

# **APPENDIX-IV**

## **IRRIGATION AND DRAINAGE**

## APPENDIX IV: IRRIGATION AND DRAINAGE

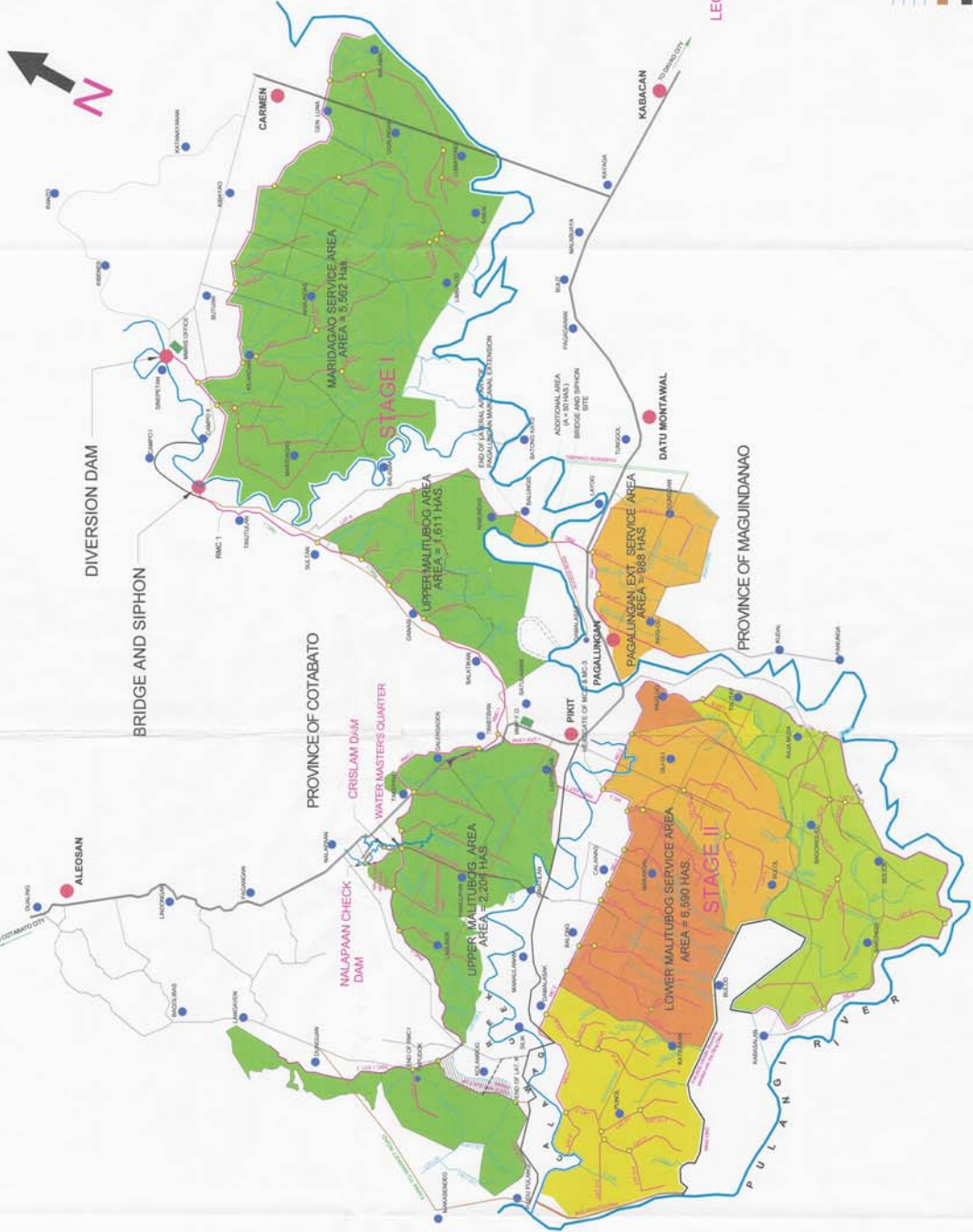
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## IV.1 IRRIGATION AND DRAINAGE

### IV.1.1 LOCATION MAP OF THE PROJECT

# MALITUBOG MARIDAGAO IRRIGATION PROJECT

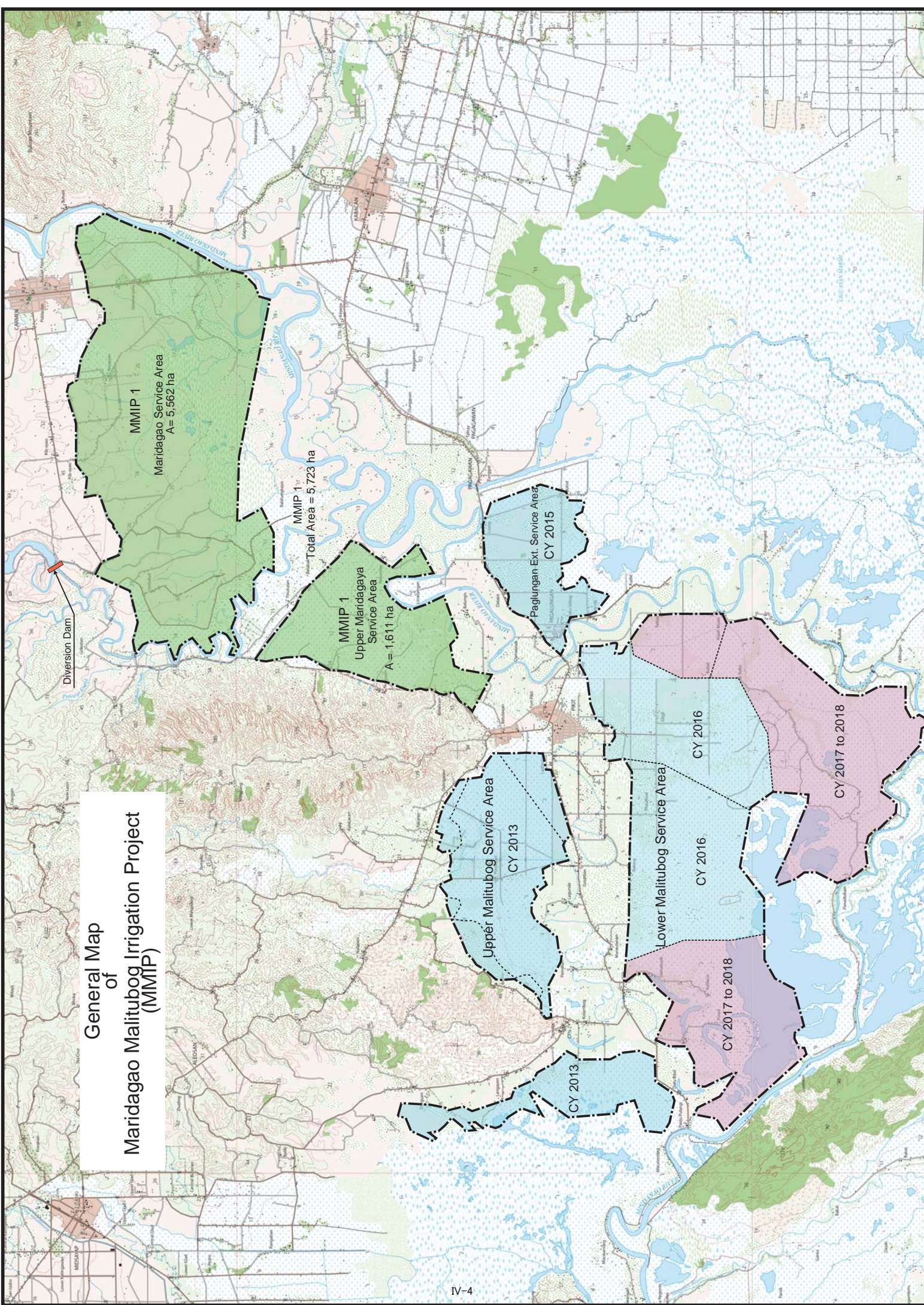


- LEGEND:**
- STAGE I
  - STAGE II
  - STAGE III (COMPLETED SERVICE AREA (A=7,173 HAS))
  - STAGE II (COMPLETED SERVICE AREA (A=2206 HAS))
  - PROPOSED NEW AREA (B=7M HAS)
  - ADDITIONAL AREA (UMSA, A= 529 HAS)
  - MUNICIPALITY
  - BARANGAY
  - NATIONAL/PROVINCIAL ROAD
  - MUNICIPAL/BARANGAY ROAD
  - ACCESS / FARM TO MARKET ROAD / ROAD DIKE
  - RING DIKE
  - RIVER / CREEKS

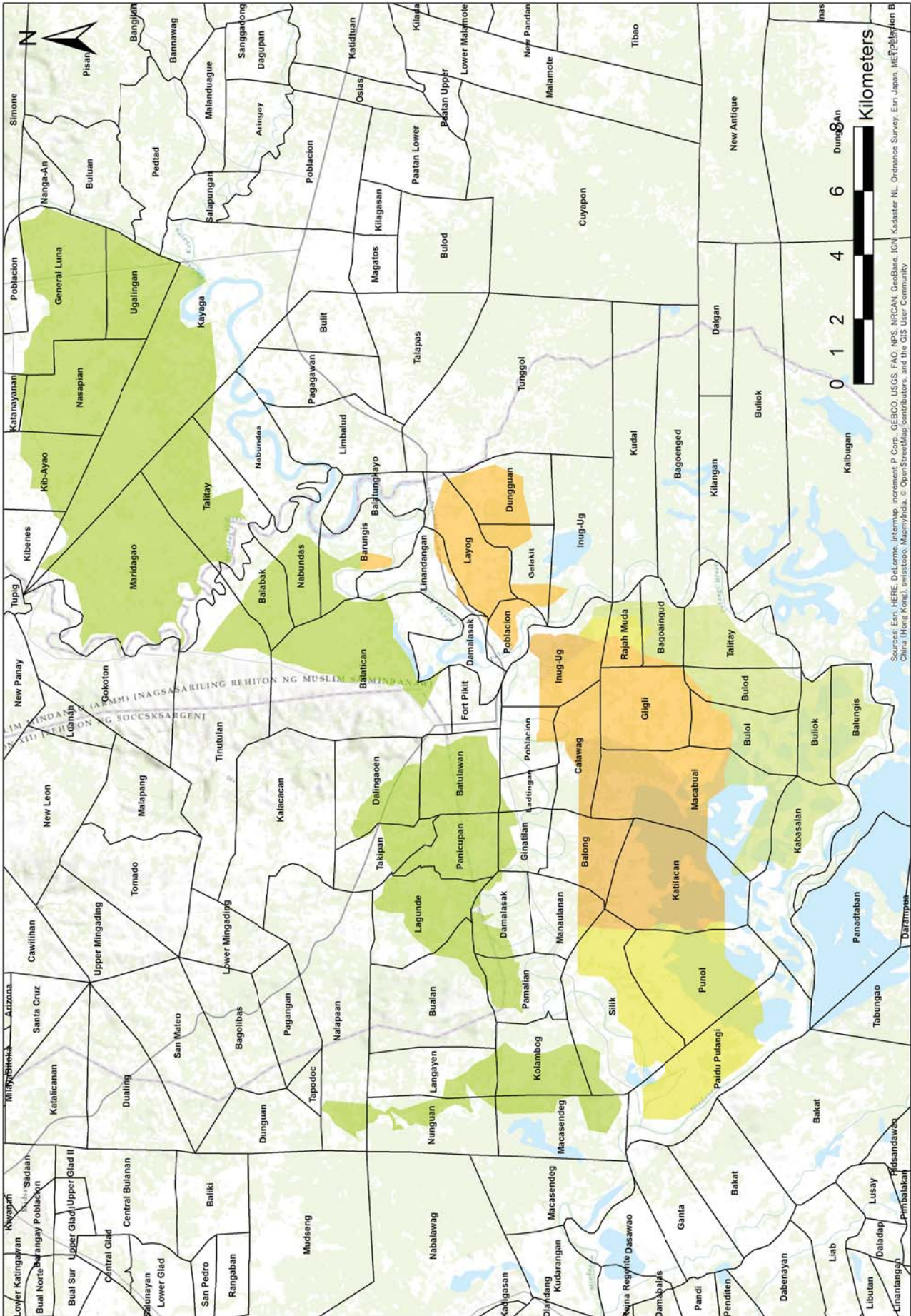
## STAGE II

UPPER MALITUBOG AREA		
MAIN CANAL	LENGTH	AREA (NET)
RMC1	15.287 Kms	461 Hbs.
RMC1-EXT. 1	4.66 Kms	132 Hbs.
SUB-TOTAL	24.647 Kms	593 Hbs.
LATERAL CANAL		
LAT. E	1.366 Kms	126 Hbs.
LAT. F	2.51 Kms	106 Hbs.
LAT. G	3.506 Kms	285 Hbs.
LAT. H (PANICUPANI)	3.494 Kms	430 Hbs.
LAT. I	1.56 Kms	48 Hbs.
LAT. J	2.054 Kms	133 Hbs.
LAT. K	2.722 Kms	149 Hbs.
LAT. L	1.74 Kms	185 Hbs.
LAT. M	1.599 Kms	151 Hbs.
SUB-TOTAL	23.91 Kms	1,613 Hbs.
TOTAL	48.56 Kms	2,206 Hbs.
LOWER MALITUBOG AREA		
MAIN CANAL-2	22.79 Kms	1,107 Hbs.
MAIN CANAL-3	11.46 Kms	467 Hbs.
LAT. CANALS	81.76 Kms	5,016 Hbs.
TOTAL	116.00 Kms	6,590 Hbs.
PAGALUNGAN EXT. SERVICE AREA		
PMC	7.44 Kms	178 Hbs.
LAT. P-1	4.76 Kms	394 Hbs.
LAT. P-2	2.30 Kms	227 Hbs.
LAT. P-3	1.62 Kms	189 Hbs.
TOTAL	16.12 Kms	988 Hbs.
ADDITIONAL AREA		
RMC1-EXT. 2	4.70 Kms	191 Hbs.
LAT. A (UMSA 1,611)	50 Hbs.	50 Hbs.
LAT. K-EXT.	3.36 Kms	188 Hbs.
NALAPAAN MC	0.66 Km	100 Hbs.
TOTAL	8.72 Kms	529 Hbs.
GRAND TOTAL	189.00 Kms	10,313 Hbs.

# General Map Of Maridagao Malitubog Irrigation Project (MMIP)



# Location Map of MMIP Project Area with Barangay boundary



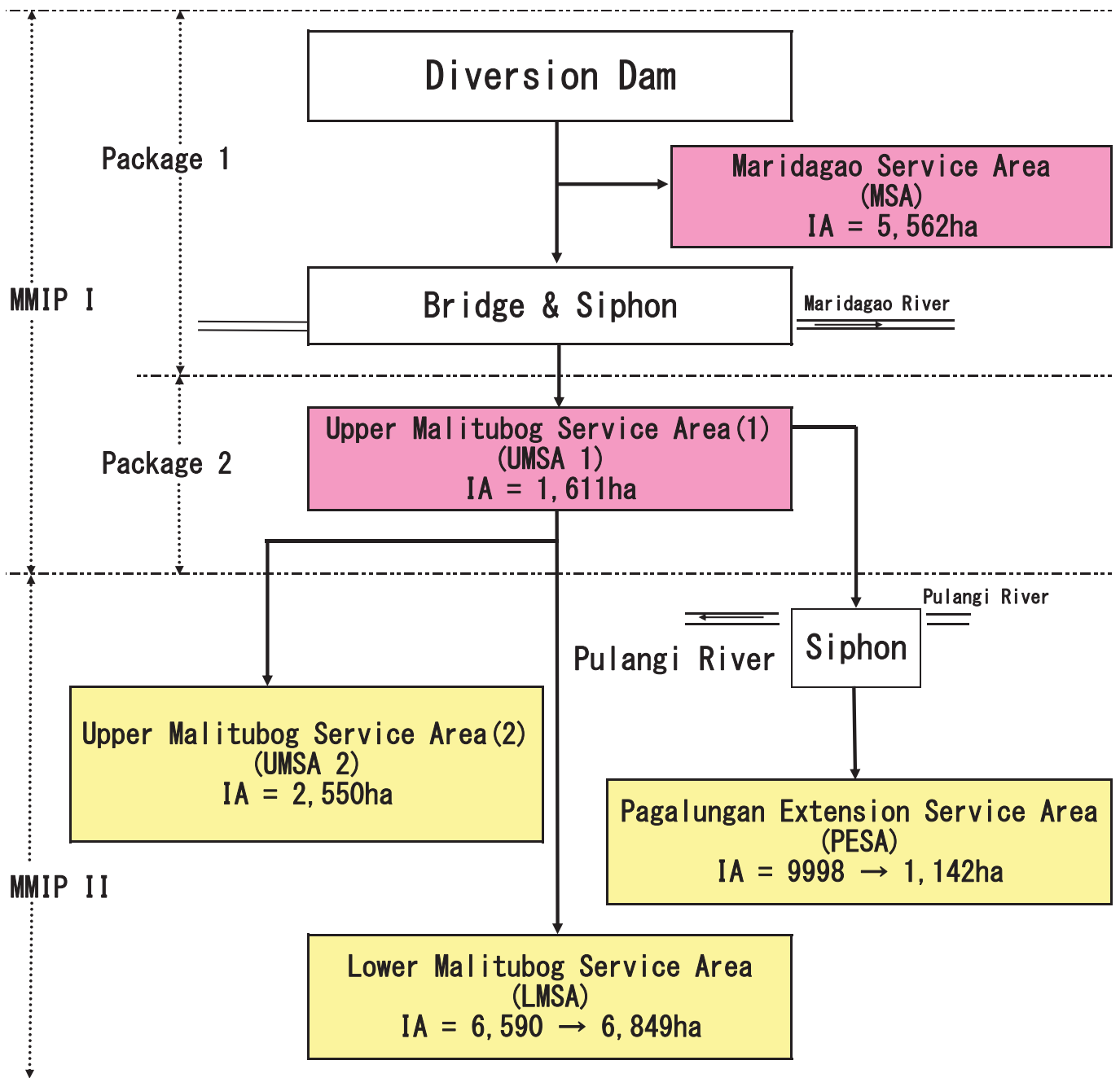
Source: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Esri, IGN, Swisstopo, Mapbox, © OpenStreetMap contributors, and the GIS User Community



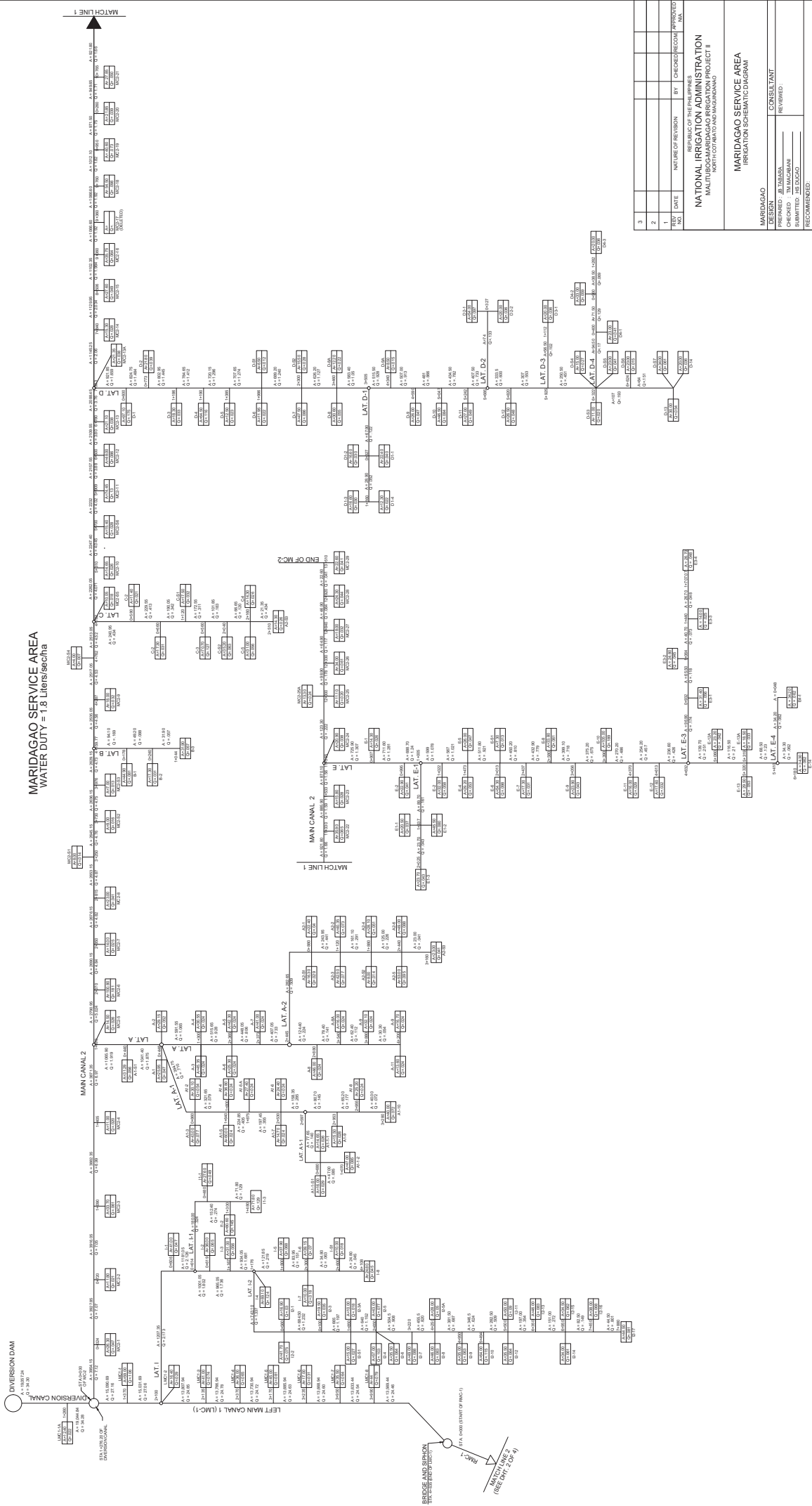
### IV.1.3 PRESENT CONDITION OF IRRIGATION SYSTEM



# Outline on Schematic Diagram of Irrigation System



MARIDAGAO SERVICE AREA  
WATER DUTY = 1.8 Liters/sec/ha



REV	DATE	NATURE OF REVISION	BY	CHECKED/RECOM	APPROVED
1					
2					
3					

DESIGN: \_\_\_\_\_  
 PREPARED: \_\_\_\_\_  
 SUBMITTED: \_\_\_\_\_  
 RECOMMENDED: \_\_\_\_\_

NATIONAL IRRIGATION ADMINISTRATION  
 MALUBOG-MARIDAGAO IRRIGATION PROJECT II  
 NORTH-COTABATO AND MAGUINDANAO

MARIDAGAO SERVICE AREA  
 IRRIGATION SCHEMATIC DIAGRAM

CONSULTANT  
 REVIEWED: \_\_\_\_\_  
 MANAGER: \_\_\_\_\_  
 RECOMMENDED: \_\_\_\_\_

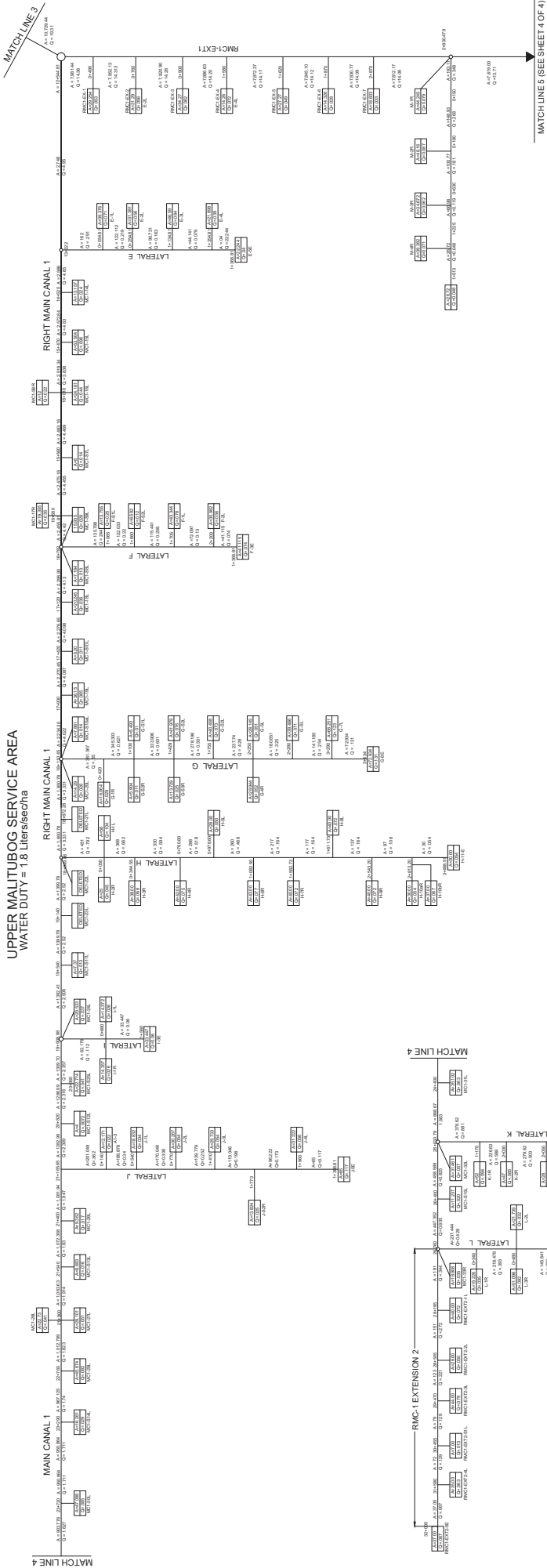
REYNALDOM SARCILUMBA  
 MANAGER, ENGRG. DIVISION

APPROVED: \_\_\_\_\_

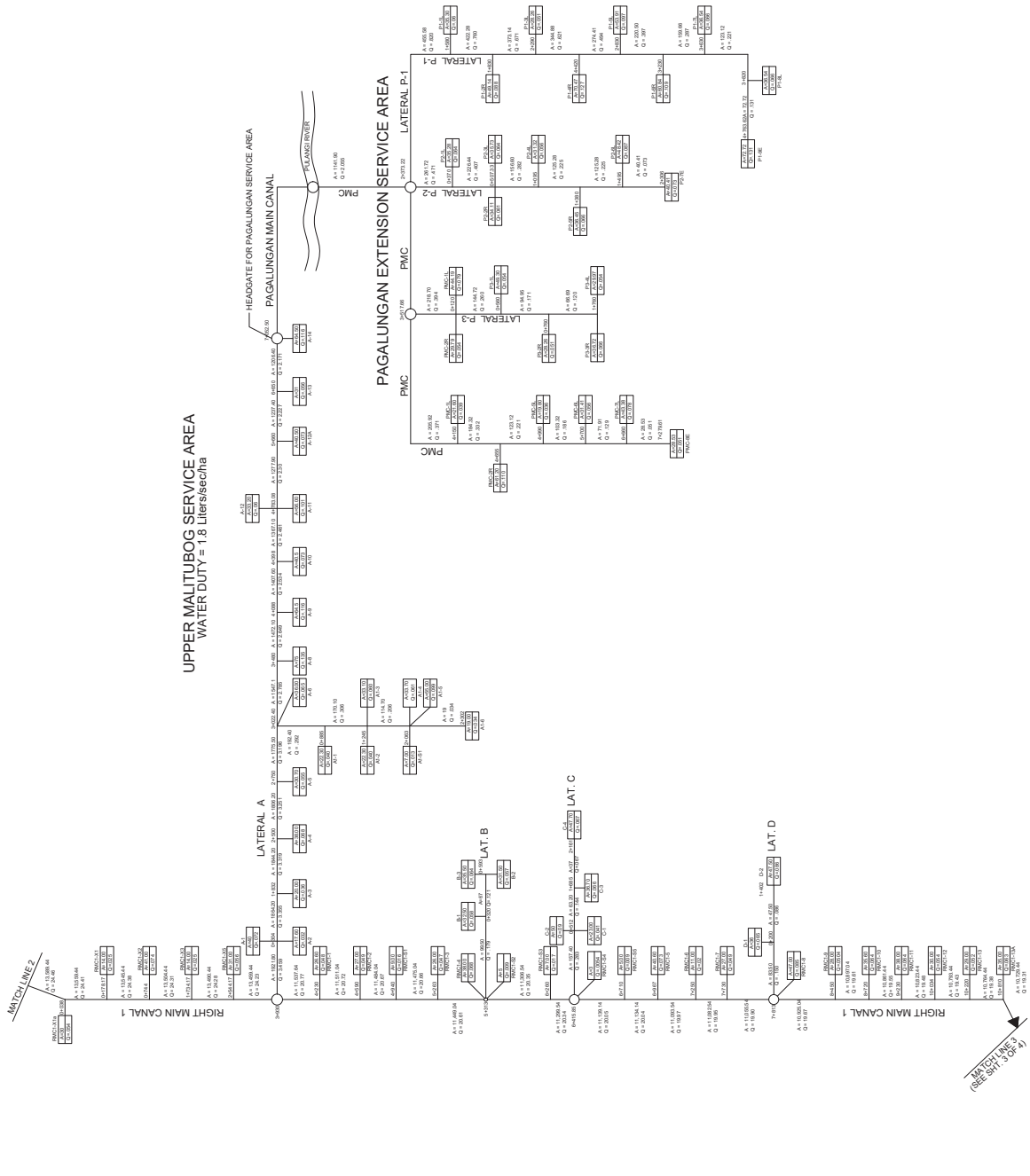
AKASA A. BASILAN  
 ACTING PROJECT MANAGER

MARIDAGAO IRRIGATION PROJECT II  
 SHEET 1 OF 4

UPPER MALITUBOG SERVICE AREA  
WATER DUTY = 1.8 Liters/Sec/ha



3									
2									
1	DATE	NATURE OF REVISION	BY	CHECKED	REVISION	APPROVED	DATE		
NSI									
REVISIONS OF THE DESIGN NATIONAL IRRIGATION ADMINISTRATION MALITUBOG-MARDAGAO IRRIGATION PROJECT II NORTH-COTABATO AND MAGUINDANAO UPPER MALITUBOG SERVICE AREA & PAGALJUNGAN EXTENSION SERVICE AREA IRRIGATION SCHEMATIC DIAGRAM MARDAGAO									
DESIGN									
PREPARED: JAVIER S. MARDAGAO									
CHECKED: JAVIER S. MARDAGAO									
RECOMMENDED: JESUS CALAGAN									
REVISIONS: NONE									
APPROVED:									
REYNALDO M. SARCILUMBA MANAGER, ENGR. DIVISION									
AKASA A. BASILAN ACTING PROJECT MANAGER									
SHEET 2 OF 4									



UPPER MALITUBOG SERVICE AREA  
WATER DUTY = 1.8 Liters/Sec/ha

TEST NO.	DATE	NAME OF REVISION	BY	CHANGED	REASON	APPROVED
3						
2						

REPUBLIC OF THE PHILIPPINES  
NATIONAL IRRIGATION ADMINISTRATION  
MALITUBOG-MARIGAO IRRIGATION PROJECT I  
NORTH COTABATO AND MAGUINDANAO

UPPER MALITUBOG SERVICE AREA  
IRRIGATION SCHEMATIC DIAGRAM

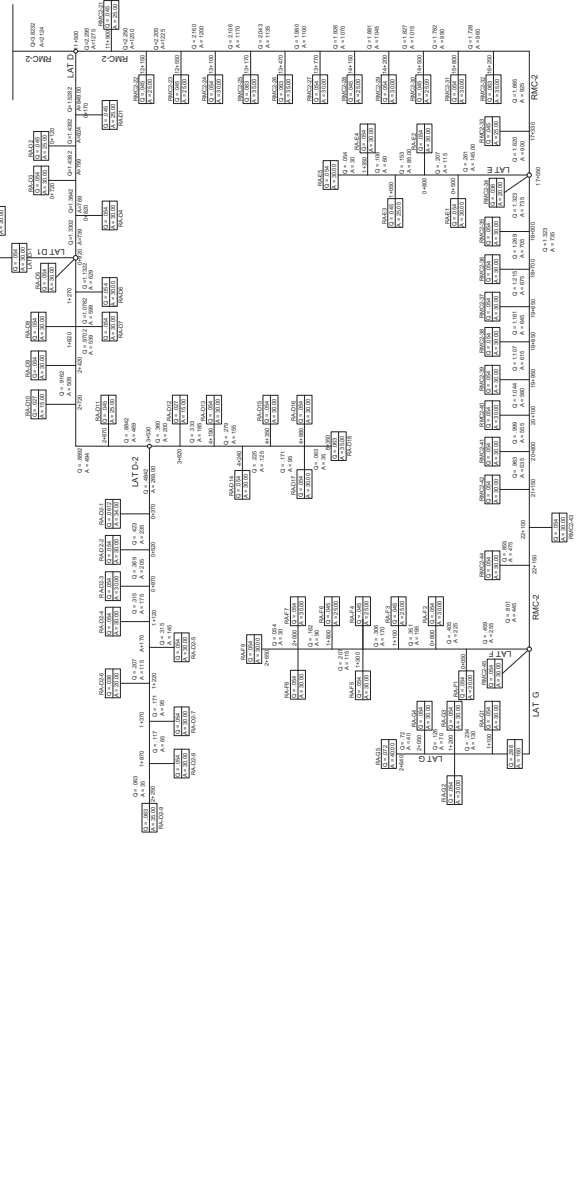
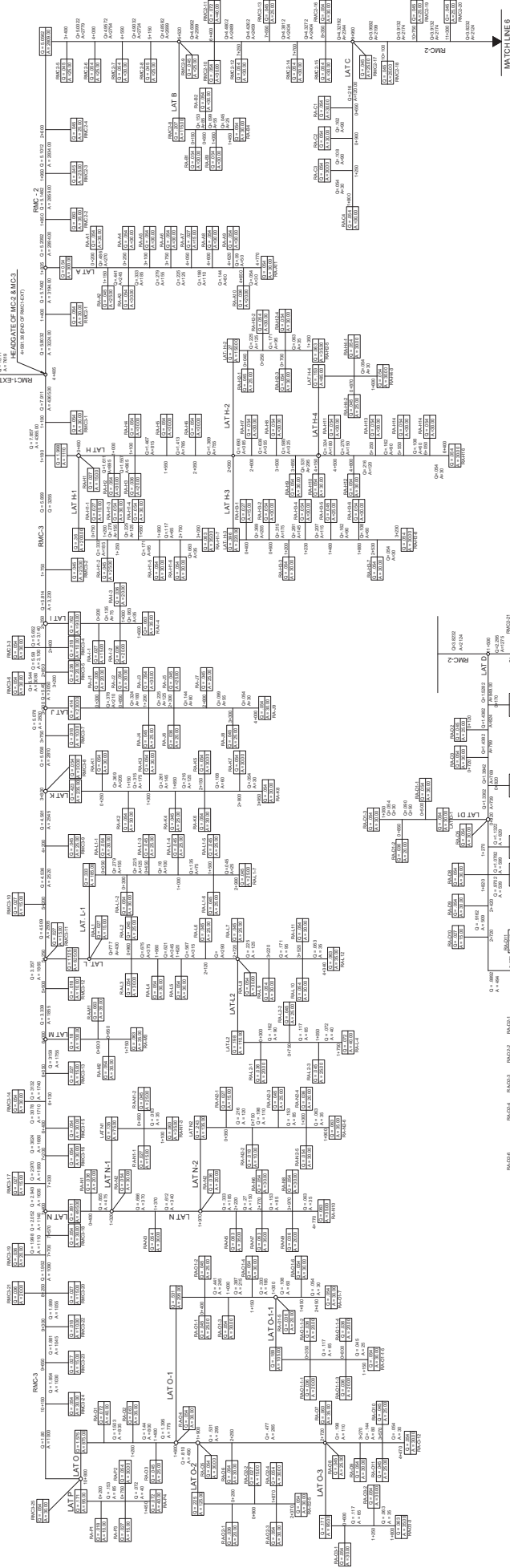
MARIGAO  
DESIGN  
PREPARED BY: JABARA  
CHECKED BY: JABARA  
SUBMITTED BY: JABARA  
RECOMMENDED

CONSULTANT  
REVIEWED  
REYNALDO M. SARIGIMBA  
MANAGER, ENGG. DIVISION

APPROVED:  
AKAS A. BASILAN  
ACTING PROJECT MANAGER

LOWER MALITUBOG SERVICE AREA  
WATER DUTY = 1.8 Liters/sec/ha

MATCH LINE 5



TEST NO.	DATE	BY	CHECKED	REVISION	APPROVED

REPUBLIC OF THE PHILIPPINES  
NATIONAL IRRIGATION ADMINISTRATION  
MALIBON, MARICORRAO IRRIGATION PROJECT I  
NORTH COTABATO AND MAGSAYSAY

LOWER MALITUBOG SERVICE AREA  
IRRIGATION SCHEMATIC DIAGRAM

MARICORRAO  
DESIGN  
PREPARED BY: J. TABARA  
CHECKED BY: J. TABARA  
SUBMITTED BY: J. TABARA  
TELECOMMENCED

REYNALDO M. SARGIMBA  
MANAGER, ENCG DIVISION

APPROVED:  
AKAS A. BASILAN  
ACTING PROJECT MANAGER

#### IV.1.4 ORIGINAL PLAN OF IRRIGATION AND DRAINAGE NETWORK

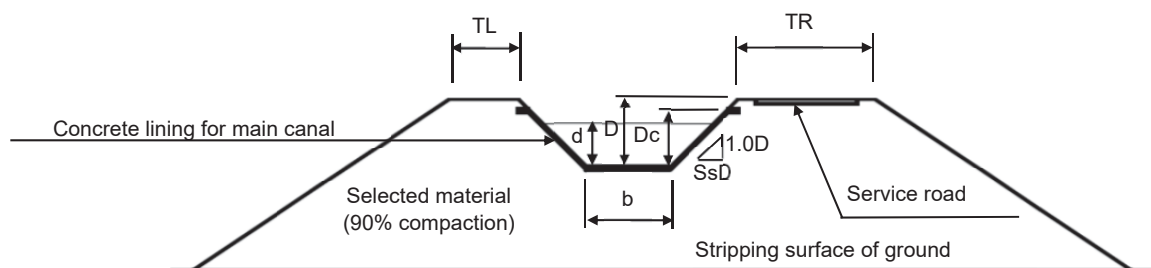
# Irrigable Area under LMSA and Progress of the construction work

NO.	CANAL	Original Plan (Construction of Dike)			Condition of the contract work			Plan without construction of dike			Difference		
		STATION	Length (m)	Irrigable area (ha)	STATION	Length (m)	Irrigable area (ha)	Completion of works	STATION	Length (m)	Irrigable area (ha)	Canal length (m)	Irrigable area (ha)
1	RMC-2	0+000	1,867	75	0+000	1,867	75	84.1%	0+000	1,867	75	0	0
1	RMC-2	1+867	2,253	105	1+867	2,253	105	43.5%	1+867	4+120	105	0	0
1	RMC-2	4+120	1,700	295	4+120	1,700	295	8.2%	4+120	5+820	295	0	0
1	RMC-2	5+820	2,860	293	5+820	2,860	293	0.0%	5+820	8+680	293	0	0
1	RMC-2	8+680	2,920	162	8+680	2,920	162		8+680	11+600	162	0	0
1	RMC-2	11+600	11,189	634	11+600	11,189	634						
2	RMC-3	0+000	1,317	30	0+000	1,317	30	89.5%	0+000	1+317	30	0	-634
2	RMC-3	1+317	5,643	260	1+317	5,643	260	9.5%	1+317	6+960	260	0	0
2	RMC-3	6+960	4,426	174	6+960	4,426	174	4.0%	6+960	11+386	174	0	0
3	LATERAL A	0+000	4,770	300	0+000	4,442	300	62.1%	0+000	4+442	300	0	0
4	LATERAL B	0+000	1,450	115	0+000	1,369	115	0.0%	0+000	1+369	115	0	0
5	LATERAL C	0+000	1,800	108	0+000	1,677	108		0+000	1+677	108	0	0
6	LATERAL D	0+000	6,350	390	0+000	6,341	390		0+000	4+640	272	-1,701	-118
7	LATERAL D-1	0+000	1,350	75	0+000	1,299	75		0+000	1+299	75	0	0
8	LATERAL D-2	0+000	2,250	141	0+000	2,250	141		0+000	2+250	141	0	0
9	LATERAL D-3	0+000	2,288	243	0+000	2,288	243		0+000	2+288	243	0	0
10	LATERAL E	0+000	1,350	145	0+000	1,948	145		0+000	0+000	0	-1,948	-145
11	LATERAL F	0+000	2,650	255	0+000	1,990	255		0+000	0+000	0	-1,990	-255
12	LATERAL G	0+000	2,640	160	0+000	2,653	160		0+000	0+000	0	-2,653	-160
13	LATERAL H	0+000	6,400	455	0+000	5,987	455		0+000	5+987	455	0	0
14	LATERAL H-1	0+000	3,050	200	0+000	3,037	200		0+000	3+037	200	0	0
15	LATERAL H-2	0+000	1,350	150	0+000	1,248	150	43.2%	0+000	1+248	150	0	0
16	LATERAL H-3	0+000	3,230	220	0+000	3,007	220		0+000	3+007	220	0	0
17	LATERAL H-4	0+000	1,600	85	0+000	1,606	85		0+000	1+606	85	0	0
18	LATERAL I	0+000	1,600	90	0+000	1,648	90	32.8%	0+000	1+648	90	0	0
19	LATERAL J	0+000	4,000	230	0+000	2,849	230	30.2%	0+000	1+200	105	-1,649	-125
20	LATERAL K	0+000	3,950	235	0+000	2,302	235	22.9%	0+000	1+300	120	-1,002	-115
21	LATERAL L	0+000	4,340	440	0+000	2,360	440	19.8%	0+000	2+360	150	0	-290
22	LATERAL L-1	0+000	2,900	185	0+000	2,114	185	25.3%	0+000	1+000	110	-1,114	-75
23	LATERAL M	0+000	1,750	100	0+000	1,702	100	39.9%	0+000	1+702	100	0	0
24	LATERAL N	0+000	4,770	285	0+000	3,510	285		0+000	2+500	135	-1,010	-150
25	LATERAL N-1	0+000	1,100	75	0+000	1,120	75	41.9%	0+000	1+120	75	0	0
26	LATERAL N-2	0+000	1,900	135	0+000	1,921	135		0+000	1+000	100	-921	-35
27	LATERAL O	0+000	4,470	255	0+000	4,542	255		0+000	1+400	100	-3,142	-155
28	LATERAL O-1	0+000	2,450	295	0+000	2,320	295		0+000	0+000	0	-2,320	-295
29	LATERAL O1-1	0+000	1,150	105	0+000	1,077	105	20.2%	0+000	0+000	0	-1,077	-105
30	LATERAL O-2	0+000	2,370	125	0+000	1,210	125		0+000	0+000	0	-1,210	-125
31	LATERAL O-3	0+000	1,800	95	0+000	1,794	95		0+000	0+000	0	-1,794	-95
32	LATERAL P	0+000	1,450	171	0+000	1,488	171		0+000	1+488	171	0	0
<b>TOTAL</b>			<b>116,703</b>	<b>7,891</b>		<b>107,272</b>	<b>7,891</b>			<b>72,554</b>	<b>5,014</b>	<b>-34,718</b>	<b>-2,877</b>

Note: Irrigable area is based on the Schematic Diagram of Irrigation System. Present design area is 6,590ha.

- Construction from 2015
- Construction from 2016
- Construction from 2017
- Construction from 2018

## Dimension of typical cross section of irrigation canal



### Main canal MC-2

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	n
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	1+867	5.80	0.92	6.29	2.80	1.47	2.10	1.80	0.90	4.00	2.00	1.0	0.00025	0.0016
1+867	4+911	5.26	0.90	5.83	2.60	1.44	2.00	1.70	0.87	4.00	2.00	1.0	0.00025	0.0016
4+911	9+018	5.06	0.89	5.65	2.50	1.40	2.00	1.70	0.86	4.00	2.00	1.0	0.00025	0.0016
9+018	11+586	4.84	0.88	5.47	2.50	1.40	2.00	1.70	0.86	4.00	2.00	1.0	0.00025	0.0016
11+586	17+198	3.31	0.86	3.85	2.10	1.17	1.70	1.50	0.71	4.00	2.00	1.0	0.00030	0.0016
17+198	22+789	3.05	0.84	3.61	2.00	1.15	1.60	1.40	0.69	4.00	2.00	1.0	0.00030	0.0016

Note: Q: Discharge, V: Velocity, A: Flow area, b: Canal bed width, d: water depth, D: canal depth, TR: Width of right canal bank, TL: Width of left canal bank, Ss: Slope of canal side slope, S: Slope of canal, n: Coefficient of friction

### Lateral canal LAT-A

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	n
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+366	0.653	0.592	1.248	1.00	0.64	0.95	-	0.378	1.50	4.00	1.5:1	0.0008	0.025
0+366	1+360	0.610	0.563	1.085	1.00	0.58	0.90	-	0.351	1.50	4.00	1.5:1	0.0008	0.025
1+360	1+644.30	0.543	0.548	0.991	0.90	0.56	0.90	-	0.337	1.50	4.00	1.5:1	0.0008	0.025
1+644.30	2+300	0.427	0.516	0.827	0.80	0.52	0.85	-	0.308	1.50	4.00	1.5:1	0.0008	0.025
2+300	3+120	0.374	0.498	0.750	0.80	0.49	0.80	-	0.293	1.50	4.00	1.5:1	0.0008	0.025
3+120	3+463	0.278	0.464	0.601	0.70	0.44	0.75	-	0.263	1.50	4.00	1.5:1	0.0008	0.025
3+463	3+901.91	0.206	0.431	0.480	0.60	0.40	0.70	-	0.235	1.50	4.00	1.5:1	0.0008	0.025
3+901.91	4+065	0.135	0.385	0.351	0.60	0.32	0.70	-	0.199	1.50	4.00	1.5:1	0.0008	0.025
4+065	4+442.25	0.103	0.358	0.288	0.60	0.28	0.60	-	0.177	1.50	4.00	1.5:1	0.0008	0.025

### Lateral canal LAT-B

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	n
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+520	0.179	0.412	0.435	0.70	0.35	0.65	-	0.220	1.50	3.00	1.5:1	0.0008	0.025
0+520	1+369	0.125	0.377	0.331	0.60	0.31	0.65	-	0.193	1.50	3.00	1.5:1	0.0008	0.025

### Lateral canal LAT-C

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	n
From	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+510	0.194	0.459	0.421	0.60	0.36	0.65	-	0.219	1.50	3.00	1.5:1	0.0010	0.025
0+510	1+100	0.138	0.420	0.328	0.60	0.31	0.60	-	0.19	1.50	3.00	1.5:1	0.0010	0.025
1+100	1+676.76	0.053	0.330	0.164	0.50	0.20	0.50	-	0.133	1.50	3.00	1.5:1	0.0010	0.025



### Lateral canal LAT-D

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	n
From	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+500	1.528	0.634	2.411	1.60	0.84	1.20	-	0.52	1.50	4.00	1.5:1	0.0006	0.025
0+500	0+850	1.428	0.622	2.294	1.60	0.81	1.20	-	0.506	1.50	4.00	1.5:1	0.0006	0.025
0+850	1+300	1.199	0.595	2.012	1.50	0.76	1.10	-	0.474	1.50	4.00	1.5:1	0.0006	0.025
1+300	2+235	1.048	0.576	1.818	1.40	0.73	1.05	-	0.451	1.50	4.00	1.5:1	0.0006	0.025
2+235	2+700	0.970	0.565	1.719	1.40	0.70	1.00	-	0.438	1.50	4.00	1.5:1	0.0006	0.025
2+700	3+125	0.869	0.550	1.579	1.30	0.68	1.00	-	0.421	1.50	4.00	1.5:1	0.0006	0.025
3+125	3+930	0.770	0.533	1.446	1.30	0.64	1.00	-	0.401	1.50	4.00	1.5:1	0.0006	0.025
3+930	4+590	0.317	0.427	0.742	0.90	0.46	0.80	-	0.288	1.50	4.00	1.5:1	0.0006	0.025
4+590	5+205	0.175	0.369	0.475	0.70	0.36	0.70	-	0.231	1.50	4.00	1.5:1	0.0006	0.025
5+205	5+760	0.123	0.338	0.365	0.60	0.34	0.65	-	0.203	1.50	3.00	1.5:1	0.0006	0.025
5+760	6+341.38	0.089	0.310	0.289	0.60	0.28	0.60	-	0.179	1.50	3.00	1.5:1	0.0006	0.025

### Lateral canal LAT-D1

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+610	0.083	0.366	0.227	0.60	0.24	0.60	-	0.156	1.00	3.00	1.5:1	0.0010	0.025
0+610	1+299.18	0.036	0.299	0.121	0.40	0.18	0.50	-	0.115	1.00	3.00	1.5:1	0.0010	0.025

### Lateral canal LAT-D2

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+260	0.177	0.41	0.429	0.70	0.35	0.70	-	0.219	1.50	3.00	1.5:1	0.0008	0.025
0+260	0+560	0.121	0.374	0.324	0.60	0.31	0.60	-	0.190	1.50	3.00	1.5:1	0.0008	0.025
0+560	1+009.102	0.082	0.339	0.241	0.50	0.27	0.60	-	0.165	1.50	3.00	1.5:1	0.0008	0.025

### Lateral canal LAT-D3

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+530	0.438	0.515	0.850	1.00	0.49	0.80	-	0.307	1.00	4.00	1.5:1	0.0008	0.025
0+530	1+008	0.331	0.480	0.686	0.90	0.44	0.70	-	0.277	1.00	4.00	1.5:1	0.0008	0.025
1+008	1+360	0.192	0.420	0.457	0.70	0.37	0.70	-	0.226	1.00	3.00	1.5:1	0.0008	0.025
1+360	2+287.57	0.045	0.315	0.139	0.40	0.20	0.50	-	0.124	1.00	3.00	1.5:1	0.0008	0.025

### Lateral canal LAT-E

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	1+000	0.264	0.455	0.580	0.80	0.41	0.70	-	0.255	3.00	1.00	1.5:1	0.0008	0.025
1+000	1+947.68	0.186	0.417	0.446	0.70	0.36	0.70	-	0.223	3.00	1.00	1.5:1	0.0008	0.025

### Lateral canal LAT-F

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+078	0.368	0.378	0.894	1.20	0.50	0.80	-	0.325	1.50	4.00	1.5:1	0.0004	0.025
0+078	1+140	0.274	0.352	0.727	1.00	0.45	0.80	-	0.292	1.00	3.00	1.5:1	0.0004	0.025
1+140	1+160	0.223	0.335	0.616	0.90	0.43	0.70	-	0.271	1.00	3.00	1.5:1	0.0004	0.025
1+160	1+990.76	0.115	0.282	0.378	0.80	0.32	0.60	-	0.210	1.00	3.00	1.5:1	0.0004	0.025

### Lateral canal LAT-G

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+293	0.336	0.432	0.779	1.00	0.46	0.80	-	0.293	4.00	1.50	1.5:1	0.0006	0.025
0+293	1+000	0.217	0.388	0.558	0.80	0.40	0.70	-	0.249	3.00	1.50	1.5:1	0.0006	0.025
1+000	2+000	0.134	0.346	0.389	0.60	0.35	0.70	-	0.210	3.00	1.50	1.5:1	0.0006	0.025
2+000	2+652.55	0.052	0.316	0.163	0.40	0.22	0.60	-	0.135	3.00	1.50	1.5:1	0.0006	0.025

### Main canal MC-3

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	1+317.242	7.810	1.065	7.332	3.00	1.60	2.30	1.90	0.976	2.50	4.00	1.5:1	0.0003	0.016
1+317.42	2+915.223	5.560	0.975	5.702	2.80	1.37	2.00	1.70	0.855	2.50	4.00	1.5:1	0.0003	0.016
2+915.223	3+953.042	5.276	0.963	5.476	2.70	1.35	2.00	1.70	0.840	2.50	4.00	1.5:1	0.0003	0.016
3+953.042	4+565.311	4.849	0.946	5.128	2.50	1.34	2.00	1.65	0.816	2.50	4.00	1.5:1	0.0003	0.016
4+565.311	5+864.328	4.226	0.913	4.628	2.40	1.26	1.90	1.60	0.746	2.50	4.00	1.5:1	0.0003	0.016
5+864.328	6+820.085	3.206	0.854	3.756	2.10	1.15	1.75	1.45	0.700	2.50	4.00	1.5:1	0.0003	0.016
6+820.085	8+252.184	2.882	0.830	3.47	2.10	1.09	1.70	1.40	0.670	2.50	4.00	1.5:1	0.0003	0.016
8+252.184	11+589.55	1.929	0.750	2.57	1.80	0.94	1.50	1.25	0.280	1.50	4.00	1.5:1	0.0003	0.016

### Lateral canal LAT-H

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+506	1.791	0.613	2.92	1.90	0.90	1.30	-	0.568	1.50	4.00	1.5:1	0.0005	0.025
0+506	1+584.91	1.708	0.607	2.813	1.80	0.89	1.30	-	0.559	1.50	4.00	1.5:1	0.0005	0.025
1+584.91	2+640	0.960	0.525	1.829	1.50	0.71	1.00	-	0.450	1.50	4.00	1.5:1	0.0005	0.025
2+640	3+609.96	0.868	0.513	1.693	1.40	0.69	1.00	-	0.434	1.50	4.00	1.5:1	0.0006	0.025
3+609.96	4+560	0.503	0.479	1.051	1.10	0.55	0.90	-	0.342	1.50	4.00	1.5:1	0.0006	0.025
4+560	5+060	0.388	0.448	0.864	1.10	0.50	0.80	-	0.310	1.50	4.00	1.5:1	0.0006	0.025
5+060	5+760	0.230	0.394	0.583	0.80	0.41	0.70	-	0.255	1.50	3.00	1.5:1	0.0006	0.025
5+760	5+987.12	0.077	0.301	0.256	0.50	0.28	0.60	-	0.170	1.00	3.00	1.5:1	0.0006	0.025

### Lateral canal LAT-H1

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	1+131	0.439	0.539	0.817	1.00	0.48	0.80	-	0.301	1.00	4.00	1.5:1	0.0009	0.025
1+131	1+840	0.372	0.519	0.720	0.90	0.45	0.80	-	0.283	1.00	4.00	1.5:1	0.0009	0.025
1+840	2+380	0.291	0.507	0.576	0.80	0.41	0.70	-	0.254	1.00	4.00	1.5:1	0.0010	0.025
2+380	2+770	0.185	0.451	0.410	0.70	0.34	0.70	-	0.213	1.00	3.00	1.5:1	0.0010	0.025
2+770	3+037.23	0.137	0.419	0.326	0.60	0.31	0.60	-	0.191	1.00	3.00	1.5:1	0.0010	0.025

### Lateral canal LAT-H2

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+080	0.198	0.424	0.469	0.70	0.37	0.70	-	0.229	1.00	3.00	1.5:1	0.0008	0.025
0+080	0+637	0.151	0.394	0.382	0.70	0.32	0.70	-	0.205	1.00	3.00	1.5:1	0.0008	0.025
0+637	1+020	0.108	0.363	0.398	0.60	0.29	0.60	-	0.182	1.00	3.00	1.5:1	0.0008	0.025
1+020	0+247.67	0.081	0.335	0.241	0.60	0.25	0.60	-	0.161	1.00	3.00	1.5:1	0.0008	0.025

### Lateral canal LAT-H3

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+720	0.392	0.500	0.785	1.00	0.46	0.80	-	0.294	1.50	4.00	1.5:1	0.0008	0.025
0+720	1+060	0.325	0.477	0.679	0.90	0.44	0.80	-	0.274	1.50	4.00	1.5:1	0.0008	0.025
1+060	1+580	0.287	0.465	0.617	0.80	0.43	0.75	-	0.263	1.50	4.00	1.5:1	0.0008	0.025
1+580	2+014	0.197	0.424	0.467	0.70	0.37	0.70	-	0.229	1.00	3.00	1.5:1	0.0008	0.025
2+014	2+570	0.161	0.401	0.402	0.70	0.33	0.65	-	0.211	1.00	3.00	1.5:1	0.0008	0.025
2+570	3+006.73	0.120	0.373	0.322	0.60	0.30	0.60	-	0.190	1.00	3.00	1.5:1	0.0008	0.025

### Lateral canal LAT-H4

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+ 000	0+480	0.232	0.439	0.528	0.80	0.38	0.70	-	0.242	1.00	3.00	1.5:1	0.0008	0.025
0+480	1+160	0.187	0.417	0.449	0.70	0.36	0.70	-	0.224	1.00	3.00	1.5:1	0.0008	0.025
1+160	1+606.28	0.062	0.300	0.208	0.50	0.24	0.50	-	0.151	1.00	3.00	1.5:1	0.0008	0.025

Lateral canal LAT-I

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+882	0.162	0.400	0.399	0.60	0.35	0.70	-	0.213	1.50	3.00	1.5:1	0.0008	0.025
0+882	1+578.18	0.083	0.340	0.243	0.50	0.27	0.60	-	0.165	1.50	3.00	1.5:1	0.0008	0.025

Lateral canal LAT-K

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+420	0.435	0.539	0.807	0.90	0.49	0.80	-	0.302	4.00	1.50	1.5:1	0.0009	.0.025
0+420	0+735	0.356	0.511	0.695	0.90	0.44	0.80	-	0.278	4.00	1.50	1.5:1	0.0009	0.025
0+735	1+155	0.264	0.474	0.556	0.80	0.40	0.70	-	0.249	3.00	1.00	1.5:1	0.0009	0.025
1+155	1+680	0.214	0.432	0.495	0.70	0.39	0.70	-	0.236	3.00	1.00	1.5:1	0.0008	0.025
1+680	2+301.72	0.139	0.388	0.358	0.60	0.33	0.60	-	0.201	3.00	1.00	1.5:1	0.0008	0.025

Lateral canal LAT-L

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+334.25	0.926	0.621	1.489	1.30	0.65	1.00	-	0.407	1.50	4.00	1.5:1	0.0008	0.025
0+334.25	0+840	0.631	0.565	1.116	1.10	0.57	0.90	-	0.354	1.50	4.00	1.5:1	0.0008	0.025
0+840	2+000	0.539	0.542	0.995	1.10	0.53	0.90	-	0.332	1.50	4.00	1.5:1	0.0008	0.025
2+000	2+360	0.422	0.509	0.826	1.00	0.48	0.80	-	0.302	1.50	4.00	1.5:1	0.0008	0.025
2+360	2+862	0.318	0.475	0.669	0.90	0.43	0.80	-	0.272	1.50	4.00	1.5:1	0.0008	0.025
2+862	3+160.109	0.269	0.457	0.589	0.80	0.41	0.70	-	0.257	1.00	3.00	1.5:1	0.0008	0.025

Lateral canal LAT-L1

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+060	0.248	0.447	0.556	0.80	0.40	0.70	-	0.249	1.50	3.00	1.5:1	0.0008	0.025
0+060	0+940	0.194	0.421	0.460	0.70	0.37	0.70	-	0.227	1.50	3.00	1.5:1	0.0008	0.025
0+940	2+113.937	0.147	0.394	0.374	0.60	0.34	0.70	-	0.206	1.50	3.00	1.5:1	0.0008	0.025

Lateral canal LAT-M

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+970	0.18	0.431	0.416	0.70	0.34	0.70	-	0.215	1.00	3.00	1.5:1	0.0009	0.025
0+970	1+702.51	0.09	0.362	0.252	0.60	0.26	0.60	-	0.166	1.00	3.00	1.5:1	0.0009	0.025

Lateral canal LAT-N

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+722	0.779	0.596	1.307	1.20	0.62	1.00	-	0.382	1.50	4.00	1.5:1	0.0008	0.025
0+722	1+269.96	0.712	0.539	1.218	1.10	0.61	0.90	-	0.371	1.50	4.00	1.5:1	0.0008	0.025
1+269.96	1+917.13	0.529	0.540	0.931	0.90	0.54	0.90	-	0.326	1.50	4.00	1.5:1	0.0009	0.025
1+917.13	2+168	0.234	0.460	0.511	0.80	0.38	0.80	-	0.237	1.50	4.00	1.5:1	0.0009	0.025
2+168	2+940	0.180	0.431	0.417	0.70	0.34	0.70	-	0.215	1.00	3.00	1.5:1	0.0009	0.025
2+940	3+509.75	0.153	0.416	0.369	0.60	0.33	0.65	-	0.204	1.00	3.00	1.5:1	0.0009	0.025

Lateral canal LAT-N1

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+680	0.123	0.374	0.325	0.60	0.31	0.60	-	0.191	1.00	3.00	1.5:1	0.0008	0.025
0+680	1+120.02	0.066	0.321	0.206	0.50	0.24	0.60	-	0.151	1.00	3.00	1.5:1	0.0008	0.025

Lateral canal LAT-N2

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+680	0.257	0.451	0.568	0.80	0.40	0.70	-	0.252	1.00	3.00	1.5:1	0.0008	0.025
0+680	1+340	0.209	0.430	0.488	0.70	0.38	0.70	-	0.234	1.00	3.00	1.5:1	0.0008	0.025
1+340	1+*20.85	0.058	0.391	0.151	0.50	0.19	0.50	-	0.127	1.00	3.00	1.5:1	0.0008	0.025

Lateral canal LAT-O

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	1+483.238	1.575	0.521	3.019	1.60	0.94	1.30	-	0.582	1.50	4.00	1.5:1	0.00035	0.025
1+483.238	1+730.82	1+060	0.472	2.247	1.60	0.80	1.10	-	0.500	1.50	4.00	1.5:1	0.00035	0.025
1+730.82	2+795.64	0.545	0.400	1.362	1.20	0.63	1.00	-	0.391	1.00	4.00	1.5:1	0.00035	0.025
2+795.64	3+760	0.329	0.353	0.933	1.00	0.52	0.90	-	0.323	1.00	4.00	1.5:1	0.00035	0.025

Lateral canal LAT-O1

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	1+459.942	0.515	0.538	0.957	1.00	0.53	0.90	-	0.328	1.50	4.00	1.5:1	0.0008	0.025
1+459.942	1+760	0.329	0.482	0.684	0.80	0.46	0.80	-	0.278	1.50	4.00	1.5:1	0.0008	0.025

Lateral canal LAT-O1-1

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+280	0.254	0.379	0.670	0.80	0.45	0.80	-	0.254	1.50	3.00	1.5:1	0.0004	0.025
0+280	0+800	0.204	0.356	0.553	0.70	0.42	0.80	-	0.204	1.50	3.00	1.5:1	0.0004	0.025

Lateral canal LAT-O2

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	0+340	0+254	0.379	0.670	0.80	0.45	0.80	-	0.275	1.50	3.00	1.5:1	0.0005	0.025
0+340	0+880	0.197	0.356	0.553	0.70	0.42	0.80	-	0.251	1.50	3.00	1.5:1	0.0005	0.025

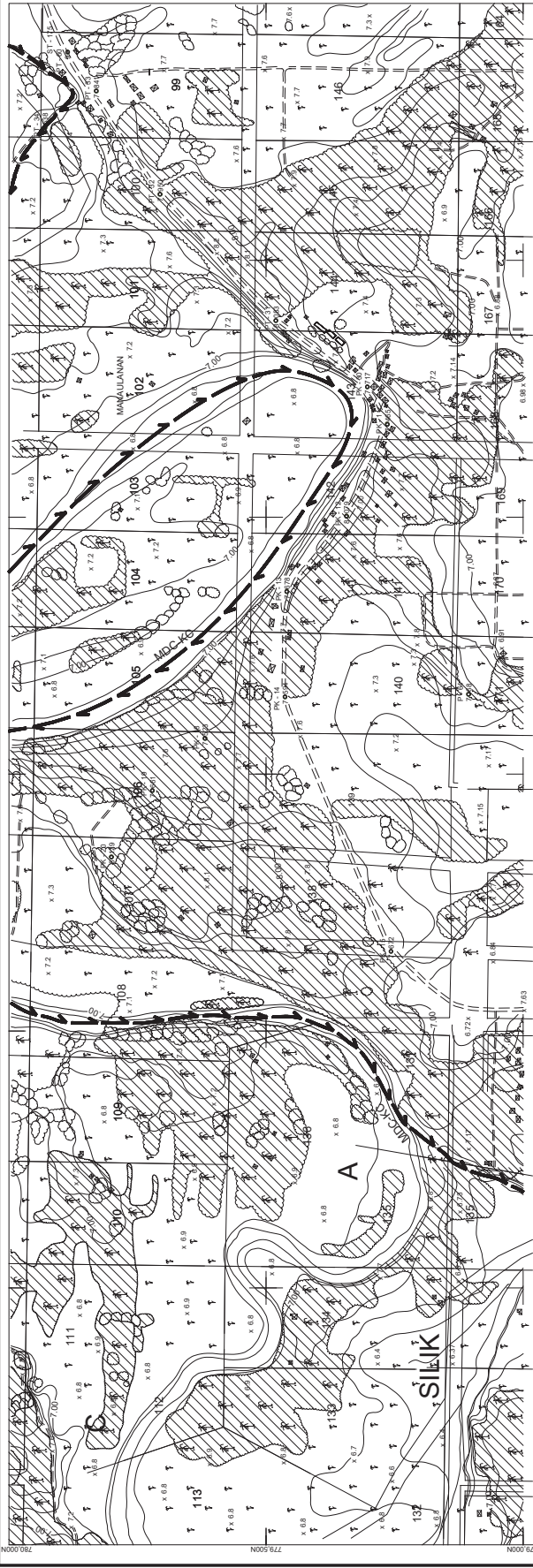
Lateral canal LAT-O3

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	1+420	0.216	0.363	0.597	0.80	0.42	0.80	-	0.237	3.00	1.50	1.5:1	0.0005	0.025

Lateral canal LAT-P

Station		Q	V	A	b	d	D	Dc	R	TR	TL	Ss	S	N
from	to	m <sup>3</sup> /s	m/s	m	m	m	m	m	m	m	m			
0+000	1+317.242	0.167	0.343	0.489	0.60	0.40	0.65	-	0.237	3.00	1.50	1.5:1	0.0005	0.025

## IV.1.5 ORIGINAL PLAN OF PROTECTION DIKE AND RING DIKE



1	2	3	4	5	6	7
14	13	12	11	10	9	8
15	16	17	18	19	20	21
27	26	25	24	23	22	
28	29	30	31	32		
					34	33

INDEX TO ADJOINING SHEETS

- LEGEND
- PROPOSED HEADWORKS / OVERFLOW WORKS
  - EXISTING HEADWORKS / OVERFLOW WORKS
  - MAIN CANAL (EXISTING)
  - LATERAL (SUB-LATERAL) (EXISTING)
  - EXISTING MAIN CANAL (EXISTING)
  - EXISTING MAIN CANAL (PROPOSED)
  - MAIN CANAL (PROPOSED)
  - LATERAL (PROPOSED)
  - EXISTING LATERALS
  - PROPOSED LATERALS
  - EXISTING CANALS
  - PROPOSED CANALS
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  - EXISTING BICYCLES / STREETS / OTHER ROADS
  - TRAIL
  - EXCLUDED AREA
  - LIMIT OF IRRIGABLE / PROJECT AREA
  - CREEKS / RIVERS / NATURAL WATERWAYS



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NATIONAL IRRIGATION ADMINISTRATION  
 REGION 12  
 PROVINCE OF NORTH COTABATO  
 MALITUBOG MARIDAGAO IRRIGATION PROJECT  
 LOWER MALITUBOG DIVISION AND MANAGEMENT PLAN  
**LOWER MALITUBOG SERVICE AREA**

DRAFTING: \_\_\_\_\_  
 CHECKED: \_\_\_\_\_  
 REVISION: \_\_\_\_\_  
 SUBMITTED: \_\_\_\_\_

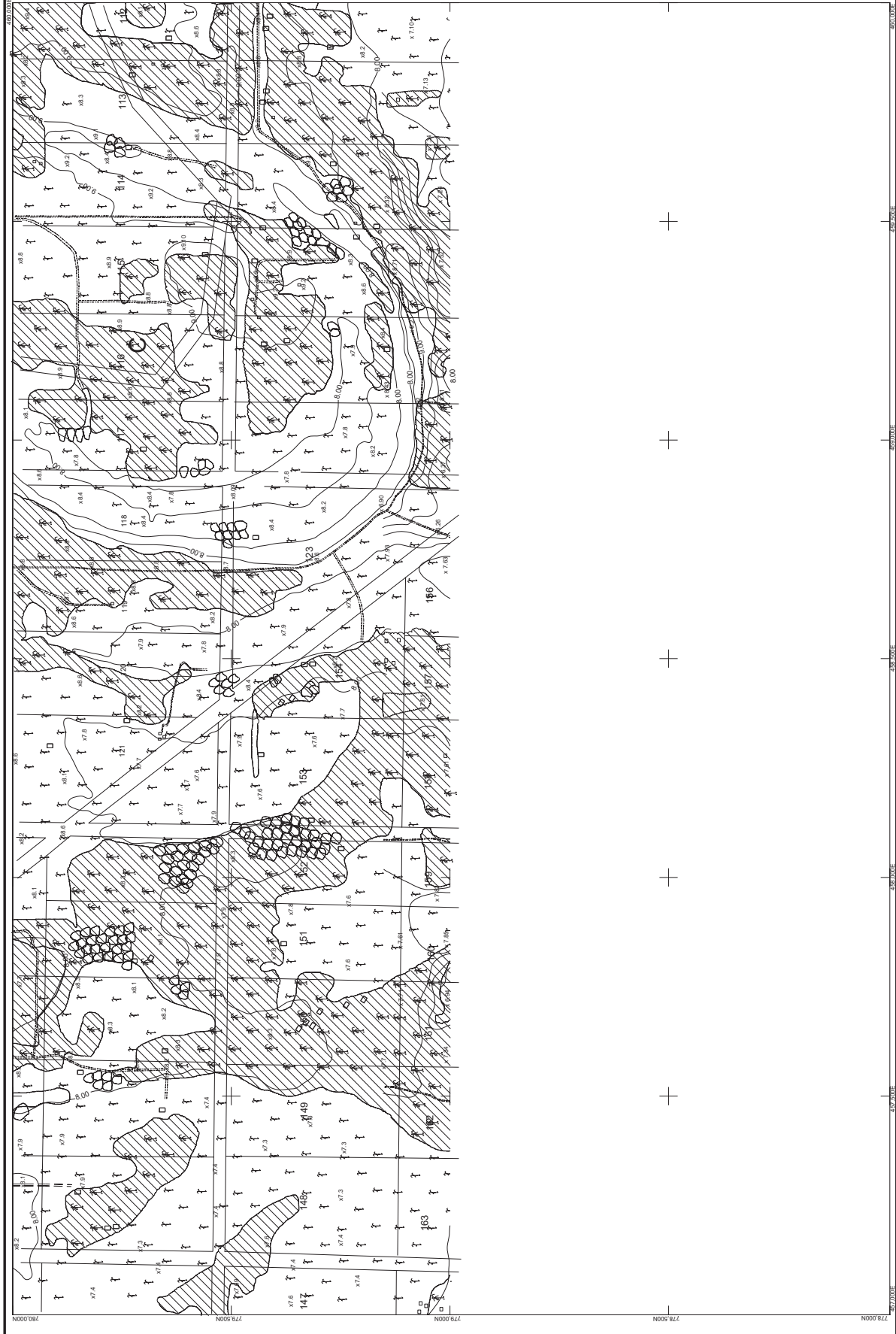
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 CHECKED: \_\_\_\_\_  
 REVISION: \_\_\_\_\_  
 SUBMITTED: \_\_\_\_\_

ACTING PROJECT MANAGER:  
 ALI S. SULTO

RECOMMENDING APPROVAL:  
 LYDIA S. ESCLERA  
 MANAGER ENGINEERING DEPARTMENT

APPROVED:  
 CIZAR M. SILIK  
 DEPUTY ADMINISTRATOR FOR ENGINEERING & OPERATION

MALITUBOG DIVISION (DWS) NO. 04-112-AMM-16-1-20  
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  - EXISTING / RIVER(S) / NATURAL WATERWAYS
  - NATIONAL AREA
  - PROPOSED NATIONAL AREA
  - PRESENTATION

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REPUBLIC OF THE PHILIPPINES  
NATIONAL IRRIGATION ADMINISTRATION  
REGIONAL OFFICE - COTABATO

PROVINCE OF NORTH COTABATO  
MULTIPOCS MARDIGAO IRRIGATION PROJECT  
LOWER MALTUBOG SERVICE AREA  
LOWER MALTUBOG MAIN CANAL BRANCH DRAINAGE

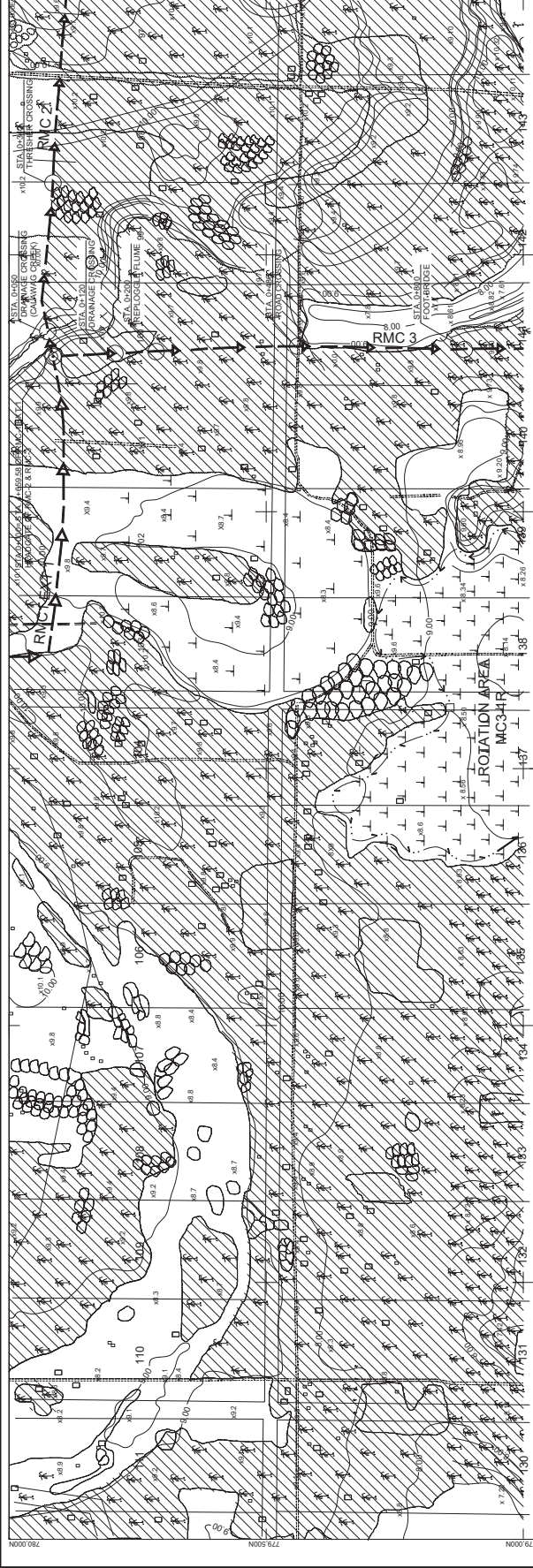
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DESIGN BY \_\_\_\_\_  
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SUBMITTED BY \_\_\_\_\_

A.L.S. SAJOL  
ACTING PROJECT MANAGER

RECOMMENDING APPROVAL:  
LYDIA S. ESCOLERA  
MANAGER / ENGINEERING DEPARTMENT

APPROVED:  
CZAR M. SILAK  
DEPUTY ADMINISTRATOR FOR ENGINEERING & OPERATION

MAILING ADDRESS: LOW MALTUBOG BRANCH, COTABATO CITY, PHILIPPINES



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  - MAINFAN CATCH (PROPOSED)
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  - ROTATIONAL PERCENTAGE
  - PRESENTATION



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REPUBLIC OF THE PHILIPPINES  
 NATIONAL IRRIGATION ADMINISTRATION  
 REGION 10  
 PROVINCE OF NORTH COTABATO  
 MEDIANO, COTABATO

**MALITUBOG MARIDAGAO IRRIGATION PROJECT**  
 NORTH COTABATO PROVINCE  
**LOWER MALITUBOG SERVICE AREA**

DESIGN  
 DRAWN BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 REVISIONS: \_\_\_\_\_

DESIGN  
 DESIGNED BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 REVISIONS: \_\_\_\_\_

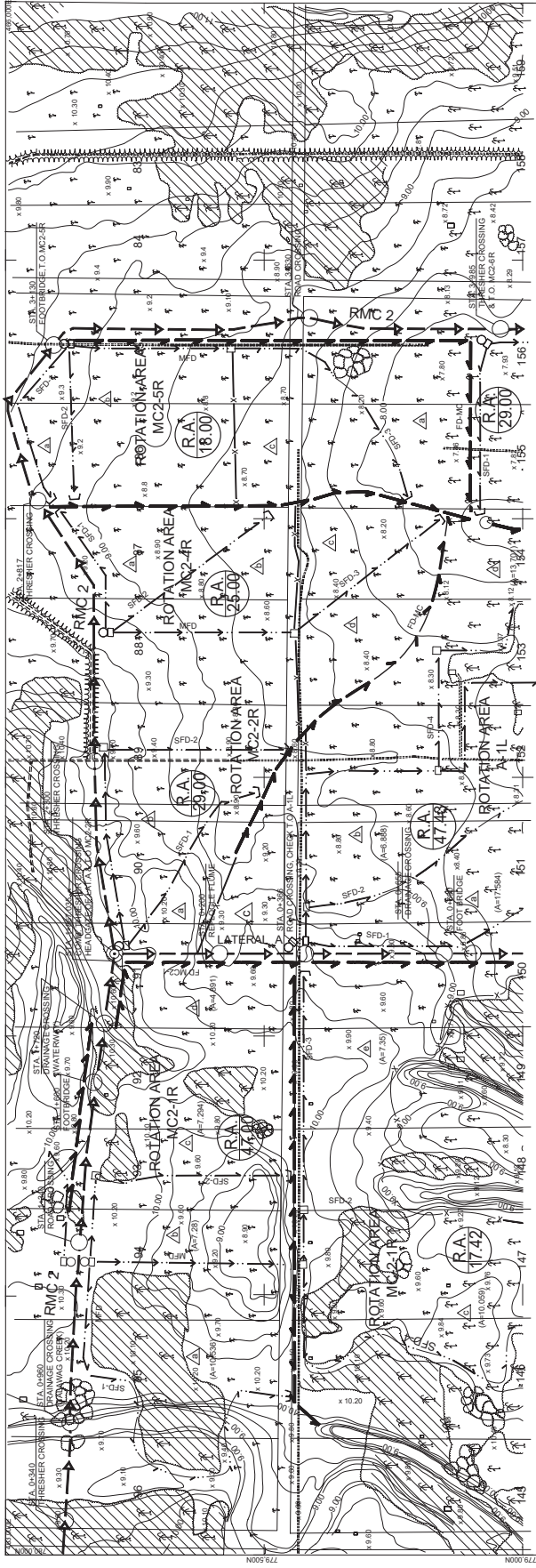
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 NAME: \_\_\_\_\_  
 TITLE: \_\_\_\_\_

RECOMMENDING APPROVAL:  
 NAME: \_\_\_\_\_  
 TITLE: \_\_\_\_\_

APPROVED:  
 NAME: \_\_\_\_\_  
 TITLE: \_\_\_\_\_

DESIGN/ADMINISTRATOR FOR ENGINEERING & OPERATION  
 NAME: \_\_\_\_\_  
 TITLE: \_\_\_\_\_





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  - EXISTING LATERAL CANALS
  - PROPOSED MAIN CANALS
  - EXISTING MAIN CANALS
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  - EXISTING SUBSIDIES
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  - EXISTING CANAL STRUCTURE
  - PROPOSED CANAL STRUCTURE (WITH COVER)
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  - EXISTING SERVICE ROAD (ALONG EXISTING CANAL)
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  - CREEKS / RIVERS / NATURAL WATERWAYS



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REPUBLIC OF THE PHILIPPINES  
NATIONAL IRRIGATION ADMINISTRATION  
REGION VI

PROVINCE OF NORTH COTABATO  
MALUBOGS IRRIGATION DISTRICT  
ACTIVITY COORDINATOR AND SUPERVISOR  
**LOWER MALUTUBOGS SERVICE AREA**  
IRRIGATION AND DRAINAGE NETWORK

DESIGN: \_\_\_\_\_  
CHECKED: \_\_\_\_\_  
REVIEWED: \_\_\_\_\_  
BY: \_\_\_\_\_  
IN CHARGE

APPROVED: \_\_\_\_\_  
ACTING PROJECT MANAGER

APPROVED: \_\_\_\_\_  
MANAGER ENGINEERING DEPARTMENT

APPROVED: \_\_\_\_\_  
DEPUTY ADMINISTRATOR FOR ENGINEERING & OPERATION

DATE: \_\_\_\_\_

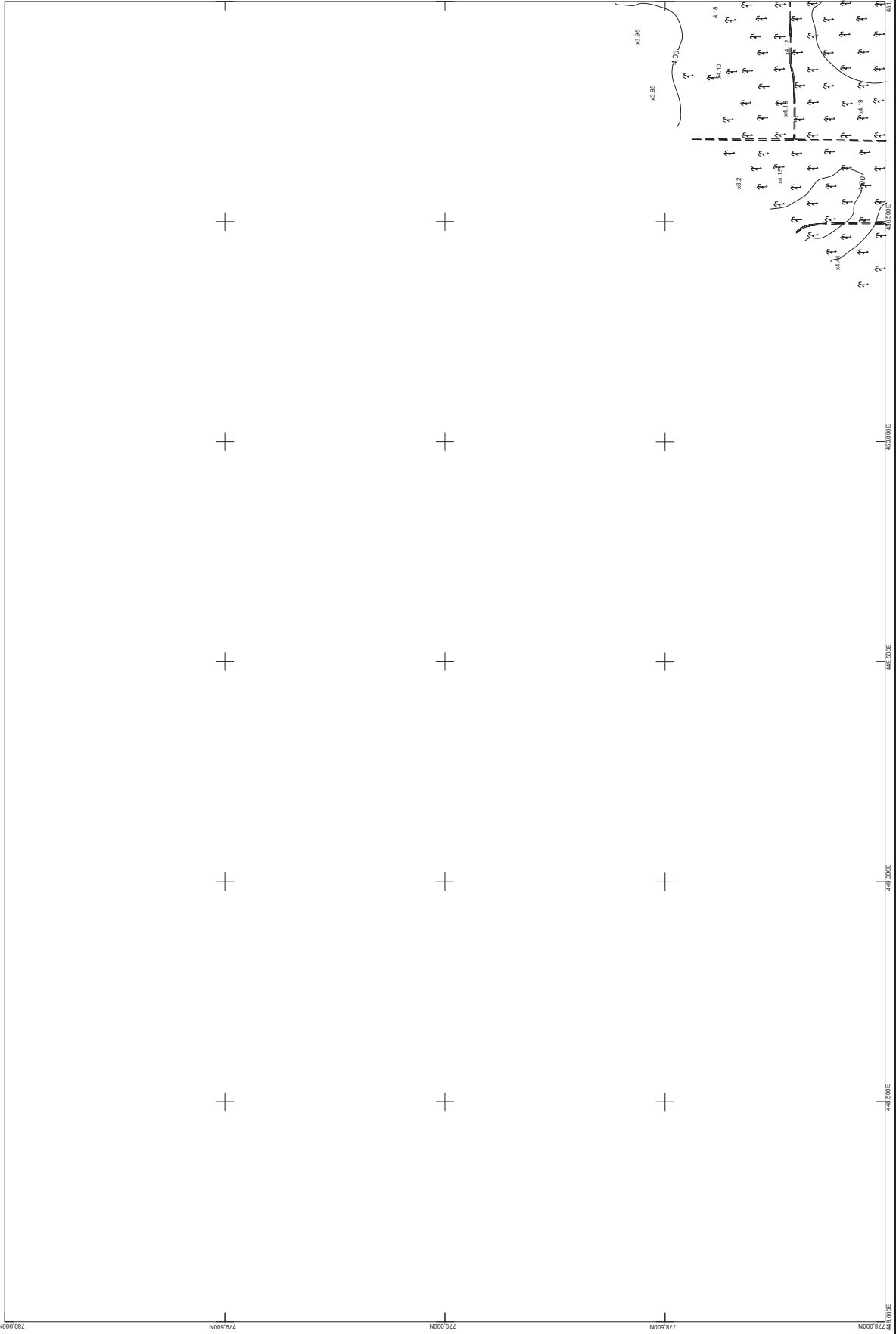
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  - LIMIT OF IRIGANBLE PROJECT AREA
  - CREEPS (REVERS) NATURAL WATERWAYS



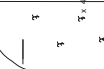
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  - EXCLUDED AREA
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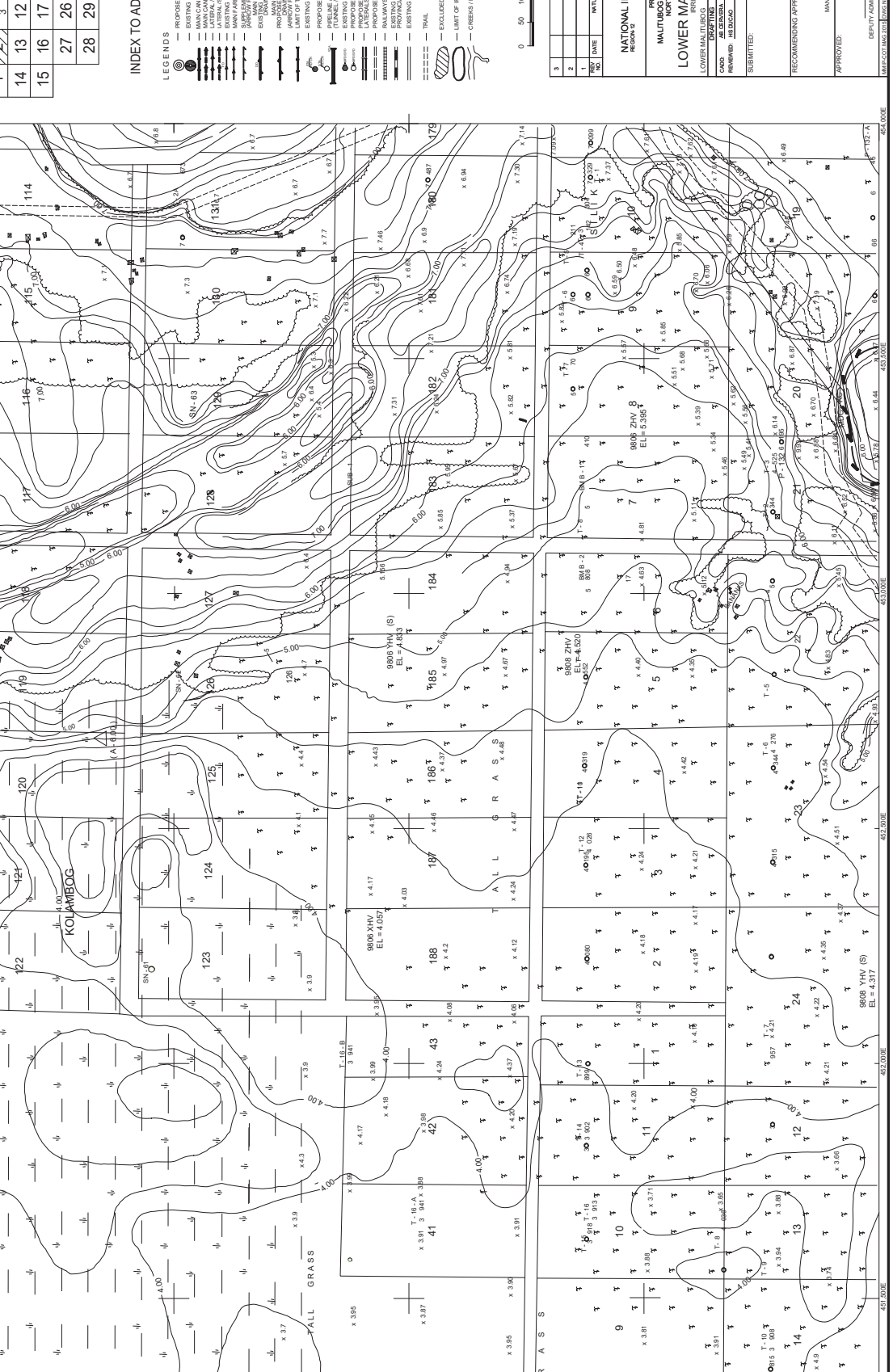
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**MULTIBOG MARIAGAO IRRIGATION PROJECT**  
**NORTH COTABATO AND LAAGUARAN**  
**LOWER MALITUBOG SERVICE AREA**

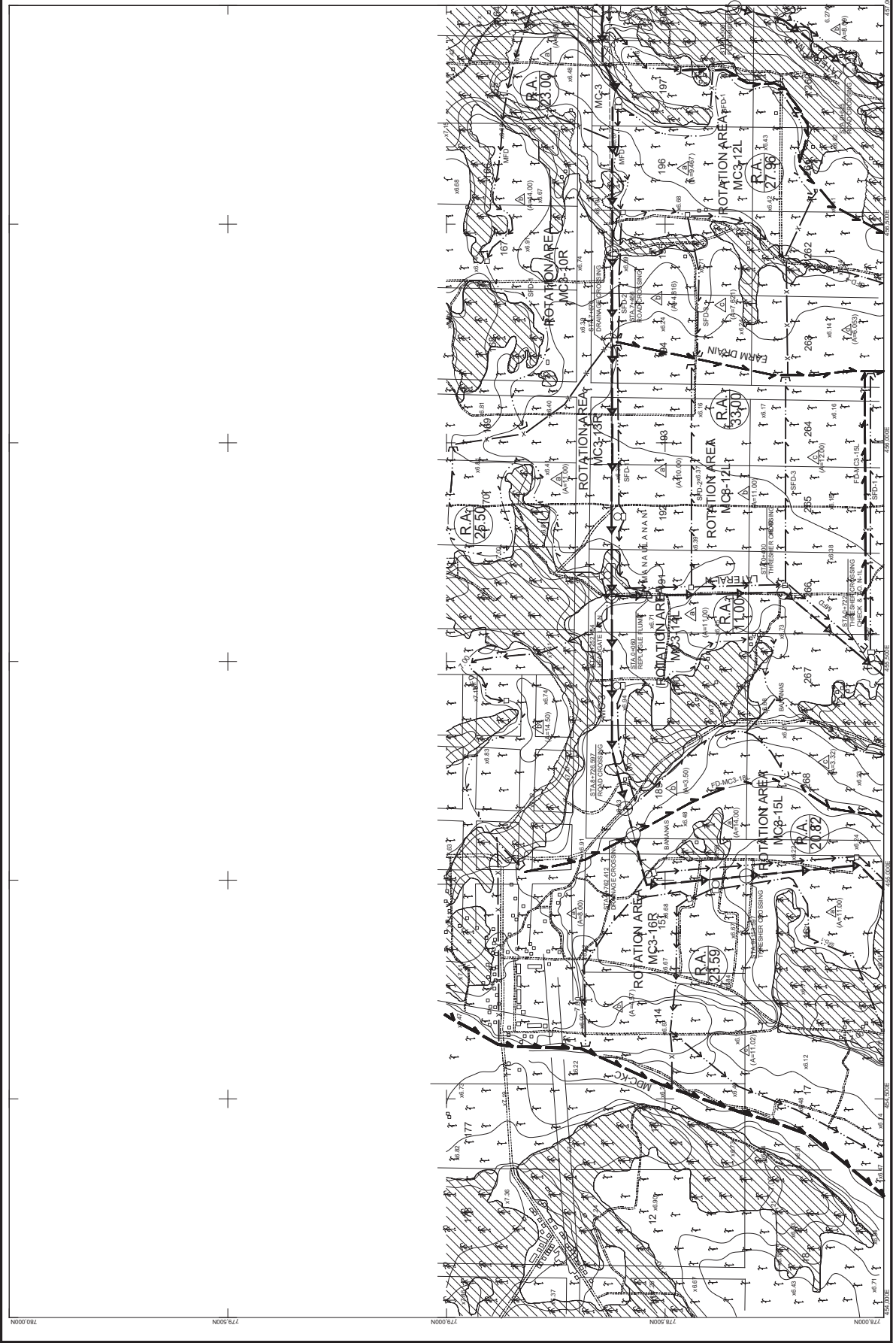
LOWER MALITUBOG IRRIGATION AND DRAINAGE NETWORK

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CHECKED	CHECKED BY		
REVISIONS	REVISIONS		

RECOMMENDING APPROVAL

APPROVED:





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  - MAIN FAN LINES (PROPOSED)
  - LATERAL TO BE LATERAL (PROPOSED)
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  - PROPOSED CANALS / STRUCTURES
  - EXISTING CANAL STRUCTURE
  - PROPOSED CANAL STRUCTURE
  - PERMANENT LONG STRUCTURES (P.L.S. COVER)
  - EXISTING TURNOUT WITH ANCHORED
  - PROPOSED TURNOUT WITH ANCHORED
  - LATERALS OR SUB LATERALS
  - BACKWATER ACCESS ROAD
  - EXISTING NATIONAL ROAD / HIGHWAYS /
  - EXISTING BICYCLE ROADS / OTHER ROADS
  - TRAIL
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  - LIMIT OF IRRIGABLE / PROJECT AREA
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  - CREEKS / RIVERS / NATURAL WATERWAYS



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REPUBLIC OF THE PHILIPPINES  
**NATIONAL IRRIGATION ADMINISTRATION**  
 REGION 12  
 PROVINCE OF NORTH COTABATO  
**MALITUBOG MARIDAGAO IRRIGATION PROJECT**  
 NORTH COTABATO PROVINCE  
**LOWER MALITUBOG IRRIGATION AND DRAINAGE SYSTEM**  
**LOWER MALITUBOG SERVICE AREA**

DESIGNER: A.L.S. SALES  
 CHECKED: [ ]  
 REVISIONS: [ ]  
 REVISIONS: [ ]

RECOMMENDING APPROVAL: A.L.S. SALES  
 ACTING PROJECT MANAGER

APPROVED: LYDIA S. EGBERHA  
 MANAGER ENGINEERING DEPARTMENT

IDENTITY ADMINISTRATOR FOR ENGINEERING & OPERATION: CELIAS M. BELAK  
 DENITY ADMINISTRATOR FOR ENGINEERING & OPERATION: [ ]

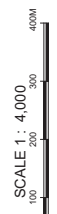
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  - EXISTING MAIN FARM DITCH (S/MPD OR S/FD)
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  - AREAS UNDER PROTECTION (EXISTING)
  - MAIN FLOODWAY
  - EXISTING DRAINAGE DITCHES
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  - EXISTING TURNOUTS
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  - LATERALS OF LATERALS
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NATIONAL IRRIGATION ADMINISTRATION  
REPUBLIC OF THE PHILIPPINES  
PROVINCE OF NORTH COTABATO  
MULITUBOG MARIADGAGO IRRIGATION PROJECT  
LOWER MALITUBOG SERVICE AREA  
IRRIGATION AND DRAINAGE MANAGEMENT PLAN

DESIGN	DESIGNER
DRAWINGS	DRAWN
REVISIONS	REVISIONS
REVISION NO.	REVISION DATE
REVISION BY	REVISION DATE

SUBMITTED: \_\_\_\_\_  
RECOMMENDING APPROVAL: \_\_\_\_\_  
ACTING PROJECT MANAGER: \_\_\_\_\_  
APPROVED: \_\_\_\_\_  
MANAGER ENGINEERING DEPARTMENT: \_\_\_\_\_  
APPROVED: \_\_\_\_\_  
DEPUTY ADMINISTRATOR FOR ENGINEERING & OPERATION: \_\_\_\_\_

PROJECT NO. 104-100-104-112-2001-104-00  
SHEET NO. 34 OF 34

