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GOVERNMENT OF JAMAICA
MINISTRY OF AGRICULTURE

THE AGRICULTURAL DEVELOPMENT PROJECT

ON

THE BLACK RIVER LOWER MORASS

FEASIBILITY REPORT

**VOLUME III
DRAWINGS**

MAY 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

THE AGRICULTURAL DEVELOPMENT PROJECT
ON
THE BLACK RIVER LOWER MORASS

FEASIBILITY STUDY REPORT

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- B. METEOROLOGY AND HYDROLOGY
- C. GEOLOGY AND HYDROGEOLOGY
- D. SOILS AND LAND CAPABILITY CLASSIFICATION
- E. SOIL MECHANICS
- F. SOCIO ECONOMY AND AGRO ECONOMY
- G. AGRICULTURE
- H. LAND RECLAMATION AND DRAINAGE
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- L. ENVIRONMENTAL ASSESSMENT
- M. PROJECT ORGANIZATION
- N. IMPLEMENTATION PROGRAMME AND PROJECT COST
- O. PROJECT EVALUATION








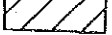
VOLUME III - DRAWINGS

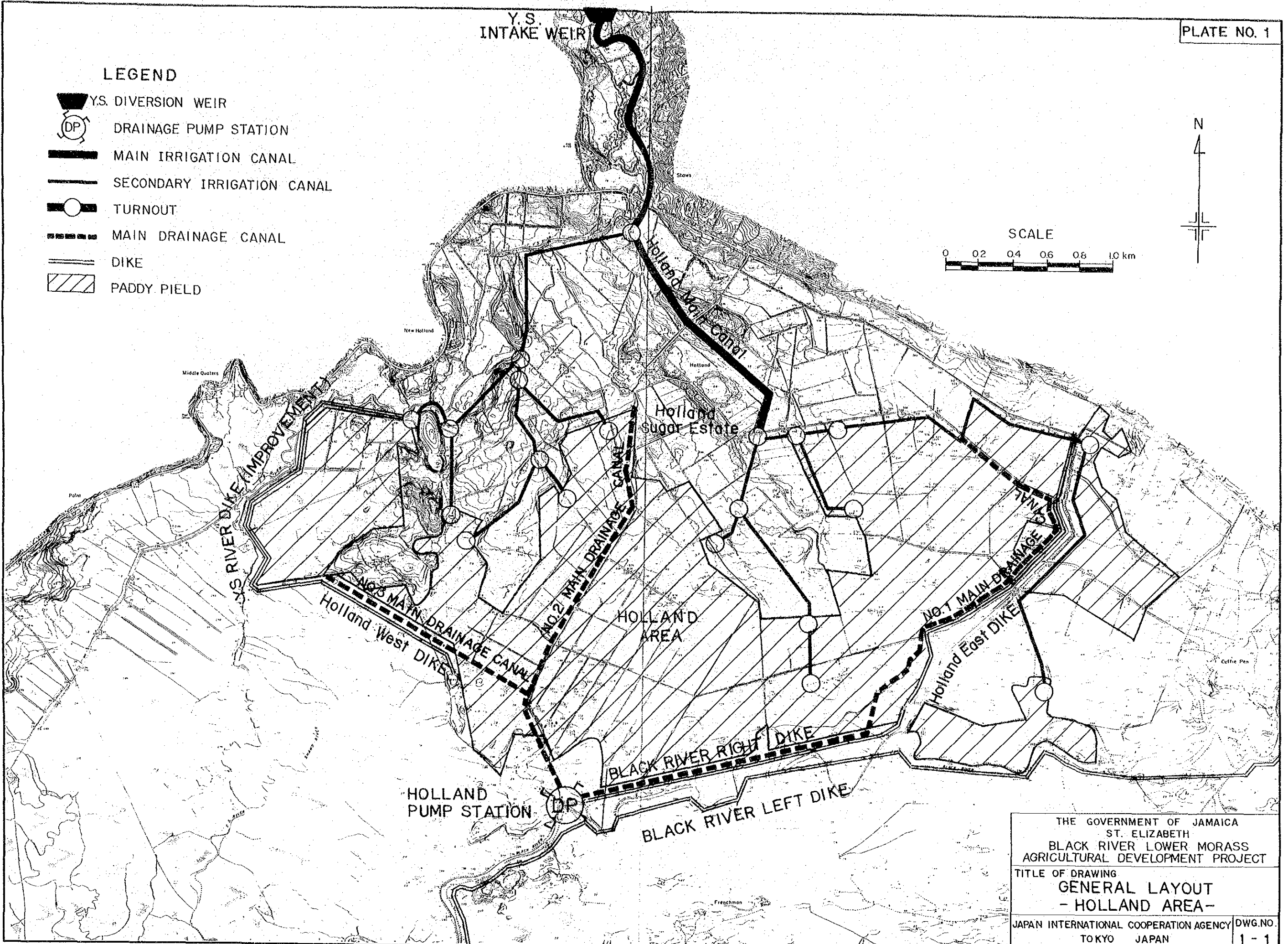
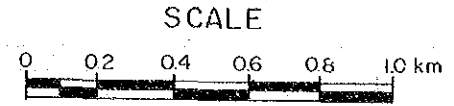
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登録No. 12189	80.7
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4	2 - 1	LACOVIA IRRIGATION PUMP STATION
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6	4 - 1	PROFILE OF HOLLAND MAIN CANAL
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21	7 - 4	TYPICAL CROSS SECTION OF DIKES
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24	9 - 1	TURNOUT AND SPILLWAY
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26	9 - 3	CULVERT AND DROP
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LEGEND

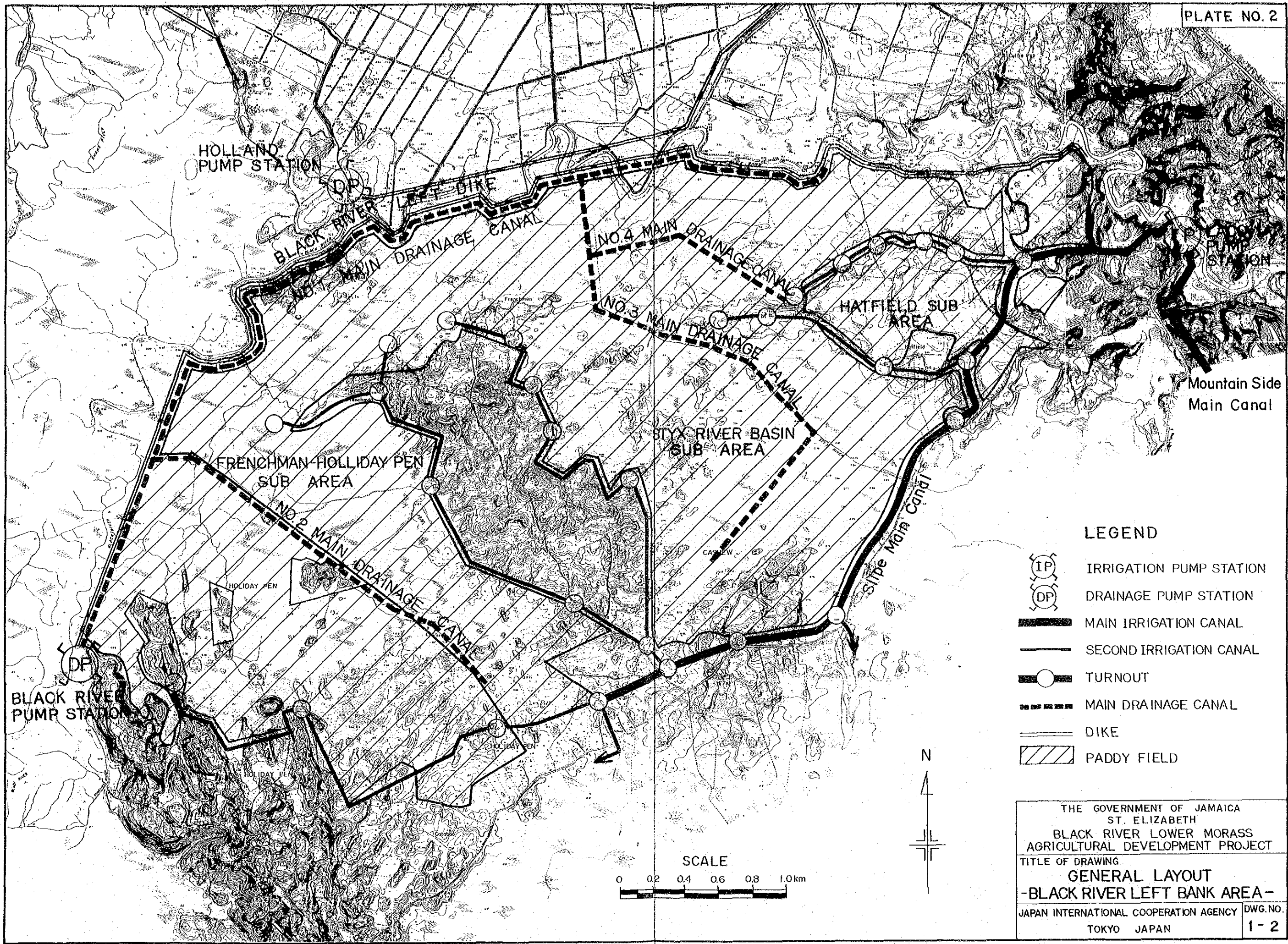
-  Y.S. DIVERSION WEIR
-  DRAINAGE PUMP STATION
-  MAIN IRRIGATION CANAL
-  SECONDARY IRRIGATION CANAL
-  TURNOUT
-  MAIN DRAINAGE CANAL
-  DIKE
-  PADDY FIELD










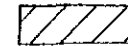
THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
**GENERAL LAYOUT
 - HOLLAND AREA -**

JAPAN INTERNATIONAL COOPERATION AGENCY / DWG. NO.
 TOKYO JAPAN / 1 - 1



LEGEND







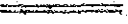

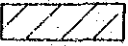
-  IRRIGATION PUMP STATION
-  DRAINAGE PUMP STATION
-  MAIN IRRIGATION CANAL
-  SECOND IRRIGATION CANAL
-  TURNOUT
-  MAIN DRAINAGE CANAL
-  DIKE
-  PADDY FIELD

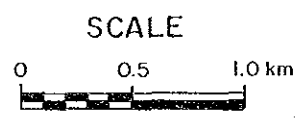
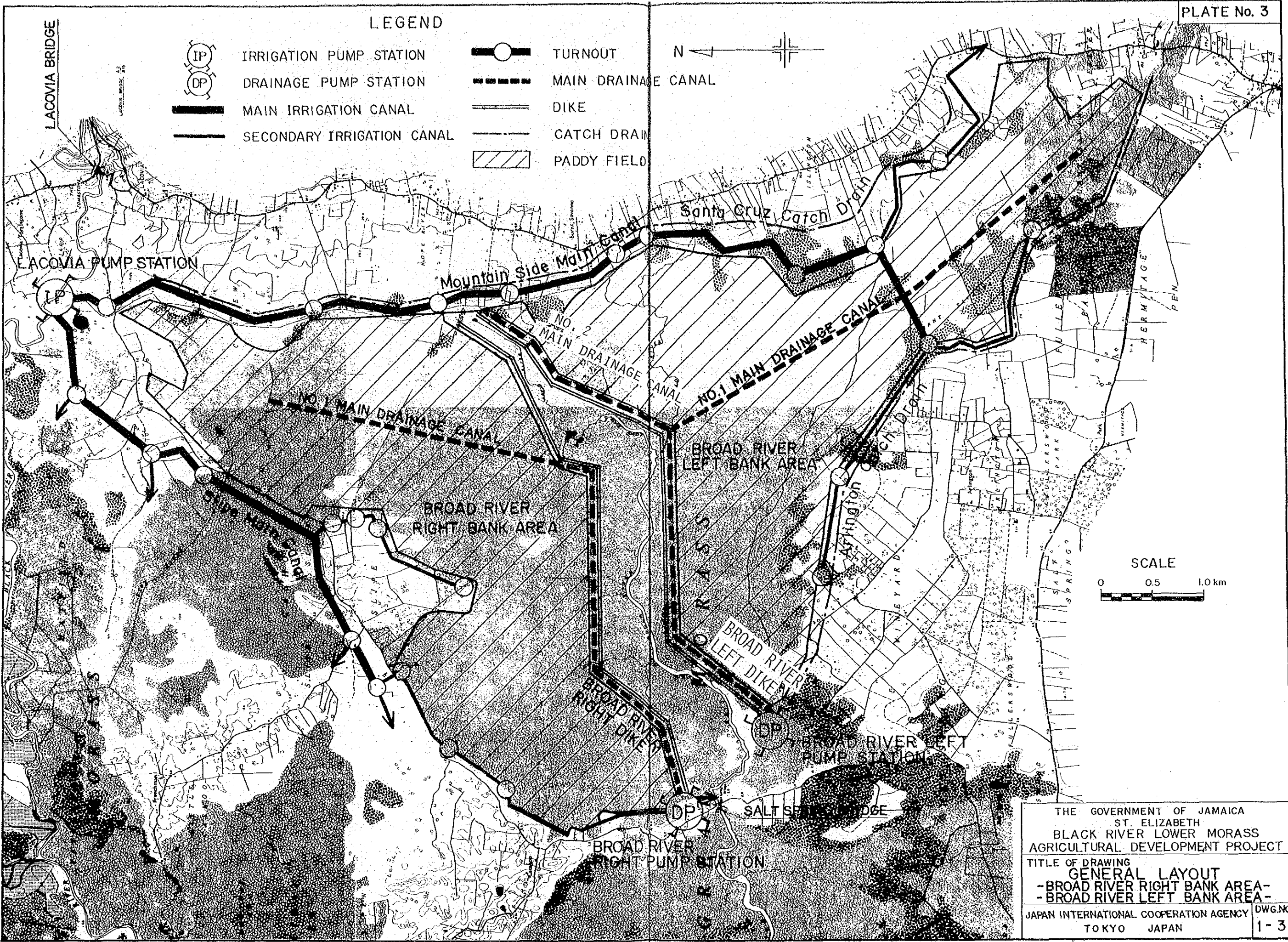
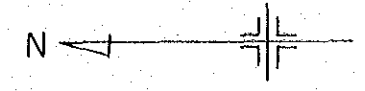
THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
GENERAL LAYOUT
-BLACK RIVER LEFT BANK AREA-

JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN DWG. NO. 1-2

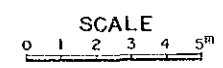
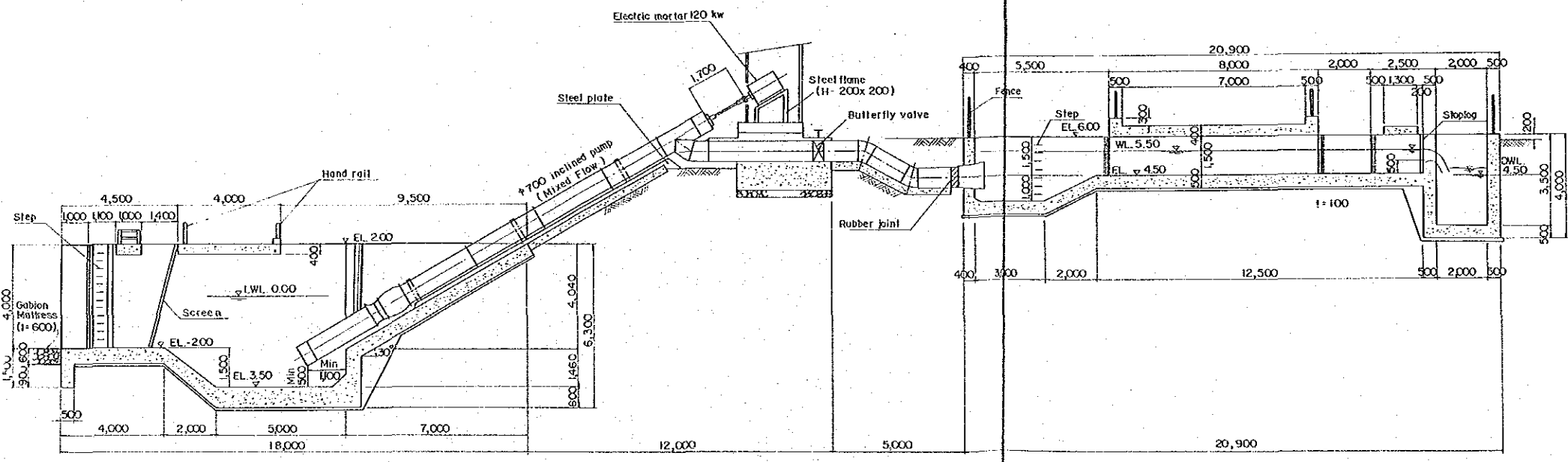
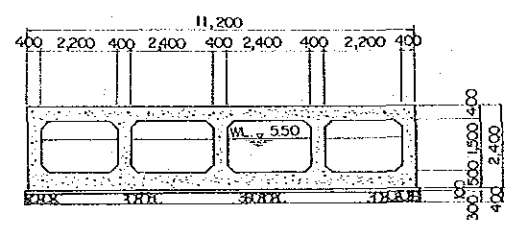
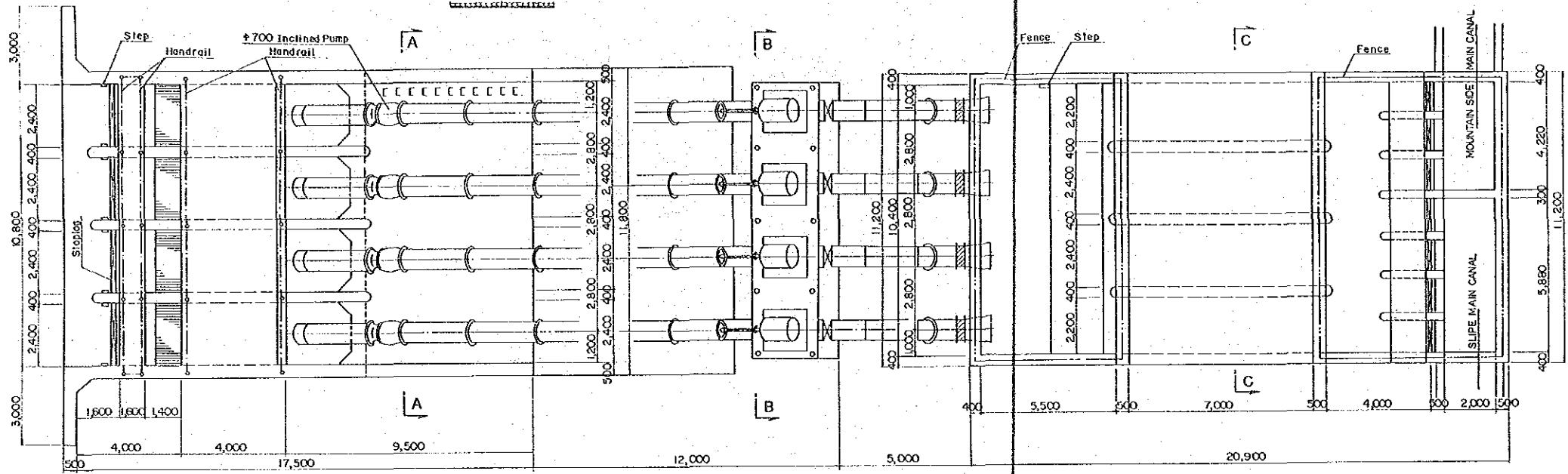
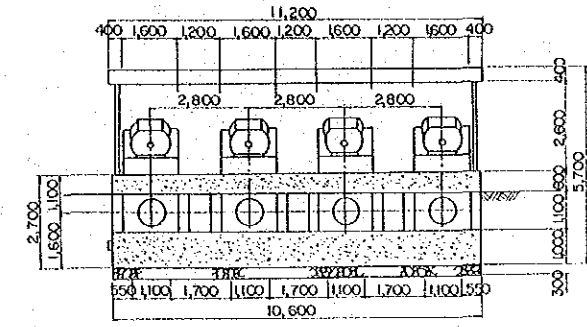
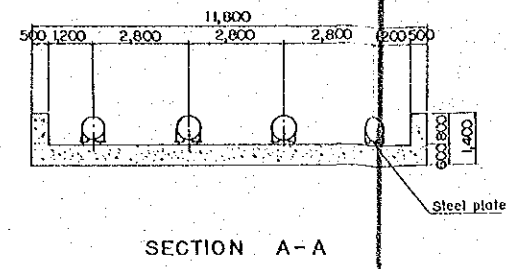
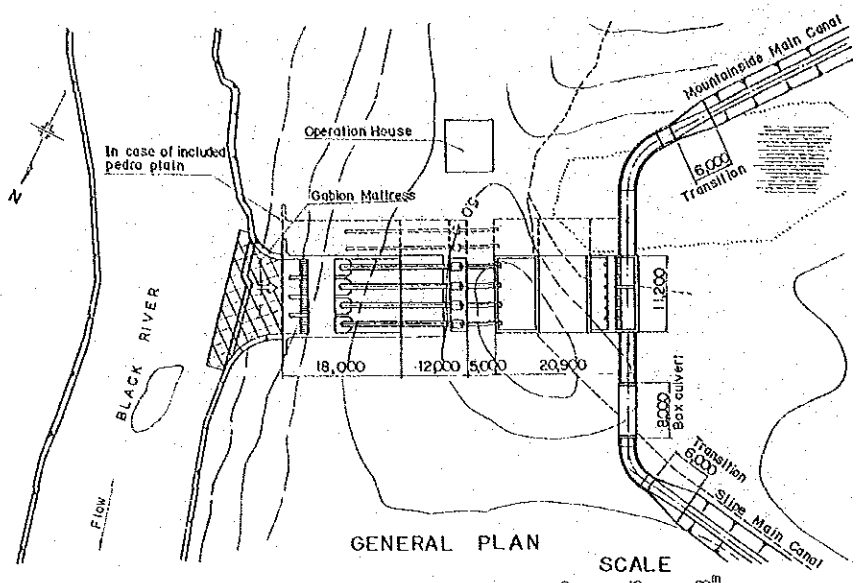
LEGEND

-  IRRIGATION PUMP STATION
-  DRAINAGE PUMP STATION
-  MAIN IRRIGATION CANAL
-  SECONDARY IRRIGATION CANAL
-  TURNOUT
-  MAIN DRAINAGE CANAL
-  DIKE
-  CATCH DRAIN
-  PADDY FIELD

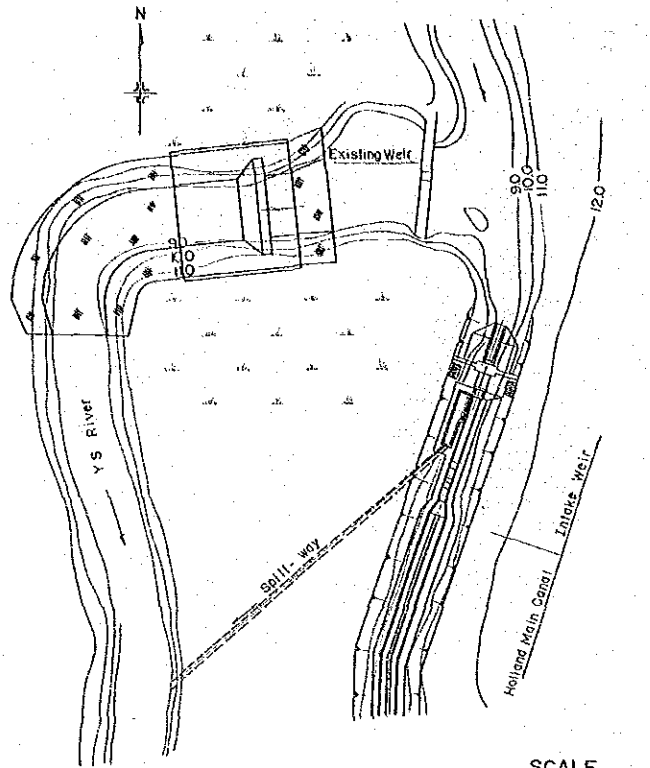


THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
 GENERAL LAYOUT
 - BROAD RIVER RIGHT BANK AREA -
 - BROAD RIVER LEFT BANK AREA -
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

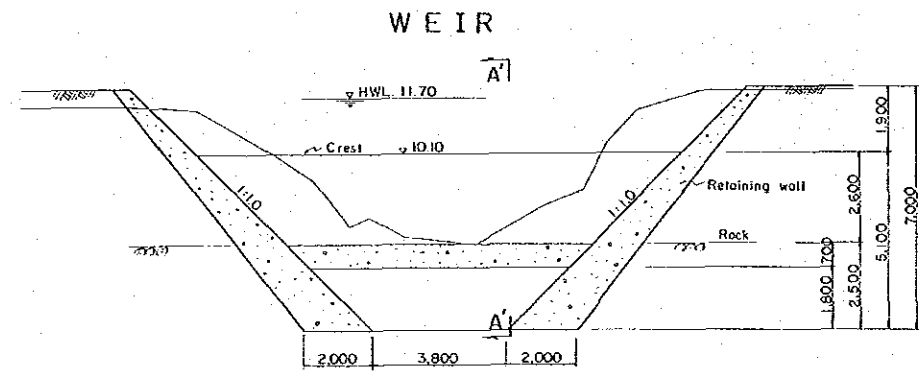
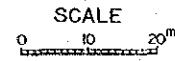
DWG. NO.
 1-3



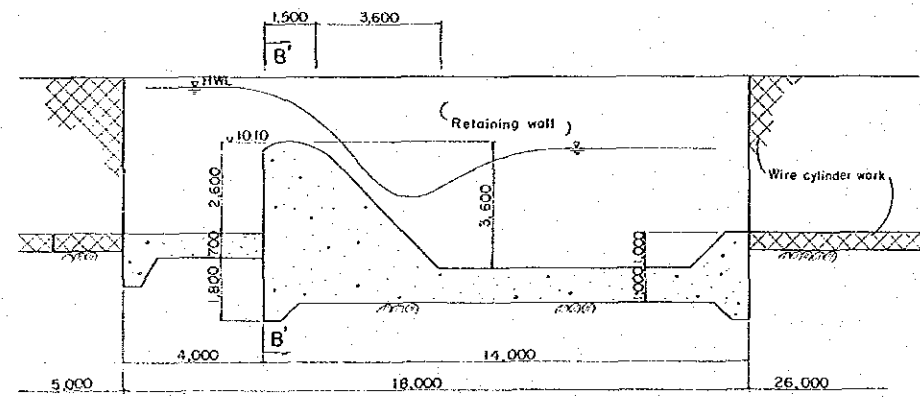
THE GOVERNMENT OF JAMAICA
ST. ELIZABETH
BLACK RIVER LOWER MORASS
AGRICULTURAL DEVELOPMENT PROJECT
TITLE OF DRAWING
LACOVIA IRRIGATION PUMP STATION
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN
DWG. NO.
2-1



GENERAL PLAN

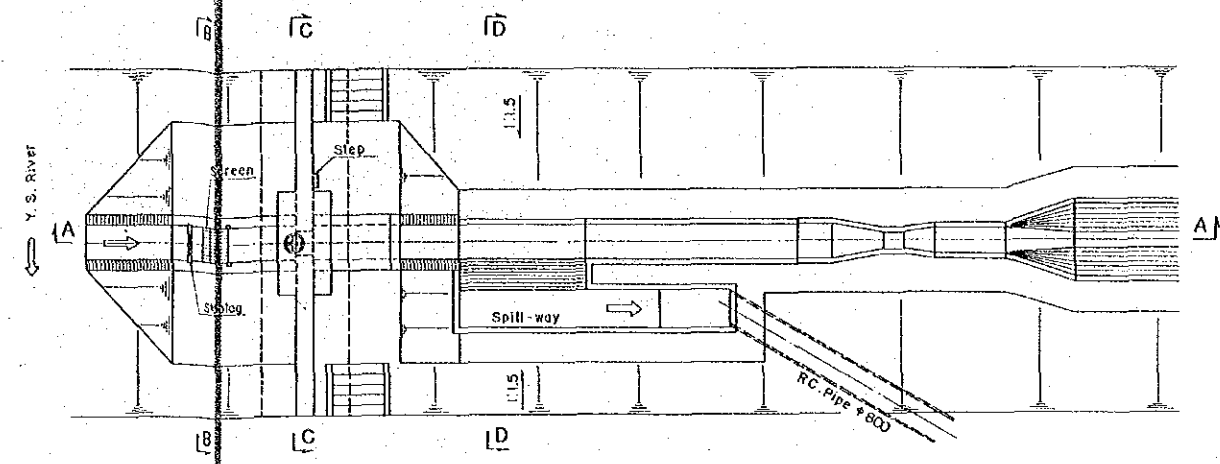


PROFILE (B'-B')

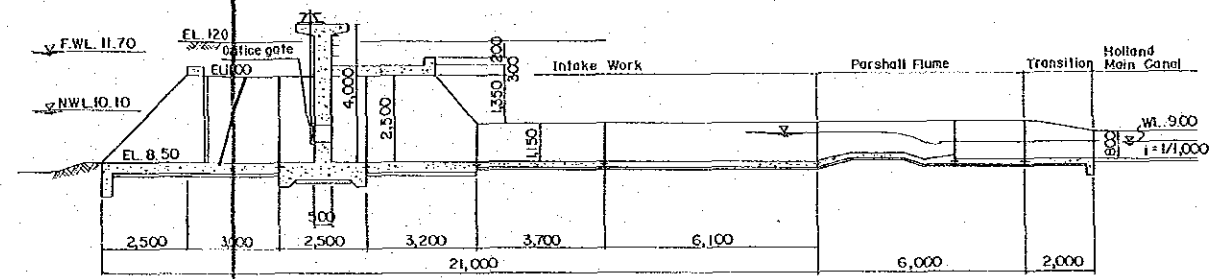


SECTION A-A

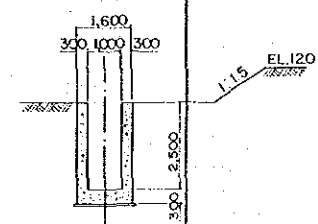
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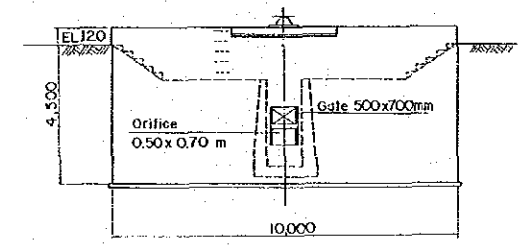
PLAN



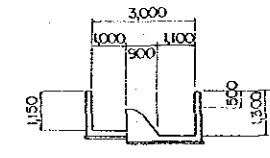
PROFILE (SECTION A-A)



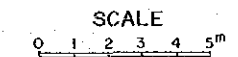
SECTION B-B



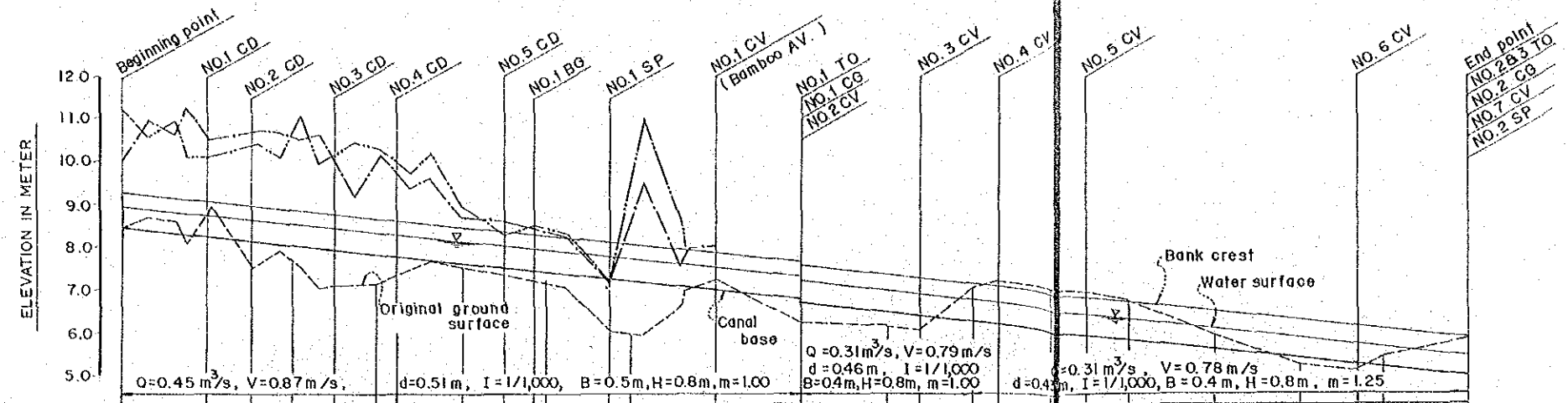
SECTION C-C



SECTION D-D

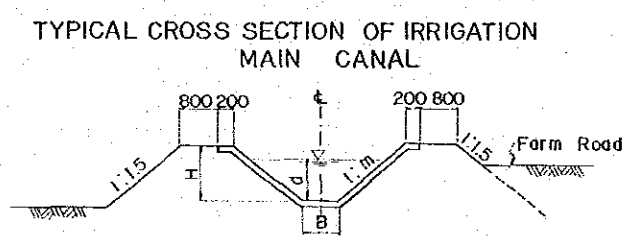
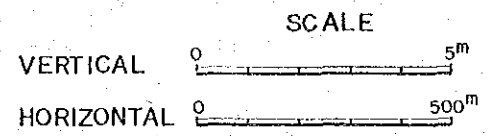


THE GOVERNMENT OF JAMAICA	
ST. ELIZABETH	
BLACK RIVER LOWER MORASS	
AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
Y.S. INTAKE WEIR	
JAPAN INTERNATIONAL COOPERATION AGENCY	DWG. NO.
TOKYO JAPAN	3 - 1



CANAL BASE ELEVATION	8.49	8.29	8.19	8.09	7.99	7.89	7.84	7.69	7.59	7.52	7.49	7.34	7.29	7.09	7.99	7.79	6.69	6.49	6.41	6.36	6.24	6.18	6.13	5.99	5.89	5.84	5.74	5.54	5.34	5.20	5.15	5.09	4.97
WATER SURFACE ELEVATION	9.00	8.80	8.70	8.60	8.50	8.40	8.35	8.20	8.10	8.03	8.00	7.85	7.80	7.60	7.50	7.30	7.20	7.00	6.92	6.87	6.75	6.69	6.64	6.50	6.40	6.35	6.25	6.05	5.85	5.71	5.66	5.60	5.40
GROUND SURFACE ELEVATION	8.50	8.90	7.50	7.65	7.10	7.24	7.35	7.51	7.32	7.20	7.17	6.00	5.95	7.20	6.20	6.10	6.00	6.00	6.00	6.00	7.00	7.10	7.00	6.90	6.90	6.80	6.25	5.90	5.20	5.10	5.10	5.10	5.80
REDUCED DISTANCE	0.0	200.0	300.0	400.0	500.0	600.0	650.0	800.0	900.0	970.0	1,000.0	1,150.0	1,200.0	1,400.0	1,600.0	1,800.0	1,880.0	2,000.0	2,060.0	2,200.0	2,300.0	2,400.0	2,600.0	2,800.0	2,940.0	3,000.0	3,200.0						

LEGEND
 - - - Left side original ground surface
 - - - Right side original ground surface



LEGEND

Q : Design Discharge
 V : Velocity
 d : Water Depth
 I : Hydraulic Gradient
 B : Canal Base Width
 H : Canal Height
 m : Canal Inside Slope

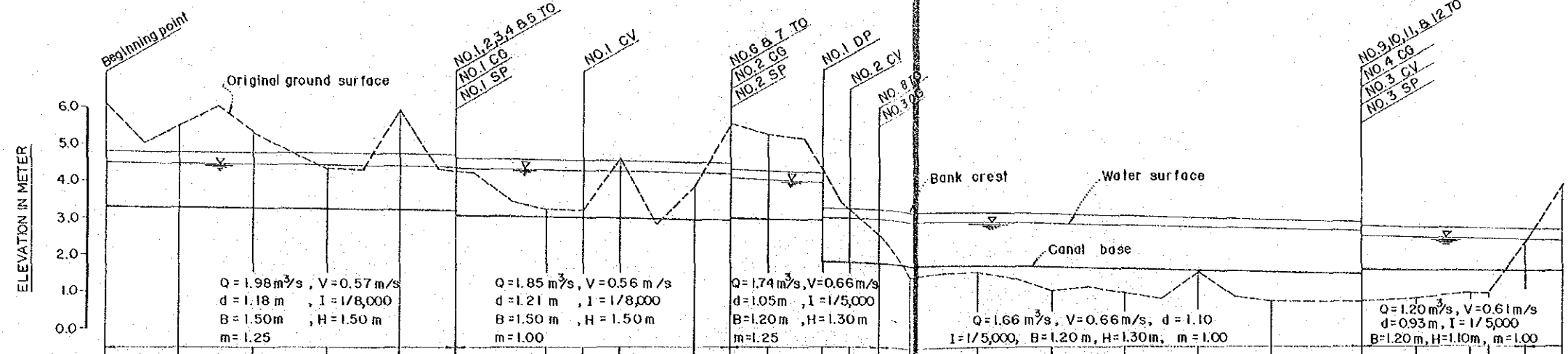
TO : Turnout
 CV : Culvert
 CG : Check Gate
 DP : Drop
 SP : Spilway
 CD : Cross Drain
 BG : Bridge

THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

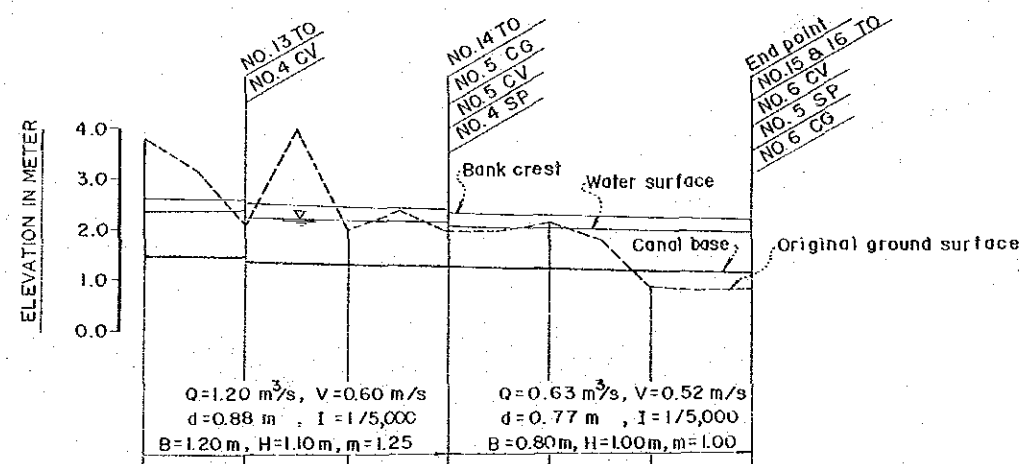
TITLE OF DRAWING
PROFILE OF HOLLAND MAIN CANAL

JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DWG. NO.
 4 - 1

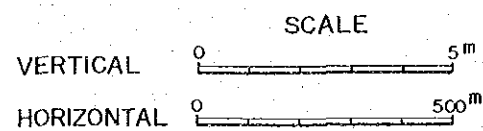
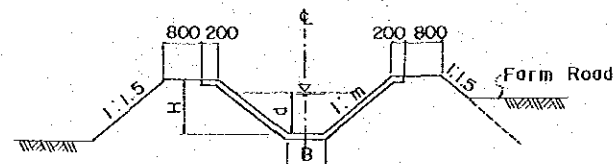


CANAL BASE ELEVATION	3.32	3.30	3.27	3.25	3.22	3.20	3.07	3.04	3.03	2.98	2.97	2.94	2.93	2.99	2.94	2.89	2.84	1.70	1.66	1.62	1.58	1.54	1.50	1.49	1.58	1.53	1.50	1.49	1.47	1.52	1.50
WATER SURFACE ELEVATION	4.50	4.48	4.45	4.43	4.40	4.38	4.28	4.25	4.24	4.19	4.18	4.15	4.14	4.04	4.02	3.99	3.94	2.80	2.76	2.72	2.68	2.64	2.60	2.59	2.49	2.46	2.43	2.42	2.40	2.38	2.38
GROUND SURFACE ELEVATION	6.10	5.50	5.30	4.30	6.00	4.30	4.20	3.20	3.20	4.24	4.60	3.80	5.50	5.20	3.40	3.30	2.50	1.40	1.50	1.00	0.90	1.50	0.70	0.70	0.80	0.90	0.90	0.90	2.35	3.80	3.80
REDUCED DISTANCE	0.0	200.0	400.0	600.0	800.0	950.0	1,000.0	1,200.0	1,300.0	1,400.0	1,600.0	1,700.0	1,800.0	1,950.0	2,000.0	2,020.0	2,100.0	2,200.0	2,400.0	2,600.0	2,800.0	3,000.0	3,200.0	3,400.0	3,450.0	3,600.0	3,750.0	3,800.0	3,900.0	4,000.0	4,000.0



CANAL BASE ELEVATION	1.50	1.47	1.33	1.29	1.25	1.21	1.17
WATER SURFACE ELEVATION	2.38	2.34	2.20	2.16	2.02	1.98	1.94
GROUND SURFACE ELEVATION	3.80	2.10	2.00	2.00	2.10	0.90	0.80
REDUCED DISTANCE	4,000.0	4,200.0	4,400.0	4,600.0	4,800.0	5,000.0	5,200.0

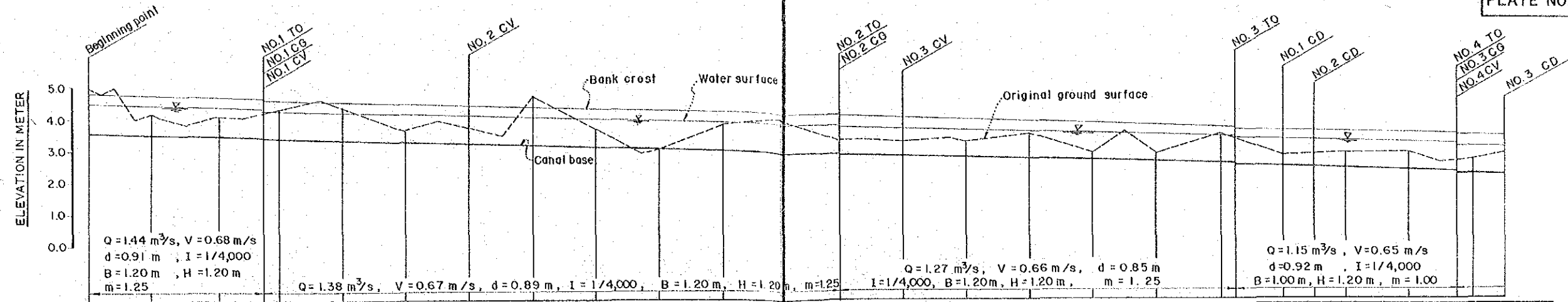
TYPICAL CROSS SECTION OF IRRIGATION MAIN CANAL



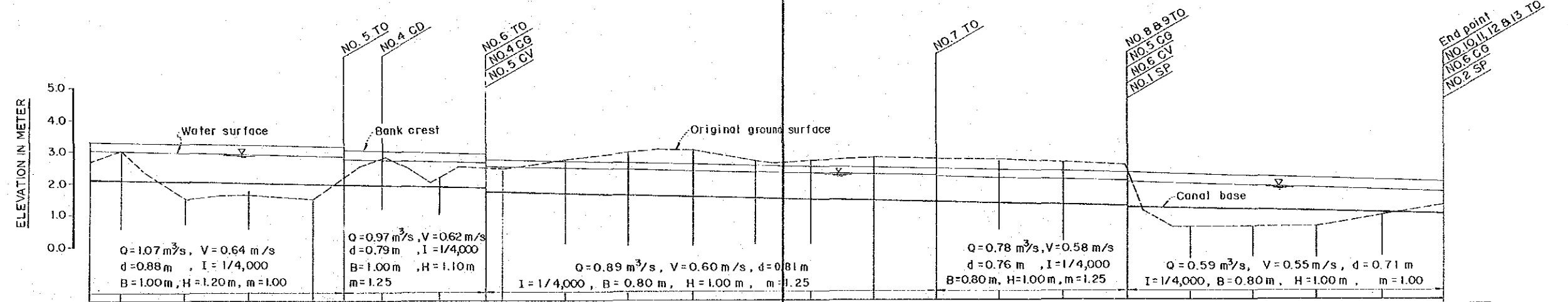
LEGEND

- | | |
|------------------------|------------------|
| Q : Design Discharge | TO : Turnout |
| V : Velocity | CV : Culvert |
| d : Water Depth | CG : Check Gate |
| E : Hydraulic Gradient | DP : Drop |
| B : Canal Base Width | SP : Spillway |
| H : Canal Height | CD : Cross Drain |
| m : Canal Inside Slope | BG : Bridge |

THE GOVERNMENT OF JAMAICA ST. ELIZABETH BLACK RIVER LOWER MORASS AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING PROFILE OF SLIPE MAIN CANAL	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG. NO. 4 - 2

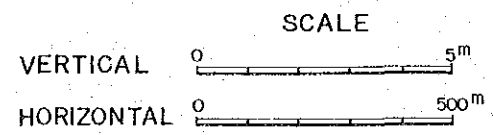
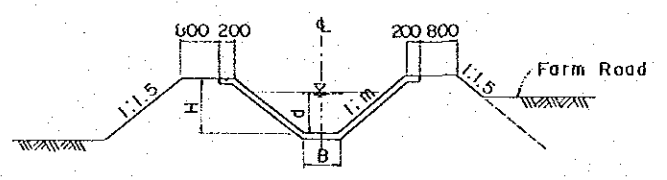


CANAL BASE ELEVATION	3.59	3.54	3.48	3.45	3.36	3.31	3.26	3.21	3.16	3.11	3.06	3.01	2.96	2.91	2.86	2.80	2.75	2.70	2.65	2.60	2.55	2.50	2.45	2.37	2.33	2.3	2.28	2.23	2.19	2.15	2.11	2.07	2.10
WATER SURFACE ELEVATION	4.50	4.45	4.40	4.36	4.28	4.20	4.15	4.10	4.05	4.00	3.95	3.90	3.85	3.80	3.75	3.70	3.65	3.60	3.55	3.50	3.45	3.40	3.35	3.34	3.29	3.25	3.23	3.20	3.15	3.11	3.07	3.00	2.98
GROUND SURFACE ELEVATION	5.00	4.10	4.10	4.20	4.30	4.40	3.60	3.75	4.70	3.70	3.70	3.00	3.80	3.80	3.25	3.20	3.20	3.40	2.80	2.80	2.80	2.80	3.40	3.20	2.70	2.75	2.80	2.80	2.60	2.50	2.60	2.70	2.70
REDUCED DISTANCE	0.0	200.0	400.0	550.0	600.0	800.0	1,000.0	1,200.0	1,400.0	1,600.0	1,800.0	2,000.0	2,200.0	2,400.0	2,600.0	2,800.0	3,000.0	3,200.0	3,400.0	3,600.0	3,800.0	4,000.0	4,200.0	4,350.0	4,400.0	4,500.0							



CANAL BASE ELEVATION	2.10	2.07	2.02	1.97	1.92	1.90	1.94	1.91	1.86	1.82	1.70	1.69	1.64	1.59	1.54	1.49	1.44	1.39	1.34	1.29	1.24	1.19	1.14	1.09	1.04	0.99	0.94	0.89						
WATER SURFACE ELEVATION	2.98	2.95	2.90	2.85	2.80	2.78	2.73	2.70	2.65	2.61	2.51	2.50	2.45	2.40	2.35	2.30	2.25	2.20	2.15	2.10	2.05	2.00	1.95	1.85	1.80	1.75	1.70	1.65	1.60					
GROUND SURFACE ELEVATION	2.70	3.00	1.50	1.60	1.50	2.10	2.80	2.20	2.20	2.40	2.40	2.70	2.70	2.90	3.00	2.70	2.60	2.65	2.70	2.65	2.60	2.50	0.50	0.50	0.50	0.50	0.90	1.20						
REDUCED DISTANCE	4,500.0	4,600.0	4,800.0	5,000.0	5,120.0	5,300.0	5,400.0	5,600.0	5,750.0	5,800.0	6,000.0	6,200.0	6,400.0	6,600.0	7,000.0	7,200.0	7,400.0	7,600.0	7,800.0	8,000.0	8,200.0	8,400.0	8,600.0	8,800.0										

TYPICAL CROSS SECTION OF IRRIGATION MAIN CANAL

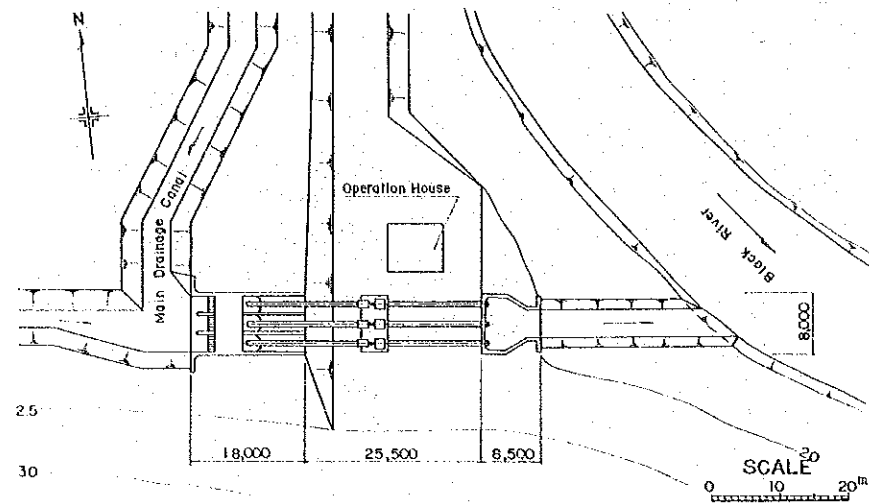


- LEGEND**
- Design Discharge
 - Velocity
 - Water Depth
 - Hydraulic Gradient
 - Canal Base Width
 - Canal Height
 - Canal Inside Slope
 - TO: Turnout
 - CV: Culvert
 - CG: Check Gate
 - DP: Drop
 - SP: Spillway
 - BG: Bridge

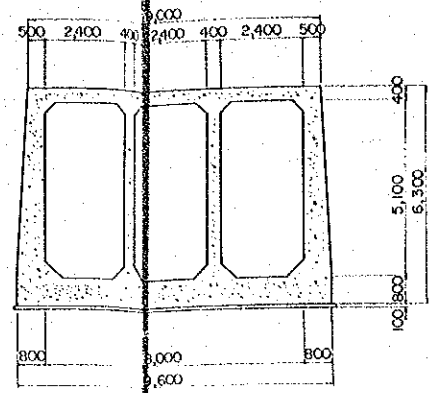
THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
PROFILE OF MOUNTAINSIDE MAIN CANAL

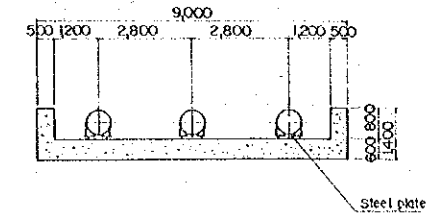
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN DWG. NO. 4-3



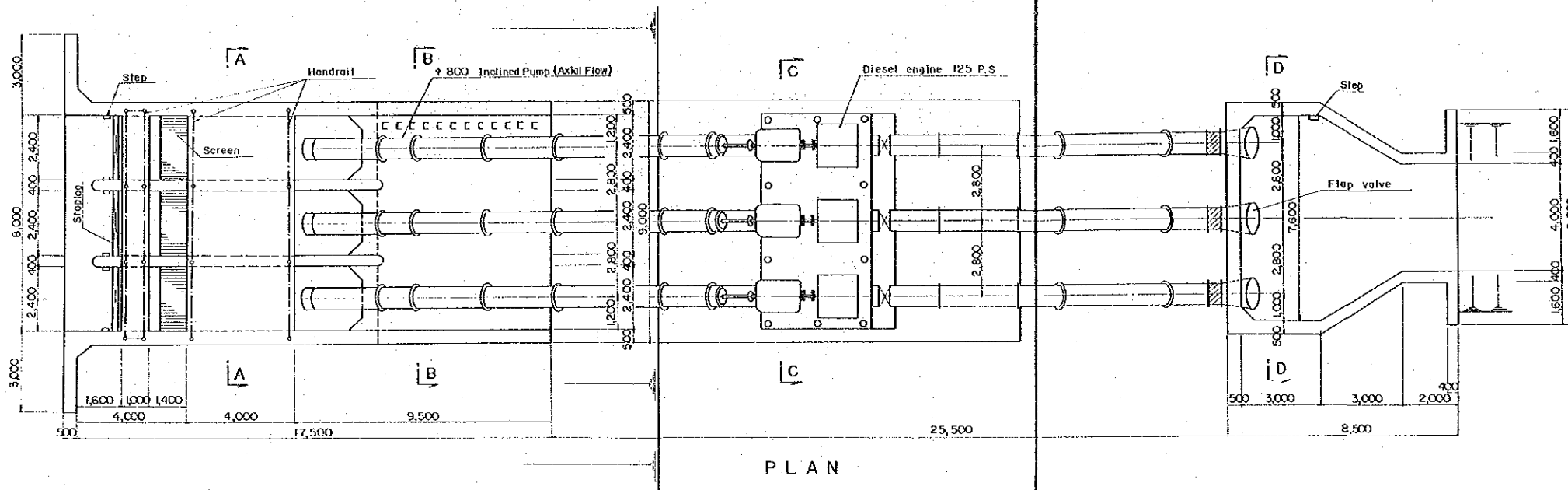
GENERAL PLAN



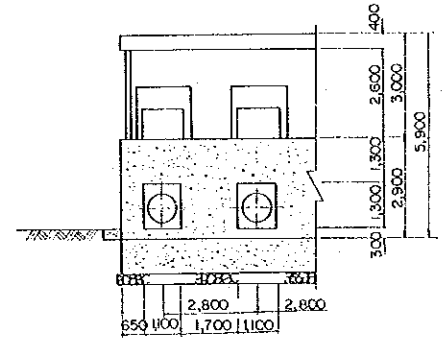
SECTION A-A



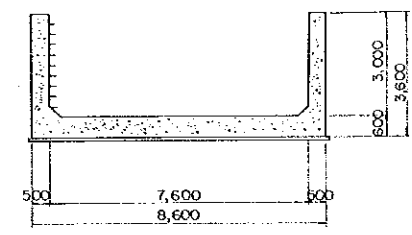
SECTION B-B



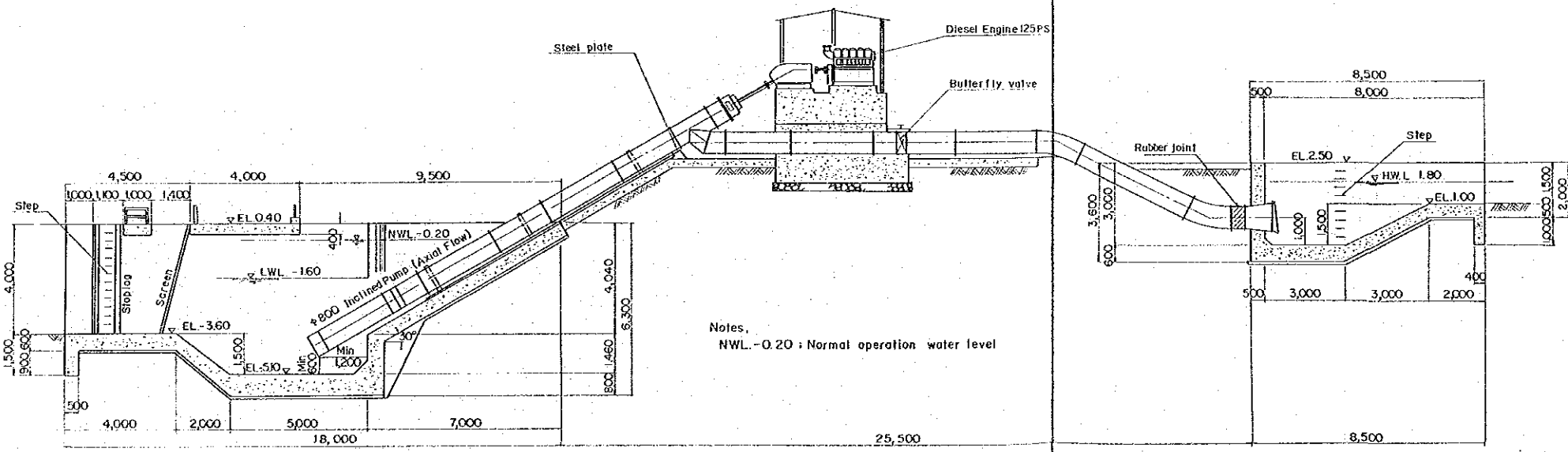
PLAN



SECTION C-C

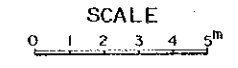


SECTION D-D

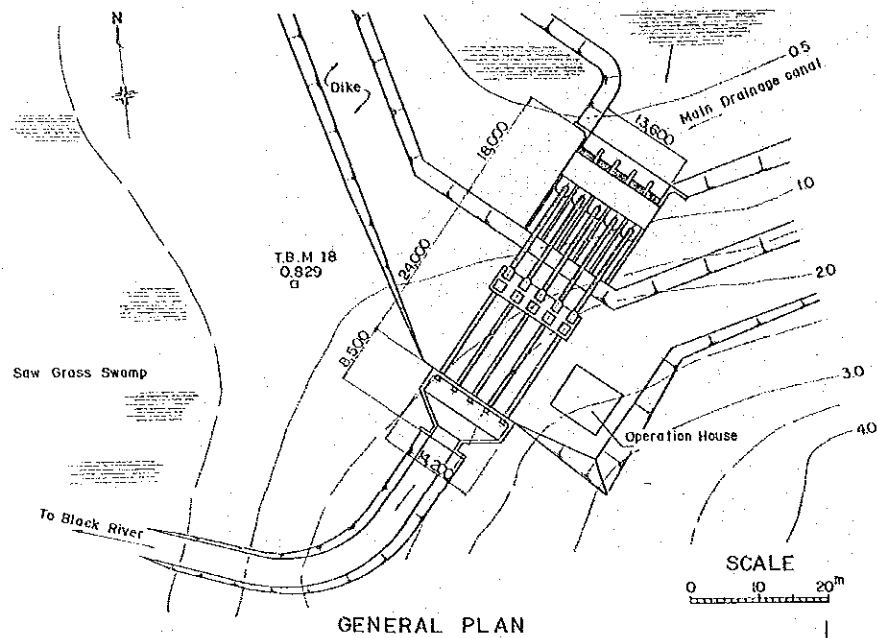


PROFILE

Notes,
NWL -0.20 : Normal operation water level

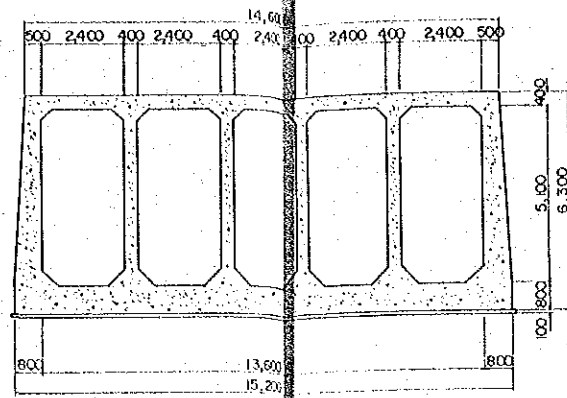


THE GOVERNMENT OF JAMAICA
ST. ELIZABETH
BLACK RIVER LOWER MORASS
AGRICULTURAL DEVELOPMENT PROJECT
TITLE OF DRAWING
HOLLAND PUMP STATION
JAPAN INTERNATIONAL COOPERATION AGENCY DWG. NO.
TOKYO JAPAN 5-1

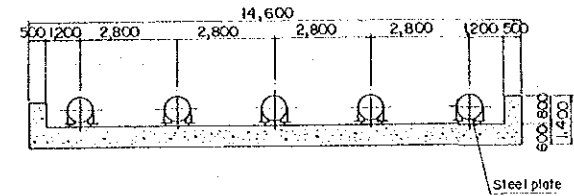


GENERAL PLAN

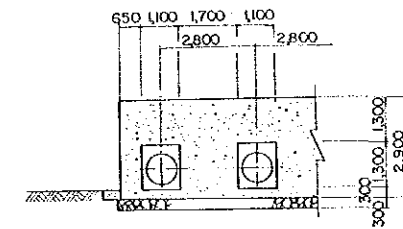
SCALE
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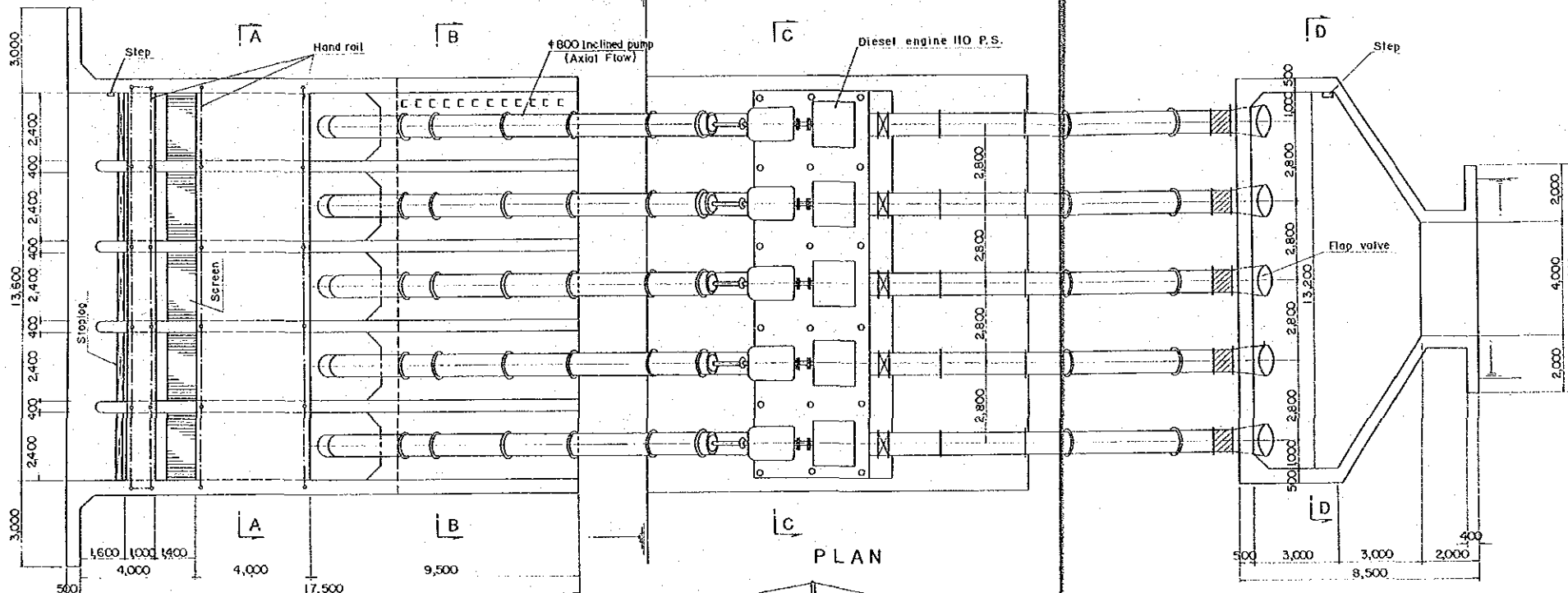
SECTION A-A



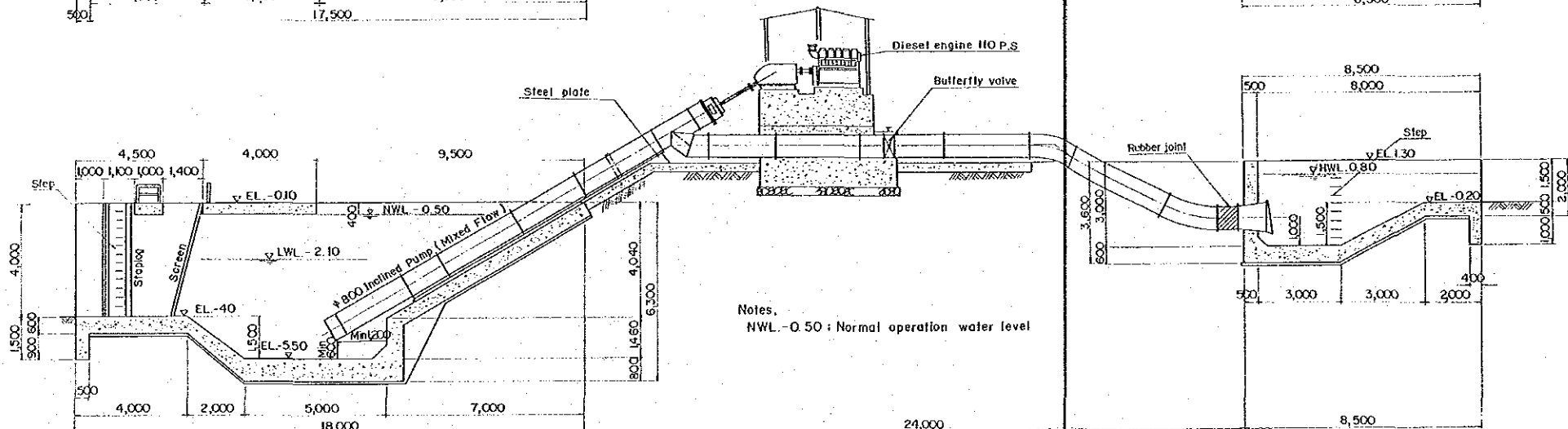
SECTION B-B



SECTION C-C

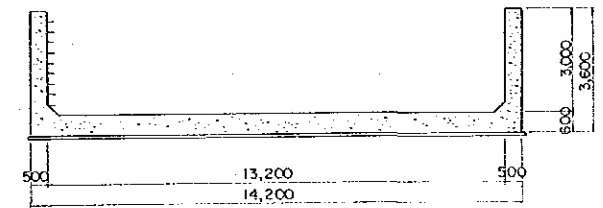


PLAN



PROFILE

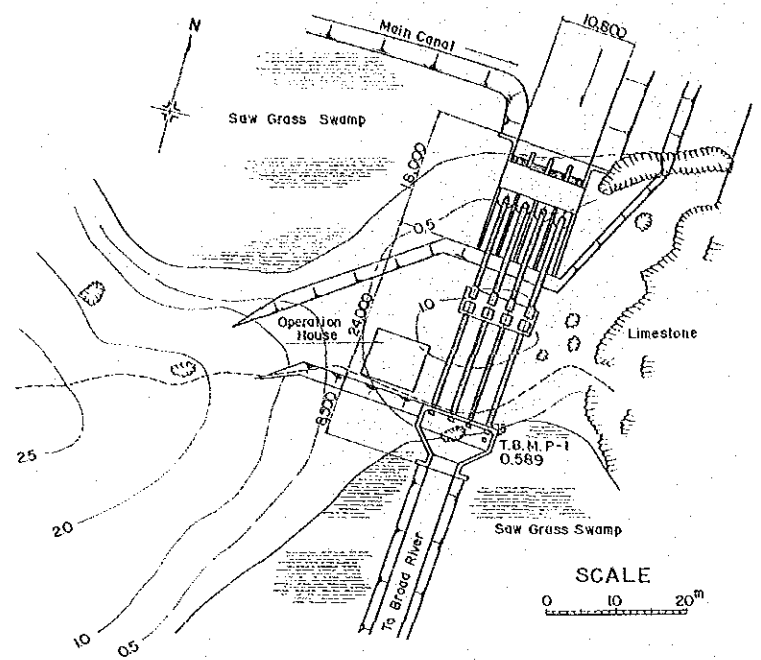
Notes.
NWL - 0.50 : Normal operation water level



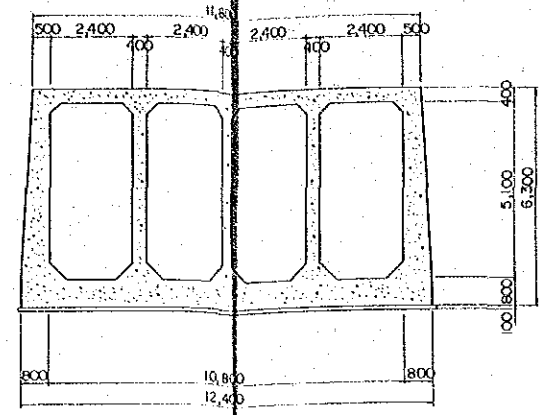
SECTION D-D

SCALE
0 1 2 3 4 m

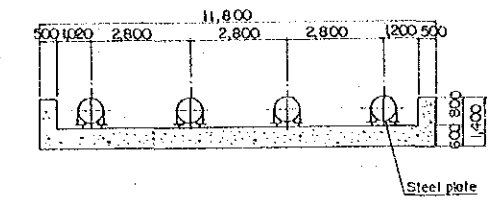
THE GOVERNMENT OF JAMAICA
ST. ELIZABETH
BLACK RIVER LOWER MORASS
AGRICULTURAL DEVELOPMENT PROJECT
TITLE OF DRAWING
BLACK RIVER LEFT PUMP STATION
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN
DWG. NO.
5 - 2



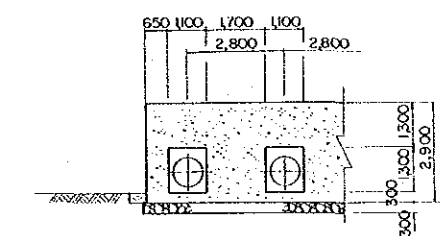
GENERAL PLAN



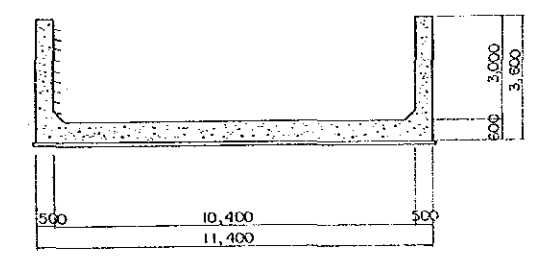
SECTION A-A



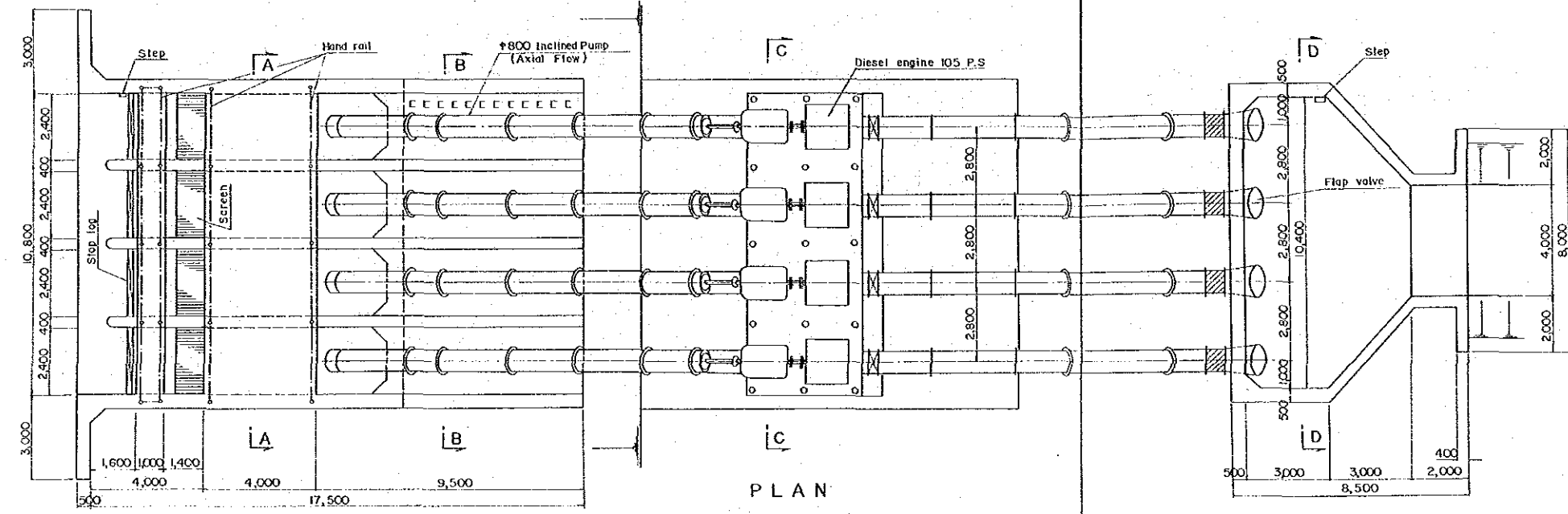
SECTION B-B



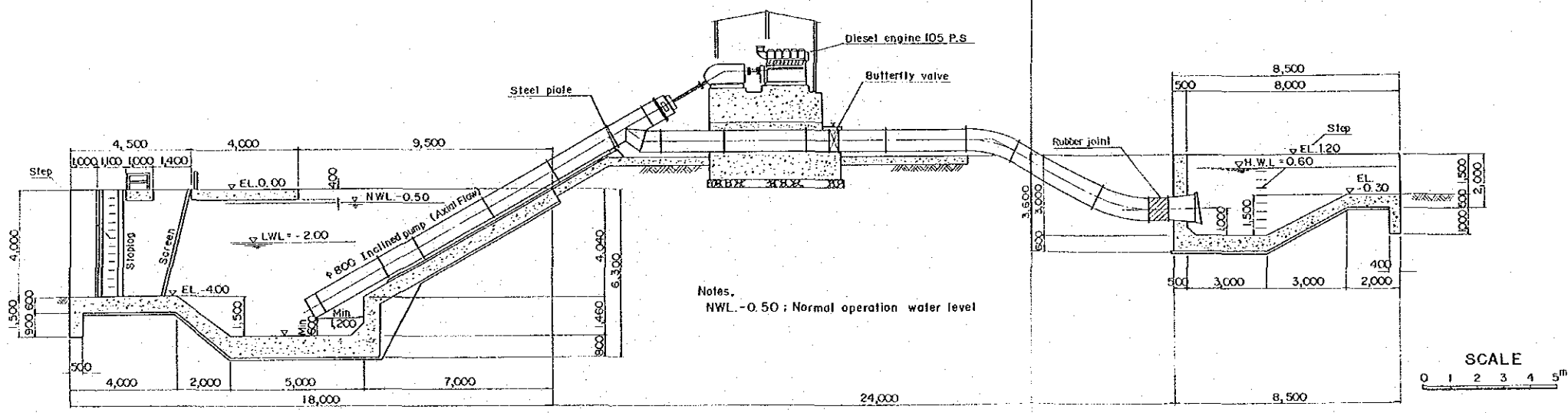
SECTION C-C



SECTION D-D

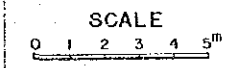


PLAN

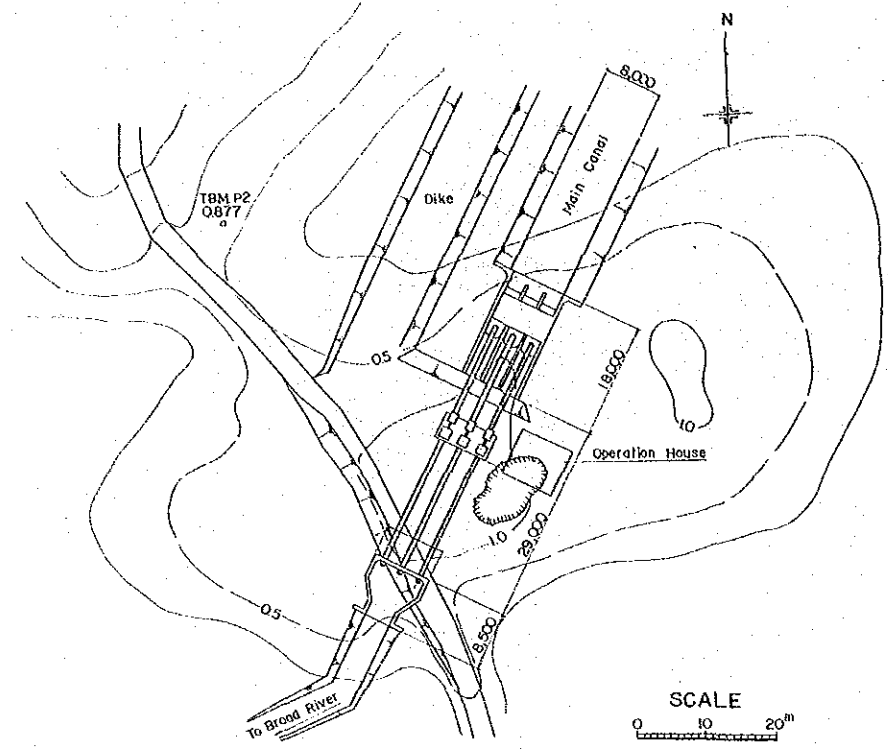


PROFILE

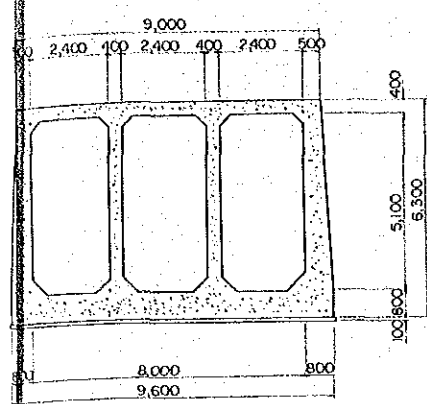
Notes.
NWL = -0.50 : Normal operation water level



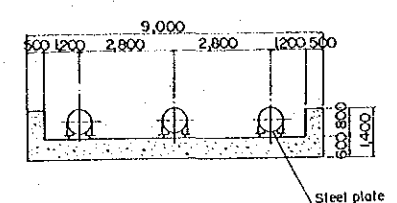
THE GOVERNMENT OF JAMAICA
ST. ELIZABETH
BLACK RIVER LOWER MORASS
AGRICULTURAL DEVELOPMENT PROJECT
TITLE OF DRAWING
BROAD RIVER RIGHT PUMP STATION
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN
DWG. NO.
5 - 3



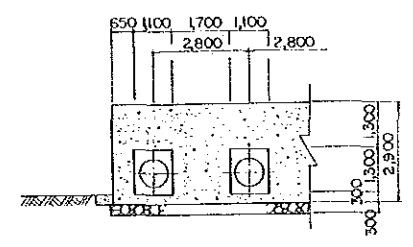
GENERAL PLAN



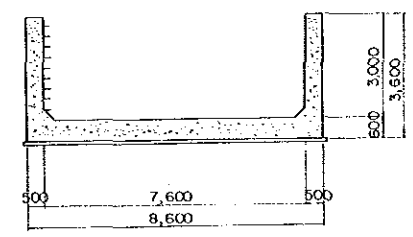
SECTION A-A



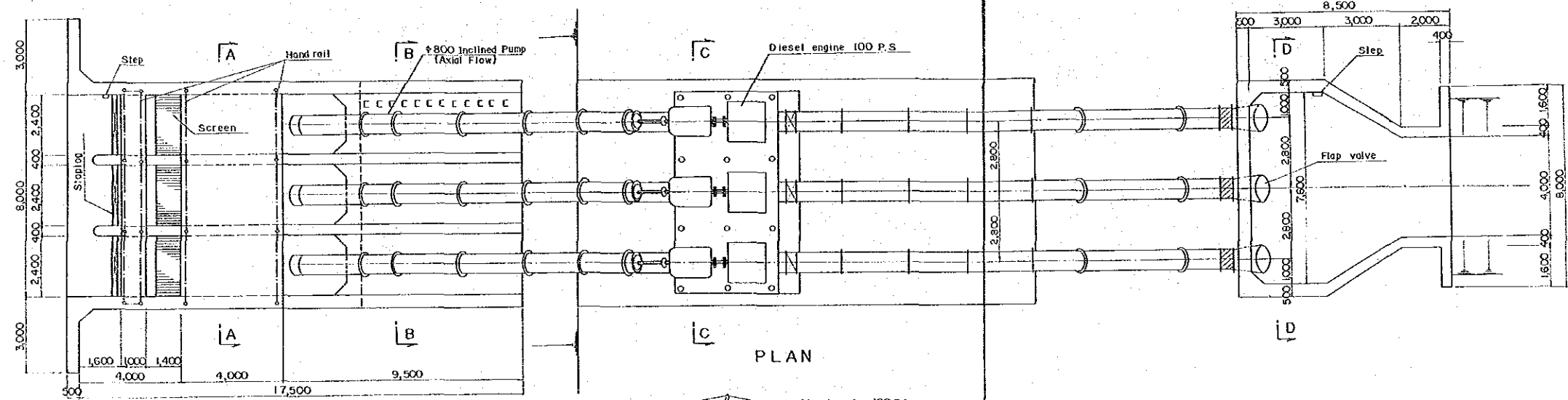
SECTION B-B



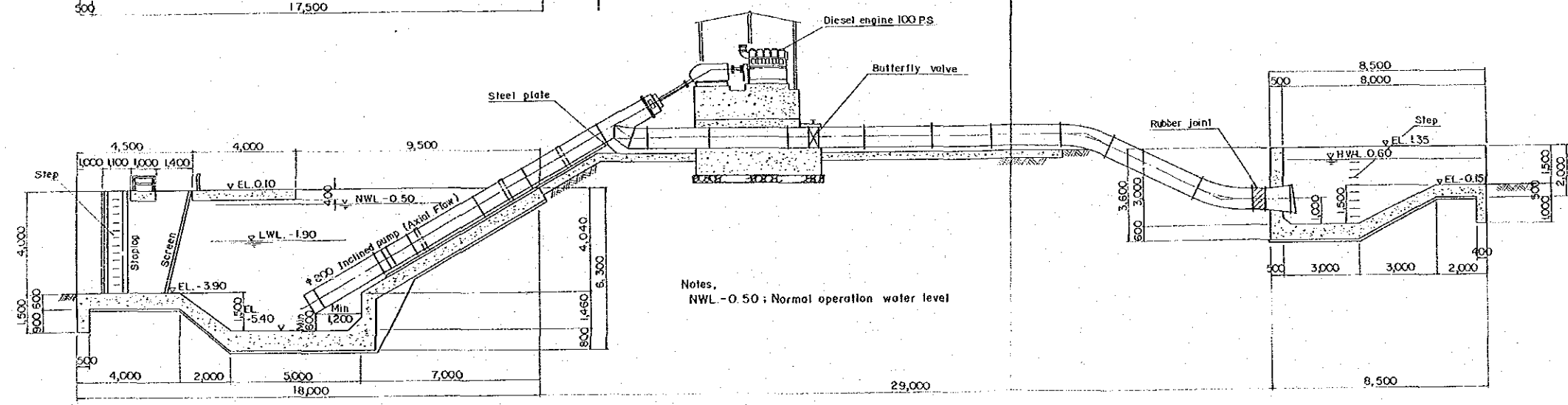
SECTION C-C



SECTION D-D



PLAN



PROFILE

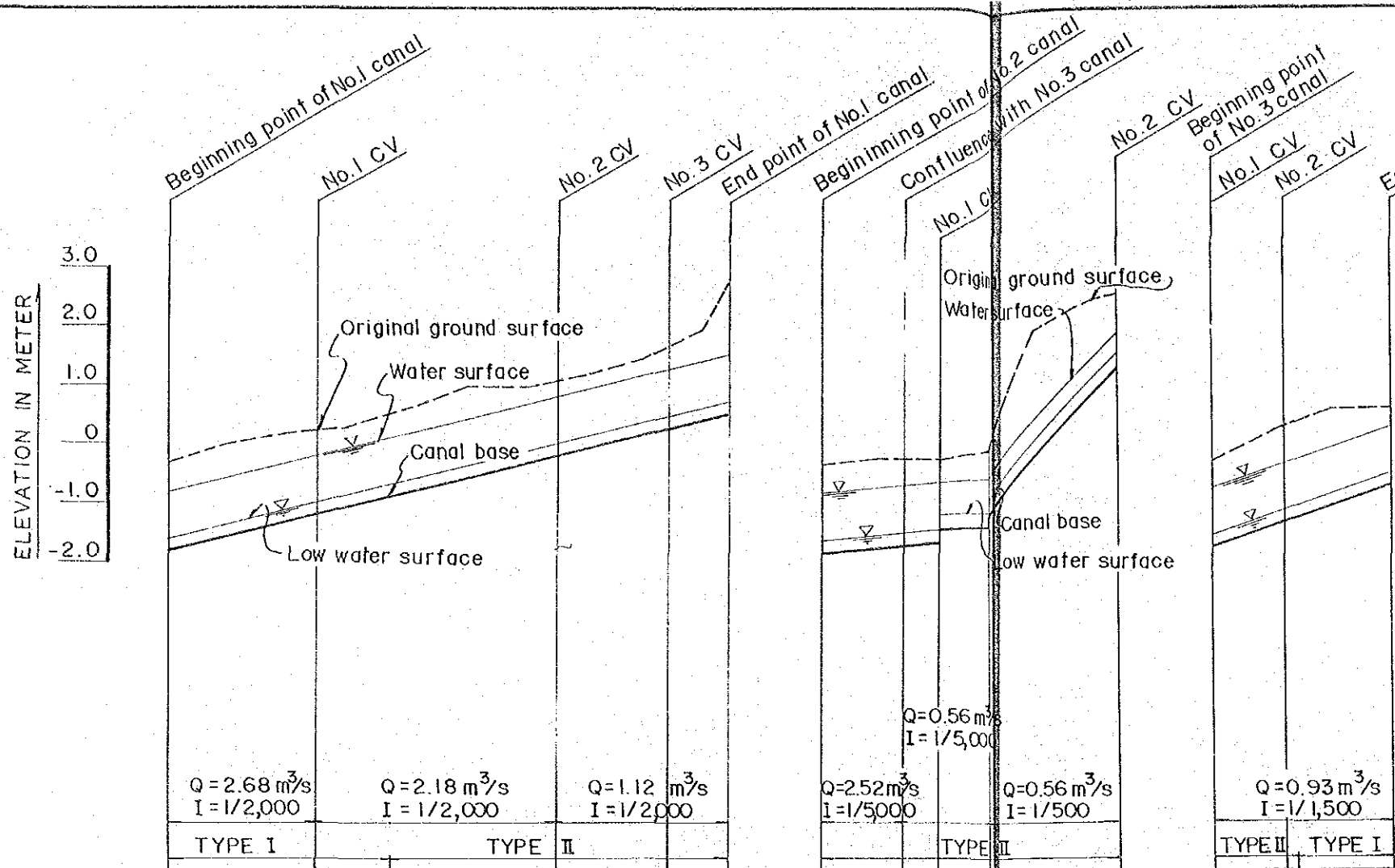
Notes,
NWL - 0.50; Normal operation water level

THE GOVERNMENT OF JAMAICA
ST. ELIZABETH
BLACK RIVER LOWER MORASS
AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
BROAD RIVER LEFT PUMP STATION

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN

DWG. NO.
5 - 4



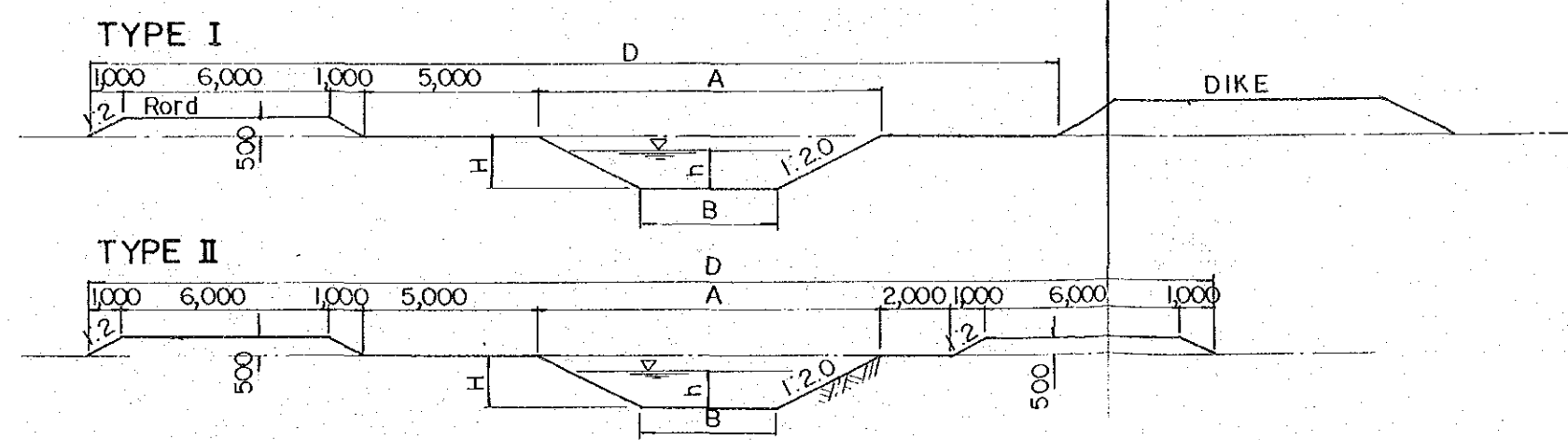
DIMENSION TABLE

Canal No.	Accumulated Distance	Canal length	Dimension				Canal Type	
			B	h	H	A		D
1	0 - 1,250	1,250	2,500	1,030	1,500	8,500	26,500	TYPE-I
	1,250 - 1,900	650	2,000	"	1,350	7,400	25,400	TYPE-I
	1,900 - 3,250	1,350	2,000	"	1,450	7,800	30,800	TYPE-II
	3,250 - 4,700	1,450	500	"	1,350	5,900	28,900	"
2	0 - 700	700	4,000	1,060	1,500	10,000	33,000	"
	700 - 1,500	800	500	890	1,400	6,100	29,100	"
	1,500 - 2,700	1,200	500	540	2,100	8,900	31,900	"
3	0 - 700	700	500	1,060	1,400	6,100	29,100	TYPE-II
	700 - 1,500	800	"	"	1,450	6,300	24,300	TYPE-I

LEGEND
 CV : Drainage culvert
 Q : Design discharge
 I : Hydraulic gradient

CANAL BASE ELEVATION	WATER SURFACE ELEVATION	GROUND SURFACE ELEVATION	REDUCED DISTANCE
-1.80	-0.77	-0.3	0
-1.55	0.52	0.0	500
-1.30	0.27	0.2	1,000
-1.18	0.15	0.3	1,250
-1.05	0.02	0.5	1,500
-0.85	0.18	0.6	1,900
-0.80	0.23	1.0	2,000
-0.55	0.48	1.0	2,500
-0.30	0.73	1.0	3,000
-0.18	0.85	1.1	3,250
-0.05	0.98	1.2	3,500
0.20	1.23	1.5	4,000
0.30	1.33	2.0	4,200
0.45	1.48	2.0	4,500
0.55	1.58	2.8	4,700

TYPICAL CROSS SECTION OF MAIN DRAINAGE CANAL



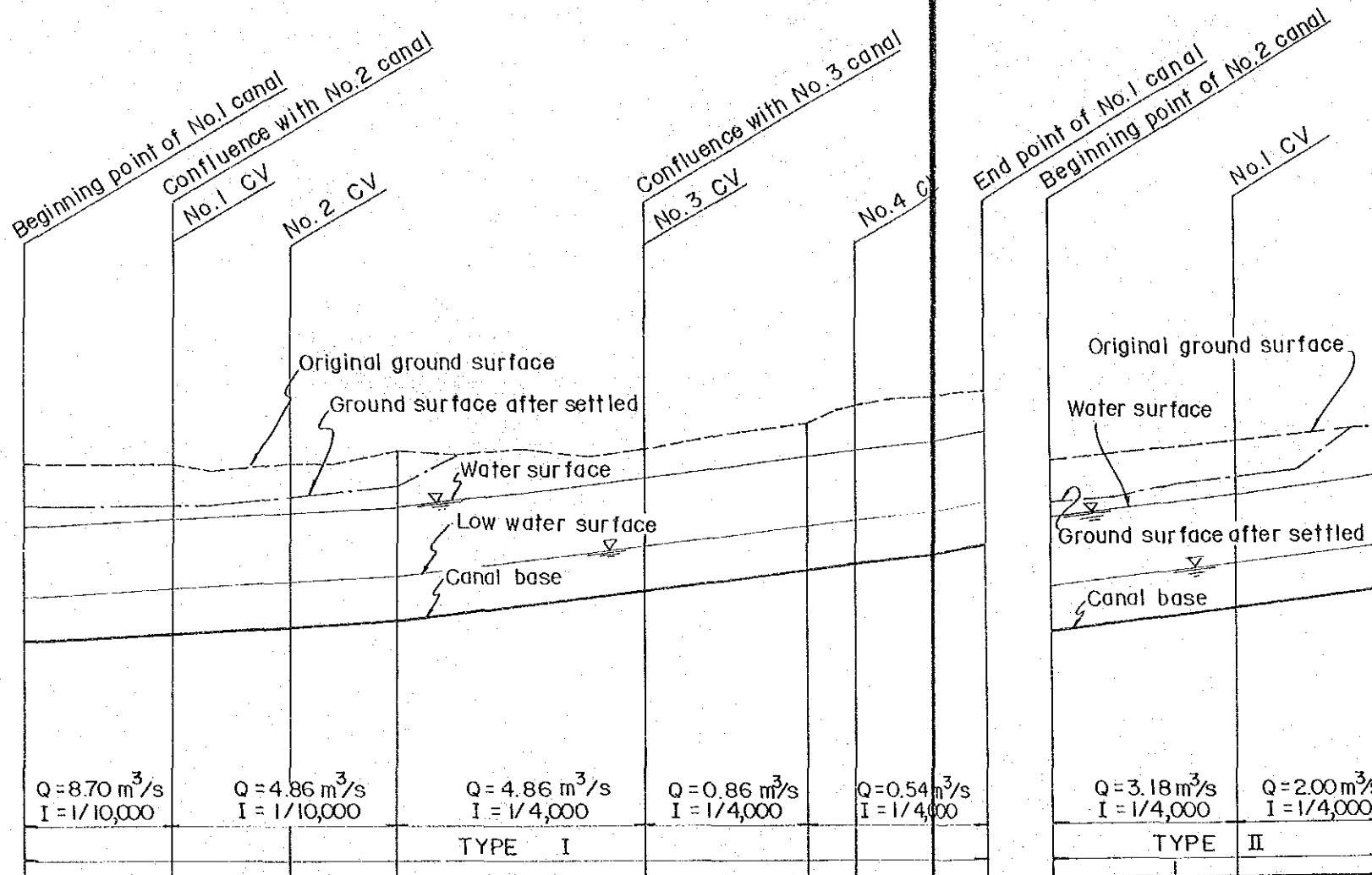
THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
**PROFILE OF MAIN DRAINAGE CANAL
 - HOLLAND AREA -**

JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DWG. NO.
 6-1

ELEVATION IN METER
1.0
0
-1.0
-2.0
-3.0



DIMENSION TABLE

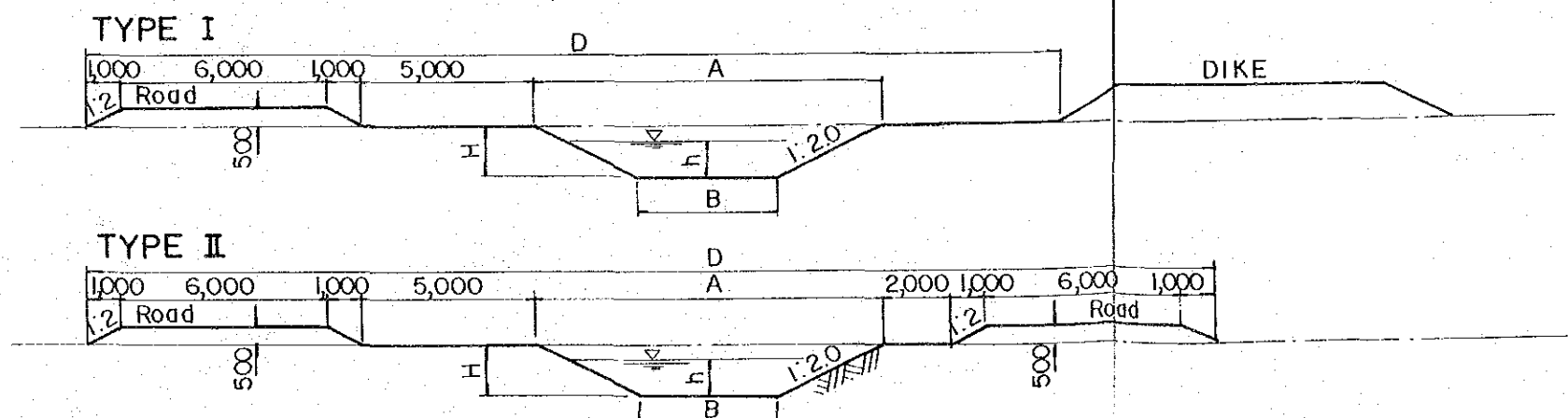
Canal No.	Accumulated Distance	Canal Length	Dimension					Canal Type
			B	h	H	A	D	
1	0 - 1,200	1,200	8,000	1,850	2,800	19,200	37,200	TYPE I
	1,200 - 3,000	1,800	3,500	"	2,700	14,300	32,300	"
	3,000 - 5,000	2,000	2,000	"	2,400	11,600	29,600	"
	5,000 - 6,300	1,300	500	"	2,350	9,900	27,900	"
	6,300 - 7,900	1,600	500	"	2,500	10,500	28,500	"
2	0 - 1,500	1,500	1,000	1,610	2,750	12,000	35,000	TYPE II
	1,500 - 2,700	1,200	500	"	2,700	11,300	34,300	"

LEGEND

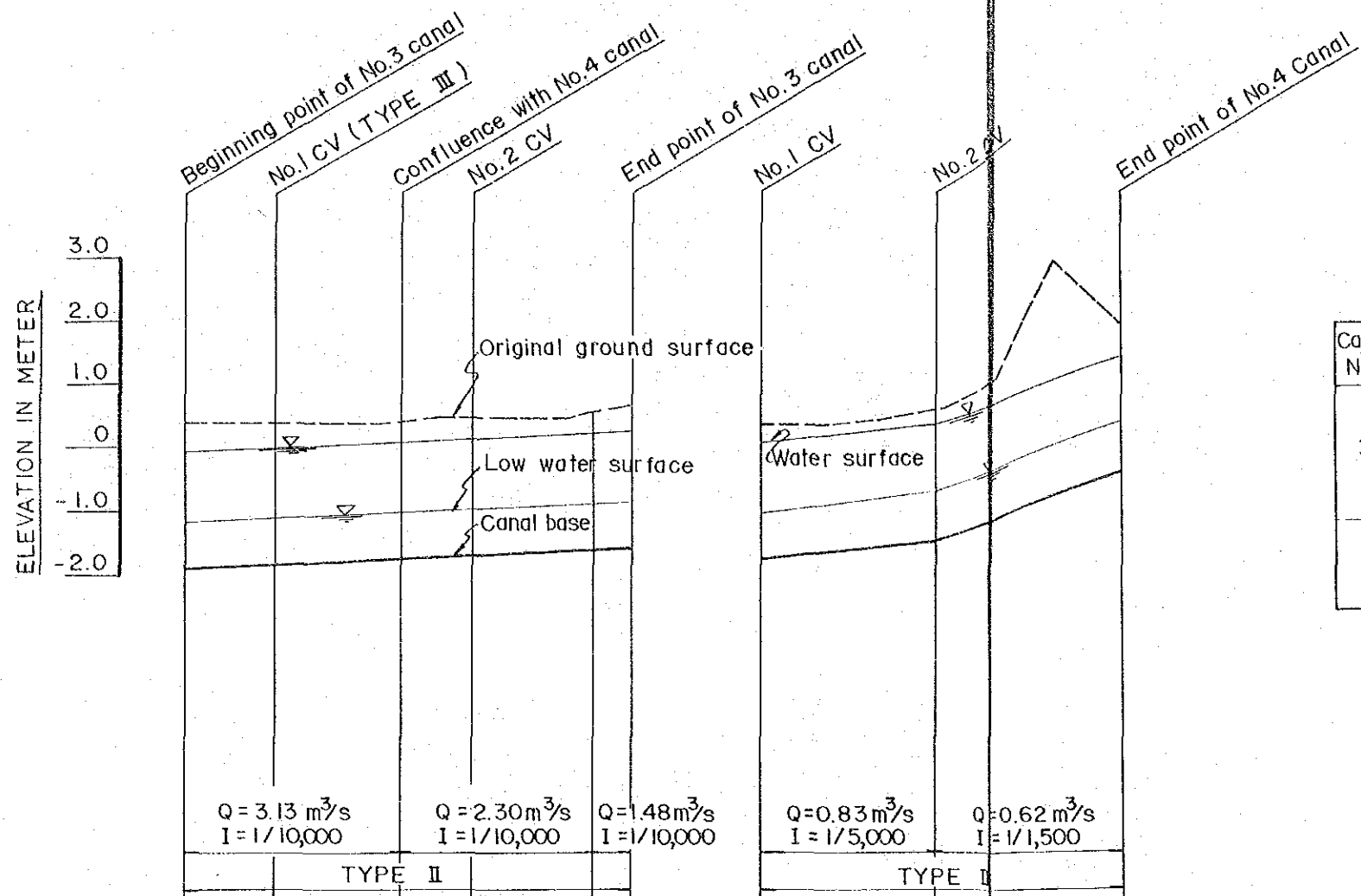
- CV : Drainage culvert
- Q : Design discharge
- I : Hydraulic gradient

CANAL BASE ELEVATION	WATER SURFACE ELEVATION	GROUND SURFACE ELEVATION	REDUCED DISTANCE
-2.70	-0.85	-0.5	0
-2.65	-0.80	-0.5	500
-2.60	-0.75	-0.5	1,000
-2.58	-0.73	-0.5	1,200
-2.55	-0.70	-0.5	1,500
-2.50	-0.65	-0.4	2,000
-2.49	-0.64	-0.4	2,150
-2.45	-0.60	-0.3	2,500
-2.40	-0.55	-0.2	3,000
-2.28	-0.43	0.3	3,500
-2.15	-0.30	0.4	4,000
-2.03	-0.18	0.3	4,500
-1.90	-0.05	0.4	5,000
-1.78	0.07	0.6	5,500
-1.65	0.20	0.7	6,000
-1.58	0.27	0.8	6,300
-1.53	0.32	1.0	6,500
-1.48	0.37	1.0	6,700
-1.40	0.45	1.2	7,000
-1.28	0.57	1.3	7,500
-1.18	0.67	1.3	7,900

TYPICAL CROSS SECTION OF MAIN DRAINAGE CANAL



THE GOVERNMENT OF JAMAICA
ST. ELIZABETH
BLACK RIVER LOWER MORASS
AGRICULTURAL DEVELOPMENT PROJECT
TITLE OF DRAWING
**PROFILE OF MAIN DRAINAGE CANAL
-BLACK RIVER LEFT BANK AREA (1/2)-**
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN
DWG. NO.
6-2



DIMENSION TABLE

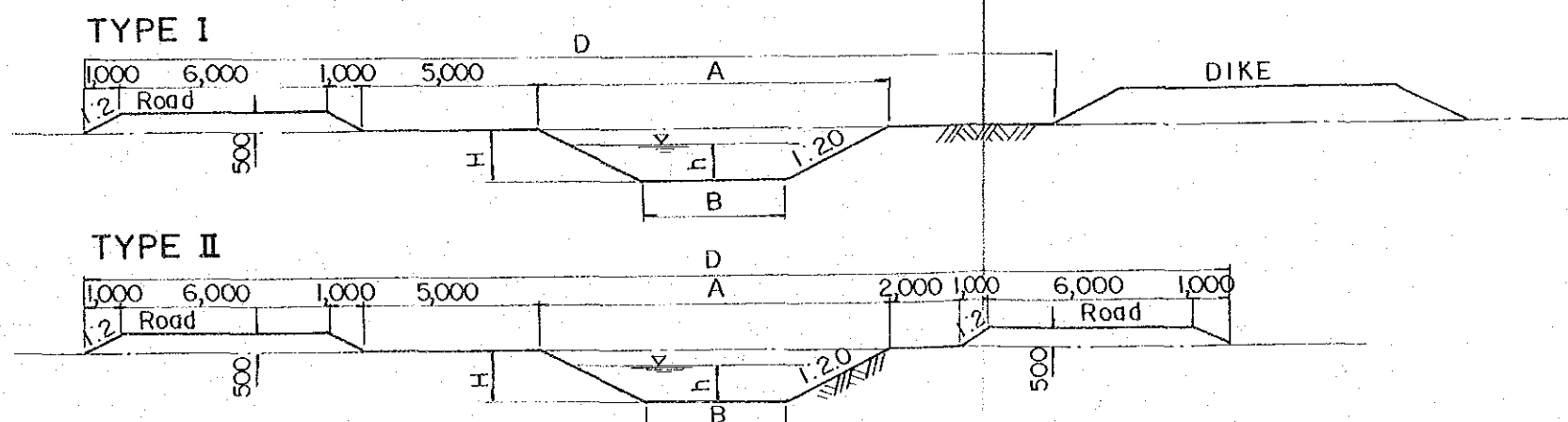
Canal No.	Accumulated Distance	Canal Length	Dimension					Canal Type
			B	h	H	A	D	
3	0-1,700 ^m	1,700 ^m	2,000	1,740	2,250	11,000	34,000	TYPE II
	1,700-3,200	1,500	500	"	2,200	9,300	32,300	"
	3,200-3,500	300	"	"	2,250	9,500	32,500	"
4	0-1,400	1,400	500	1,740	2,100	8,900	31,900	"
	1,400-3,000	1,600	"	"	3,100	12,900	35,900	TYPE-II

LEGEND

- CV : Drainage culvert
- Q : Design discharge
- I : Hydraulic gradient

	TYPE II							TYPE I												
CANAL BASE ELEVATION	-1.90	-1.85	-1.85	-1.80	-1.75	-1.70	-1.68	-1.65	-1.73	-1.63	-1.53	-1.45	-1.38	-1.05	-0.72	-0.38				
WATER SURFACE ELEVATION	0.16	0.11	0.09	0.06	0.01	0.01	0.04	0.06	0.09	0.14	0.16	0.19	0.01	0.11	0.21	0.29	0.36	0.69	1.04	1.36
GROUND SURFACE ELEVATION	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.7	0.7	1.2	3.0	2.0							
REDUCED DISTANCE	0	500	700	1,000	1,500	1,700	2,000	2,250	2,500	3,000	3,200	3,500	0	500	1,000	1,400	1,500	2,000	2,500	3,000

TYPICAL CROSS SECTION OF MAIN DRAINAGE CANAL

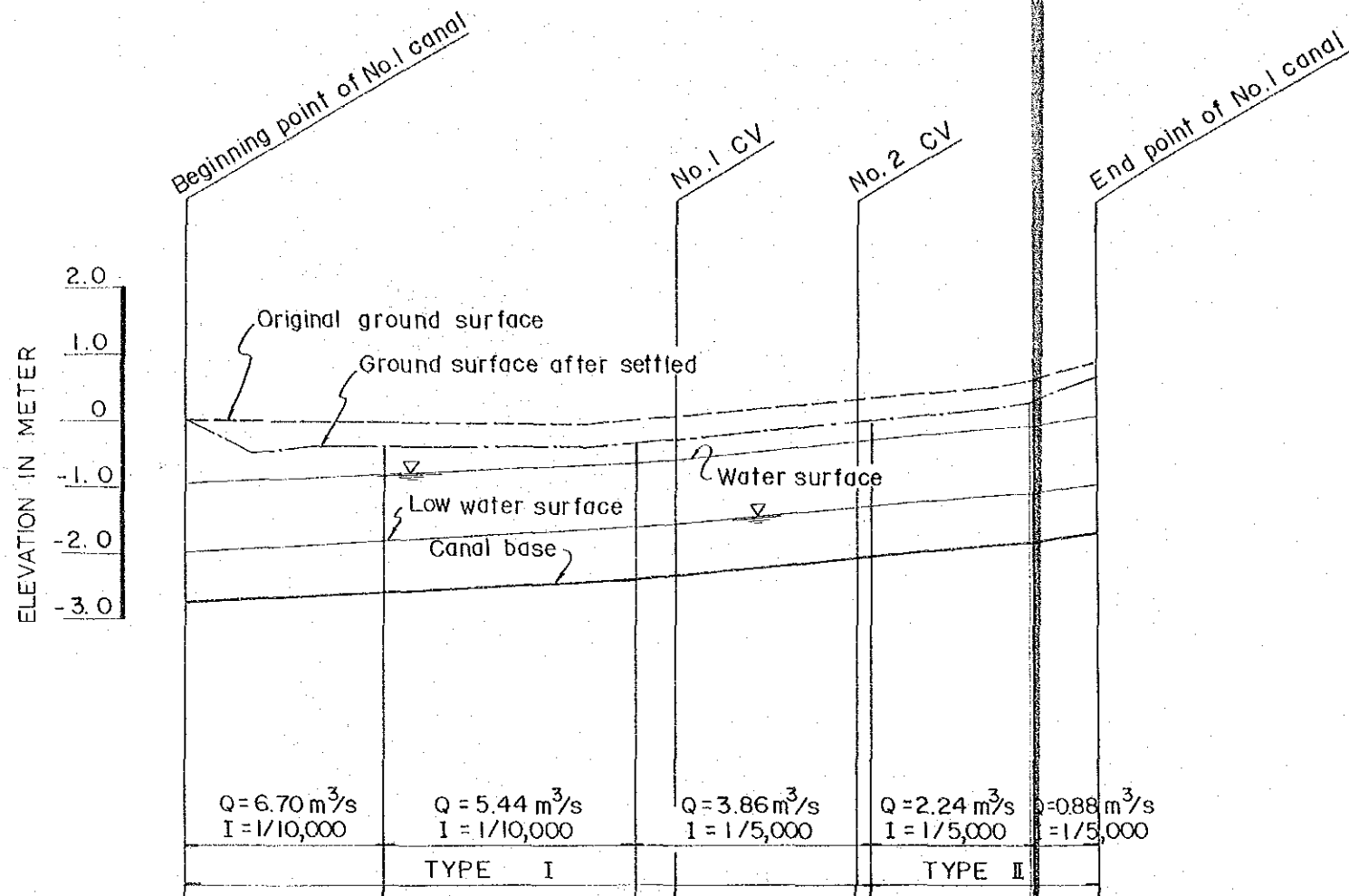


THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
**PROFILE OF MAIN DRAINAGE CANAL
 - BLACK RIVER LEFT BANK AREA (2/2)-**

JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DWG. NO.
 6-3



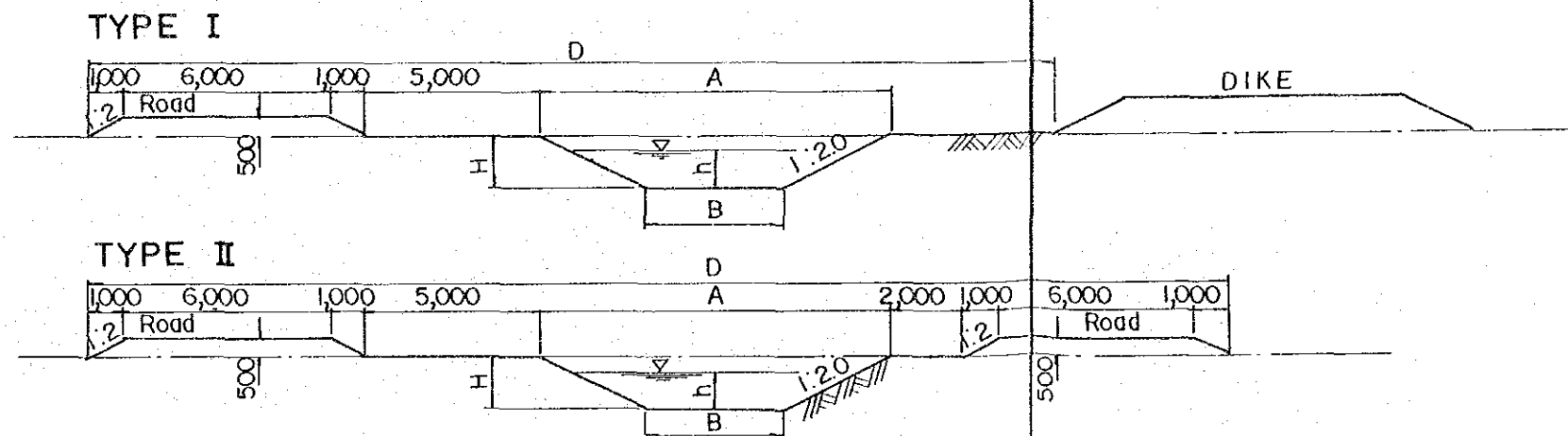
DIMENSION TABLE

Canal No.	Accumulated Distance	Canal Length	Dimension					Canal Type
			B	h	H	A	D	
1	0-1,500	1,500	6,000	1,810	2,600	16,400	34,400	TYPE-I
	1,500-3,400	1,900	4,590	"	2,500	14,500	32,500	"
	3,400-3,700	300	"	"	2,400	14,100	32,100	TYPE-I
	3,700-5,150	1,450	1,500	"	2,400	11,100	34,100	TYPE-II
	5,150-6,400	1,250	500	"	2,400	10,100	33,100	"
	6,400-7,000	600	"	"	2,550	10,700	33,700	TYPE-II

LEGEND
 CV : Drainage culvert
 Q : Design discharge
 I : Hydraulic gradient

CANAL BASE ELEVATION	-2.70	-2.65	-2.60	-2.55	-2.50	-2.45	-2.40	-2.36	-2.34	-2.30	-2.24	-2.14	-2.05	-2.01	-1.94	-1.84	-1.74	-1.64
WATER SURFACE ELEVATION	-0.89	-0.84	-0.79	-0.74	-0.69	-0.64	-0.59	-0.55	-0.53	-0.49	-0.43	-0.33	-0.23	-0.20	-0.13	-0.03	0.07	0.17
GROUND SURFACE ELEVATION	0.0	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.2	-0.1	0.0	0.1	0.1	0.2	0.2	0.4	0.7
REDUCED DISTANCE	0	500	1,000	1,500	2,000	2,500	3,000	3,400	3,500	3,700	4,000	4,500	5,000	5,150	5,500	6,000	6,400	7,000

TYPICAL CROSS SECTION OF MAIN DRAINAGE CANAL



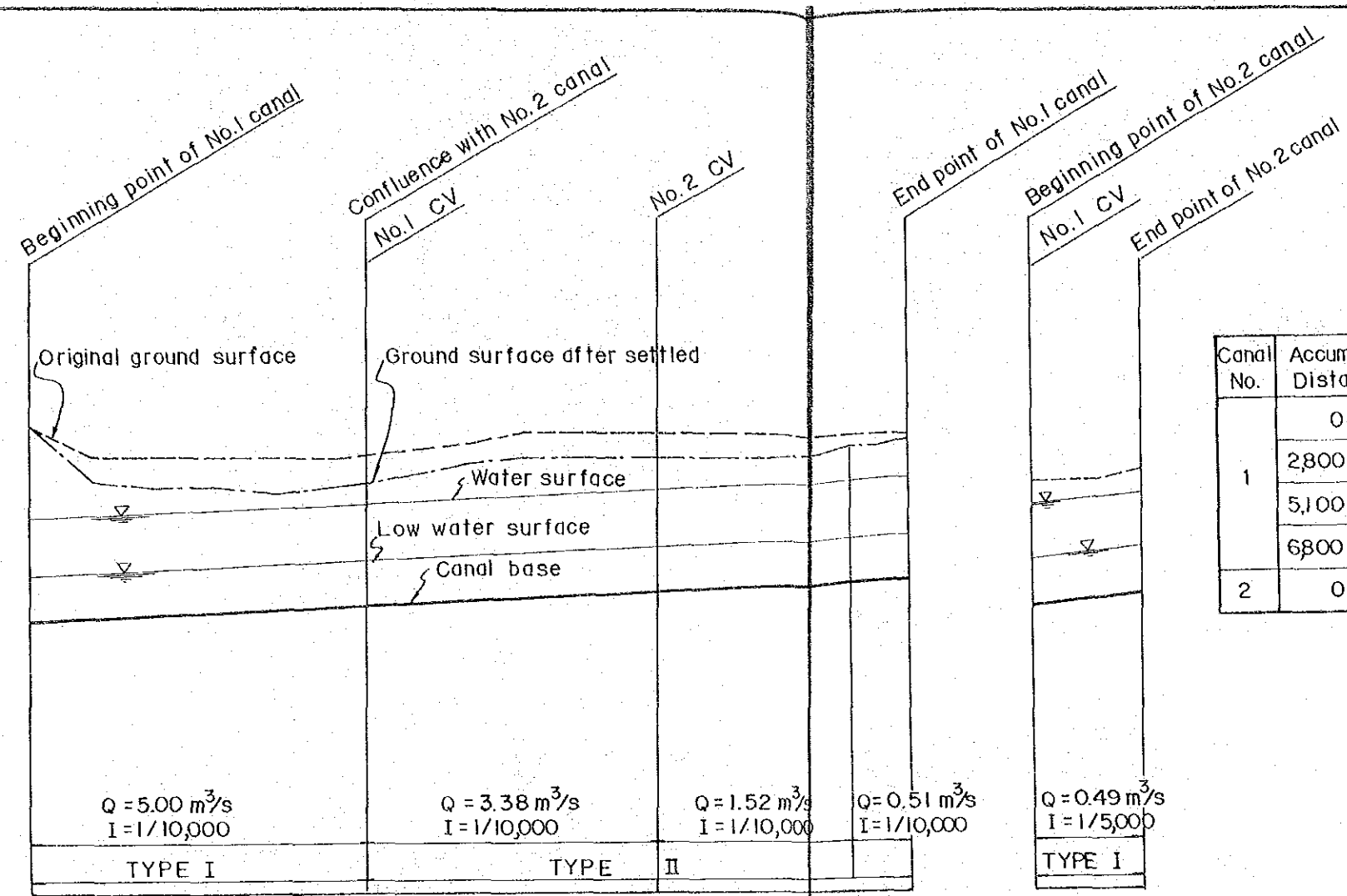
THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
**PROFILE OF MAIN DRAINAGE CANAL
 - BROAD RIVER RIGHT BANK AREA -**

JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DWG. NO.
 6-4

ELEVATION IN METER
1.0
0
-1.0
-2.0
-3.0
-4.0



DIMENSION TABLE

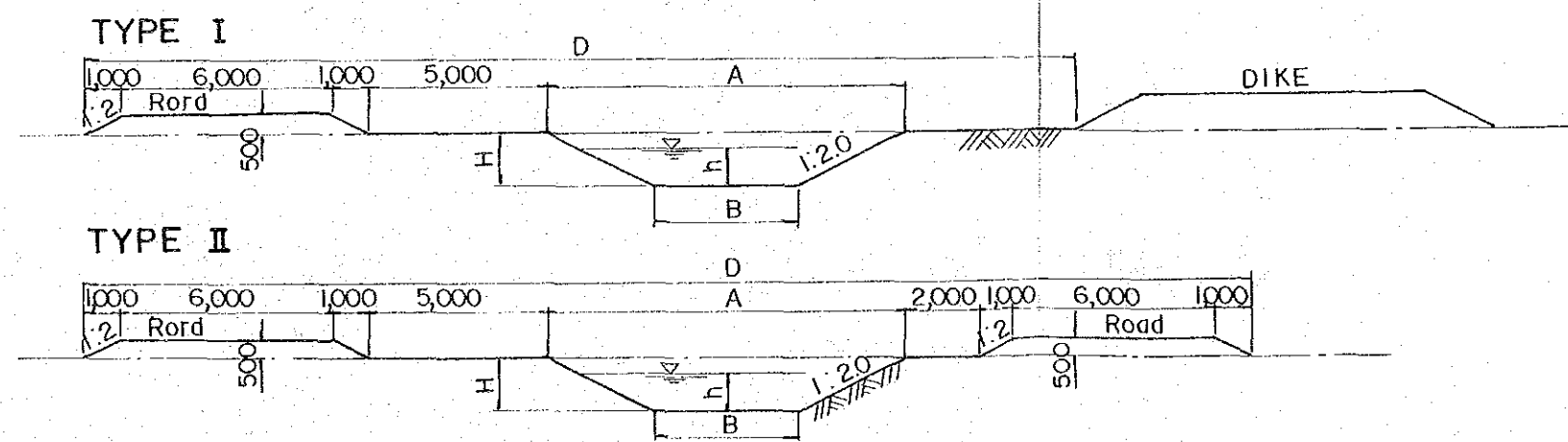
Canal No.	Accumulated Distance	Canal Length	Dimension					Canal Type
			B	h	H	A	D	
1	0-2800	2800	5,000	1,670	2,600	15,400	33,400	TYPE-I
	2800-5,100	2,300	3,000	"	2,500	13,000	36,000	TYPE-II
	5,100-6800	1,700	500	"	2,500	10,500	33,500	"
	6800-7,300	500	500	"	2,350	9,900	32,900	"
2	0-900	900	500	"	2,000	8,500	26,500	TYPE-I

LEGEND

- CV : Drainage culvert
- Q : Design discharge
- I : Hydraulic gradient

CANAL BASE ELEVATION	-2.70	-2.65	-2.60	-2.55	-2.50	-2.45	-2.42	-2.40	-2.35	-2.30	-2.25	-2.20	-2.19	-2.15	-2.10	-2.05	-2.02	-2.00	-1.97
WATER SURFACE ELEVATION	-1.03	-0.98	-0.93	-0.88	-0.83	-0.78	-0.75	-0.73	-0.68	-0.63	-0.58	-0.53	-0.52	-0.48	-0.43	-0.38	-0.35	-0.33	-0.30
GROUND SURFACE ELEVATION	0.5	0.4	0.5	0.5	0.6	0.5	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3
REDUCED DISTANCE	0	500	1,000	1,500	2,000	2,500	2,800	3,000	3,500	4,000	4,500	5,000	5,100	5,500	6,000	6,500	6,800	7,000	7,300

TYPICAL CROSS SECTION OF MAIN DRAINAGE CANAL

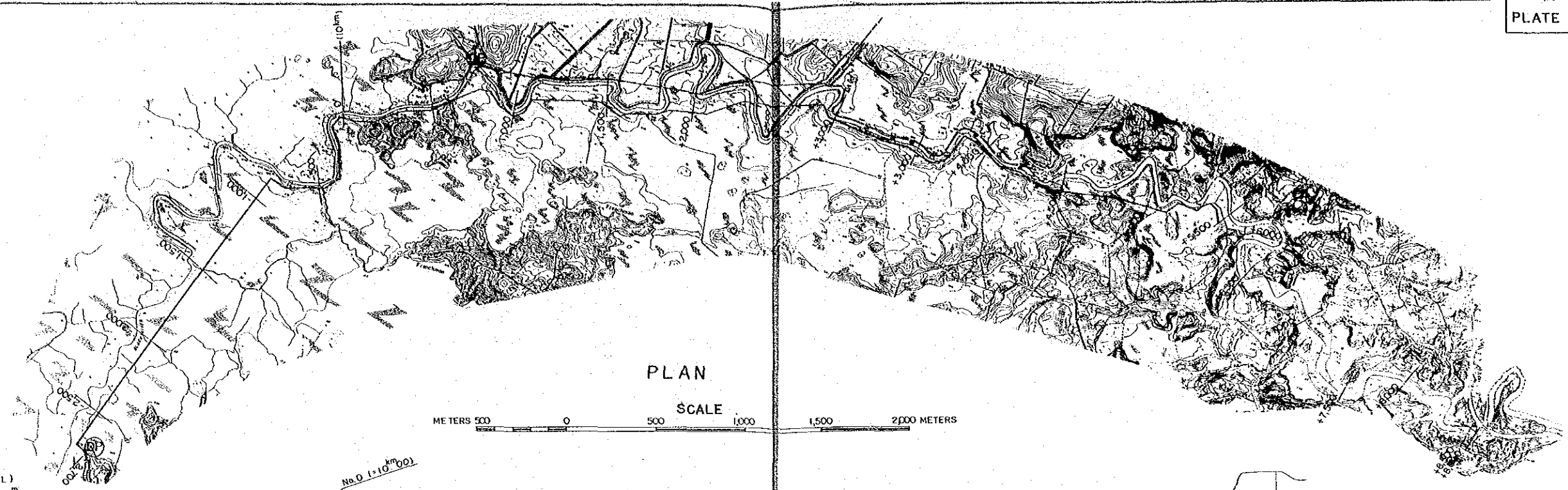


THE GOVERNMENT OF JAMAICA
ST. ELIZABETH
BLACK RIVER LOWER MORASS
AGRICULTURAL DEVELOPMENT PROJECT

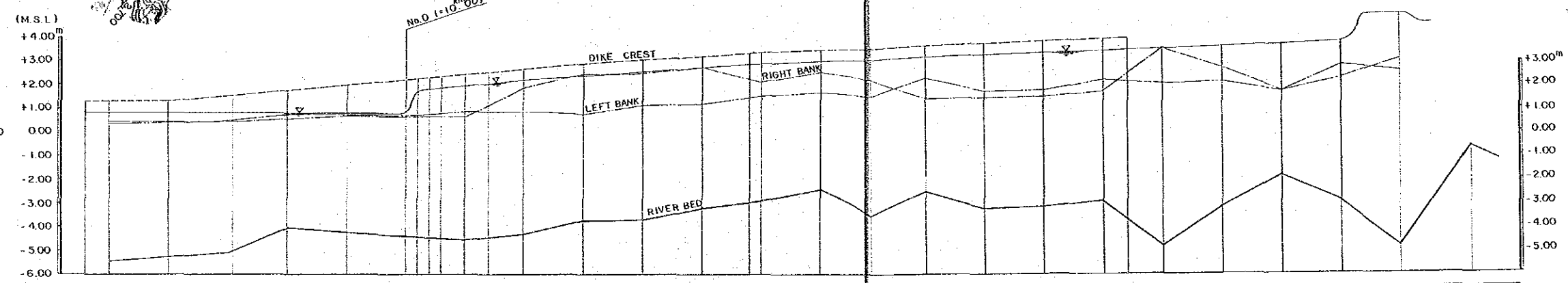
TITLE OF DRAWING
**PROFILE OF MAIN DRAINAGE CANAL
- BROAD RIVER LEFT BANK AREA -**

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN

DWG. NO.
6-5



1/100
1/20,000
SCALE



STATION NO.	RIVER BED EL.	LEFT BANK EL.	RIGHT BANK EL.	FLOOD WATER SURFACE EL.	PLAN OF LEFT DIKE EL.	PLAN OF RIGHT DIKE EL.
-2,700	-5.46	0.37	0.43		1.30	
-2,500	-5.46	0.40	0.41		1.30	
-2,000	-5.25	0.42	0.45		1.53	
-1,500	-4.06	0.71	0.54		1.75	
-1,000	-4.24	0.67	0.62		1.98	
-500	-4.42	0.63	0.69	0.80	2.21	
0	-4.42	0.63	0.69	1.72	2.25	
+100	-4.58	0.82	0.63	1.80	2.30	
+200	-4.58	0.82	0.63	1.86	2.36	
+300	-4.31	0.82	1.89	1.96	2.46	
+500	-3.74	0.77	2.48	2.21	2.54	2.54
+1,000	-3.71	1.15	2.48	2.39	2.71	2.71
+1,500	-3.20	1.20	2.73	2.55	2.89	2.89
+2,000	-2.90	1.53	2.18	2.74	3.05	3.05
+2,500	-2.40	1.71	2.55	2.91	3.24	3.24
+3,000	-2.51	1.57	2.24	2.91	3.38	3.38
+3,500	-2.51	2.31	1.47	3.14	3.53	3.53
+4,000	-3.21	1.76	1.47	3.21	3.64	3.64
+4,500	-3.14	1.79	1.51	3.30	3.71	3.71
+5,000	-2.90	2.25	1.72	3.38	3.80	3.80
+5,500	-4.81	2.08	3.56	3.51	3.88	3.88
+6,000	-3.12	2.13	2.74	3.51	4.01	4.01
+6,500	-1.81	1.77	1.78	3.62	4.05	4.05
+7,000	-2.50	2.83	2.29	3.69		
+7,500	-4.80	2.59	3.08	3.76		
+8,000	-0.60			3.86		
+8,500				4.17		
+9,000				4.35		
+9,100				4.59		
+9,200				5.00		
+9,300				5.01		
+9,400				4.85		

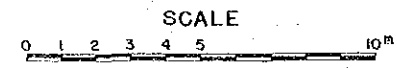
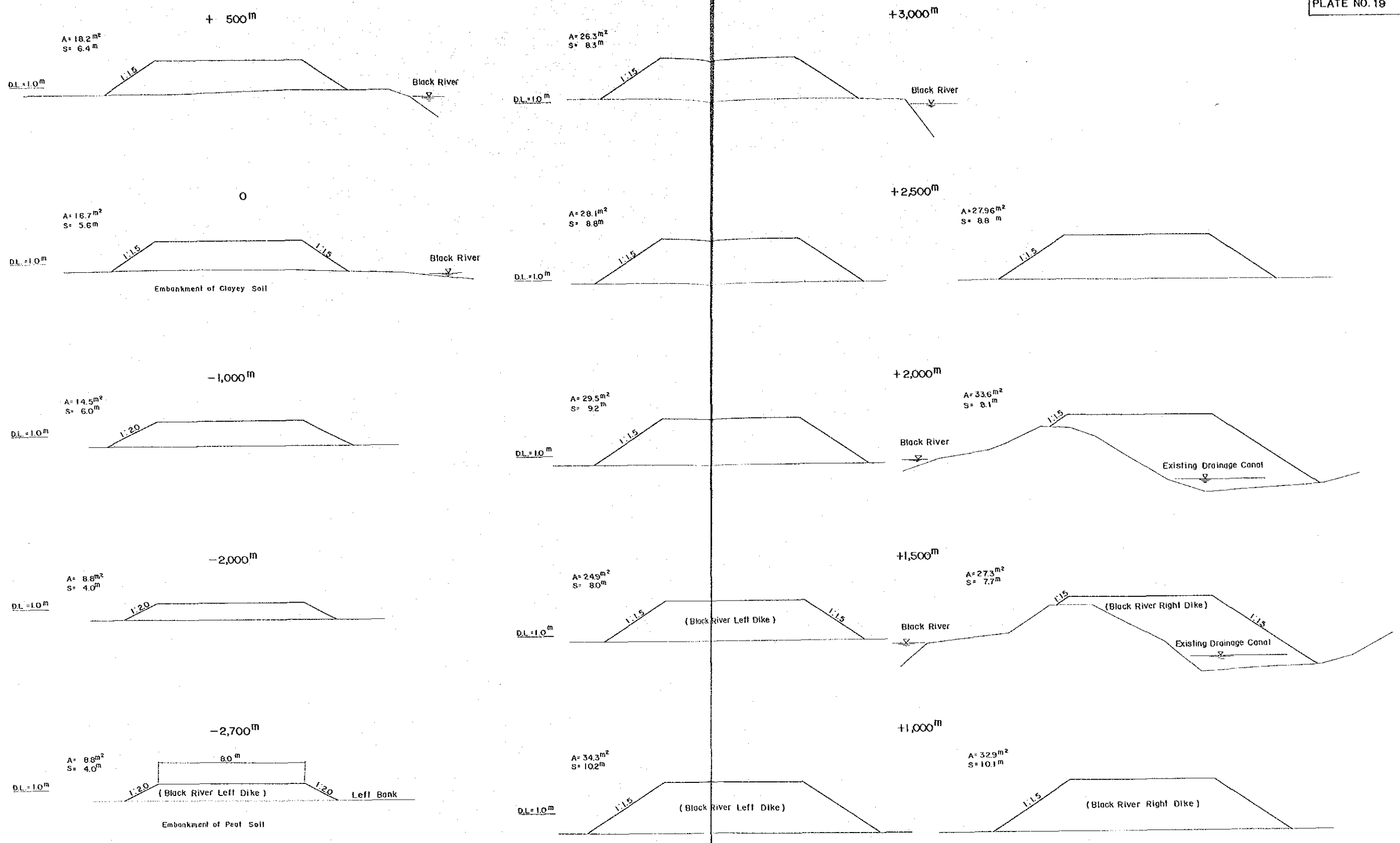
Notes ; 1. Figures in Station No. column shows the accumulated distance along the River.
 2. Figures in brackets shows the revised one along the planned dike.
 3. Station No. in PLAN shows the revised figure.
 4. The station No. 0 as the beginning point is located at 100km from the River mouth.

THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

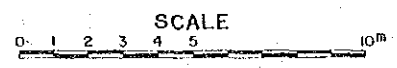
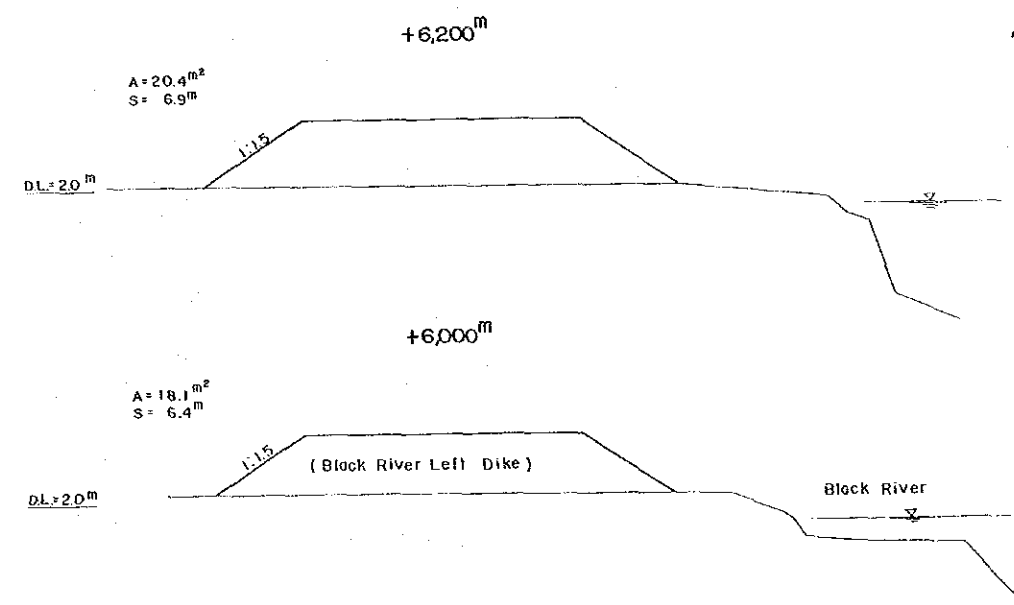
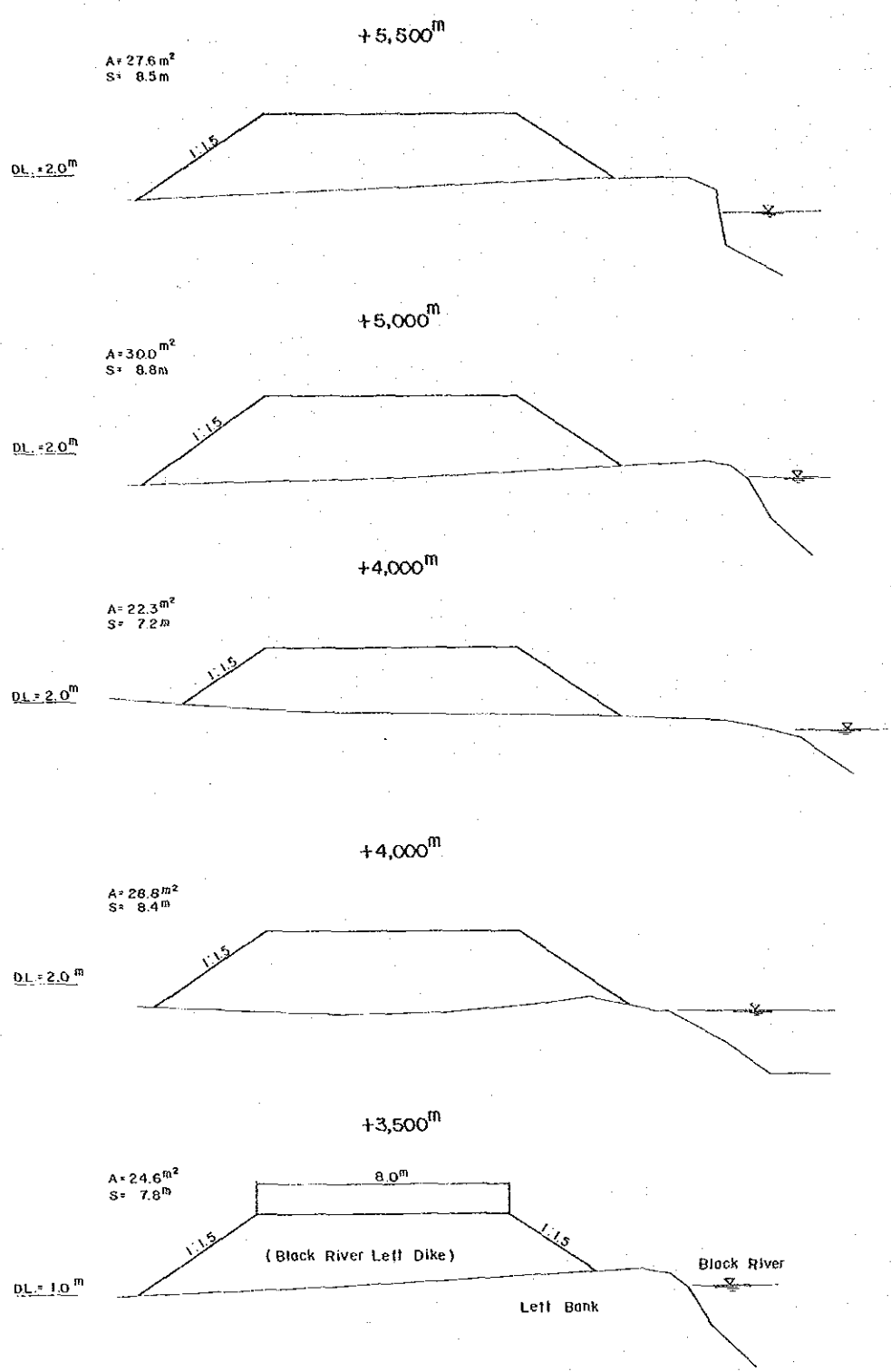
TITLE OF DRAWING
**PLAN & PROFILE OF BLACK RIVER
 RIGHT & LEFT DIKE**

JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DWG. NO.
7-1

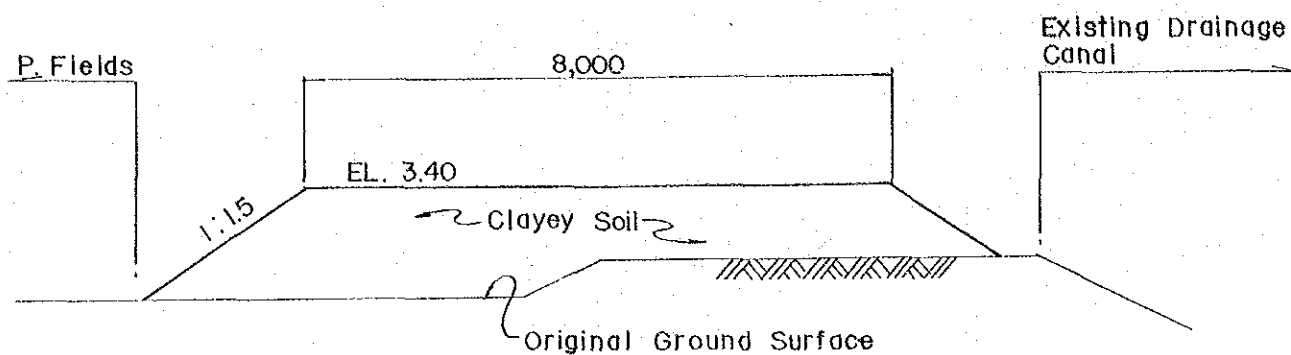


THE GOVERNMENT OF JAMAICA ST. ELIZABETH BLACK RIVER LOWER MORASS AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING CROSS SECTION OF BLACK RIVER RIGHT & LEFT DIKE (1-2)	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG. NO 7-2

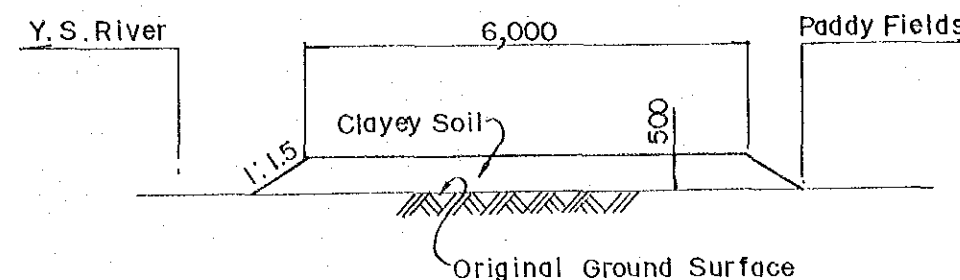


THE GOVERNMENT OF JAMAICA ST. ELIZABETH BLACK RIVER LOWER MORASS AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING CROSS SECTION OF BLACK RIVER RIGHT & LEFT DIKE (2/2)	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG. NO. 7-3

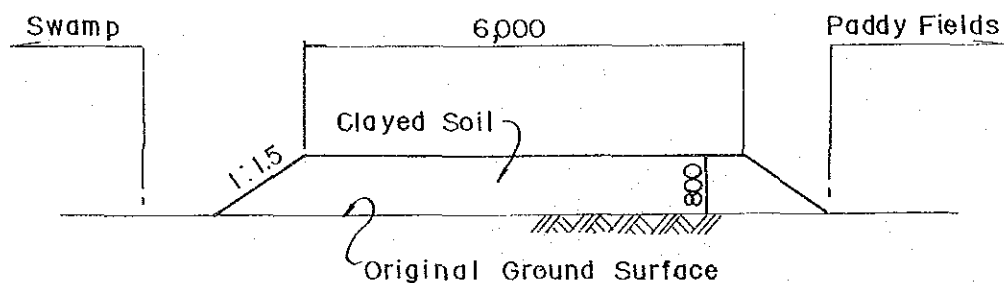
HOLLAND EAST DIKE



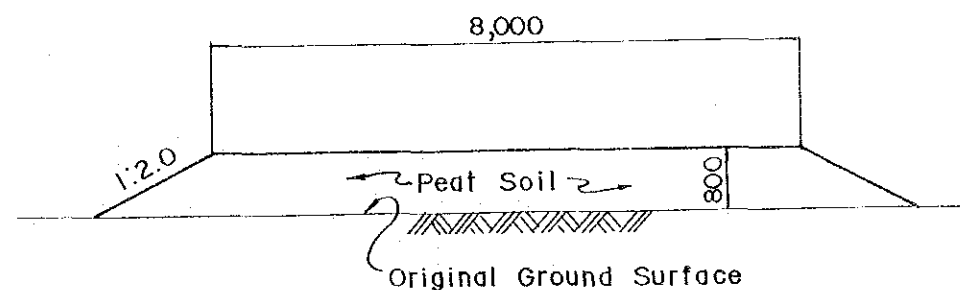
Y.S. RIVER LEFT BANK IMPROVEMENT



HOLLAND WEST DIKE



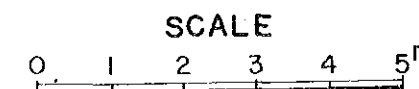
BROAD RIVER LEFT AND RIGHT DIKE



DIMENSION TABLE

Dike	B	H	fb	L	Remarks
Holland East Dike	8.0	0.5	0.5	2.9	On clay soil
Holland West Dike	6.0	0.8	0.3	2.4	On peat soil
Y.S. Dike Improvement	6.0	0.5	0.3	1.6	On clay soil
Broad River Right Dike	8.0	0.8	0.3	5.7	On peat soil
Broad River Left Dike	8.0	0.8	0.3	5.7	On peat soil

- B: Width of dikes crest (m)
- H: Height of dike (m)
- Fb: Freeboard (m)
- L: Length of dikes (km)
- * Height of dike is not fixed because the ground surface is undulated.



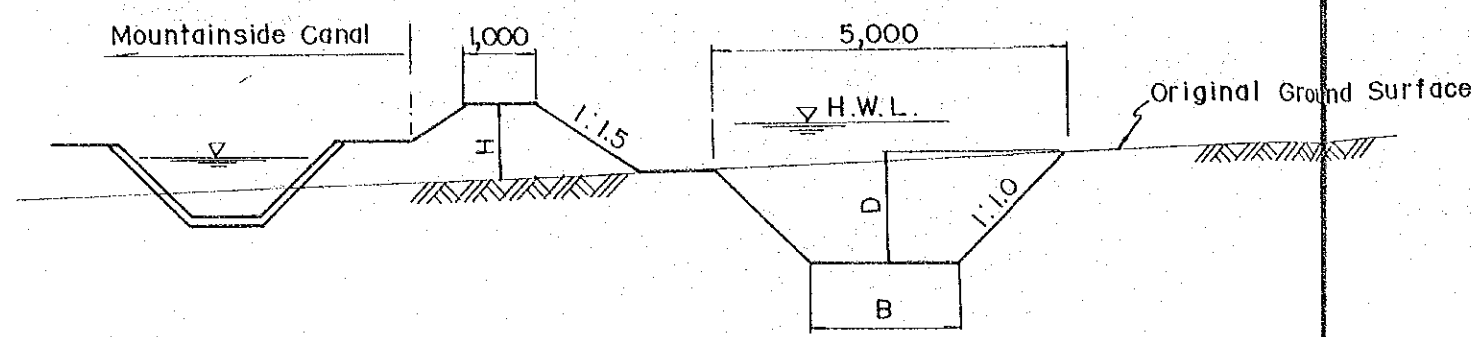
THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
TYPICAL CROSS SECTION OF DIKES

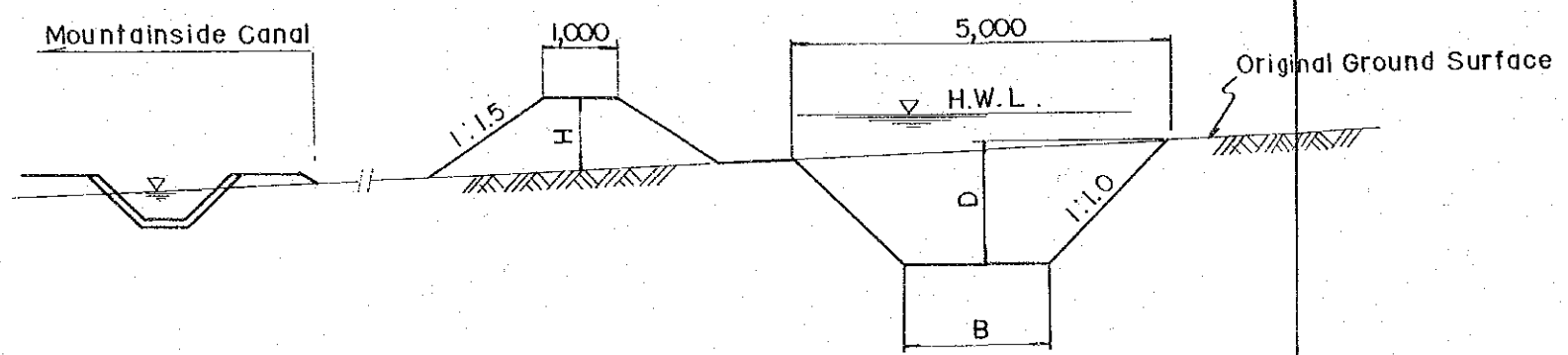
JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DWG. NO.
7-4

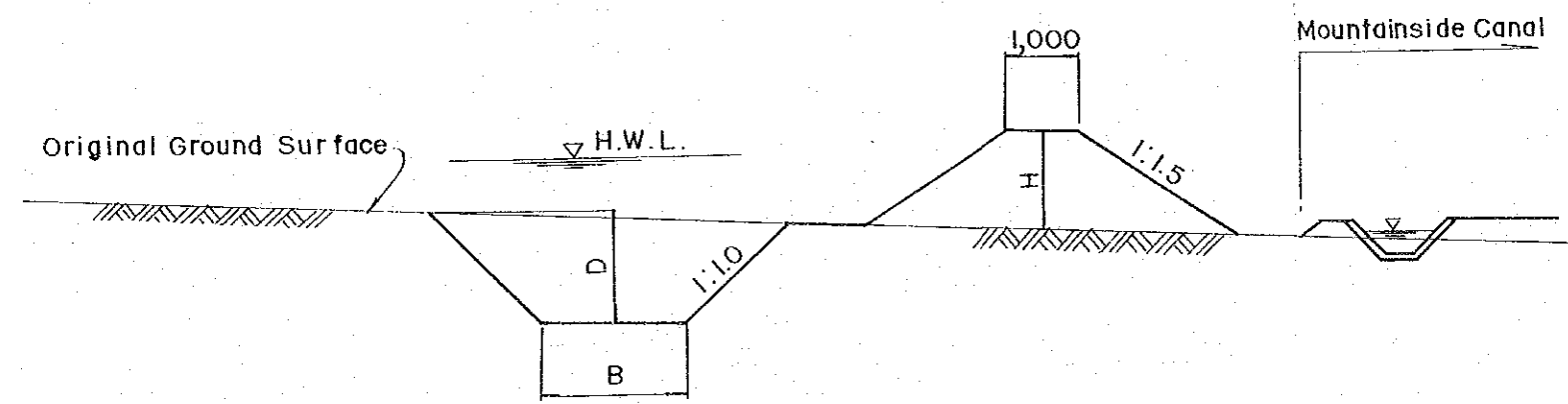
SANTA CRUZ CATCH DRAIN - North -



SANTA CRUZ CATCH DRAIN - South -



ARLINGTON CATCH DRAIN



DIMENSION TABLE

Santa Cruz Catch Drain (North)

L	A	Q	I	H	D	B
1.5	770	5.1	1:4,000	1.3	1.5	2.0
1.5	560	3.7	1:4,000	1.0	1.5	2.0
1.0	220	1.5	1:4,000	0	1.5	2.0

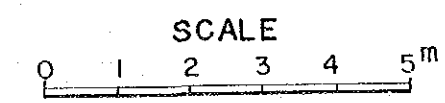
Santa Cruz Catch Drain (South)

L	A	Q	I	H	D	B
2.0	1,450	9.6	1:2,000	1.5	1.5	2.0
2.0	560	3.7	1:2,000	1.1	1.5	2.0
1.0	220	1.5	1:2,000	1.0	1.0	1.0

Arlington Catch Drain

L	A	Q	I	H	D	B
2.0	2,800	18.6	1:4,000	2.0	2.0	4.0
2.0	1,430	9.5	1:4,000	1.5	1.5	2.0
2.0	960	6.4	1:2,000	1.0	1.5	2.0
2.0	480	3.2	1:2,000	0.7	1.0	1.0

- L: Distance of catch drain (km)
- A: Water-shed area (ha)
- Q: Design discharge (m³/s)
- I: Hydraulic gradient
- H: Height of bank (m)
- D: Water depth (m)
- B: Canal base width (m)

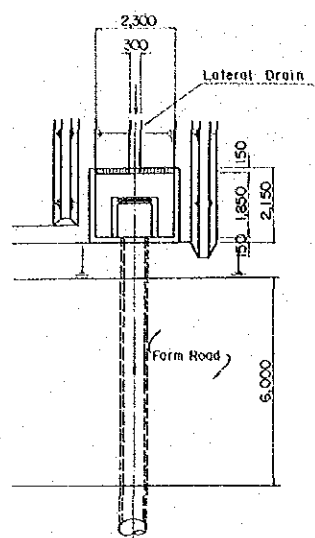


THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

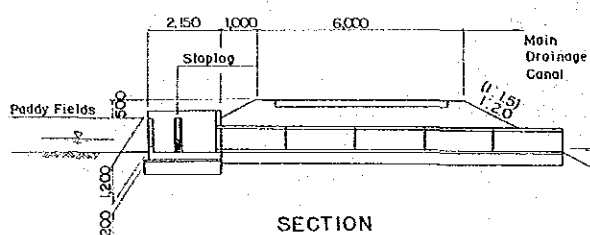
TITLE OF DRAWING
**TYPICAL CROSS SECTION
 OF CATCH DRAINS**

JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN DWG. NO.
7-5

DRAINAGE CHECK

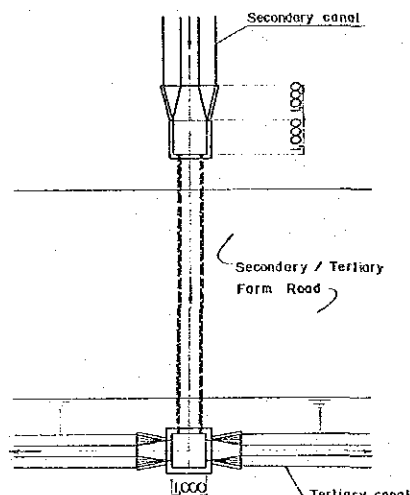


PLAN

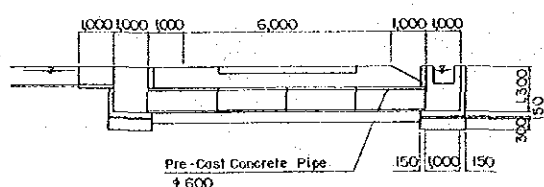


SECTION

CULVERT OF SECONDARY IRRIGATION CANAL

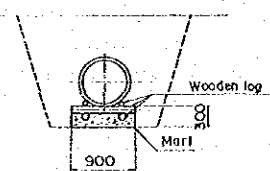


PLAN

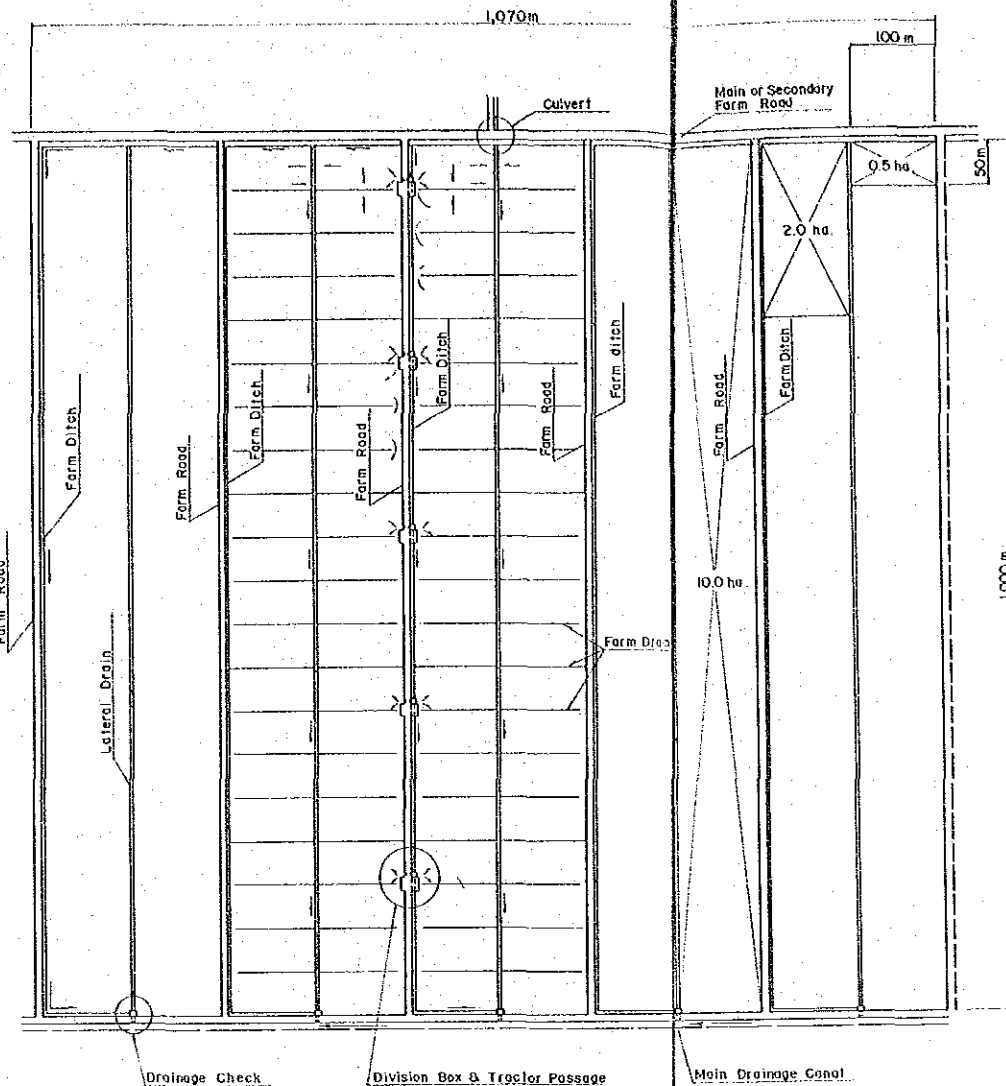


SECTION

DETAIL OF PIPE FOUNDATION IN PEAT AREA



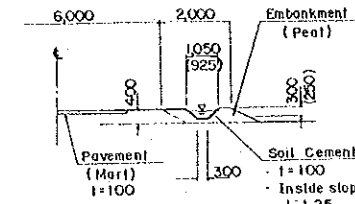
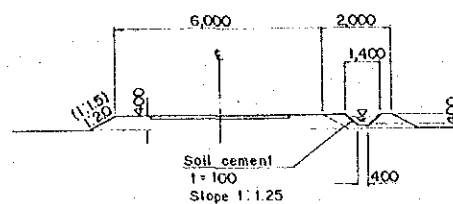
GENERAL PLAN OF ON-FARM DEVELOPMENT



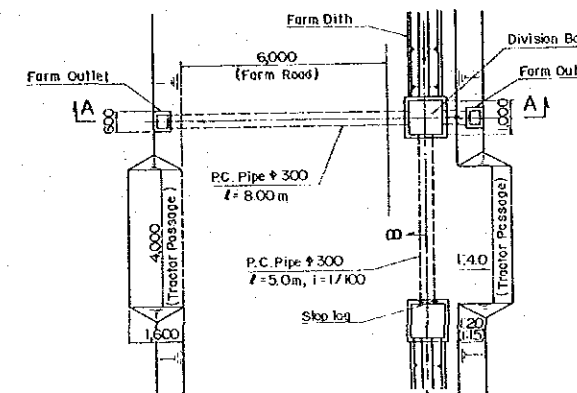
FARM ROAD AND FARM DITCHES

(For 40 ha)

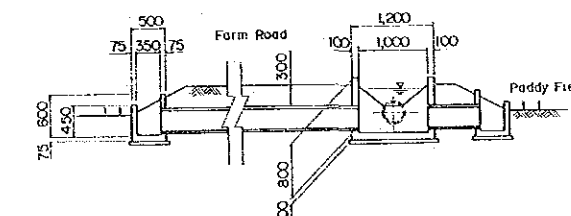
(For 20 ha)



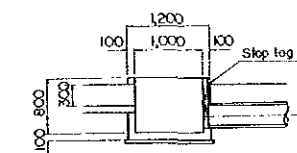
DIVISION BOX AND TRACTOR PASSAGE



PLAN

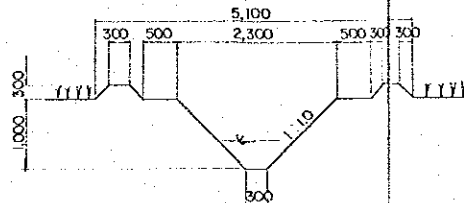


SECTION A-A

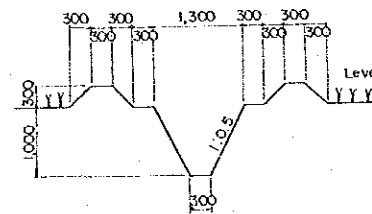


SECTION B-B

LATERAL DRAIN



FARM DRAIN



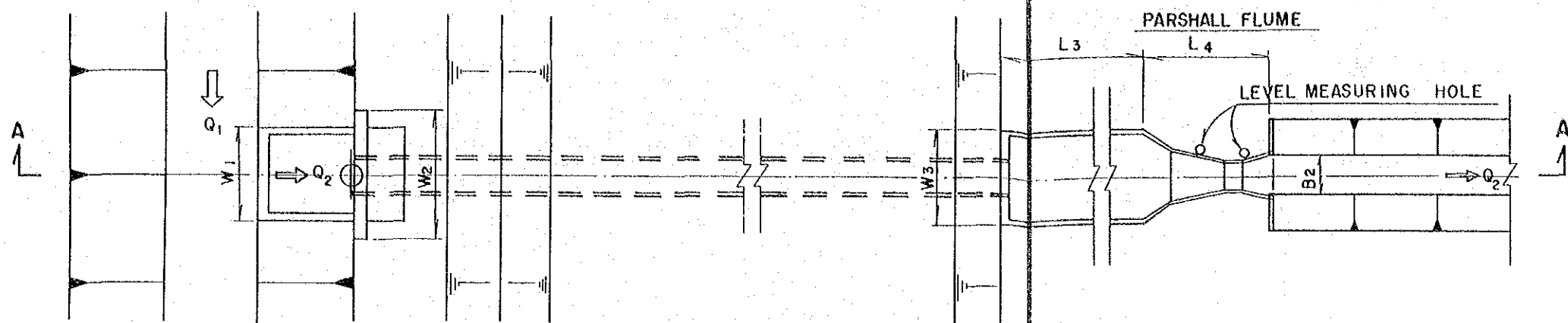
- Notes :
1. Figure in the bracket () shows the dimension for mineral soil area.
 2. Division box should be constructed in each irrigation unit of 4.0 ha.
 3. Tractor passage should be constructed in each 2.0 ha unit in peat area.
 - do - 1.0 ha unit in Holland Area.
 - do - 0.5 ha plot in Hatfield Area.
 4. Wooden ladder foundation with marl (1+0.3m) should be constructed for the concrete structures in peat area.

THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
ON-FARM DEVELOPMENT PLAN

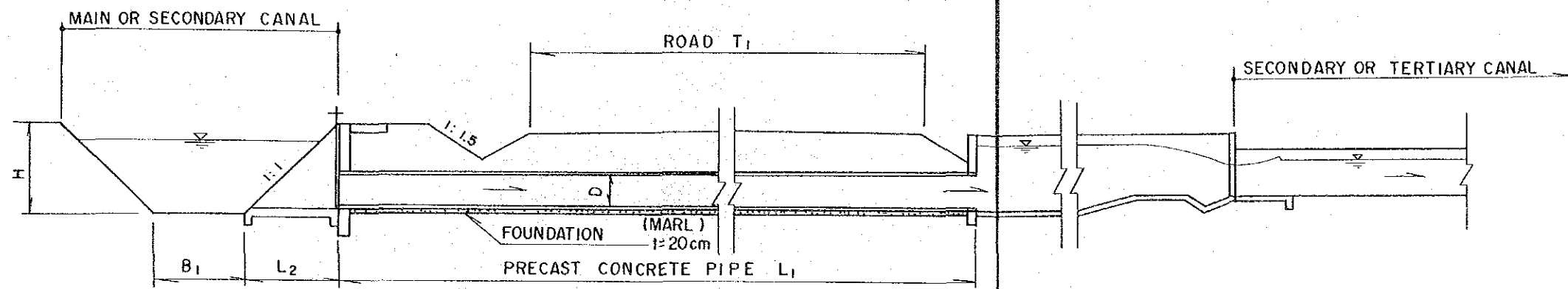
JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN

DWG. NO.
 8 - 1

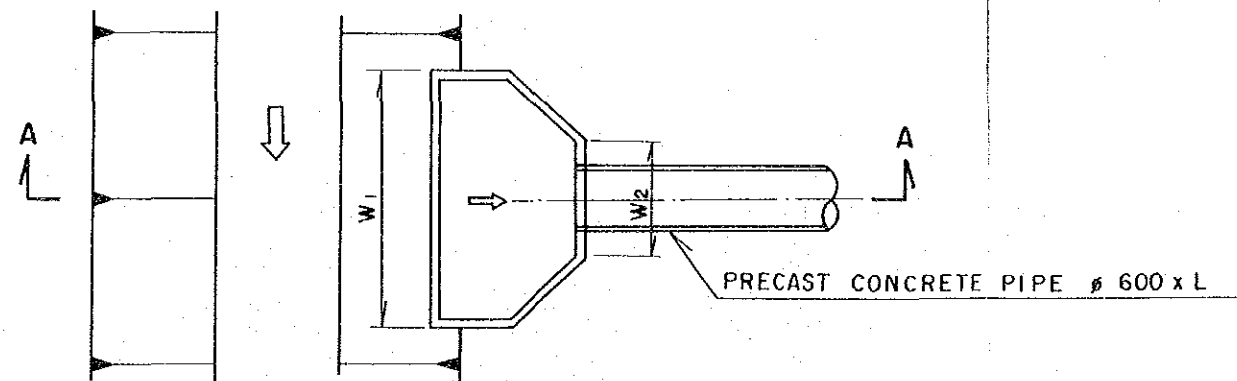


PLAN OF TURNOUT

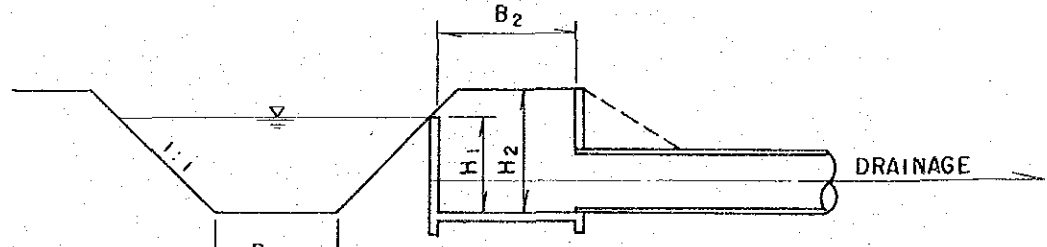
TYPE	(m ³ /s)	(m ³ /s)	(mm)
	Q ₁	Q ₂	D
I	1.0~2.0	> 0.2	600
II	1.0~2.0	≐ 0.2	400
III	< 1.0	< 0.2	300



SECTION A-A



PLAN OF SPILLWAY



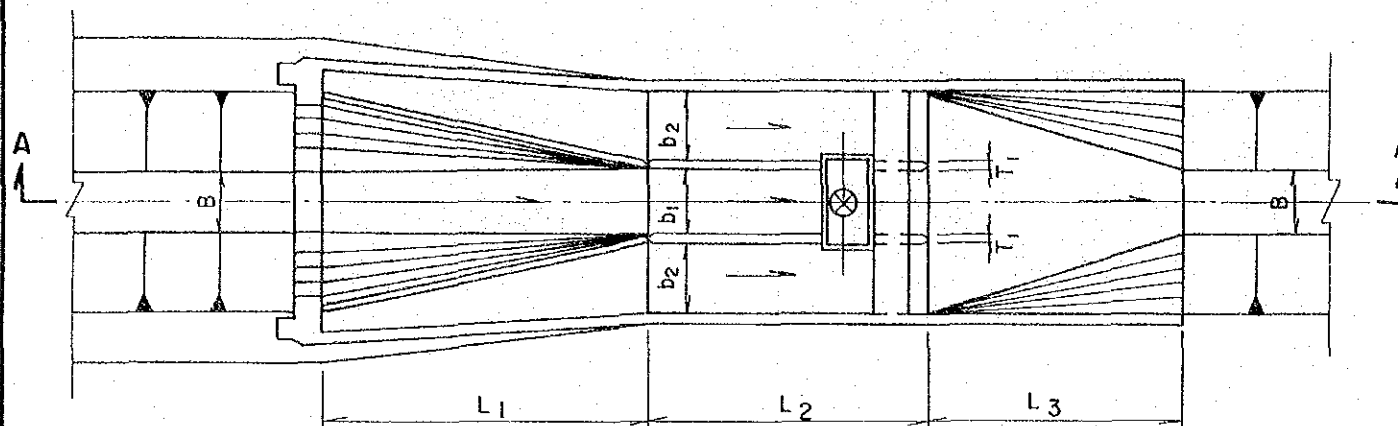
SECTION A-A

Note

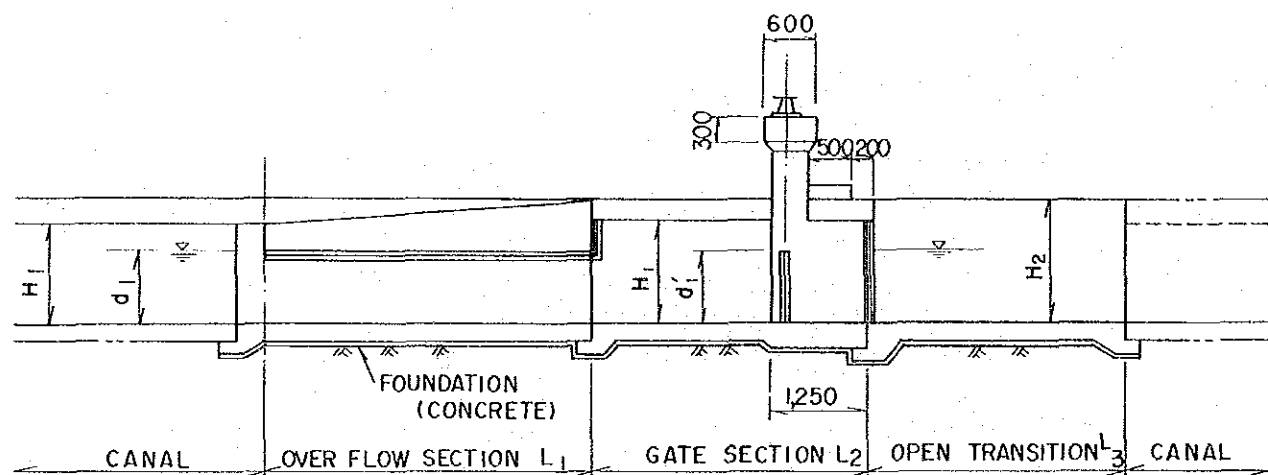
Each dimension shall be decided under consideration of canal size and discharge.

THE GOVERNMENT OF JAMAICA ST. ELIZABETH BLACK RIVER LOWER MORASS AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING TURNOUT AND SPILLWAY	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG. No. 9-1

TYPE I (MAIN CANAL)



PLAN

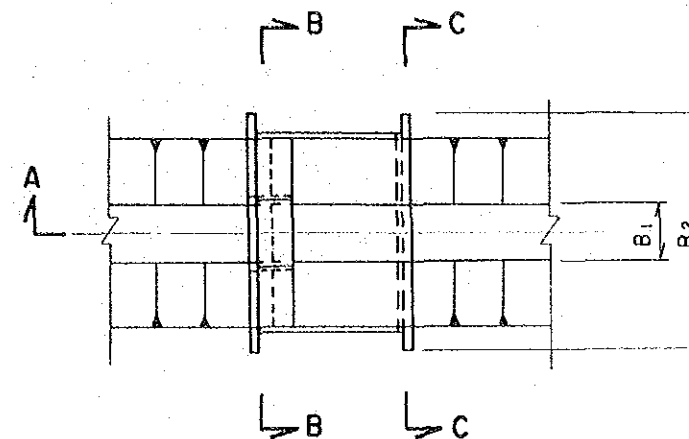


SECTION A-A

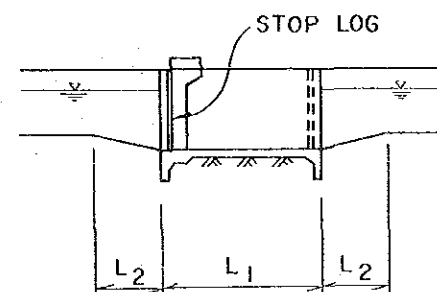
Note

Each dimension shall be decided under consideration of canal size and discharge.

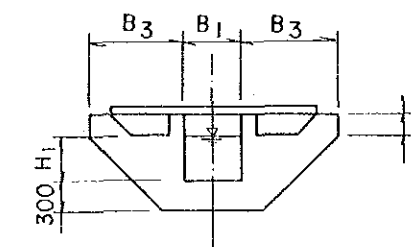
TYPE II (SECONDARY CANAL)



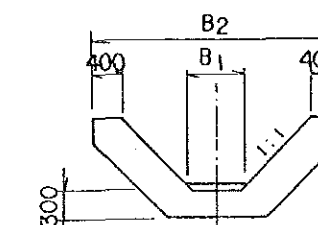
PLAN



SECTION A-A

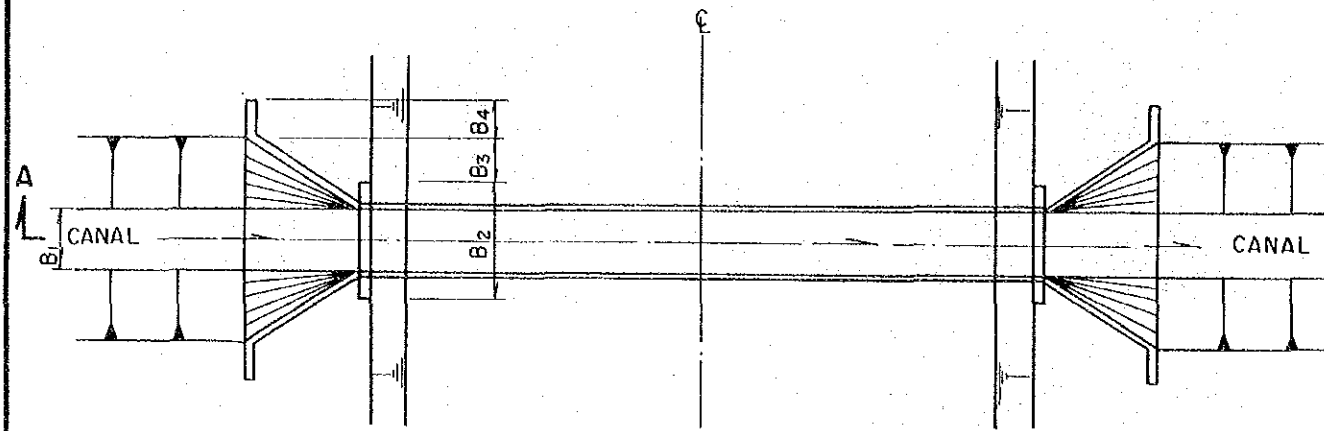


SECTION B-B

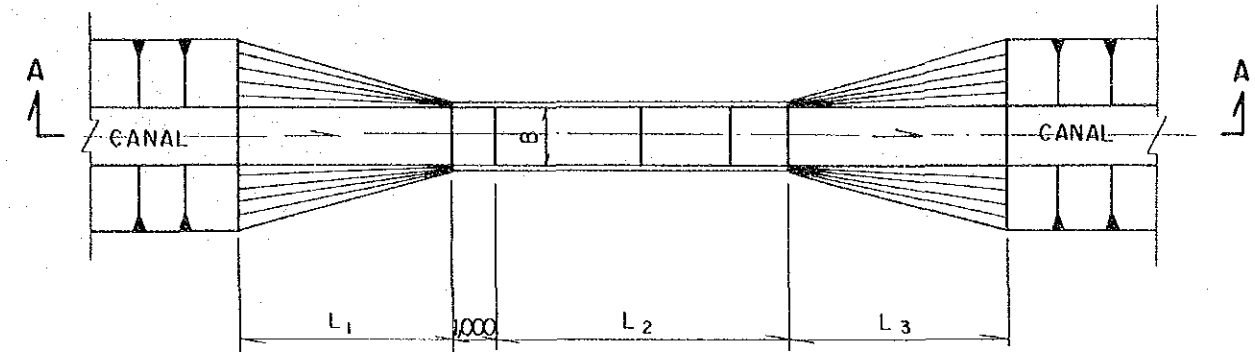


SECTION C-C

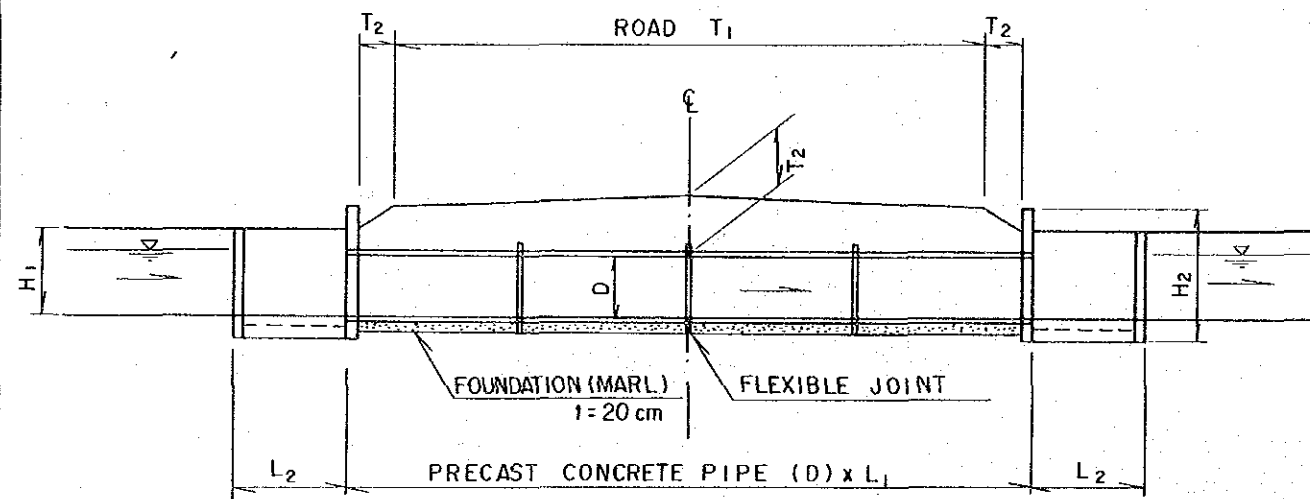
THE GOVERNMENT OF JAMAICA ST. ELIZABETH	
BLACK RIVER LOWER MORASS AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING CHECK GATE	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG.No. 9-2



PLAN OF CULVERT



PLAN OF DROP



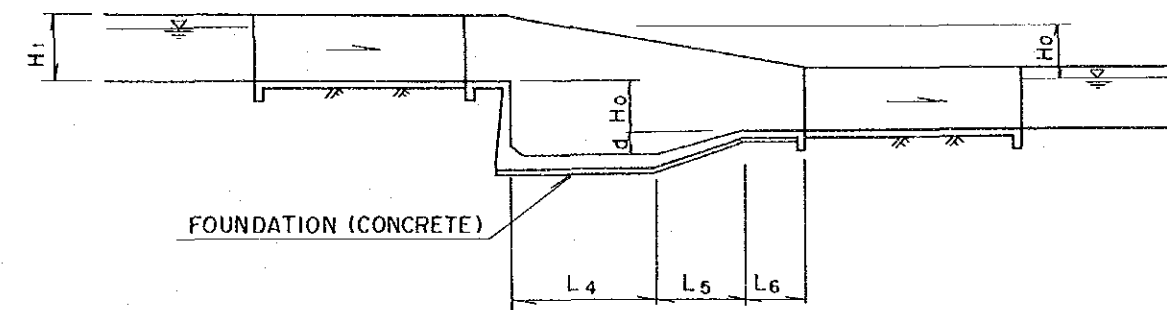
SECTION A-A

Note

Each dimension shall be decided under consideration of canal size, discharge and road width.

DIMENSION (mm)

	D	T ₁	T ₂	L ₁	L ₂	H ₂
TYPE I	1,200	8,000	500	9,000	1,800	2,500
TYPE II	600	8,000	500	9,000	1,000	1,800



SECTION A-A

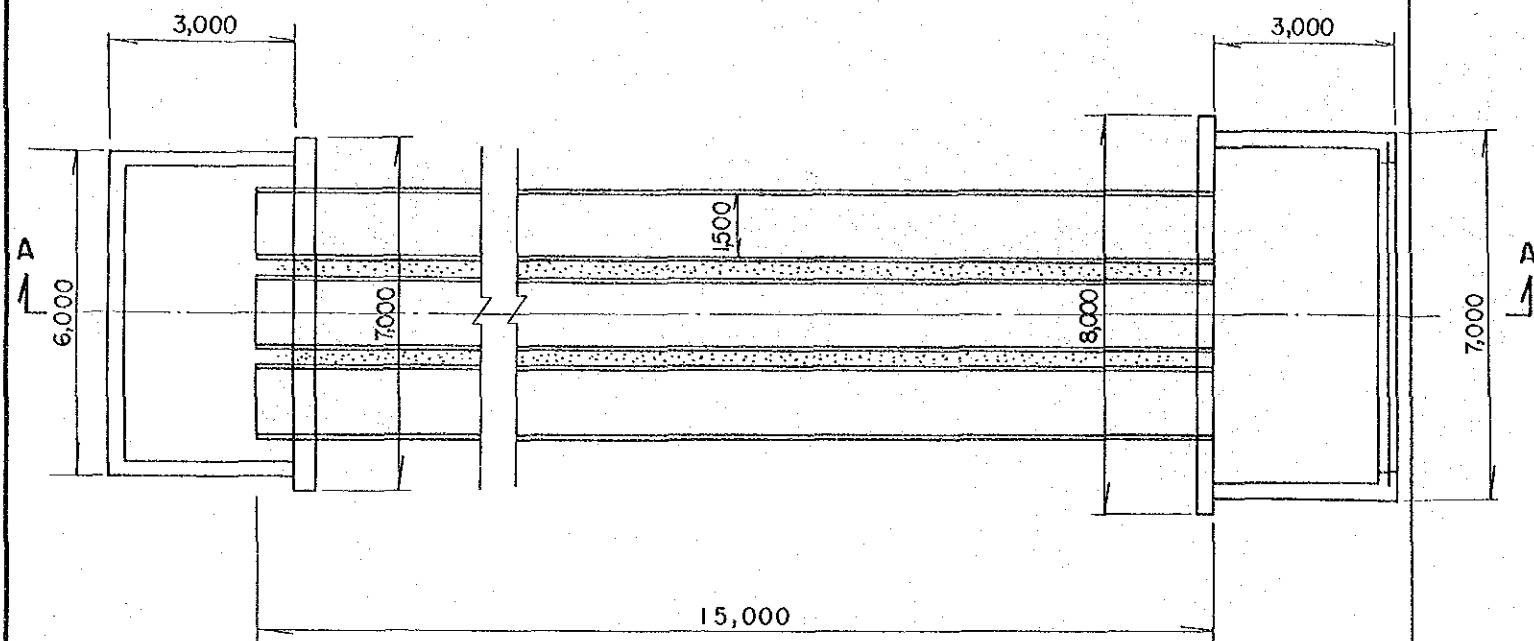
Note

Each dimension shall be decided under consideration of canal size, discharge and fall.

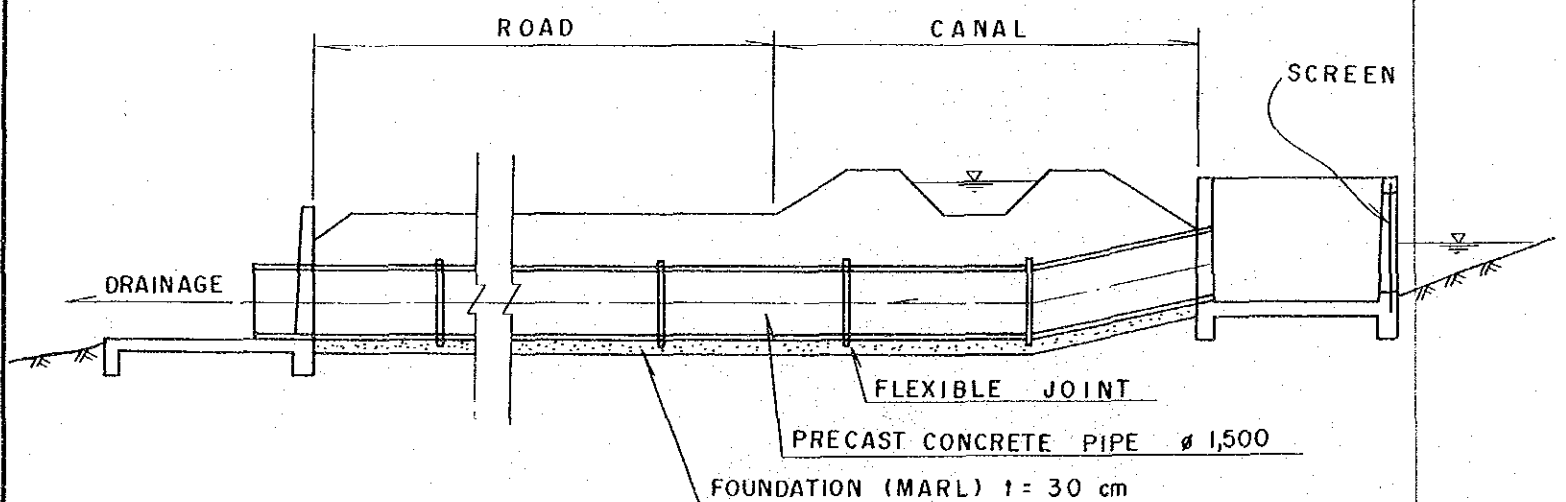
H₀ will be 1.0^m or 0.5^m

THE GOVERNMENT OF JAMAICA ST. ELIZABETH BLACK RIVER LOWER MORASS AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING CULVERT AND DROP	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG.No. 9-3

TYPE I



PLAN

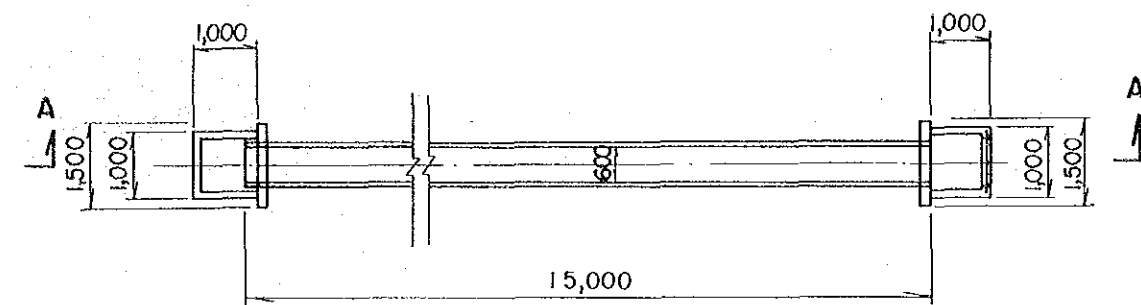


SECTION A-A

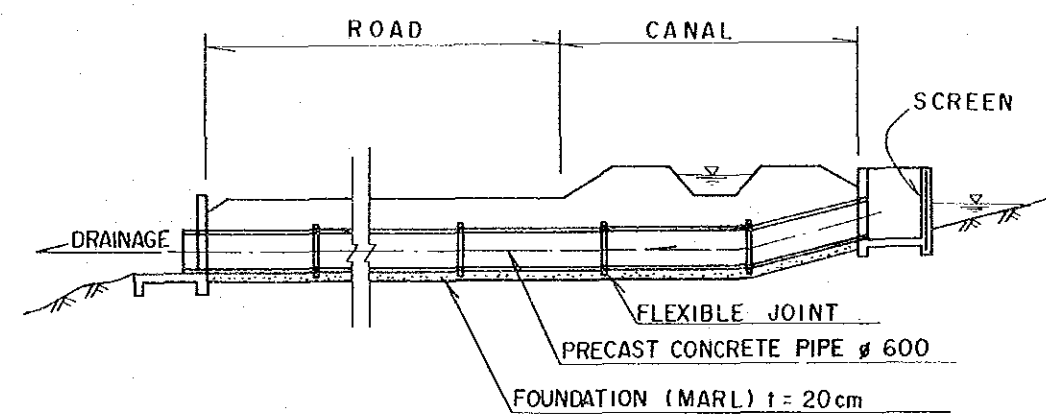
Note

Each dimension shall be examined by detailed design.

TYPE II



PLAN

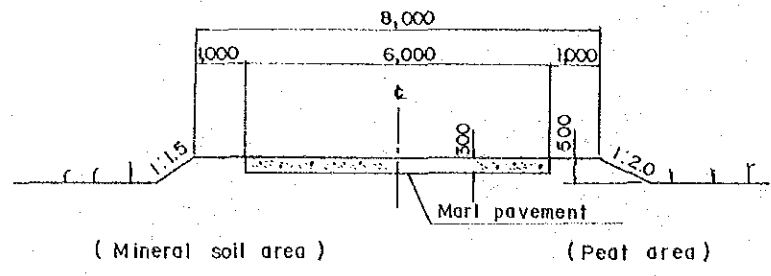


SECTION A-A

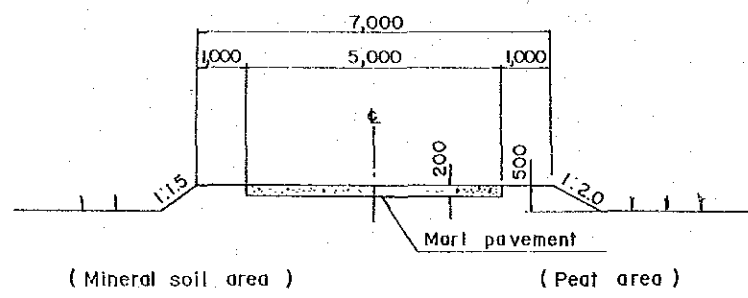
THE GOVERNMENT OF JAMAICA ST. ELIZABETH BLACK RIVER LOWER MORASS AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING <p style="text-align: center;">CROSS DRAIN</p>	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG. No. <p style="text-align: center;">9-4</p>

ROADS

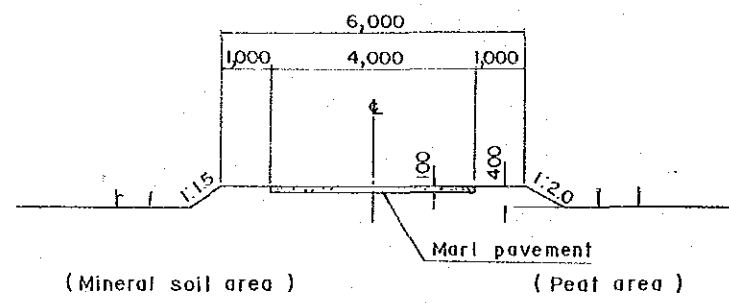
MAIN ROAD



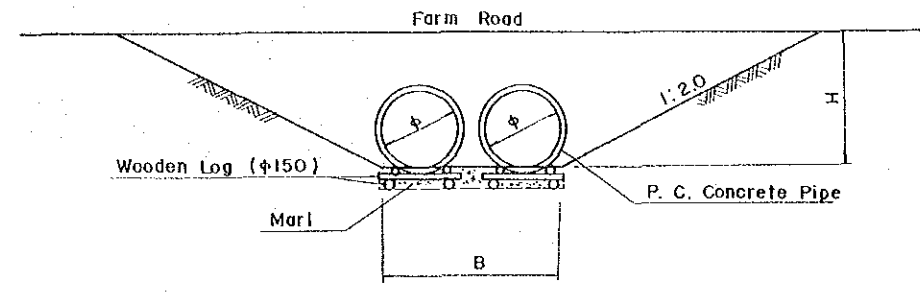
SECONDARY ROAD



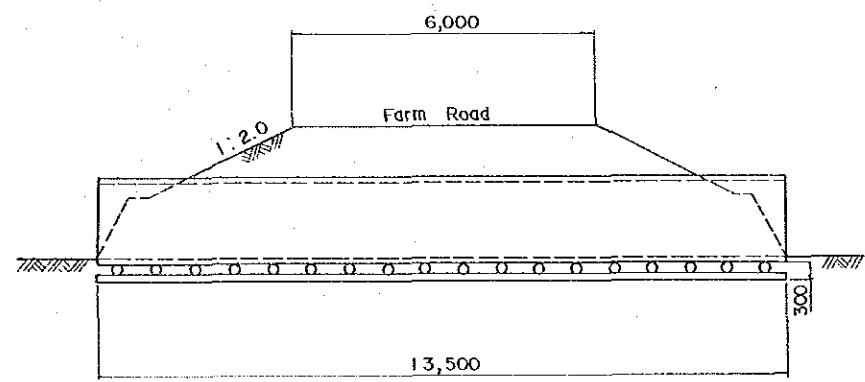
FARM ROAD



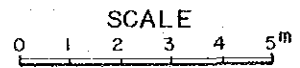
CULVERT FOR DRAINAGE CANAL



TYPICAL CROSS SECTION



TYPE	B	φ - n	H	Canal Bed Width
1	3.5 m	mm Line 1,500 - 2	2.6 m	3.0 to 3.5 m
2	2.0	1,200 - 2	2.6	1.5 to 2.0
3	0.5	1,200 - 1	2.4	0.5



THE GOVERNMENT OF JAMAICA
 ST. ELIZABETH
 BLACK RIVER LOWER MORASS
 AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
ROADS AND DRAINAGE CULVERT.

JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN DWG. NO. 10 - 1



LIE