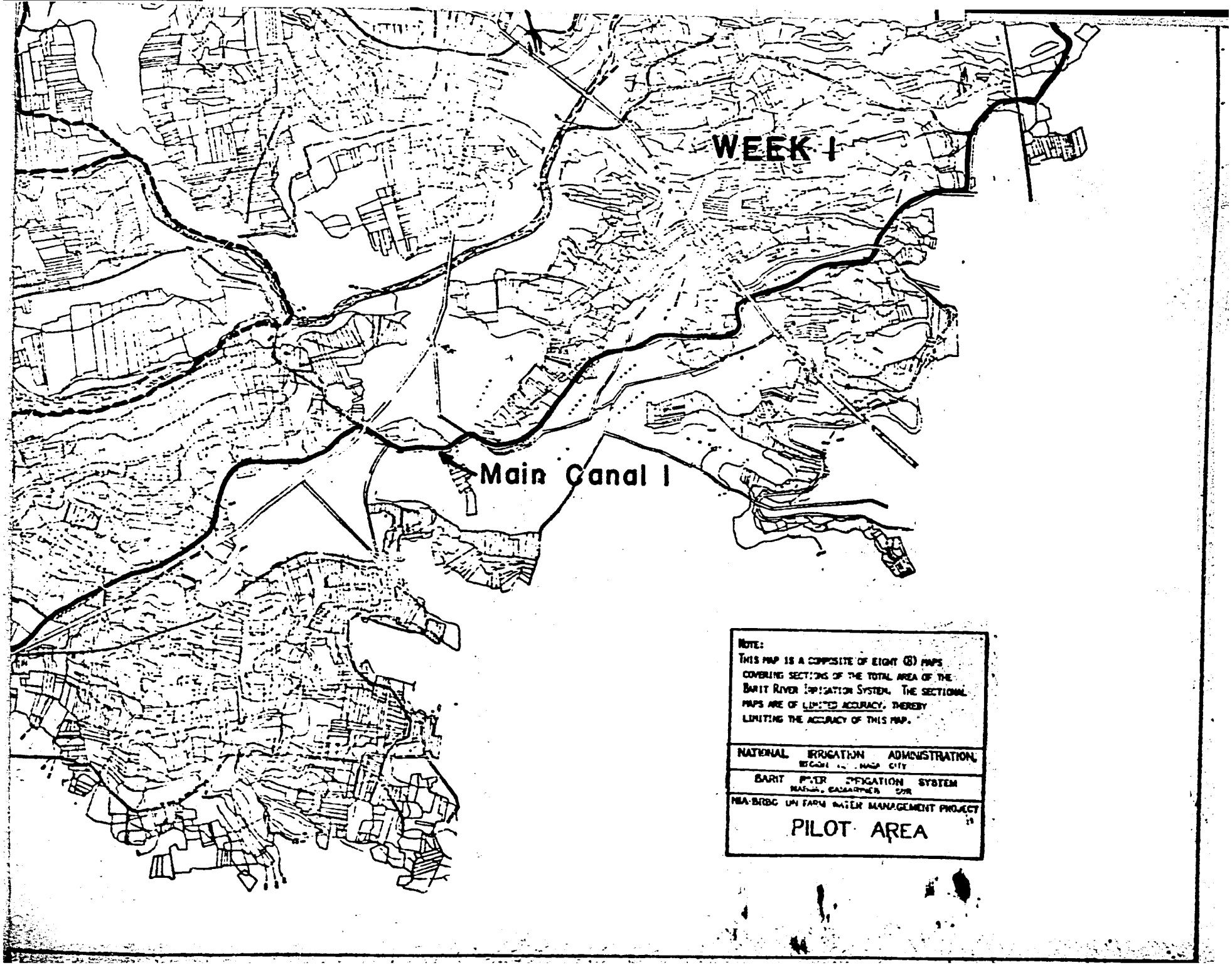
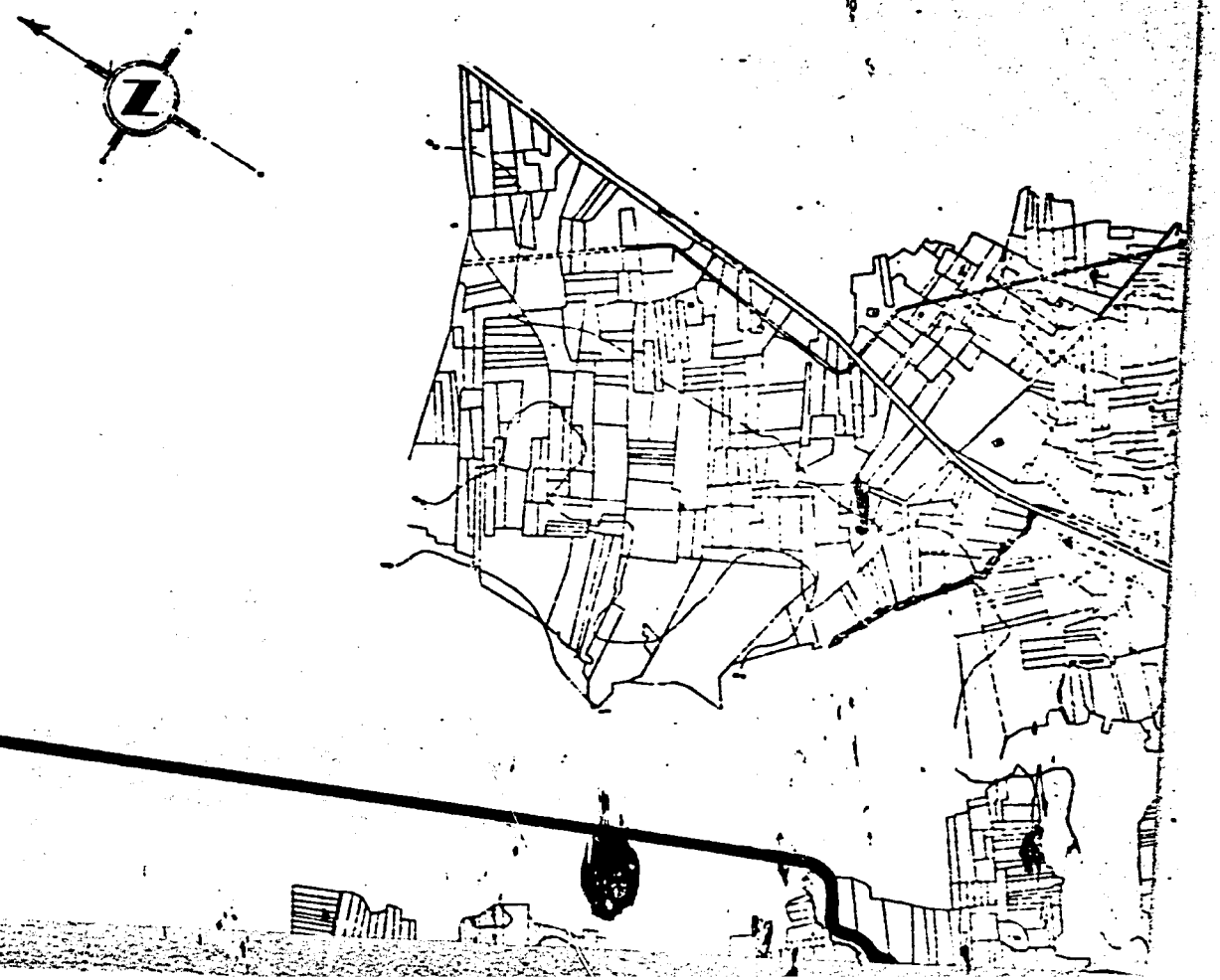
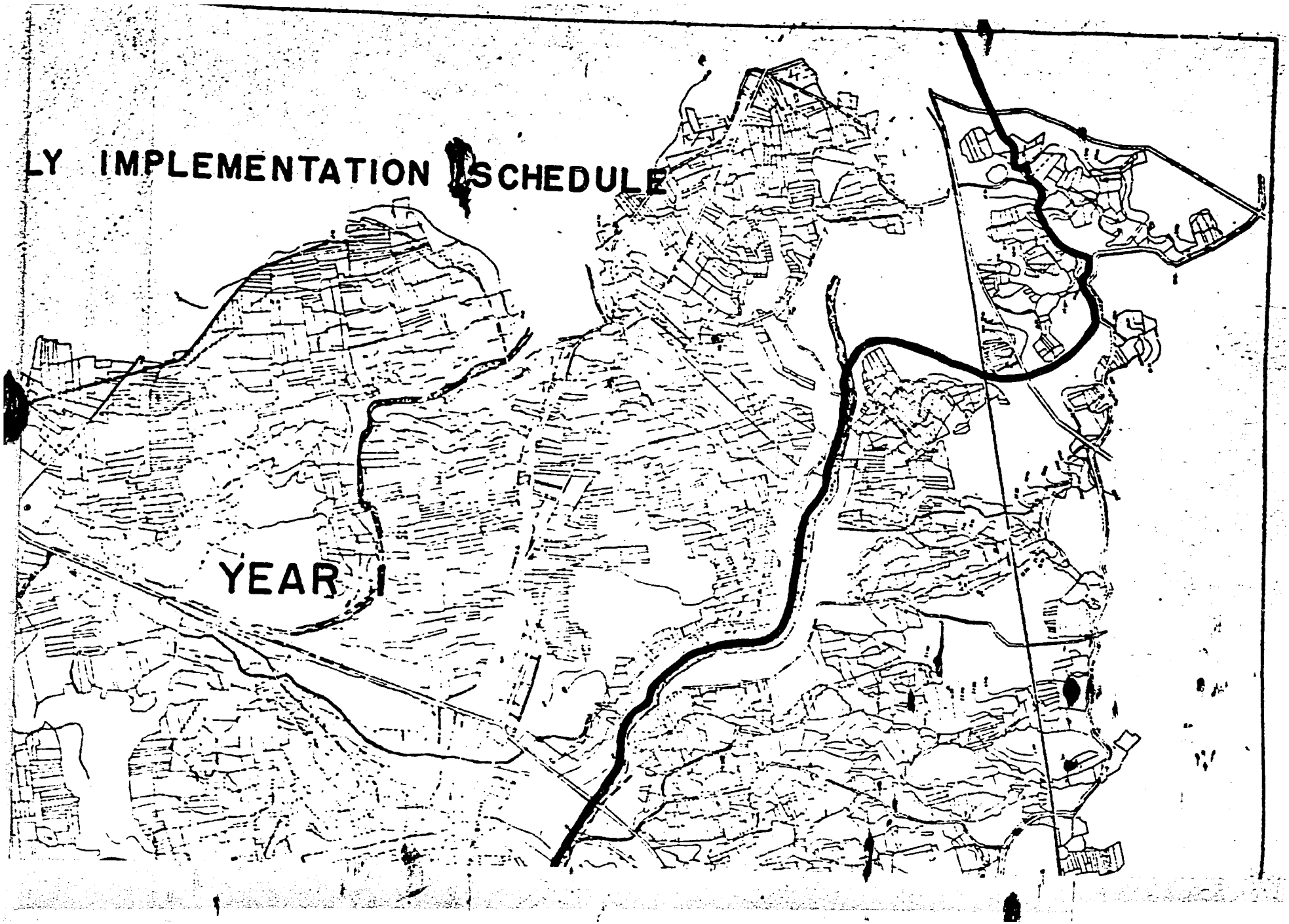
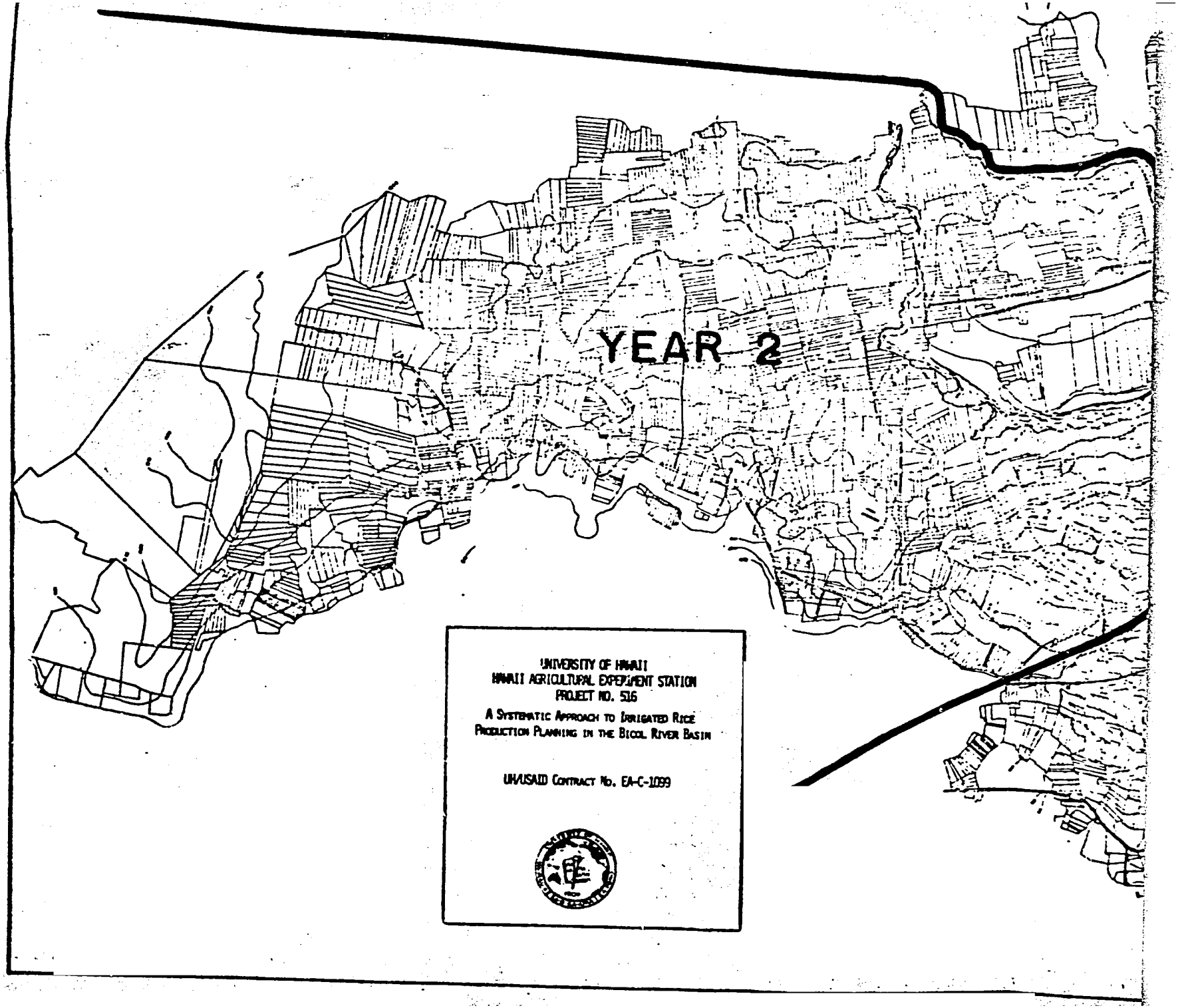

WEEK I
Main Canal I
NOTE:
THIS MAP IS A COMPOSITE OF EIGHT (8) MAPS COVERING SECTIONS OF THE TOTAL AREA OF THE BARIT RIVER IRRIGATION SYSTEM. THE SECTIONAL MAPS ARE OF LIMITED ACCURACY, THEREBY LIMITING THE ACCURACY OF THIS MAP.
NATIONAL IRRIGATION ADMINISTRATION
BARIT RIVER IRRIGATION SYSTEM
NIA-BRDC ON FARM WATER MANAGEMENT PROJECT
PILOT AREA

FIGURE 15. YEARLY IMP



LY IMPLEMENTATION SCHEDULE

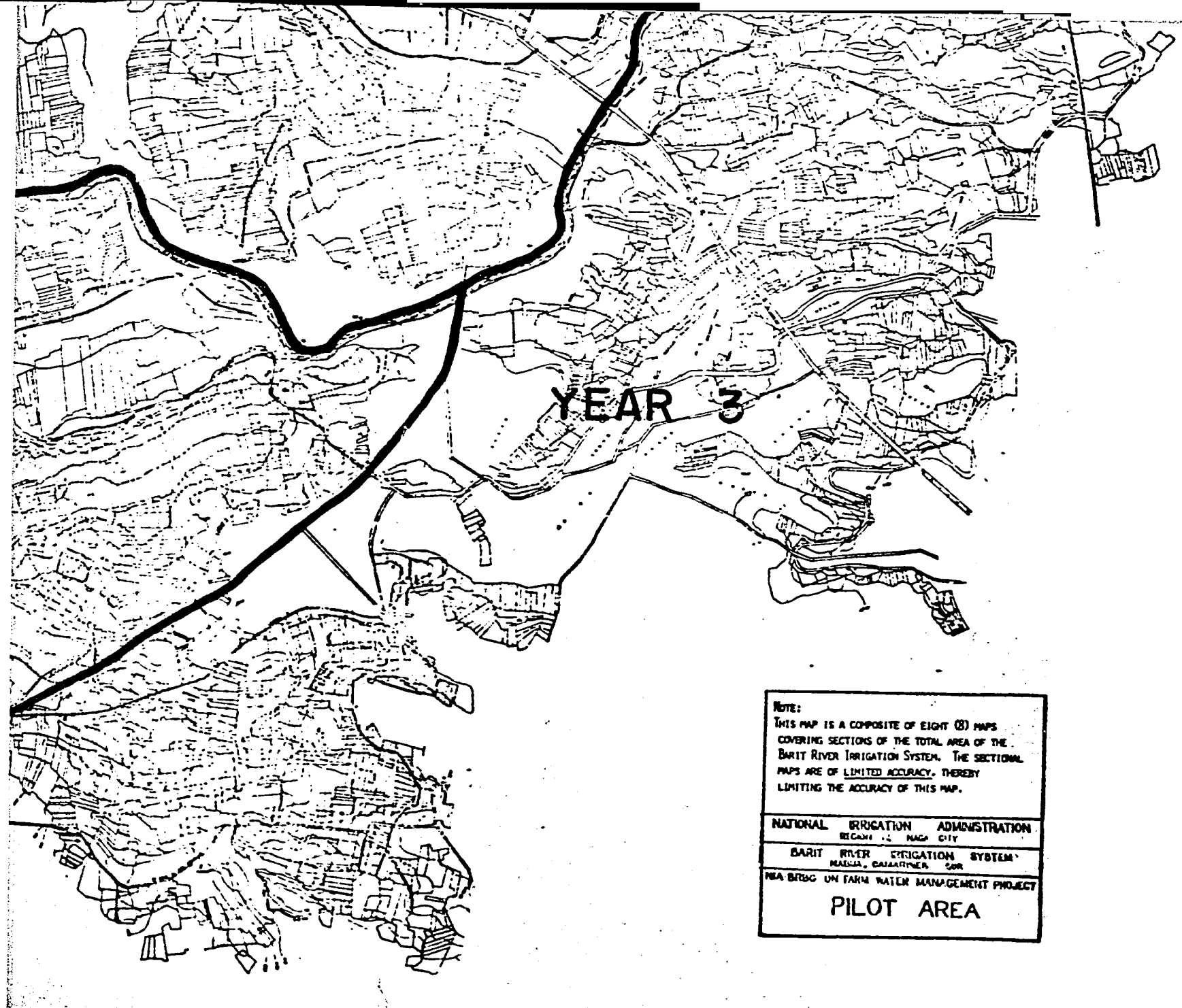




UNIVERSITY OF HAWAII
HAWAII AGRICULTURAL EXPERIMENT STATION
PROJECT NO. 516

A SYSTEMATIC APPROACH TO IRRIGATED RICE
PRODUCTION PLANNING IN THE BICOL RIVER BASIN

UH/USAID CONTRACT NO. EA-C-1099



NOTE:
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NATIONAL IRRIGATION ADMINISTRATION
REGION V NAGA CITY

BARIT RIVER IRRIGATION SYSTEM
MABOLO, CAMARINES SUR

NIA-BRIBC ON FARM WATER MANAGEMENT PROJECT

PILOT AREA