

DESIGN REPORT
OF
PARALKOTE IRRIGATION CANAL SYSTEM SURVEY
PARALKOTE ZONE, DANDAKARANYA PROJECT
IN
INDIA

VOLUME III

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OVERSEAS TECHNICAL COOPERATION AGENCY
TOKYO, JAPAN

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DESIGN REPORT OF
PARALKOTE IRRIGATION CANAL SYSTEM SURVEY

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BILL OF QUANTITIES

No. 1

KINDS	UNIT	A-ROUTE	B-ROUTE	C-ROUTE	TOTAL	REMARKS
(1) EARTH WORK						
EXCAVATION(SAND)	m ³	23,569.2	40,207.2	173,793.7	237,569.1	
EXCAVATION(ROCK)	m ³	87.2			87.2	
EMBANKMENT	m ³	3,079.7	13,301.5	14,657.5	36,038.7	
BACKFILLING	m ³	5,136.2	17,366.2	46,777.3	69,279.7	
(2) CONCRETE WORK						
REINFORCED CONCRETE	m ³	858.63	1,274.74	1,323.86	3,457.23	
PLAIN CONCRETE	m ³	58.00	397.32	10.63	465.95	
FOUEMENT CONCRETE	m ³	1.64	4.98		6.62	
FORM	m ²	3,165.95	5,153.36	3,062.40	11,381.71	
REINFORCEMENT	kg	81,583.59	126,164.05	107,210.77	315,528.43	
(3) OTHERS						
WET MASONRY	m ³	9,883.68	10,957.70	3,789.52	29,535.90	
DRY STONE PITCHING	m ³	894.90	1,185.84	461.10	2,542.44	
BACK-FILL COBBLES	m ³	132.80	158.04	20.32	311.16	
WATER STOP	m	176.33	172.60	101.80	450.73	
ASPHALT	m ²	143	0.45	0.15	2.03	
FLASH BOARD	m ²	25.58	8.50	3.96	38.04	
BEARING	SET	42	12	16	70	
SAND	m ³	10.26	3.00	2.04	15.30	
SLUICE GATE	SET	1	7	1	9	H W 100 x 200
"	SET	2	2		4	900 x 1,000
"	SET	1			1	1,100 x 1,200
"	SET	4			4	1,900 x 2,000
"	SET		2		2	1,650 x 2,200

BILL OF QUANTITIES FOR A-ROUTE

No. 2

KINDS	UNIT	IRRIGATION	IRRIGATION	TRANSITION	LETLET	INLET	DRAINAGE	ESCAPE	BRIDGE	CHECK	TOTAL
		AQUEDUCT	SYPHON	STRUCTURE	STRUCTURE	STRUCTURE	CULVERT	STRUCTURE	STRUCTURE	GATE	
(1) EARTH WORK											
EXCAVATION (SAND)	m ³	5735.3	1033.2	486.1	351.2	5312.2	9673.2	822.9	43.2	51.9	23509.2
EXCAVATION (ROCK)	m ³			87.3							87.2
EMBANKMENT	m ³	841.2	672.0	481.8					1048.9	35.8	3079.7
BACKFILLING	m ³	737.4	353.7	88.1	198.7		3625.0	116.7	9.3	7.3	5136.2
(2) CONCRETE WORK											
REINFORCED CONCRETE	m ³	296.87	41.71		21.63		433.71		22.22	41.86	858.63
PLAIN CONCRETE	m ³	58.00									58.00
PAVEMENT CONCRETE	m ³								1.64		1.64
FORM	m ²	1368.36	100.58		106.42		1391.60		48.76	150.23	3165.95
REINFORCEMENT	kg	27411.02	3151.29		2897.54		40459.26		2156.88	2307.90	81583.59
(3) OTHERS											
WET MASONRY	m ³	1019.79	538.80	434.13	133.64	5378.41	3746.15	561.88	25.20		9888.68
DRY STONE PITCHING	m ³		60.00			300.00	534.90				894.90
BACK-FILL COBBLE	m ³	132.80									132.80
WATER STOP	m	97.90	78.43								176.33
ASPHALT	m ³	1.43									1.43
FLASH BOARD	m ²	3.54	3.00					19.64			25.58
BEARING	SET	42-									42
SAND	m ³							10.26			10.26
SLUICE GATE (600x200)	SET				1-						1
(900x1000)					2-						2
(1100x1200)					1-						1
(1700x2000)									4-		4

BILL OF QUANTITIES FOR B-ROUTE

No. 3

KINDS	UNIT	IRRIGATION	IRRIGATION	IRRIGATION	CUTLET	INLET	DRAINAGE	ESCAPE	SPILLWAY	BRIDGE	TOTAL
		AQUEDUCT	SYPHON	CULVERT	STRUCTURE	STRUCTURE	CULVERT	STRUCTURE	STRUCTURE	STRUCTURE	
(1) EARTH WORK											
EXCAVATION (SAND)	m ³	835.9	1,733.9	1,713.3	1,507.8	213.9	12,075.0	281.8	280.1	723.5	10,807.2
EMBANKMENT	m ³	2,025.1	1,747	34.5	740	3,341.6			4,024.5	3,577.1	13,301.5
BACKFILLING	m ³	303.2	1,103.3	5,756.6	849.7		8,914.1	37.6		401.7	17,366.2
(2) CONCRETE WORK											
REINFORCED CONCRETE	m ³	149.66	25.50	3,84.80	76.52		620.85			57.41	1,274.74
PLAIN CONCRETE	m ³	17.00							380.32		397.32
PAVEMENT CONCRETE	m ³									4.98	4.98
FORM	m ²	537.51	68.66	743.92	340.03		1,991.89		1,331.17	137.84	5,153.36
REINFORCEMENT	Kg	7,416.58	2,782.30	31,463.25	1,539.70		7,4015.97			3,946.25	126,164.05
(3) OTHERS											
WET MASONRY	m ³	800.21	493.05	1,969.78	597.36	398.90	5,614.53	169.27	214.61	400.09	10,857.70
DRY STONE PITCHING	m ³		6.00			164.63	845.70		169.50		1,185.84
BACK-FILL COBBLE	m ³	158.04									158.04
WATER STOP	m	43.60	129.60								173.20
ASPHALT	m ³	0.45									0.45
FLASH BOARD	m ²	1.70	1.30					5.60			8.60
BEAKING	SET	12-									12
SAND	m ³							3.00			3.00
SLUICE GATE (600-700)	SET				7-						7
(1900-1000)	SET				2-						2
(1600-2200)	SET				2-						2

BILL OF QUANTITIES FOR E-ROUTE

No. 4

KINDS	UNIT	IRRIGATION	IRRIGATION	IRRIGATION	OUTLET	INLET	DRAINAGE	ESCAPE	TAIL	TOTAL	REMARKS
		AQUEDUCT	SYPHON	CULVERT	STRUCTURE	STRUCTURE	CULVERT	STRUCTURE	ESCAPE		
(1) EARTH WORK											
EXCAVATION (SAND)	m ³	1,323.0			72.4	866.7	1624.0	299.4	(16861.9) 71.3	11395.7	
EMBANKMENT	m ³	15.9				1844.7			(1745.3) 11.6	19657.5	
BACKFILLING	m ³	126.7			42.0		837.8	48.1	(55705.9) 16.4	46777.3	
(2) CONCRETE WORK											
REINFORCED CONCRETE	m ³	67.24	15.30	1,208.66	4.37		28.29			1323.86	
PLAIN CONCRETE	m ³	10.63								10.63	
FORM	m ²	440.71	41.04	2,460.57	20.63		106.05			3068.40	
REINFORCEMENT	Kg	4,717.48	1,669.30	92,823.76	444.64		31,355.53			107,840.71	
(3) OTHERS											
WET MASONRY	m ³	144.89	123.41	6,975.93	50.20	600.64	631.60	230.68	52.17	8789.52	
DRY STONE PITCHING	m ³		1.50			371.00	139.20			461.70	
BACK-FILL COBBLE	m ³	20.32								20.32	
WATER STOP	m	27.00	74.80							101.80	
ASPHALT	m ³	0.15								0.15	
FLASH BOARD	m ³							3.96		3.96	
BEARING	SET	16								16	
SAND	m ³							2.04		2.04	
SLUICE GATE (600x700)	SET				1					1	

IRRIGATION ASPECTS FOR A ROUTE

NO. 5

KINDS	UNIT	NO. 1	NO. 2	TOTAL	REMARKS
(1) EARTH WORK					
EXCAVATION	m ³	3442.9	2292.4	5735.3	
EMBANKMENT	m ³	105.9	725.3	831.2	
BACKFILLING	m ³	560.6	176.8	737.4	
(2) CONCRETE WORK					
REINFORCED CONCRETE	m ³	149.04	127.85	276.89	
PLAIN CONCRETE	m ³	32.39	25.61	58.00	
FORMS	m ²	280.93	187.43	468.36	
REINFORCEMENT	kg	15621.52	11785.50	27407.02	
OTHERS					
NET MASONRY	m ³	569.62	450.17	1019.79	
BACK-FILL CORREL	m ³	64.78	68.02	132.80	
WATER STOP	m	53.40	44.50	97.90	
ASPHALT	m ²	0.78	0.65	1.43	
BEARING	SET	24	18	42	
FLASH BOARD	m ²	177	177	354	

IRRIGATION AQUEDUCT FOR B ROUTE

No. 6

KINDS	UNIT	NO. 3	TOTAL	REMARKS
UNDEREARTH WORK				
EXCAVATION	m ³	835.9	835.9	
EEMBANKMENT	m ³	2025.1	2025.1	
BACKFILLING	m ³	303.2	303.2	
(A) CONCRETE WORK				
REINFORCED CONCRETE	m ³	109.66	109.66	
PLAIN CONCRETE	m ³	17.00	17.00	
FORM	m ²	537.51	537.51	
REINFORCEMENT	kg	2416.58	7416.58	
(B) OTHERS				
NET MASONRY	m ³	800.21	800.21	
BACK-FILL CORBLE	m ³	158.04	158.04	
WATER STOP	m ¹	43.00	43.00	
ASPHALT	m ³	0.44	0.44	
BEARING	SET	12.5	12.5	
FLASH BOARD	m ³	1.70	1.70	

IRRIGATION AQUEDUCT FOR C ROUTE

KINDS	UNIT	NO. 4	TOTAL	REMARKS
(A) EARTH WORK				
EXCAVATION	m ³	1383.0	1383.0	
EMBANKMENT	m ³	15.9	15.9	
BACKFILLING	m ³	128.7	128.7	
(B) CONCRETE WORK				
REINFORCED CONCRETE	m ³	67.24	67.24	
PLAIN CONCRETE	m ³	10.63	10.63	
FORM	m ²	440.71	440.71	
REINFORCEMENT	kg	4717.48	4717.48	
(C) OTHERS				
NET MASONRY	m ³	144.89	144.89	
BACK-FILL CORBLE	m ³	20.32	20.32	
WATER STOP	m	27.00	27.00	
ASPHALT	m ²	0.15	0.15	
BEARING	SET	16.7	16.7	

Table 2 Concrete, form & Others.
IRRIGATION AQUEDUCT

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>EARTH WORK</u>					
Excavation				342.27 ^{m³}	
Embankment				105.9 ^{m³}	
Backfilling				560.6 ^{m³}	
<u>CONCRETE WORK</u>					
Reinforced Concrete	$4.20 + 41.21 \times 4$			159.04 ^{m³}	
Plain Concrete	$5.81 \times 3 + 7.69 + 7.27$			32.39 ^{m³}	
Form	$22.01 + 175.58 \times 4 + 7.48 \times 3 + 17.65 + 16.53$			780.93 ^{m²}	
Reinforcement				15125.52 ^{m²}	
<u>OTHER WORK</u>					
Water Masonry	$96.56 \times 2 + 60.13 \times 3 + 29.92 + 27.85 + 55.92 \times 2$			589.62 ^{m³}	
Rock-fel Cobble	32.39×2			64.78 ^{m³}	
Water Stop	8.90×6			53.40 ^m	b=150
Asphalt	0.13×6			0.78 ^{m³}	
Bearing	6×4			24 ^{m²}	
Flash Board				1.77 ^{m³}	

No 2 Table 2 Concrete, form & Others.
IRRIGATION AQUEDUCT

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>EARTH WORK</u>					
Excavation				227.9	
Embankment				735.3	
Backfilling				176.8	
<u>CONCRETE WORK</u>					
Reinforced Concrete	$1.20 + 41.21 \times 3$			127.83	
Plain Concrete	$5.55 \times 2 + 7.32 + 7.19$			25.61	
Form	$22.01 + 175.58 \times 3 + 7.46 \times 2 + 17.16 + 16.60$			527.43	
Reinforcement				11,788.50	
<u>OTHER WORK</u>					
Wet Masonry	$76.56 \times 2 + 35.23 \times 2 + 15.53 + 15.54 + 71.76 \times 2$			450.17	
Back-fill cobble	34.01×2			68.02	
Water stop	8.90×5			44.50	
Asphalt	0.13×5			0.65	
Bearing	1.6×3			4.8	
Black Board				1.79	

EARTH WORK No. 1 Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
Excavation	$\frac{1}{2}(10.8 + 50.0) \times 15.00 \times 2$			912.0	
	$\frac{1}{2}(71.2 + 97.7) \times 3.00 \times 2$			506.7	
	$97.7 \times 2.00 \times 2$			390.8	
	$\frac{1}{2}(97.7 + 71.5) \times 1.00 \times 2$			169.5	
	$\frac{1}{2}(85.5 + 76.7) \times 1.00 \times 2$			162.2	
	$\frac{1}{2}(76.7 + 86.5) \times 1.00 \times 2$			163.2	
	$\frac{1}{2} \times 86.5 \times 11.00 \times 2$			951.5	
	$\frac{1}{2} \times 13.0 \times 5.80 \times 6$			31.2	
	$13.0 \times 4.00 \times 3$			156.0	
		Total			3812.9
Embankment	$\frac{1}{2} \times 6.5 \times 15.00 \times 2$			97.5	
	$\frac{1}{2} \times 2.1 \times 2.00 \times 2$			8.4	
	Total			105.9	
Backfilling	$\frac{1}{2}(5.2 + 1.3) \times 15.00 \times 2$			97.5	
	$\frac{1}{2}(7.7 + 43.2) \times 3.00 \times 2$			153.0	
	$43.2 \times 2.00 \times 2$			172.8	
	$\frac{1}{2}(2.2 + 25.2) \times 1.00 \times 2$			26.6	
	$\frac{1}{2}(3.8 + 4.1) \times 1.00 \times 2$			2.1	
	$\frac{1}{2} \times 4.8 \times 1.00 \times 2$			4.8	
	$\frac{1}{2} \times 2.9 \times 4.80 \times 6$			7.0	
	$2.9 \times 2.00 \times 3$			34.2	
	Total			560.6	

EARTH WORK
No 2

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks	
				(m ³)		
				(m ³)		
Excavation	$\frac{1}{2}(22.7+34.7) \times 15.00 \times 2$			091.0		
	$\frac{1}{2}(34.7+54.6) \times 8.5 \times 2$			281.1		
	$38.6 \times 1.20 \times 2$			215.0		
	$\frac{1}{2}(89.6+82.4) \times 1.10 \times 2$			189.2		
	$82.4 \times 0.80 \times 2$			82.4		
	$\frac{1}{2}(72.4+57.3) \times 1.00 \times 2$			139.7		
	$\frac{1}{2} \times 57.3 \times 8.00 \times 2$			258.0		
	$\frac{1}{2} \times 6.0 \times 3 \times 4$			3.6		
	$6.0 \times 6.0 \times 2$			72.0		
		Total			2292.4	
Embankment	$\frac{1}{2}(7.2+30.6) \times 15.00 \times 2$			567.0		
	$\frac{1}{2}(30.6+28.6) \times 2.80 \times 2$			165.2		
	$1.30 \times 1.20 \times 2$			3.1		
		Total			735.3	
Backfilling	$\frac{1}{2} \times 2.2 \times 15.00 \times 2$			33.0		
	$\frac{1}{2} \times 13.9 \times 2.80 \times 2$			37.5		
	$37.4 \times 0.80 \times 2$			13.4		
	$1.2 \times 0.70 \times 2$			1.8		
	$\frac{1}{2}(9.7+1.3) \times 1.40 \times 2$			29.2		
	$15.2 \times 1.50 \times 2$			15.2		
	$\frac{1}{2}(11.2+3.4) \times 1.70 \times 2$			29.0		
	$\frac{1}{2}(5.6+4.2) \times 1.80 \times 2$			19.2		
		Total			276.0	

OPEN TRANSITION Table 2 Concrete, form & Others.
No. 1. 2

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ²)	
	E				
	SECTION (1)		SECTION (2)		
Net Masonry	SECTION (1)				
	1.30 x 0.30 x 7	=	0.78		A
	1.30 x 5.00 x 2	=	3.00		B
	$\frac{1}{2} \times 0.90 \times 0.597 \times 2$	=	0.54		C
	$\frac{1}{2} \times 1.30 \times 0.72 \times 2$	=	0.72		D
	$\frac{1}{2} \times \sqrt{2} (1.80 + 0.90) \times 0.30 \times 2$	=	1.36		F
	sub total	=	5.90		
	SECTION (2)				
	1.30 x 0.30 x 2	=	0.78		F
	0.30 x 2.50 x 2	=	1.50		G
	$\frac{1}{2} (0.30 + 0.90) \times 2.00 \times 2$	=	2.40		H
	sub total	=	4.68		
	$\frac{1}{2} ((1) + (2)) \times 1.80 = \frac{1}{2} (5.90 + 4.68) \times 1.80$			95.72	
	$\frac{1}{2} (4.00 + 2.40) \times 0.40 \times 1.80$			1.84	I
	total			96.56	

FLASH BOARD CHANNEL PORTION Table 2 Concrete, form & Others.
No. 1. / No. 2.

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	400 2700 600 2200 400				
Reinforced Concrete	$0.40 \times 5.80 \times 0.98$			2.27	A
	$(3.10 \times 0.30^2 + 0.38 \times 0.60 - 0.2 \times 0.2 \times 2) \times 1.70$			0.73	B
	$(0.98 \times 0.40 - 0.20 \times 0.20) \times 1.70 \times 2$			1.30	
	total			4.30	
Forms	$0.40 \times 5.80 \times 2$			4.64	A
	$0.60 \times 0.98 \times 2$			0.78	
	$2 \times 3.10 \times 0.3 \times 1.70$			3.20	B
	$0.07 \times 1.70 \times 4$			0.61	
	$1.70 \times 1.70 \times 6$			2.04	
	$0.98 \times 1.70 \times 4$			2.66	C
	$1.20 \times 1.70 \times 4$			2.72	
	$0.20 \times 1.70 \times 4$			1.36	
	total			22.01	
Flash Board	$0.20 \times 7.0 \times 2.6 \times 2$			1.77	
Water Stop	$1.60 \times 2 + 1.50$			5.90	B=ND
Asphalt	$0.025 \times 0.30 \times 1.70 \times 2$			0.02	
	$0.02 \times 0.30 \times 1.70$			0.11	
	total			0.13	

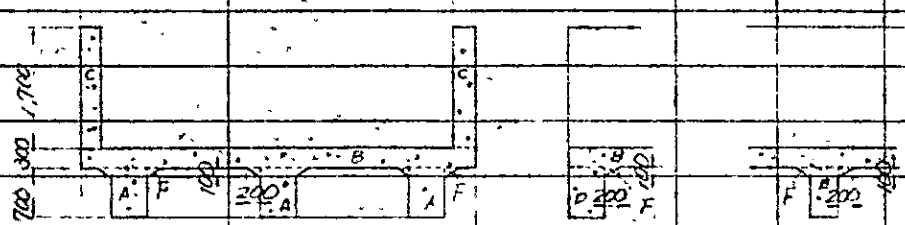
SUPER STRUCTURE Table 2. Concrete, form & Others.					
No. 1/102					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
	360 5,000 300				
					
	450 500 1,600 500 1,600 500 450 500		400		
Reinforced Concrete	$0.50 \times 0.70 \times 9.98 \times 3$ $0.30 \times 5.60 \times 9.98$ $0.30 \times 1.70 \times 9.98 \times 2$ $0.50 \times 0.70 \times 1.60 \times 2 \times 2$ $0.40 \times 0.70 \times 1.60 \times 2$ $\frac{1}{2} \times 0.20 \times 0.10 \times (9.98 \times 2 + 4.09 \times 8 + 1.50 \times 8)$			12.48 16.77 10.18 2.24 0.90 0.64	A B C D E F
	Total			41.21	
Formwork	$0.50 \times 9.98 \times 3$ $0.60 \times 9.98 \times 2$ $0.60 \times 3.89 \times 8$ $0.50 \times 0.70 \times 3$ $0.30 \times 9.98 \times 2$ $0.25 \times 9.98 \times 2$ $1.20 \times 3.89 \times 4$ 0.60×0.30 $1.70 \times 2.70 \times 4$ $0.70 \times 0.30 \times 2$ $0.50 \times 0.60 \times 2$			14.97 11.98 10.67 1.05 5.99 4.99 18.67 1.60 17.86 1.02 0.20	A B C D

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	1.40 x 0.70 x 2			2.24	D
	1.60 x 0.60 x 4			3.84	"
	0.40 x 1.60 x 2			1.28	E
	0.60 x 1.60 x 4			3.84	"
	1.15 (9.98 x 2 + 1.09 x 8 + 1.40 x 8)			14.28	F
	1/2 x 0.20 x 0.10 x 2			0.02	"
	<i>total</i>			175.58	
1" steel Strip	1.20 x 2 + 5.30			8.90	b=150
Bearing				set 6	
Asphalt	0.02 x 0.30 x 1.70			0.01	
	0.02 x 1.00 x 5.60			0.11	
	<i>total</i>			0.13	

PIER No.1 Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
			5,600	900	
Plain Concrete	$\frac{1}{2}(1.60 \times 5.60 + 1.80 \times 5.72) \times 0.50$ $0.50 \times 0.50 \times 4.00$			4.81 1.00	A B
	Total			5.81	
Form	$\frac{1}{2}(1.60 + 1.80) \times \sqrt{1.5^2 + 2.0^2} \times 2$ $\frac{1}{2}(5.60 + 5.72) \times \sqrt{0.5^2 + 1^2} \times 2$			1.71 5.77	A
	Total			7.48	
Wet Masonry	$\frac{1}{2}(1.80 \times 5.72 + 2.00 \times 5.82) \times 0.50 - 0.50 \times 0.50 \times 4.00$ $\frac{1}{2}(2.00 \times 5.82 + 3.00 \times 6.40) \times 0.50$			4.48 39.55	C D
	$4.00 \times 1.60 \times 6.40$			25.60	E
	Total			65.63	

PIER No 2 Table 2 Concrete, form & Others

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
	400 500 1600 500 400 200		5,600	300	
	plain concrete		plain concrete		
Plain Concrete	$\frac{1}{2}(1.60 \times 5.60 + 1.80 \times 5.68) \times 3.00$			4.80	A
	$0.50 \times 0.50 \times 3.00$			0.75	B
	Total			5.55	
Form	$\frac{1}{2}(5.60 + 5.18) \times \sqrt{0.5^2 + 0.1^2} \times 2$			5.75	A
	$\frac{1}{2}(1.60 + 1.80) \times \sqrt{0.5^2 + 2.00^2} \times 2$			1.71	
	Total			7.46	
Wet Masonry	$\frac{1}{2}(1.80 \times 5.68 + 2.00 \times 5.76) \times 0.5 - 0.50 \times 0.50 \times 3.00$			2.69	F
	$\frac{1}{2}(2.00 \times 5.76 + 2.60 \times 6.00) \times 1.50$			20.34	D
	$3.40 \times 0.50 \times 6.00$			10.20	E
	Total			35.23	

ABUTMENT No 1-(1) Table 2 Concrete, form & Others					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
	500 600 1000 200		5.500		
	Plain concrete				
Plain concrete	$\frac{1}{2}(0.50 + 0.55) \times 0.80 \times 5.80$ $\frac{1}{2}(1.35 + 1.38) \times 0.50 \times 5.80$ $0.50 \times 0.50 \times 4.00$			2.44 4.25 1.00 7.69	A B C
	Total			7.69	
Form	$\frac{1}{2}(0.50 + 0.55) \times 0.80 \times 2$ 0.80×5.80 $\sqrt{0.80^2 + 0.05^2} \times 5.80$ $\frac{1}{2}(1.35 + 1.38) \times 0.50 \times 2$ $\sqrt{0.50^2 + 0.03^2} \times 5.80$ $\sqrt{0.50^2 + 0.20^2} \times 5.80$			0.81 4.64 4.65 1.07 2.91 4.12 17.63	A
	Total			17.63	
Water Masonry	$\frac{1}{2}(0.50 \times 0.50) \times 0.50 \times 5.80$ $\frac{1}{2}(1.35 + 1.38) \times 0.50 \times 5.80$ $0.50 \times 0.50 \times 5.80$			0.92 18.95 7.55 29.92	D E F
	Total			29.92	

ABUTMENT No. 1 (2) Table 2 Concrete, form & Others

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
		500	4.600	500	
Plain Concrete	$\frac{1}{2}(0.50 + 0.55) \times 0.90 \times 4.60$ $\frac{1}{2}(1.35 + 1.58) \times 0.50 \times 5.60$ $0.50 \times 0.50 \times 4.00$	m ³		2.17	A
				4.10	B
				1.00	C
	Total			7.27	
Form	$\frac{1}{2}(0.50 + 0.55) \times 0.90 \times 2$ 0.90×4.60 $\sqrt{0.90^2 + 0.55^2} \times 4.60$ $\frac{1}{2}(1.35 + 1.58) \times 0.50 \times 2$ $\sqrt{0.50^2 + 0.50^2} \times 5.60$ $\sqrt{0.50^2 + 0.20^2} \times 5.60$	m ²		0.95	A
				4.14	
				4.15	
				1.47	B
				2.80	
				3.02	
	Total			16.50	
Wet Masonry	$\frac{1}{2}(1.58 + 1.81) \times 0.50 \times 5.60 - 0.50 \times 0.50 \times 4.00$ $\frac{1}{2}(1.81 + 1.50) \times 1.50 \times 5.60$ $2.50 \times 0.50 \times 5.60$	m ³		3.75	D
				18.10	E
				7.00	F
	Total			28.85	

ABUTMENT No 2 (1)		Table 2 Concrete, form & Others.				
Kinds	Calculated Process	Unit	Numbers	Total	Remarks	
				(m ³)		
				(m ²)		
			5,600			
Plan Concrete	$\frac{1}{2}(0.50 + 0.57) \times 0.80 \times 5.60$ $\frac{1}{2}(1.37 + 1.61) \times 0.50 \times 5.60$ $0.50 \times 0.50 \times 3.00$			2.80 4.17 0.75	A B C	
	Total			7.32		
Form	$5.60 \times \sqrt{0.80^2 + 0.07^2}$ 0.80×5.60 $\frac{1}{2}(0.50 + 0.57) \times 0.80 \times 2$ $5.60 \times \sqrt{0.50^2 + 0.07^2}$ $5.60 \times \sqrt{0.50^2 + 0.20^2}$ $\frac{1}{2}(1.37 + 1.61) \times 0.50 \times 2$			3.50 4.48 0.86 2.81 3.02 1.49	A " " B " "	
	Total			17.16		
Wet Mass	$\frac{1}{2}(1.61 + 1.37) \times 0.50 \times 5.60 - 0.50 \times 0.50 \times 3.00$ $\frac{1}{2}(0.86 + 0.70) \times 0.50 \times 5.60$ $2.10 \times 0.50 \times 5.60$			4.11 5.32 5.88	B E F	
	Total			15.31		

ABUTMENT No. 2 (2) Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
			4,600	500	
	Plain concrete				
	$\frac{1}{2}(1.50 + 0.58) \times 0.90 \times 4.60$ $\frac{1}{2}(1.38 + 1.62) \times 0.50 \times 5.60$ $0.50 \times 0.50 \times 3.00$			7.19	
	Wet masonry				
	$\frac{1}{2}(1.50 + 0.58) \times 0.90 \times 4.60$ 1.90×4.150 $\frac{1}{2}(1.50 + 0.58) \times 0.90 \times 2$ $5.60 \sqrt{0.50^2 + 1.04^2}$ $5.60(0.50^2 + 1.20^2)$ $\frac{1}{2}(1.38 + 1.12) \times 1.50 \times 2$			16.60	
	Form				
	$\frac{1}{2}(1.12 + 1.36) \times 1.50 \times 5.60 - 1.50 \times 1.50 \times 3.00$ $\frac{1}{2}(1.36 + 2.10) \times 0.50 \times 5.60$ $1.50 \times 2.10 \times 5.60$			25.54	

THEATHING PORTION Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
			5.700		
Net Masonry	$\frac{1}{2} \times \sqrt{5} (1.50 + 1.65) \times 1.30 \times \frac{1}{2} (1.50 + 0.70) \times 2$ $1.00 \times 0.30 \times 15.00$	m ³		6.66	A, B
	$\frac{1}{2} \times \sqrt{5} (1.35 + 1.00) \times 0.30 \times \frac{1}{2} (15.00 + 20.40)$	m ³		13.95	C
	$\frac{1}{2} \times \sqrt{5} (1.00 + 1.36) \times 0.30 \times 20.40$	m ³		12.04	D
	$\frac{1}{2} \times \sqrt{2} (3.00 + 2.88) \times 0.3 \times \frac{1}{2} (1.00 + 2.50) \times 2$	m ³		4.37	G
	$\frac{1}{2} \times \sqrt{2} (2.70 + 2.62) \times 0.3 \times \frac{1}{2} (2.50 + 4.80) \times 2$	m ³		9.37	H
	$\frac{1}{2} \times (1.00 + 1.08) \times 0.30 \times 4.80 \times 2$	m ³		4.99	I
	$1.00 \times 0.30 \times 1.12 \times 1.00 \times 2$	m ³		0.67	J
	total			5.692	
Back-fill rubble	$\frac{1}{2} (0.30 \times 2.50) \times 3.34 \times \frac{1}{2} (1.60 + 0.70) \times 2$ $\frac{1}{2} (0.30 \times 1.50) \times 3.34 \times \frac{1}{2} (15.00 + 20.40)$	m ³		8.92	E, F
	total			32.39	

THEATING PORTION Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
			9,400		
Wet Masonry	$\frac{1}{2} \times (1.50 + 1.65) \times 1.30 \times 2$ $1.00 \times 1.30 \times 2$ $\frac{1}{2} \times (0.85 + 1.50) \times 1.30 \times 2$ $\frac{1}{2} \times (1.00 + 1.30) \times 1.50 \times 2$ $\frac{1}{2} \times (6.00 + 5.13) \times 1.30 \times 2$ $\frac{1}{2} \times (3.40 + 2.57) \times 1.30 \times 2$ $\frac{1}{2} \times (2.00 + 1.91) \times 0.50 \times 2$ $\frac{1}{2} \times 0.30 \times 0.19 \times 1.00 \times 2$			9.09 6.12 10.69 15.81 13.65 10.23 4.11 0.06	A B C D E F G H I J
	Total			70.96	
Back-fill Cobble	$\frac{1}{2} \times (1.30 + 1.50) \times 1.30 \times 2$ $\frac{1}{2} \times (0.85 + 1.50) \times 1.30 \times 2$			11.35 22.66	E F
	Total			34.01	

No. 1 IRRIGATION AQUEDUCT		Table 3		Reinforcement						
Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ24	9.86	0.92	0.96	11.74	3.853	45.23	30×4	5427.60	
2	"	6.00	0.92	0.96	7.88	"	36.36	15×4	1821.60	
3	Φ13	2.12	0.24		2.36	1.042	2.46	54×4	531.36	
4	Φ16	2.12	0.30		2.42	1.578	3.82	60×4	916.80	
5	Φ13	9.12	0.48	0.52	10.12	1.042	10.55	34×4	1,434.80	
6	"	5.48	0.24		5.72	"	5.96	34×4	810.56	
7	"	9.86	0.48	0.52	10.86	"	11.32	38×4	1,720.64	
8	"	1.88	0.24		2.12	"	2.21	68×4	661.12	
9	Φ9	9.86	0.32	0.36	10.54	0.499	5.26	24×4	504.96	
10	Φ24	4.58	0.46		5.04	3.853	19.42	15×4	1,165.20	
11	Φ13	2.62	0.24		2.86	1.042	2.35	10×4	94.00	
12	"	2.12	0.24		2.36	"	2.46	20×4	196.30	
13	Φ9	0.68			0.68	0.499	0.34	99×4	134.64	
1	Φ13	9.50	0.48	0.52	10.50	1.042	10.94	4	43.76	
2	"	5.68	0.48	0.52	6.68	"	6.94	4	27.84	
3	"	1.26	0.24		1.50	"	1.15	19	21.85	
4	"	0.86	0.24		1.10	"	1.15	21	24.15	
5	"	1.97	0.24		2.21	"	2.30	8	18.40	
6	"	0.82	0.24		1.06	"	1.10	12	13.20	
6	"	0.84	0.24		1.08	"	1.13	12	13.56	
7	"	0.86	0.24		1.10	"	1.15	12	13.80	
8	Φ9	0.60	0.16		0.76	0.499	1.38	12	4.56	
9	"	1.97	0.16		2.13	"	1.06	4	4.24	
10	Φ16	2.57	0.30		2.87	1.578	4.53	10	45.30	
11	Φ13	1.27	0.24		1.51	1.042	1.57	6	9.42	
11	"	1.31	0.24		1.55	"	1.62	6	9.72	
12	Φ9	1.97	0.16		2.13	0.499	1.06	4	4.24	
13	"	0.60	0.16		0.76	"	0.38	12	4.56	

Table 3 Reinforcement.

Kind	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1A	99	6.77			6.77	0.499	0.38	18	6.84	
TOTAL									15625.52	

NO. 2
IRRIGATION
AQUEDUCT

Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ24	9.86	0.92	0.96	11.74	3.553	45.23	2613	1070.70	
2	"	6.00	0.92	0.96	7.88	"	20.36	1513	1,266.20	
3	φ13	2.12	0.24		2.36	1.042	2.46	5813	398.62	
4	φ16	2.12	0.30		2.42	1.78	3.97	1013	687.60	
5	φ13	9.12	0.48	0.52	10.12	1.042	10.55	3813	1,076.10	
6	"	5.48	0.24		5.72	"	5.96	3413	607.92	
7	"	9.86	0.48	0.52	10.86	"	11.32	3813	1,290.48	
8	"	1.80	0.24		2.12	"	2.21	6813	450.84	
9	φ9	9.86	0.32	0.36	10.54	0.499	5.26	2413	378.72	
10	φ24	4.58	0.46		5.04	3.853	17.42	1513	873.90	
11	φ13	2.02	0.24		2.26	1.042	2.35	1013	70.50	
12	"	2.12	0.24		2.36	"	2.46	2013	147.60	
13	φ9	0.68			0.68	0.499	0.34	9913	100.98	
1	φ13	9.50	0.48	0.52	10.50	1.042	10.94	4	45.76	
2	"	5.68	0.48	0.52	6.68	"	6.96	4	27.84	
3	"	0.86	0.24		1.10	"	1.15	19	21.85	
4	"	0.86	0.24		1.10	"	1.15	21	24.15	
5	"	1.97	0.24		2.21	"	2.30	8	18.40	
6	"	0.82	0.24		1.06	"	1.10	12	13.20	
6'	"	0.84	0.24		1.08	"	1.13	12	13.56	
7	"	0.86	0.24		1.10	"	1.15	12	13.80	
8	φ9	0.60	0.16		0.76	0.499	0.38	12	4.56	
9	"	1.97	0.16		2.13	"	1.06	4	4.24	
10	φ16	2.57	0.30		2.87	1.578	4.53	10	45.30	
11	φ13	1.27	0.24		1.51	1.042	1.57	6	9.42	
11'	"	1.31	0.24		1.55	"	1.62	6	9.72	
12	φ9	1.97	0.16		2.13	0.499	1.06	4	4.24	
13	"	0.60	0.16		0.76	"	0.38	12	4.56	

Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
14	79	0.77			0.77	0.999	0.78	18	6.84	
TOTAL									1185.50	

No 3

Table 2 Concrete, form & Others.

IRRIGATION AQUEDUCT

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>EARTH WORK</u>					
Excavation				235.9	
Embankment				2025.1	
Backfilling				303.2	
<u>CONCRETE WORK</u>					
Reinforced Concrete	$3.25 + 35.47 \times 3$			109.66	
Plain Concrete	$4.07 \times 2 + 4.55 + 4.31$			17.00	
Form	$1.962 + 162.36 \times 3 + 5.83 \times 2 + 1.12 + 4.33$			537.51	
Reinforcement				7416.58	
<u>OTHER WORK</u>					
Wet Masonry	$105.39 \times 2 + 76.57 \times 2 + 26.07 + 38.12 + 186.24 \times 2$			800.21	
Back-fill Cobble	79.02×2			158.04	
Water stop	8.60×5			43.00	b=150
Asphalt	0.09×5			0.45	
Benching	2×3			12	
Flash Board				170	

EARTH WORK Table 2 Concrete, form & Others.
No.3.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
Excavation	$\frac{1}{2}(1.6+4.0) \times 17.00 \times 2$			68.2	
	$\frac{1}{2}(1.0+10.7) \times 1.80 \times 2$			11.8	
	$10.7 \times 1.20 \times 2$			25.7	
	$\frac{1}{2}(10.7+11.2) \times 2.00 \times 2$			43.9	
	$11.2 \times 0.50 \times 2$			11.2	
	$\frac{1}{2}(11.2+4.6) \times 0.70 \times 2$			11.1	
	$\frac{1}{2} \times 4.6 \times 0.80 \times 2$			3.7	
	$12.3 \times 5.80 \times 2$			142.7	
	$12.3 \times 2.90 \times 2$			71.7	
	22.2×20.0			444.0	
	Total			835.9	
Embankment	$\frac{1}{2}(62.7+38.0) \times 17.00 \times 2$			1215.3	
	$38.0 \times 1.30 \times 2$			98.8	
	$27.6 \times 0.70 \times 2$			38.6	
	$\frac{1}{2}(7.6+19.0) \times 2.00 \times 2$			93.2	
	$28.8 \times 0.5 \times 2$			28.8	
	$\frac{1}{2}(7.8+16.8) \times 0.70 \times 2$			32.6	
	$\frac{1}{2} \times 16.8 \times 1.00 \times 2$			16.8	
		Total			2025.1
Backfilling	$\frac{1}{2}(1.2+3.0) \times 17.00 \times 2$			71.4	
	$\frac{1}{2}(3.0+5.7) \times 1.80 \times 2$			10.2	
	$12.6 \times 1.20 \times 2$			30.2	
	$\frac{1}{2}(12.6+1.0) \times 2.00 \times 2$			26.2	

FLASH BOARD CHANNEL PORTION Table 2 Concrete, form & Others.
No. 3

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²)	
				(m ²)	
	200 200 3,000 200,200				
Reinforced Concrete	0.40 x 3.90 x 0.98			1.49	A
	(0.40 x 0.98 - 0.20 x 0.20) x 2.50 x 2			1.76	B
	<i>total</i>			3.25	
Form	0.40 x 3.90 x 2			3.12	A
	0.40 x 0.98 x 2			0.78	"
	0.98 x 2.50 x 4			9.80	B
	0.40 x 2.50 x 4			4.00	"
	0.20 x 2.50 x 4			2.00	"
	<i>total</i>			19.62	
Water Stop	2.625 x 2 + 3.35			8.60	
Asphalt	0.02 x 0.35 x 2.35 x 2			0.04	
	0.02 x 0.70 x 3.70			0.05	
	<i>total</i>			0.09	
Flash Board	0.20 x 2.50 x 3.40			1.70	

SUPER STRUCTURE Table 2 Concrete, form & Others.

No 3

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
Reinforced Concrete	$0.50 \times 0.35 \times 9.98 \times 2$ $0.35 \times 3.70 \times 9.98$ $1.35 \times 2.50 \times 7.98 \times 2$ $1.35 \times 1.50 \times 2.70 \times 2$ $1.35 \times 0.40 \times 2.70$ $\frac{1}{2} \times 0.20 \times 0.10 \times (4.09 \times 4 + 2.50 \times 4)$ total			3.09 12.92 17.47 0.95 0.38 0.26 35.47	A B C D E F
Form	$1.35 \times 9.98 \times 2$ $0.50 \times 9.98 \times 2$ $0.25 \times 3.89 \times 4$ $0.50 \times 0.33 \times 2$ $1.35 \times 9.98 \times 2$ 0.35×0.70 $0.30 \times 0.89 \times 2$ $0.35 \times 0.50 \times 2$ $0.30 \times 7.98 \times 4$ $1.35 \times 2.70 \times 2$			6.99 9.98 3.89 0.35 6.99 1.30 17.89 7.75 99.80 2.70	A B C D

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	0.35 x 2.70			0.95	D
	0.25 x 2.70 x 2			1.35	
	0.40 x 2.70			1.08	E
	1.25 x 2.70 x 2			1.35	
	1.15 (5 x (4.07 x 4 + 2.50 x 4))			5.89	F
	<i>total</i>			162.26	
Water Stop	2.125 x 2 + 3.35			8.60	
Boarding				4	
Asphalt	0.02 x 0.35 x 2.50 x 2			0.04	
	0.02 x 0.70 x 3.70			0.05	
	<i>total</i>			0.09	

PIER No 3 Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
Diam Concrete	$\frac{1}{2}(1.60 \times 4.00 + 1.60 \times 4.00) \times 0.50$	m ³		3.94	A
	$0.50 \times 0.50 \times 2.50$	m ³		0.63	B
	Total			4.57	
Form	$\frac{1}{2}(4.00 + 4.00) \times \sqrt{1.5^2 + 1.1^2} \times 2$	m ²		4.12	A
	$\frac{1}{2}(1.60 + 1.90) \times \sqrt{1.5^2 + 0.4^2} \times 2$	m ²		1.71	
	Total			5.83	
Wet Masonry	$\frac{1}{2}(1.90 \times 1.00 + 3.00 \times 1.16) \times 1.50 - 0.50 \times 0.50 \times 2.50$	m ³		6.22	C
	$\frac{1}{2}(3.00 \times 1.16 + 3.60 \times 4.80) \times 2.00$	m ³		51.20	D
	$2.50 \times 1.60 \times 4.80$	m ³		19.20	E
	Total			76.62	

ABUTMENT No 3 (1) Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
			2000		
Plain Concrete	$\frac{1}{2}(0.50+0.53) \times 0.50 \times 4.00$			1.03	A
	$\frac{1}{2}(1.33+1.56) \times 1.50 \times 4.00$			2.87	B
	$0.50 \times 1.50 \times 2.50$			0.63	C
	<i>Total</i>			4.53	
Form	$4.00 \times \sqrt{0.50^2 + 0.03^2}$			200	A
	1.50×4.00			200	
	$\frac{1}{2}(0.50+0.53) \times 1.50 \times 2$			0.52	
	$4.00 \times \sqrt{0.50^2 + 0.03^2}$			200	B
	$4.00 \times \sqrt{0.50^2 + 0.20^2}$			215	
	$\frac{1}{2}(1.33+1.56) \times 0.50 \times 2$			1.45	
	<i>Total</i>			1012	
Wet Masonry	$\frac{1}{2}(1.56+1.79) \times 2.50 \times 4.00 - 0.50 \times 0.50 \times 2.50$			2.73	D
	$\frac{1}{2}(1.77+2.70) \times 2.00 \times 4.00$			17.96	E
	$2.70 \times 0.50 \times 4.00$			5.40	F
	<i>Total</i>			26.09	

ABUTMENT
No 3 (2)

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
	200 500 800	700	2 800	700	
Plan Concrete	$\frac{1}{2}(1.50 + 1.53) \times 0.60 \times 2.60$ $\frac{1}{2}(1.33 + 1.55) \times 1.50 \times 4.00$ $0.50 \times 0.50 \times 2.50$			0.80 2.88 0.63	A E
	Total			4.31	
Form	$2.60 \times \sqrt{0.60^2 + 1.23^2}$ $\frac{1}{2} \times (1.50 + 1.53) \times 0.60 \times 2$ 0.60×2.60 $4.00 \times \sqrt{0.50^2 + 1.02^2}$ $4.00 \times \sqrt{0.50^2 + 1.20^2}$ $\frac{1}{2}(1.33 + 1.55) \times 0.50 \times 2$			1.56 0.62 1.56 2.00 2.15 1.44	A B
	Total			7.33	
Wet Masonry	$\frac{1}{2}(1.53 + 1.77) \times 1.50 \times 4.00 - 0.50 \times 0.50 \times 2.50$ $\frac{1}{2}(1.77 + 1.90) \times 3.00 \times 4.00$ $0.10 \times 0.50 \times 4.00$			2.70 27.22 0.40	D E F
	Total			30.12	

THEATHING PORTION Table 2 Concrete, form & Others.

№ 3

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
		300	6,000	2,800	
Wet Masonry	$\frac{1}{2}(2.1+5.2) \times \sqrt{5} (1.50+1.15) \times \frac{1}{5} \times 0.30 \times 2$			7.71	A
	$\times 0.0 \times 0.30 \times 6.2 \times 2$			3.72	B
	$\frac{1}{2} \times \sqrt{5} (2.30+1.15) \times 0.30 \times 2$			17.39	C
	$\frac{1}{2} \times \sqrt{5} (1.10+1.25) \times 0.30 \times \frac{1}{5} (3.5+4.6) \times 2$			7.71	
	$\frac{1}{2} (1.00+1.58) \times 0.50 \times (1.14+2 \times 1.6)$			13.33	D
	$1.10 \times (\sqrt{1.70^2+1.40^2}+1.50) \times 0.30$			18.59	G
	$\frac{1}{2} \times \sqrt{5} (1.50+1.15) \times \frac{1}{5} \times 2.00 \times \frac{1}{7} \times 0.30 \times 1,900 \times 2$			55.24	A~H
	$1.30 \times 1.00 \times 1,900 \times 2$			10.80	B~I
	$\frac{1}{2} [\sqrt{5} (1.10+1.25) + \sqrt{5} (1.10+1.10)] \times \frac{1}{5} \times 0.30 \times 1,900 \times 2$			32.30	C~J
	$\frac{1}{2} [(1.10+1.56) + 1.00+0.91] \times \frac{1}{5} \times 0.50 \times 1,900 \times 2$			19.22	D~K
	<i>Total</i>			186.04	
Back-fill Cobble	$\frac{1}{2} (0.30+0.50) \times 3.00 \times \frac{1}{5} (2.1+5.2) \times 2$			8.76	E
	$\frac{1}{2} (1.30+1.50) \times 4.10 \times 2.2$			22.15	F
	$\frac{1}{2} (0.30+0.50) \times 3.20 \times \frac{1}{5} (3.5+4.6) \times 2$			10.87	
	$\frac{1}{2} (0.30+0.50) \times 3.00 \times 7.00 \times 2$			21.60	E
	$\frac{1}{2} (0.30+0.50) \times 2.20 \times 7.00 \times 2$			15.84	F
	<i>Total</i>			79.02	

NO. 3		IRRIGATION AQUEDUCT		Table 3		Reinforcement.				
Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ19	9.86	0.72	0.76	11.34	2.226	25.24	2013	1514.40	
2	φ13	3.58	0.24		3.82	1.042	3.98	3413	405.96	
3	"	3.74	0.24		3.98	"	4.15	2813	348.60	
4	"	3.58	0.24		3.82	"	3.98	3413	405.96	
5	"	9.86	0.48	0.52	10.86	"	11.32	2613	882.96	
6	"	4.40	0.24		4.64	"	4.83	6813	985.32	
7	"	2.00	0.24		2.24	"	2.33	17013	838.80	
8	"	3.07	0.24		3.31	"	3.45	6813	703.80	
9	φ9	9.86	0.32	0.36	10.54	0.499	5.26	3613	568.08	
10	φ19	3.58	0.36		3.94	2.226	8.77	913	236.79	
11	φ13	1.52	0.24		1.76	1.042	1.83	2613	142.74	
12	"	1.42	0.24		1.66	"	1.73	1313	67.47	
13	φ9	0.73			0.73	0.499	0.36	11013	118.80	
1	φ13	9.10	0.48	0.52	10.10	1.042	10.52	4	42.08	
2	"	3.68	0.24		3.92	"	4.08	4	16.32	
3	"	0.86	0.24		1.10	"	1.15	28	32.20	
4	"	2.78	0.24		3.02	"	3.15	8	25.20	
5	"	0.83	0.24		1.07	"	1.11	36	39.96	
6	"	0.86	0.24		1.10	"	1.15	18	20.70	
7	φ9	0.60	0.16		0.76	0.499	1.38	18	6.84	
8	"	2.78	0.16		2.94	"	1.47	4	5.88	
9	"	0.77			0.77	"	0.38	8	3.04	
10	"	0.78			0.78	"	0.39	12	4.68	
TOTAL									7416.58	

No. 2 Table 2. Concrete, form & Others. IRRIGATION ABUJEDIKT					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
EARTH WORK					
Excavation				15230 ^{m³}	
Embankment				159 ^{m³}	
Backfilling				1267 ^{m³}	
CONCRETE WORK					
Reinforced Concrete	16.81 x 4			6724 ^{m³}	
Plain Concrete	2.15 x 3 + 2.09 x 2			1063 ^{m³}	
Form	10.41 x 4 + 4.15 x 3 + 5.31 x 2			12071 ^{m²}	
Reinforcement				4717.48 ^{kg}	
OTHER WORK					
Wet masonry	37.43 x 2 + 4.57 x 3 + 4.07 x 2 + 24.09 x 2			144.89 ^{m³}	
Back fill Cattle	10.76 x 2			20.52 ^{m³}	
Water step	6.40 x 5			7.00 ^m	
Flooring	4 x 4			16 ^{mt}	

EARTH WORK Table-2 Concrete, form & Others.

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
Excavation	12.0 x 1.70 x 2			40.8	
	$\frac{1}{2} \times 12.0 \times 0.50 \times 2$			6.0	
	43.8 x 30.0			1314.0	
	2.0 x 3.40 x 3			20.4	
	$\frac{1}{2} \times 2.0 \times 1.13 \times 2 \times 3$			1.8	
	<i>total</i>			1383.0	
Embankment	5.7 x 1.0 x 2			11.4	
	$\frac{1}{2} \times 5.7 \times 0.70 \times 2$			4.0	
	<i>total</i>			15.4	
Backfilling	6.3 x 1.20 x 2			15.1	
	12.0 x 0.50 x 2			12.0	
	$\frac{1}{2} \times 12.0 \times 0.50 \times 2$			6.0	
	2.0 x 1.0 x 3			6.0	
	0.8 x 2.40 x 3			5.8	
	$\frac{1}{2} \times 2.0 \times 1.1 \times 2 \times 3$			1.8	
	2.0 x 2.0 x 2			8.0	
	<i>total</i>			56.7	

OPEN TRANSITION Table 2 Concrete, form & Others

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m)	
	SECTION ①	SECTION ②			
Wet Masonry	SECTION ①				
	$0.30 \times 1.30 \times 2 = 0.78$				A
	$\frac{1}{2} \times 0.90 \times 0.361 \times 2 = 0.32$				B
	$\frac{1}{2} \times 0.30 \times 0.79 \times 2 = 0.24$				C
	$2.50 \times 0.30 \times 2 = 1.50$				D
	$\sqrt{5} (1.70 + 1.44) \times 5 \times 1.30 \times 2 = 2.11$				E
	$\frac{1}{2} \times 1.20 \times 0.30 \times 2 = 0.06$				F
	sub total = 3.81				
	SECTION ②				
	$0.30 \times 1.30 \times 2 = 0.78$				G
	$0.80 \times 0.30 \times 2 = 0.48$				H
	$\frac{1}{2} (0.30 + 0.90) \times 2.00 \times 2 = 1.20$				I
	sub total = 3.66				
	$\frac{1}{2} (3.81 + 3.66) \times 1.00 = 3.735$			3.735	
	$\frac{1}{2} (0.80 + 0.40) \times 0.60 \times 2 = 0.60$			0.60	J
	Total			37.00	

SUPER STRUCTURE Table 2. Concrete, form & Others.
No 11

Kinda	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
Reinforced Concrete	0.50 x 0.25 x 9.98 x 2			2.50	A
	2.10 x 0.25 x 9.98			5.24	B
	0.25 x 1.70 x 9.98 x 2			8.48	C
	0.50 x 0.25 x 1.10 x 2			0.28	D
	0.40 x 0.25 x 1.10			0.11	E
	1/2 x 0.20 x 0.10 x (4.09 x 4 + 6.90 x 4)			0.20	F
	Total			16.81	
Form	0.25 x 9.98 x 2			2.99	A
	0.50 x 9.98 x 2			9.98	
	1.50 x 0.25 x 2			0.25	
	0.15 x 4.29 x 4			2.57	
	1.25 x 9.98 x 2			4.99	B
	0.25 x 2.10			0.53	
	0.71 x 3.89 x 2			5.45	
	1.70 x 9.98 x 4			67.86	C
	0.25 x 1.70 x 2			0.85	
	1.70 x 0.25			0.29	D
	0.15 x 1.10 x 2			0.33	
	0.50 x 1.10 x 2			1.10	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	0.40×1.10			m^2 0.44	F
	$0.15 \times 1.10 \times 2$			0.33	
	$\sqrt{0.2^2 + 0.1^2} (4.9 \times 4 + 0.9 \times 4)$			4.46	F
	Total			m^2 10.41	
Water Stop	$1.775 \times 2 + 1.85$			m 5.40	
Bearing				40 I	
Asphalt	$0.02 \times 0.25 \times 170$			0.85	
	$0.02 \times 0.50 \times 2.10$			0.21	
	Total			m^2 1.06	

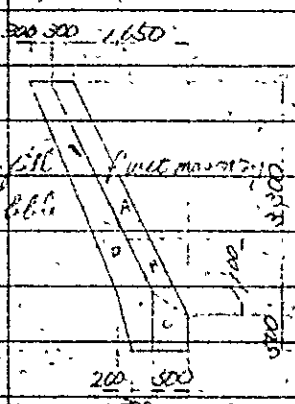
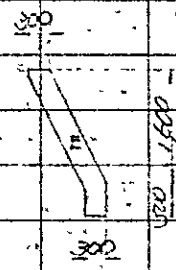
PIER No. 4 Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
Plain Concrete	$\frac{1}{2}(1.60 + 1.70) \times 0.50 \times 2.40$ $0.30 \times 0.30 \times 1.20$			2.94 0.11	A B
	total			3.05	
Form	$\sqrt{0.50^2 + 0.1^2} \times 2.40 \times 2$ $\frac{1}{2}(1.60 + 1.70) \times 0.50 \times 2$			2.85 1.70	
	total			4.55	
Wet Masonry	$\frac{1}{2}(1.20 + 1.72) \times 0.30 \times 2.40 - 0.30 \times 0.30 \times 1.20$ $\frac{1}{2}(1.72 + 2.00) \times 0.20 \times 2.40$ $0.50 \times 2.00 \times 2.40$			1.23 2.94 2.40	C D E
	total			4.57	

ABUTMENT Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
Plain Concrete	$\frac{1}{2}(1.50 + 1.53) \times 1.40 \times 2.40$ $\frac{1}{2}(1.33 + 1.56) \times 1.50 \times 2.40$ $0.30 \times 1.30 \times 1.20$	m ³		0.25 1.73 0.11	A B C
	Total			2.09	
Form	$\sqrt{1.40^2 + 1.03^2} \times 1.20$ 1.80×1.20 $\frac{1}{2}(1.50 + 1.53) \times 1.40 \times 2$ $\sqrt{1.50^2 + 1.03^2} \times 2.40$ $\sqrt{1.50^2 + 1.20^2} \times 2.40$ $\frac{1}{2}(1.33 + 1.56) \times 1.50 \times 2$	m ²		2.48 2.48 1.41 1.20 1.29 1.45	A B C D E
	Total			5.31	
Wet Masonry	$\frac{1}{2}(1.56 + 1.71) \times 1.30 \times 2.40 - 0.30 \times 1.30 \times 1.20$ $\frac{1}{2}(1.31 + 1.80) \times 1.20 \times 2.40$ $2.50 \times 1.90 \times 2.40$	m ³		3.67 1.84 2.86	D E F
	Total			4.07	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
					
Wet Masonry	$\frac{1}{2} \times (1.65 + 1.45) \times 0.30 \times \frac{1}{2} (2.6 + 9.0)$ $\frac{1}{2} \times (1.53 + 1.40) \times 0.30 \times 2.10$ $\frac{1}{2} (0.50 + 0.02) \times 0.50 \times 11.1$ $0.30 \times (1.5 \times 0.70 + 1.50) \times 2.00$ Total			m ³ 6.13 0.67 3.66 13.73 24.19	A - E
Back-fill Cobble	$\frac{1}{2} \times (0.30 + 0.50) \times 3.00 \times \frac{1}{2} (2.6 + 9.0)$ $\frac{1}{2} (0.30 + 0.50) \times 1.60 \times 3.10$ Total			m ³ 8.92 1.34 10.26	D

No. 4
IRRIGATION AQUEDUCT Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ19	9.86	0.72	0.76	11.34	2.226	25.24	10×4	1,009.60	
2	φ13	3.20	0.24		3.44	1.042	3.58	10×4	859.20	
3	"	3.20	0.24		3.44	"	3.58	8×4	114.56	
4	φ19	1.98	0.36		2.34	2.226	5.21	30×4	625.20	
5	φ9	1.98	0.16		2.14	0.499	1.07	4×4	17.12	
6	φ13	1.98	0.24		2.22	1.042	2.31	30×4	271.20	
7	"	1.98	0.24		2.22	"	2.31	4×4	36.96	
8	φ9	9.84	0.32	0.36	10.52	0.499	5.25	14×4	294.00	
9	φ13	2.07	0.24		2.31	1.042	2.41	68×4	655.52	
10	φ9	9.86	0.32	0.36	10.54	0.499	5.26	34×4	504.96	
11	φ19	1.98	0.36		2.34	2.226	5.21	6×2	125.04	
12	"	1.98	0.36		2.34	"	5.21	3×4	62.52	
13	φ9	1.12	0.16		1.28	0.499	0.64	11×2	35.84	
14	"	1.12	0.16		1.28	"	0.64	7×4	17.92	
15	"	0.63			0.63	"	0.31	66×4	21.84	
									4,717.48	

IRRIGATION SYPHON FOR A ROUTE

No. 50

KINDS	UNIT	NO. 1	TOTAL	REMARKS
1) EARTH WORK				
EXCAVATION	m ³	1033.2	1033.2	
EMBANKMENT	m ³	672.0	672.0	
BACKFILLING	m ³	355.7	355.7	
2) CONCRETE WORK				
REINFORCED CONCRETE	m ³	41.71	41.71	
FORM	m ²	100.58	100.58	
REINFORCEMENT	kg	3151.29	3151.29	
3) OTHERS				
WET MASONRY	m ²	538.88	538.88	
DRY STONE PITCHING	m ³	60.00	60.00	
WATER STOP	m	78.43	78.43	R = 150 mm
FLASH BOARD	m ³	3.00	3.00	

IRRIGATION SIPHON FOR B ROUTE

No. 51

KINDS	UNIT	NO	TOTAL	REMARKS
1) EARTH WORK				
EXCAVATION	m ³	1,733.9	1,733.9	
EMBANKMENT	m ³	174.7	174.7	
BACKFILLING	m ³	1,103.3	1,103.3	
2) CONCRETE WORK				
REINFORCED CONCRETE	m ³	25.50	25.50	
FORM	m ²	68.06	68.06	
REINFORCEMENT	Kg	2,782.30	2,782.30	
3) OTHERS				
WET MASONRY	m ³	49.905	49.905	
DRY STONE PITCHING	m ³	6.00	6.00	
WATER SIDP	m ²	129.60	129.60	B = 150 ^{MM}
FLASH BOARD	m ²	1.20	1.20	

IRRIGATION SYPHON EGA. C. ROUTE

NO. 52

KINDS	UNIT	NO'S	TOTAL	REMARKS
1) EARTH WORK				
EXCAVATION	m ³			
EMBANKMENT	m ³			
BACKFILLING	m ³			
2) CONCRETE WORK				
REINFORCED CONCRETE	m ³	15.30	15.30	
FORM	m ²	41.04	41.04	
REINFORCEMENT	Kg	1667.38	1667.38	
3) OTHERS				
NET MASONRY	m ³	123.41	123.41	
DRY STONE PITCHING	m ³	1.50	1.50	
WATER STOP	m	74.80	74.80	R=150"

NO. 1 IRRIGATION SYPHON					
Table 2 Concrete, form & Others					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>Earth work</u>					
Excavation				1033.2	
Backfilling				353.7	
Embankment				672.0	
<u>Concrete work</u>					
Reinforced Concrete				41.71	
Form				100.58	
Reinforcement				151.29	
<u>Others work</u>					
Wet Masonry				532.82	
Dry stone masonry				60.00	
Water stop				78.43	
Flash board				3.00	

No 1 IRRIGATION SYPHON		Table 2 Concrete, form & Others.			
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
Earth work				(m) (m ³)	
Excavation	$\textcircled{1} \frac{1}{2} \times (13.0 + 14.0) \times 1.00 = 13.50$ $\textcircled{2} \frac{1}{2} \times (14.0 + 16.1) \times 2.10 = 31.61$ $\textcircled{3} \frac{1}{2} \times (8.1 + 10.2) \times 2.10 = 19.22$ $\textcircled{4} \frac{1}{2} \times (8.1 + 12.1) \times 4.0 = 40.40$ $\textcircled{5} \frac{1}{2} \times (8.1 + 12.1) \times 4.0 = 40.40$ $\textcircled{6} \frac{1}{2} \times (8.1 + 10.3) \times 2.2 = 20.24$ $\textcircled{7} \frac{1}{2} \times (14.0 + 16.2) \times 2.2 = 33.22$ $\textcircled{8} \frac{1}{2} \times (13.0 + 13.5) \times 0.5 = 6.63$				
	$\frac{1}{2} \times (13.50 + 31.61) \times 2.0 =$			180.4	$\frac{1}{2} \times (10 \times 10) \times 8.0$
	$\frac{1}{2} \times (19.22 + 40.40) \times 7.5 =$			223.6	$\frac{1}{2} \times (8 \times 10) \times 7.5$
	$\frac{1}{2} \times (40.40 + 40.40) \times 6.0 =$			242.4	$\frac{1}{2} \times (8 \times 10) \times 6.0$
	$\frac{1}{2} \times (40.40 + 20.24) \times 7.5 =$			227.4	$\frac{1}{2} \times (10 \times 10) \times 7.5$
	$\frac{1}{2} \times (33.22 + 6.63) \times 8.0 =$			159.4	$\frac{1}{2} \times (10 \times 8) \times 8.0$
	Total of excavation			1033.2	
Backfilling	$\textcircled{1} \frac{1}{2} \times (0.5 + 1.0) \times 1.0 \times 2 = 1.50$ $\textcircled{2} \frac{1}{2} \times (0.5 + 1.6) \times 2.10 \times 2 = 4.41$ $\textcircled{3} \frac{1}{2} \times (0.5 + 1.6) \times 2.10 \times 2 = 4.41$ $\textcircled{4} \frac{1}{2} \times (8.1 + 12.1) \times 4.0 - \frac{1}{2} \times (7.10 + 5.70) \times 2.35 + 7.10 \times 0.70 = 20.39$ $\textcircled{5} = 20.39$ $\textcircled{6} \frac{1}{2} \times (0.5 + 1.6) \times 2.20 \times 2 = 4.62$				

Table 2 Concrete, form & Others.

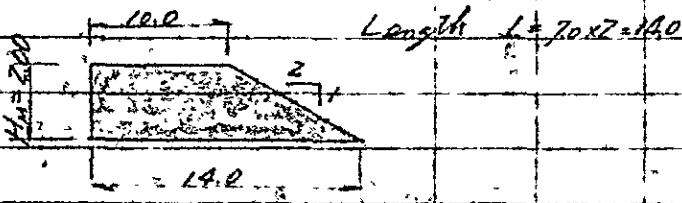
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	$\frac{1}{2} \times (1.5 + 1.6) \times 2.20 \times 2 = 4.62$				
	$\frac{1}{2} \times (1.5 + 2.75) \times 0.50 \times 2 = 0.63$				
	$\frac{1}{2} \times (1.50 + 4.41) \times 8.0 =$			236	$\frac{1}{2}(10+2) \times 80$
	$\frac{1}{2} \times (4.41 + 20.37) \times 7.5 =$			93.0	$\frac{1}{2}(10+10) \times 75$
	$\frac{1}{2} \times (20.39 + 20.39) \times 6.0 =$			122.5	$\frac{1}{2}(10+10) \times 60$
	$\frac{1}{2} \times (20.39 + 4.62) \times 7.5 =$			93.8	$\frac{1}{2}(10+2) \times 75$
	$\frac{1}{2} \times (4.62 + 0.63) \times 8.0 =$			21.0	$\frac{1}{2}(10+2) \times 80$
	Total of Backfilling			353.7	
Embankment					
					
	$\frac{1}{2} \times (14.0 + 10.0) \times 2.0 \times 140 \times 2 =$			672.00	

Table 2 Concrete, form & Others.

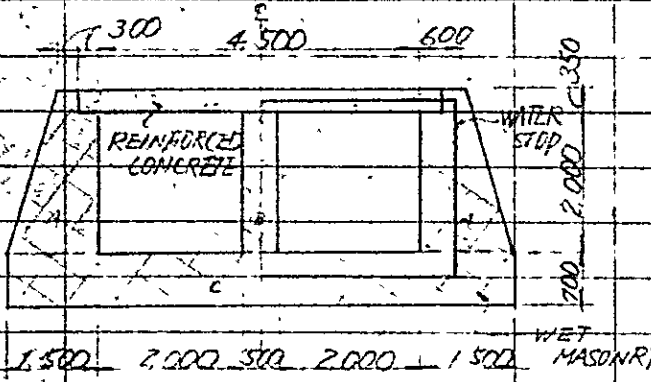
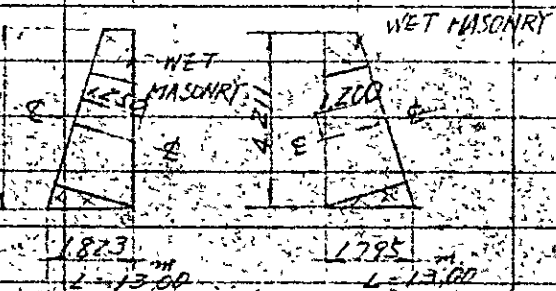
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
					
	TYPICAL SECTION				
Reinforced concrete	$5.10 \times 1.35 \times (8.851 + 8.824 + 5.690) =$				
				41.71	
Wet masonry	$\frac{1}{2} \times (0.6 + 1.50) \times 2.35 - 1.30 \times 0.35$ $\times (1.9006 + 1.000 + 8.979) \times 2 =$				
				110.35 A	
	$0.50 \times 2.00 \times (9.026 + 6.50 - 8.979) =$				
				23.99 B	
	$7.50 \times 0.70 \times (9.161 + 9.134 + 6.310) =$				
				129.18 C	
				Sub-total	265.52
					
	$\frac{1}{2} \times (0.6 + 1.823) \times 4.315 \times 13.00 =$				
				67.96	
	$\frac{1}{2} \times (0.6 + 1.795) \times 4.211 \times 13.00 =$				
				65.55	
	$(-) \frac{1}{2} \times (7.50 \times 5.70) \times 2.35 + 7.50 \times 0.70 =$				

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
	$\times (1.250 + 1.200)$			50.86	
	Sub-total			82.65	
Transmission					
	<p>Inlet Transmission length () <i>Esigra</i> in calculation for calculation <i>show dimension for Transmission outlet</i></p> $L = 8000 - 1000 - \frac{1}{2}(0.6 + 1.823) = 5.79$				
	<p>Outlet Transmission length for calculation</p> $L = 8000 - \frac{1}{2}(0.6 \times 2 + 1.795 + 1000) = 6.09$				
	<p>Section ①</p> $\frac{1}{2} \times (0.50 + 1.00) \times 1.80 \times 2 + 120 \times 0.70 = 11.10$				
	<p>Section ② Inlet</p> $\frac{1}{2} \times (0.50 + 1.50) \times 3.20 \times 2 + 130 \times 0.70 = 15.50$				
	<p>Outlet</p> $\frac{1}{2} \times (0.50 + 1.50) \times 3.123 \times 2 + 130 \times 0.70 = 15.31$				
	$\frac{1}{2} \times (11.10 + 15.60) \times 5.79 = 77.01$			77.01	
	$\frac{1}{2} \times (11.10 + 15.31) \times 6.09 = 79.23$			79.23	
	Sub-total			156.24	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	$19.10 \times 2.50 \times 1.00 =$			34.00	
	↳ $2.70 \times 1.80 \times 1.00 \times 2 =$			7.14.58	
	↳ $0.20 \times 0.30 \times 1.80 \times 6 =$			0.65	Flood bank channel
	Sub-total			18.77	
	$\frac{1}{2} \times (0.60 + 1.00) \times 1.80 \times 13.60 =$			19.58	
	$1.00 \times 0.70 \times 13.60 =$			9.52	
	↳ $\frac{1}{2} \times (0.60 + 1.00) \times 1.80 \times 10.00 =$			7.14.00	
	Sub-total			14.70	
	Total of wet masonry			538.88	
Form	$4.00 \times (8.85 + 8.82 + 5.69) =$			93.04	
	$5.70 \times 0.35 \times 4 =$			7.14	
	Total			100.58	

Table 2 Concrete, form & Others

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
Water stop	$D=150$ $L=(5.40+2.525) \times 2 \times 2$ $\pi(8251 + 8824 + 5190) \times 2 =$			(m) 78.43	
Reinforcement	$\phi 16 \quad L=2.750 \quad R=4 \times 2$ $1.578 \times 2.75 \times 8 =$			(kg) 34.72	
Deep stone	$10.00 \times 0.30 \times 10.00 \times 2 =$			60.00	
Block board	$3.27 \times 1.80 \times 0.743 =$			(m) 3.02	

No. 1
IRRIGATION SYPHON Table 3: Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ13	4.98	0.24		5.22	1.042	5.44	119	647.36	
2	φ16	4.98	0.30		5.28	1.578	8.33	119	991.27	
3	φ13	8.73	0.48	0.52	9.73	1.042	10.14	36	365.04	
4	"	8.70	0.48	0.52	9.70	"	10.11	36	363.96	
5	"	5.57	0.48	0.52	6.57	"	6.85	36	246.60	
6	φ19	1.00	0.36		1.36	2.226	3.03	158	478.74	
7	φ9	0.73			0.73	0.499	0.36	162	58.32	
									3151.29	

NO. 2
IRRIGATION
SYPHON

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>Earth Work</u>					
Excavation				1733.9	
Backfilling				1103.3	
Embankment				174.7	
<u>Concrete Work</u>					
Reinforced Concrete				25.50	
Form				68.06	
Reinforcement				2782.30	
<u>Other Work</u>					
Wet Masonry				493.05	
Dry Stone Paving				6.00	
Water Stop				129.60	
Black Sand				1.20	

NO. 2
IRRIGATION
SYSTEM

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
Earth work	<div style="display: flex; justify-content: space-around;"> Ⓐ Ⓑ Ⓒ </div>				
	<div style="display: flex; justify-content: space-around;"> Transition System Transition </div>				
	<div style="display: flex; justify-content: space-around;"> 5.00 50.0 500 </div>				
Excavation					
	$\frac{1}{2} \times (11.0 + 16.0) \times 5.0 \times 5.0 =$			337.5	Transition
	$\frac{1}{2} \times (4.10 + 8.7) \times 4.0 \times 50.0 =$			1220.0	System
	$\frac{1}{2} \times (8.0 + 17.6) \times 3.6 \times 5.0 =$			176.4	Transition
	<p style="text-align: center;">Total of excavation</p>			1733.9	
Backfilling					
	$\frac{1}{2} \times (0.5 + 3.0) \times 5.0 \times 2 + 4.3 \times 13.5 \times 2 \times 5.0 =$			115.5	Transition
	$\frac{1}{2} \times (4.10 + 8.7) \times 4.0 \times 50.0 =$			1220.0	
	$-\frac{1}{2} \times (3.10 + 7.3) \times 16 + 3.10 \times 15.0 \times 5.0 =$			926.5	System
	$\frac{1}{2} \times (0.5 + 2.3) \times 3.6 \times 2 + 3.10 \times 7.5 \times 2 \times 5.0 =$			61.8	Transition
	<p style="text-align: center;">Total of Backfilling</p>			1103.8	
Endowment					
	$\frac{1}{2} \times (8.60 + 7.00) \times 1.00 \times 40 \times 2 =$			174.72	

NO. 2
IRRIGATION
SYPHON

Table 2 Concrete, form & Others.

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	<p>TYPICAL SECTION</p>				
Reinforced concrete	$170 \times 30 \times 500$			25.50	
Wet masonry	$\frac{1}{2} \times (0.50 + 0.90) \times 160 - 0.30 \times 0.20 \times 500 \times 2$			106.00	
	$310 \times 0.50 \times 500$			77.50	
	Sub-total			183.50	
	$\frac{1}{2} \times (0.60 + 2.00) \times 5.50 \times 40.00$			77.50	
	$\frac{1}{2} \times (0.60 + 1.50) \times 6.075 \times 700$			307.30	
	$\frac{1}{2} \times (1.310 + 2.30) \times 160 + 300 \times 0.20$				
	$\times (1.733 + 1.270)$			-177.63	
	Sub-total			84.07	

Table 2 Concrete, form & Others.

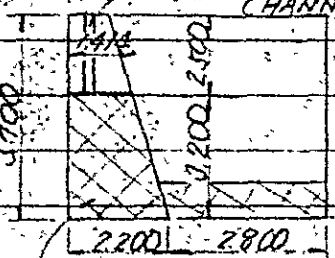
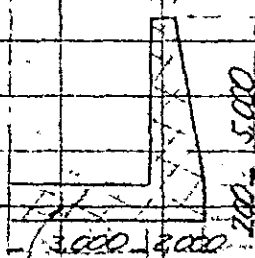
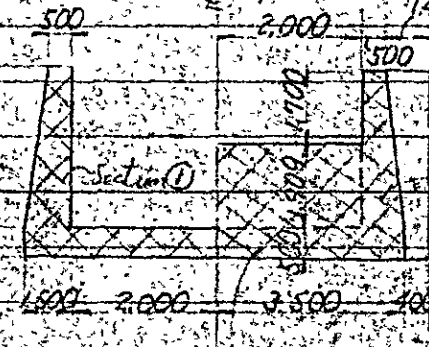
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²)	
				(m)	
Wet masonry	Inlet of transition				
		WET. MASONRY	WET. MASONRY		
	$L = 13.00$		$L = \frac{1}{2}(4.20 + 2.80) = 3.50$		
	$\frac{1}{2} \times (220 + 0.80) \times 5.70 \times 130 =$			111.15	
(5)	$\frac{1}{2} \times \{ (3.0 \times 1.414) + (6.0 \times 0.8) \} \times 2.5 =$			11.30	
(1)	$0.22 \times 0.3 \times \sqrt{1.5^2 + 2.5^2} \times 2 =$			0.35	
	Sub-total			99.50	
	$\frac{1}{2} \times (0.5 + 2.0) \times 5.0 \times 3.5 =$			21.88	
	$10.0 \times 0.70 \times 2.8 =$			19.60	
	Sub-total			41.48	
Outlet of transition					
	WET. MASONRY				

Table 2 Concrete, form & Others.

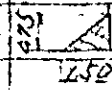
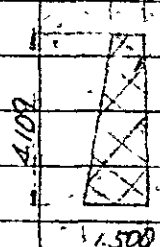
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	Section ①				
	$\frac{1}{2} \times (0.50 + 1.50) \times 3.609 \times 2$				
	$+ 7.0 \times 0.50 = 10.72$				
	Section ②				
	$\frac{1}{2} \times (0.50 + 1.50) \times 3.609 \times 2$				
	$+ 7.0 \times 0.50 + 4.0 \times 1.909 = 18.35$				
	$10.72 \times 100 =$			10.72	
	$\frac{1}{2} \times (10.72 + 18.35) \times 3.40 =$			47.82	
	$18.35 \times 0.60 =$			11.01	
	$\frac{1}{2} \times 1.50 \times 0.75 \times 0.60 \times 2 =$			0.68	
	Sub total			71.83	
	 WET MASONRY $L_m = \frac{1}{2} \times (1.10 + 0.40) \times 2 = 1.80$				
	$\frac{1}{2} \times (0.60 + 1.50) \times 4.109 \times 1.80 =$			7.77	
	Total of wet masonry			293.05	
	Form				
	$1.30 \times 5.00 + 1.70 \times 0.30 \times 6 =$			68.06	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
Water stop	B = 150 L = (20 + 17) x 2 x 4 + 50.0 x 2 =			m ² 129.60	
Screen					
Reinforcement $\phi 16$	L = 202 K = 3 1.578 Kg x 202 x 3 =			Kg 956	
Dry stone pitching	2.00 x 2.30 x 5.00 + 1.00 x 0.30 x 5.00 =			m ³ 6.00	
Flash boards	$\frac{1}{2}(2.07 + 3.57) \times 2.10 \times 17 =$			m ² 1199	

NO 2
IRRIGATION SYPHON Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ19	1.58	0.36		1.94	2.226	4.32	34	146.88	
2	Φ13	1.58	0.24		1.82	1.042	1.90	34	64.60	
3	"	9.78	0.48	0.52	10.78	"	11.23	12	134.76	
4	Φ19	1.00	0.36		1.36	2.226	3.03	68	206.02	
5	Φ9	0.38			0.38	0.499	0.19	22	4.18	
									556.46	
									556.46 x 5 =	2,782.30

N.O.3
IRRIGATION
SYPHON

Table 2. Concrete, form & Others.

Kind's	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
<u>Concrete Work</u>					
Reinforced Concrete				15.30	
Form				41.04	
Reinforcement				1667.38	
<u>Others Work</u>					
Wet Masonry				123.41	
Dry Stone Pitching				1.50	
Water Stop				74.80	

No 3
IRRIGATION
SYPHON

Table 2 Concrete, form & Others.

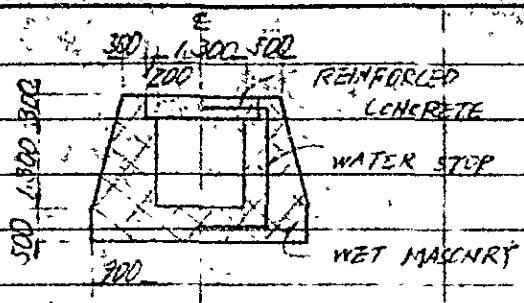
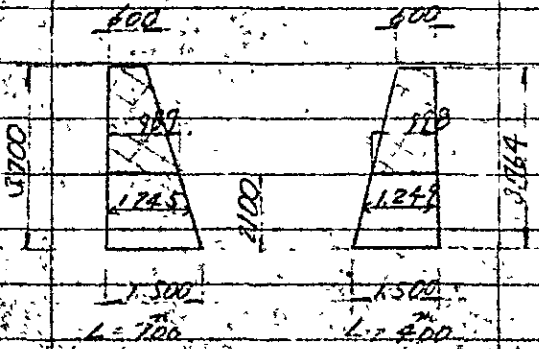
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
	 <p style="text-align: center;">TYPICAL SECTION</p>				
Reinforced concrete	$1.70 \times 0.30 \times 30.0$	=		15.30	
Wet masonry	$\frac{1}{2} \times (1.50 + 0.90) \times 1.60 - 0.30 \times 0.25 \times 30.0 =$ $3.10 \times 0.50 \times 30.0 =$	=		63.60 46.50	
	Sub-Total			110.10	
					
	$\frac{1}{2} (0.60 + 1.50) \times 3.70 \times 7.00$	=		27.20	
	$\frac{1}{2} (0.60 + 1.50) \times 3.764 \times 6.00$	=		15.81	
	$\frac{1}{2} \times (3.10 + 2.30) \times 1.60 - 3.10 \times 0.50 \times$ $\times (1.245 + 1.249)$	=		174.64	
	Sub-Total			26.81	

Table 2 Concrete, form & Others.

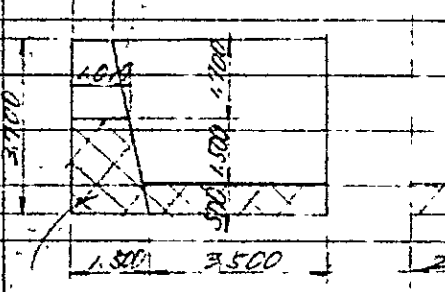
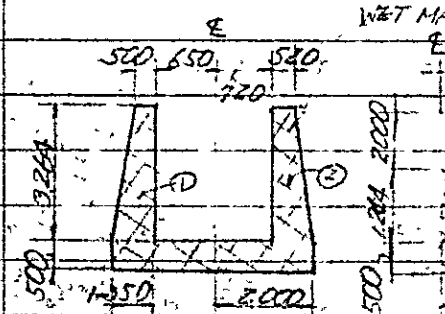
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
Wet masonry Inlet of Transition			500	WET MASONRY	
	<p>WET MASONRY L = 7.80</p>		LM = $\frac{1}{2}(3500 + 600) = 395$		
	$\frac{1}{2} \times (150 + 600) \times 370 \times 7.80 =$			30.20	
	$1) \frac{1}{2} \times (0.60 \times 600 + 1.014 \times 100) \times 170 =$			1) 2.90	
	<p>Sub-total</p>			27.40	
	$\frac{1}{2} \times (0.5 + 1.5) \times 320 \times 395 \times 2$			52.28	
	$2.0 \times 0.50 \times 3.95 \times 2$			7.65	
	<p>Sub-total</p>			52.93	
Outlet of Transition					
			WET MASONRY		
	<p>Section D</p>				
	$\frac{1}{2} \times (0.50 + 1.35) \times 3264 \times 2$			8.04	
	$+ 6.0 \times 0.50 =$				

Table 2 Concrete, form & Others

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	Section ②				
	$\frac{1}{2} \times (0.52 + 1.28) \times 3264 \times 2$				
	+ 4.0 x 0.50 = 7.88				
	Section ③				
	$\frac{1}{2} \times (4.0 + 3.2) \times 3264 + 4.0 \times 0.50$				
	- 2.0 x 2.0 = 9.68				
	$\frac{1}{2} \times (8.04 + 7.88) \times 100 =$			7.96	
	$\frac{1}{2} \times (7.88 + 9.68) \times 400 =$			35.12	
	Sub-total			43.08	
	Total of wet assembly			123.41	
	Form				
	130 x 30.0 + 170 x 30 x 4 =			41.04	
	Water step B=150				
	1 = (2.0 + 1.7) x 2 x 2 + 30.0 x 2 =			70.80	
	Reinforcement #16 L=202.10 x 3				
	1578.75 = 202 x 3			7.56	
	Any steel netting				
	100 x 0.50 = 5.00			1.50	

H0.3
IRRIGATION SYPHON Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ19	1.58	0.36		1.94	2.226	4.32	34	146.88	
2	Φ13	1.58	0.34		1.82	1.042	1.90	54	64.60	
3	"	9.78	0.48	0.52	10.78	"	11.25	12	134.76	
4	Φ19	1.00	0.36		1.36	2.226	3.03	68	206.04	
5	Φ9	0.38			0.38	0.499	0.19	22	4.18	
									556.46	
									556.46 × 3 =	1,669.38

IRRIGATION TUNNEL FOR B ROUTE

KINDS	UNIT	NO 1	NO 2	NO 3	TOTAL	REMARKS
1) EARTH WORK						
EXCAVATION	m ³	5976.7	5686.3	5472.3	17135.3	
EMBANKMENT	m ³		34.5		34.5	
BACKFILLING	m ³	1781.8	2319.5	1655.3	5756.6	
2) CONCRETE WORK						
REINFORCED CONCRETE	m ³	101.28	195.68	2754	384.80	
FORM	m ²	168.46	427.00	148.46	743.92	
REINFORCEMENT	Kg	2191.21	14935.58	7336.46	31463.25	
3) OTHERS						
NET MASONRY	m ³	488.62	1039.22	441.14	1969.78	

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ESTIMATION SHEET FOR C ROUTE

No. 74

KINDS	UNIT	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10	NO. 11	TOTAL	REMARKS
CONCRETE WORK											
REINFORCED CONCRETE	m ³	25.74	18.46	15.91	765.17	23.66	282.60	12.46	62.66	1208.66	
FORM	m ²	61.92	45.01	55.01	1385.12	66.44	651.92	45.21	171.64	2460.57	
REINFORCEMENT	Kg	2382.14	1304.52	1284.74	54499.13	2845.70	25920.20	1704.51	7532.68	97873.76	
(E) OTHERS											
MEI. MASONRY	m ²	230.56	189.36	163.11	3504.56	500.08	1684.20	189.36	714.70	6975.93	

NO. 1 IRRIGATION CULVERT					
Table 2 Concrete, form & Others					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
EARTH WORK					
				m ³	
Excavation				5976.7	
Backfilling				1781.8	
CONCRETE WORK					
				m ²	
Reinforced Concrete				101.28	
Form				168.46	
Reinforcement				9191.21	
OTHERS WORK					
				m ³	
Wet Masonry				488.62	

No. 1 IRRIGATION CULVERT					
Table 2 Concrete, form & Others.					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m)	
<u>Embankment Work</u>					
Excavation	OPEN TRANSITION				
	$\frac{1}{2}((1)+(2)) \times 10.00 \times 2 = \frac{1}{2}(133.9 + 115.6) \times 10.00 \times 2$			2495.0	
	BOX CULVERT				
	① $\times 1.00 \times 2 = 1116.5 \times 1.00 \times 2$			2232	
	$\frac{1}{2}((1)+(2)) \times 11.50 \times 2 = \frac{1}{2}(111.6 + 119.7) \times 11.50 \times 2$			2660.0	
	② $\times 5.00 = 119.7 \times 5.00$			598.5	
	sub total			3481.7	
	total			5776.7	
<u>Backfill Work</u>					
	OPEN TRANSITION				
	$\frac{1}{2}((1)+(2)) \times 10.00 \times 2 = \frac{1}{2}(2.0 + 16.8) \times 10.00 \times 2$			178.0	
	BOX CULVERT				
	① $\times 1.00 \times 2 = 16.1 \times 1.00 \times 2$			32.2	
	$\frac{1}{2}((1)+(2)) \times 11.50 \times 2 = \frac{1}{2}(9.1 + 93.6) \times 11.50 \times 2$			1157.6	
	② $\times 5.00 = 93.6 \times 5.00$			468.0	
	sub total			1653.8	
	total			1781.8	
<u>Concrete Work</u>					
Box Culvert	BOX CULVERT				
	0.36 $\times 10.00 \times 3$			10.80	
	0.24 $\times 2$			0.48	
	total			11.28	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
<i>Form</i>	BOX-CULVERT				
	3.1 x 0.55 x 4			13.32	
	2.50 x 10.00 x 2 x 3			150.00	
	0.20 x 6.4 x 2 x 2			0.98	E
	0.30 x 0.20 x 2 x 2			0.16	E
	<i>total</i>			167.46	
<i>Others</i>					
<i>Wet Masonry</i>	OPEN TRANSITION				
	1/2(①+②) x 10.00 x 2 = 1/2(5.59+8.19) x 10.00 x 2			137.80	
	0.36 x 2			0.72	G
	<i>sub total</i>			138.52	
	BOX-CULVERT				
	11.67 x 10.00 x 3			350.10	
	<i>total</i>			488.62	

No. 1 Table 3 Reinforcement.
IRRIGATION CULVERT

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ22	5.98	0.80	0.00	7.66	2.984	22.86	201	4594.86	
2	φ16	5.98	0.60	0.64	7.22	1.578	11.39		2289.39	
3	φ13	9.88	0.48	0.52	10.88	1.042	11.34	132	1496.88	
4		5.98	0.48	0.52	6.98		7.27	4	29.08	
5		0.63	0.24		0.87		0.91	88	80.08	
6	φ19	1.00	0.36		1.36	2.226	3.03	204	618.12	
7	φ9	0.93			0.93	0.499	0.46	180	82.80	
									9191.21	

140.2 IRRIGATION CULVERT Table 2 Concrete, form & Others.					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
<u>Earth-works</u>					
Excavation	$1157.0 - 4529.3$			5126.3	
Embankment	$225 + 12.0$			325	
Backfilling	$1209 + 2198.6$			2379.5	
<u>Concrete-works</u>					
Reinforced concrete	$2.44 \times 10.00 \times 8 + 0.24 \times 2$			$= 195.68$	^{m³}
Form	$2.44 \times 9 + 50.00 \times 8 + 0.08 \times 2 + 2.44 \times 2$			$= 477.00$	^{m²}
REINFORCEMENT				4935.58	^{kg}
<u>Others</u>					
Wet masonry	$\frac{1}{2}(5.51 + 6.98) \times 10.00 \times 2 + 0.36 \times 2$			$= 125.62$	^{m³}
	$14.42 \times 10.00 \times 8$			$= 913.60$	
	<i>total</i>			1039.22	^{m³}

HC 2
IRRIGATION CULVERT Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg, unit)	Number	Total Weight (kg)	Remarks
1	Φ16	5.98	0.60	0.64	7.22	1.578	11.39	67×8	6105.04	
2	Φ13	5.98	0.48	0.52	6.98	1.042	7.27	67×8	3896.72	
3	"	9.88	0.48	0.52	10.88	"	11.34	22×8	1995.84	
4	"	9.88	0.48	0.52	10.88	"	11.34	22×8	1995.84	
5	"	0.43	0.24		0.67	"	0.70	22×8	61.60	
6	"	5.98	0.48	0.52	6.98	"	7.27	2×2	29.08	
7	Φ19	1.00	0.36		1.36	2.226	5.03	34×8	824.16	
8	Φ9	0.78			0.78	0.499	0.39	7×10	27.30	
									14935.58	

NO. 3 IRRIGATION CULVERT Table 2 Concrete, form & Others.					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>EARTH WORK</u>					
Excavation				m ³ 5472.3	
Backfilling				m ³ 1655.3	
<u>CONCRETE WORK</u>					
Reinforced concrete				m ³ 87.84	
Form				m ² 148.46	
Reinforcement				kg 7336.46	
<u>OTHERS WORK</u>					
Wet masonry				m ³ 4419.4	

No. 3 IRRIGATION CULVERT					
Table 2 Concrete, form & Others					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>Earth Work</u>					
Excavation	OPEN TRANSITION			246.0	
	BOX CULVERT				
	① × 1.10 × 2 = 111.6 × 1.10 × 2			245.5	
	$\frac{1}{2}(\text{①} + \text{②}) \times 84 \times 2 = \frac{1}{2}(111.6 + 117.7) \times 84 \times 2$			1942.7	
	② × 7.00 = 117.7 × 7.00			837.9	
	sub total			3026.3	
	total			3272.3	
<u>Backfilling</u>					
Backfilling	OPEN TRANSITION			120	
	BOX CULVERT				
	① × 1.10 × 2 = 1 × 1.10 × 2			17.8	
	$\frac{1}{2}(\text{①} + \text{②}) \times 84 \times 2 = \frac{1}{2}(7.1 + 23.6) \times 84 \times 2$			854.3	
	② × 7.00 = 93.6 × 7.00			655.2	
	sub total			1527.3	
	total			1657.3	
<u>Concrete Work</u>					
Reinforced Concrete	BOX CULVERT				
	3.36 × (10.00 × 2 + 6.00)			87.36	
	2.24 × 2			4.48	E
	total			91.84	
Form	BOX CULVERT				
	26.7 × 0.86 × 4			92.2	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m)	
	$2.50 \times 10.00 \times 2 \times 2$			100.00	
	$2.50 \times 6.00 \times 2 \times 1$			30.00	
	$0.20 \times 6.1 \times 2 \times 2$			4.88	
	$0.20 \times 0.20 \times 2 \times 2$			0.16	
	<i>total</i>			145.04	
<i>Others</i>					
<i>Wet Masonry</i>	<i>OPEN TRANSITION</i>			138.52	
	<i>BOX CULVERT</i>				
	$11.67 \times (10.00 \times 2 + 6.00)$			303.42	
	<i>total</i>			441.94	

No.3 Table 3 Reinforcement.
IRRIGATION CULVERT

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ22	5.98	0.80	0.80	7.66	2.984	22.86	174	3977.64	
2	φ16	5.98	0.60	0.64	7.22	1.578	11.39	"	1921.86	
3	φ13	9.88	0.48	0.52	10.88	1.042	11.34	11	498.96	
3'	"	5.88	0.48	0.52	6.88	"	7.17	22	157.74	
4	"	5.98	0.48	0.52	6.98	"	7.27	4	29.08	
5	"	0.63	0.24		0.87	"	0.91	88	80.50	
6	φ19	1.00	0.36		1.36	2.226	3.03	178	537.34	
7	φ9	0.93			0.93	0.499	0.46	156	71.76	
									7336.46	

N04
IRRIGATION CULVERT Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ13	2.48	0.24		2.72	1.042	2.83	96	271.68	
2	Φ19	2.48	0.36		2.84	2.226	6.32	180	1188.16	
3	Φ13	9.88	0.48	0.52	10.88	1.042	11.34	36	408.24	
3'	"	7.88	0.48	0.52	8.88	"	9.25	18	166.50	
4	"	2.48	0.24		2.72	"	2.83	4	11.32	
5	"	0.43	0.24		0.47	"	0.70	36	25.20	
6	Φ19	1.00	0.36		1.36	2.226	3.03	96	290.88	
7	Φ9	0.73			0.73	0.499	0.36	56	20.16	
									2382.14	

N05
IRRIGATION CULVERT

Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ13	2.48	0.24		2.72	1.042	2.83	68	192.44	
2	Φ19	2.48	0.36		2.84	2.726	6.32	134	846.88	
3	Φ13	9.88	0.48	0.52	10.88	1.042	11.34	36	408.24	
3'	NOTHING									
4	Φ13	2.43	0.24		2.72	1.042	2.83	4	11.32	
5	"	0.43	0.24		0.67	"	0.70	36	25.20	
6	Φ19	1.00	0.36		1.36	2.726	3.03	68	206.04	
7	Φ9	0.73			0.73	0.499	0.36	40	14.40	
									1704.52	

No. 6
IRRIGATION CULVERT Table 3 Reinforcement.

Kind	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ13	2.48	0.24		2.72	1.042	2.83	51	144.33	
2	φ19	2.48	0.36		2.84	2.226	6.32	101	639.32	
3	φ13	9.88	0.48	0.52	10.88	1.042	11.34	18	204.12	
3	"	4.88	0.24		5.12	"	5.34	18	96.12	
4	"	2.48	0.24		2.72	"	2.83	4	11.32	
5	"	0.43	0.24		0.67	"	0.70	36	25.20	
6	φ19	1.00	0.36		1.36	2.226	3.03	51	154.53	
7	φ9	0.73			0.73	0.499	0.36	30	10.80	
									1284.71	

No. 7
IRRIGATION CULVERT Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ13	2.48	0.24		2.72	1.042	2.83	2217	6274.11	
2	Φ19	2.48	0.36		2.84	2.226	6.32	4369	27612.08	
3	Φ13	9.88	0.48	0.52	10.88	1.042	11.34	1152	13063.68	
3'	"	11.94	0.72	1.04	13.70	"	14.58	18	257.04	
4	"	2.48	0.24		2.72	"	2.93	4	11.32	
5	"	0.53	0.24		0.77	"	0.90	36	29.80	
6	Φ19	1.00	0.36		1.36	2.226	3.03	2217	6717.51	
7	Φ9	0.83			0.83	0.499	0.41	1304	534.64	
									54499.18	

NO. 8:
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	<u>Concrete works</u>				
	<u>Reinforced concrete</u>				
	23.66		=	23.66 ^{m³}	
	<u>Form</u>				
	66.44		=	66.44 ^{m²}	
	<u>Reinforcement</u>				
	<u>Others</u>				
	<u>Wet masonry</u>				
	85.66 + 153.08 + 61.34		=	300.08 ^{m³}	

NO 8
IRRIGATION CULVERT Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ13	2.48	0.24		2.72	1.042	2.83	34×3	288.66	
2	φ19	2.48	0.36		2.84	2.226	6.32	67×3	1270.32	
3	φ13	9.88	0.48	0.52	10.88	1.042	11.34	18×3	612.36	
4	"	2.48	0.24		2.72	"	2.83	2×2	11.32	
5	"	0.38	0.24		0.62	"	0.65	9×4	23.40	
6	φ19	1.00	0.36		1.36	2.226	3.03	18×3	618.12	
7	φ9	0.73			0.73	0.499	0.36	20×3	21.60	
									2845.78	

NO. 9. IRRIGATION CULVERT Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
	<u>Concrete work</u>				
	Reinforced concrete			33.60	m ³
	Form			651.92	m ²
	Reinforcement			25920.20	kg
	<u>Others</u>				
	Wet masonry			86.36 + 1597.84	
				= 1364.20	m ³

N09

IRRIGATION COLVERT Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ13	2.48	0.24		2.72	1.042	2.83	1055	2985.65	
2	Φ19	2.48	0.36		2.84	2.226	6.32	2030	13145.60	
3	Φ13	9.88	0.48	0.52	10.88	1.042	11.34	540	6123.60	
5'	"	10.14	0.48	0.52	11.14	"	11.61	18	208.98	
4	"	2.48	0.24		2.72	"	5.83	4	11.32	
5	"	0.43	0.20		0.63	"	0.70	36	25.20	
6	Φ19	1.00	0.36		1.36	2.226	3.03	1055	3196.65	
7	Φ9	0.73			0.73	0.499	0.36	620	223.20	
									25920.20	

NO. 10
IRRIGATION
CHUVERT

Table 2 Concrete, form & Others:

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m' (m')	
<u>Concrete work</u>					
Reinforced concrete				18.16	m ³
Form				45.01	m ²
Reinforcement				1706.52	kg
<u>Others</u>					
Wet masonry	86.36 + 103.00			= 189.36	m ³

11010
IRRIGATION CULVERT Table 3 Reinforcement.

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ13	248	0.34		272	1.042	283	68	192.44	
2	Φ19	248	0.36		284	2.226	632	134	846.88	
3	Φ13	998	0.48	0.52	10.88	1.042	1134	36	409.34	
3'	NOTHING									
4	Φ13	248	0.24		272	1.042	285	4	11.32	
5	"	0.43	0.24		0.67		0.70	56	25.20	
6	Φ19	1.00	0.36		1.36	2.226	503	68	206.04	
7	Φ9	0.23			0.73	0.499	0.36	40	14.40	
									1714.52	

NO. 11.
IRRIGATION Table 2 Concrete, form & Others.
CULVERT

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	<u>Concrete work</u>				
	<u>Reinforced concrete</u>				
	65.00		=	62.66	m ³
	<u>Form</u>				
	171.64		=	171.64	m ²
	<u>Reinforcement</u>				
				2532.68	kg
	<u>Others</u>				
	<u>Wet masonry</u>				
	85.66 + 408.00 + 220.54		=	714.20	m ³

NO 11

IRRIGATION CULVERT

Table 3 Reinforcement.

Kind	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ13	2.48	0.24		2.72	1.042	2.83	34x8	769.76	
2	Φ19	2.48	0.36		2.84	2.226	6.32	67x8	3387.52	
3	Φ13	9.88	0.48	0.52	10.88	1.042	11.34	18x8	1632.96	
4	"	2.48	0.24		2.72	"	2.83	2x2	11.32	
5	"	0.43	0.24		0.67	"	0.70	9x4	25.20	
6	Φ19	1.00	0.36		1.36	2.226	3.03	68x8	1648.32	
7	Φ9	0.73			0.73	0.499	0.36	20x8	57.60	
									7532.68	

No. 1 No. 3
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²) (m ³)	
OPEN TRANSITION					
SECTION (1) SECTION (2)					
SECTION ①					
Excavation:	$\frac{1}{2}(2 \times 1.39 + 2 \times 1.20) \times 1.90$			m ² 49.2	
	$\frac{1}{2}(2 \times 1.10 + 2 \times 3.00) \times 3.00$			57.0	
	$\frac{1}{2}(2 \times 1.70 + 2 \times 3.80) \times 1.70$			17.7	
	$\frac{1}{2}(2 \times 3.80 + 2 \times 3.25) \times 1.10$			7.7	
	$\frac{1}{2}(1.8 + 2.10) \times 0.30 \times 2$			1.5	
	total			133.1	
Backfilling	$\frac{1}{2} \times 0.20 \times 0.40 \times 2$			m ² 0.1	
	$\frac{1}{2} \times 1.15 \times 0.70 \times 2$			0.8	
	$\frac{1}{2}(1.15 + 0.85) \times 0.35 \times 2$			0.7	
	$\frac{1}{2}(1.50 + 0.65) \times 0.30 \times 2$			0.3	
	$\frac{1}{2} \times 0.15 \times 0.30 \times 2$			0.1	
	total			m ² 2.0	

Table 2 Concrete, form & Others.

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
SECTION ②					
Excavation	$\frac{1}{2}(2 \times 11.55 + 2 \times 9.75) \times 1.80$			37.3	
	$\frac{1}{2}(2 \times 8.75 + 2 \times 5.75) \times 3.00$			21.5	
	$\frac{1}{2}(2 \times 5.75 + 2 \times 4.75) \times 3.30$			25.3	
	$\frac{1}{2}(2 \times 2.40 + 2 \times 2.55) \times 0.30$			0.5	
	<i>total</i>			84.6	
Backfilling	$\frac{1}{2} \times 2.15 \times 0.30 \times 2$			0.1	
	$\frac{1}{2}(0.50 + 0.57) \times 0.3 \times 2$			0.3	
	$\frac{1}{2}(0.77 + 0.70) \times 3.00 \times 2$			10.4	
	<i>total</i>			10.8	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	E				
	11.200		8,900		
	1.000				
	8.200				
	2.000				
	3.350				
	4.350				
	0.700				
	2.750				
	500				
	4.350				
	1.350				
	500				
	<u>BOX CULVERT</u>				
	SECTION ①		SECTION ②		
	SECTION ①				
Excavation	$\frac{1}{2}(2 \times 11.20 + 2 \times 9.20) \times 1.30$			m ² 36.7	
	$\frac{1}{2}(2 \times 8.20 + 2 \times 5.35) \times 3.0$			40.7	
	$\frac{1}{2}(2 \times 5.35 + 2 \times 4.55) \times 3.05$			34.2	
	total			m ² 111.6	
Backfilling	$\frac{1}{2}(1.50 + 1.30) \times 3.45 \times 2$			m ² 6.2	
	$\frac{1}{2} \times 0.70 \times 2.75 \times 2$			1.9	
	total			m ² 8.1	
	SECTION ②				
Excavation	$\frac{1}{2}(2 \times 8.98 + 2 \times 4.55) \times 8.85$			m ² 119.7	
Backfilling	$\frac{1}{2}(2 \times 8.78 + 2 \times 4.55) \times 8.85$			m ² 119.7	
	$\frac{1}{2}(2 \times 3.35 + 2 \times 4.05) \times 2.75$			20.4	

No. 1 No. 3 IRRIGATION CULVERT Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
	SECTION ①		SECTION ②		
Wet Masonry	SECTION ①			m ²	
	$1.50 \times 1.50 \times 2$			2.90	A
	$0.30 \times 1.30 \times 2$			0.78	B
	$\frac{1}{2} \times 0.90 \times 0.37 \times 2$			0.33	C
	$\frac{1}{2} \times 0.30 \times (0.90 - 0.30) \times 0.170 \times 2$			0.24	D
	$\frac{1}{2} [(1.50 + 0.50) \times 0.51 + 2 \times 0.51^2] \times 2$			3.17	E
	$\frac{1}{2} (0.20 + 0.35) \times 0.10 \times 2$			0.17	F
	total			5.59	
	SECTION ②				
	$0.30 \times 2.75 \times 2$			1.65	A
	$0.30 \times 1.90 \times 2$			1.14	B
	$\frac{1}{2} (1.50 + 0.30) \times 0.60 \times 2$			0.90	C
	total			3.69	
	$\frac{1}{2} (0.30 + 0.10) \times 0.40 \times 1.00 \times 2$			0.36	G

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²) (m ³)	
	6,700				
	300 300 2,500 500 2,500 300 300			200	
				200	E
	1,300 2,500 500 2,500 1,300			2.00	
	<u>BOX CULVERT</u>				
Reinforced Concrete	o 55 x 6.10			336	
	o 20 x 0.20 x 6.10			24	E
Wet Masonry	o 70 x 8.10			567	A
	$\frac{1}{2} \times (0.30 + 1.00) \times 2.75 \times 2$			3.57	D
	o 50 x 2.20			110	B
	o 30 x 2.20 x 2			132	C
	total			1167	

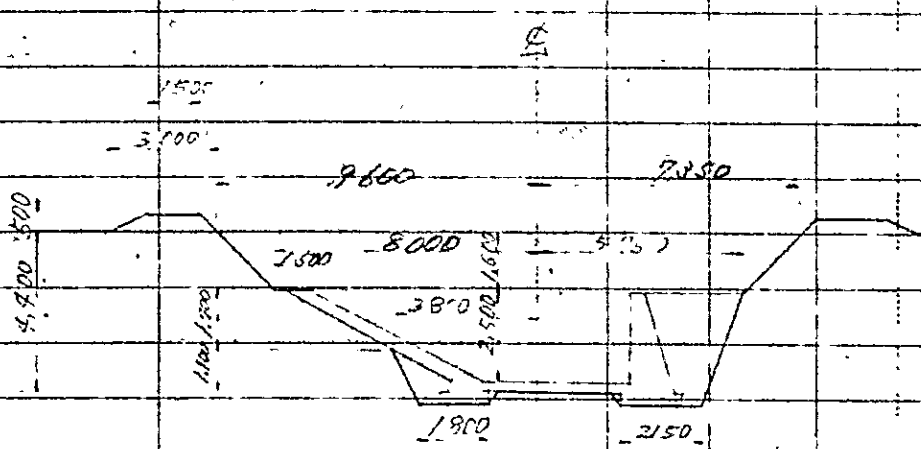
NO.2 IRRIGATION CULVERT Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
	(OPEN TRANSITION)				
	E				
	OPEN TRANSITION				
	SECTION ①		SECTION ②		
	SECTION ①				
Excavation	$\frac{1}{2}(2 \times 10.12 + 2 \times 3.50) \times 2.20$	=	39.26	m ²	
	$\frac{1}{2}(2 \times 7.20 + 2 \times 3.90) \times 1.70$	=	19.70		
	$\frac{1}{2}(2 \times 3.80 + 2 \times 3.10) \times 0.90$	=	5.52		
	$\frac{1}{2}(2.10 + 1.80) \times 0.30 \times 2$	=	1.17		
	total		65.65	m ²	①
Backfilling	$\frac{1}{2} \times 0.20 \times 0.40 \times 2$	=	0.08	m ²	
	$\frac{1}{2} \times 1.15 \times 0.93 \times 2$	=	0.84		
	$\frac{1}{2}(0.15 + 0.85) \times 0.37 \times 2$	=	0.74		
	$\frac{1}{2}(0.65 + 0.50) \times 0.30 \times 2$	=	0.35		
	$\frac{1}{2} \times 0.15 \times 0.30 \times 2$	=	0.05		
	total		2.06	m ²	①

NO. 2 IRRIGATION CULVERT					
Table 2 Concrete, form & Others.					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ²)	
	SECTION ②				
Excavation	$\frac{1}{2}(2 \times 7.95 + 2 \times 5.75) \times 2.20$	=	30.10	m ²	
	$\frac{1}{2}(2 \times 5.75 + 2 \times 4.76) \times 2.80$	=	22.43		
	$\frac{1}{2}(2.20 + 2.15) \times 0.30 \times 2$	=	1.31		
	total		60.88	m ²	②
Backfilling	$\frac{1}{2} \times 0.15 \times 0.30 \times 2$	=	0.05	m ²	
	$\frac{1}{2}(0.50 + 0.55) \times 0.30 \times 2$	=	0.32		
	$\frac{1}{2}(0.75 + 2.70) \times 2.80 \times 2$	=	9.66		
	total		10.03	m ²	②

N.O. 2
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²)	
				(m ²)	
					
<p>OPEN TRANSITION SECTION (3) SECTION (4)</p>					
SECTION (3)					
Excavation	$\frac{1}{2}(2 \times 9.60 + 2 \times 8.00) \times 1.50$	=	28.16	m ²	
	$\frac{1}{2}(2 \times 7.20 + 2 \times 3.80) \times 1.70$	=	18.70	m ²	
	$\frac{1}{2}(2 \times 3.80 + 2 \times 3.10) \times 0.80$	=	5.52	m ²	
	$\frac{1}{2}(2.10 + 1.80) \times 0.30 \times 2$	=	1.17	m ²	
	total			53.55	m ² (3)
Embankment	$\frac{1}{2}(1.50 + 3.00) \times 0.50 \times 2$	=	2.25	m ²	
Bank Sloping	$\frac{1}{2} \times 0.20 \times 0.40 \times 2$	=	0.08	m ²	
	$\frac{1}{2} \times 1.15 \times 0.73 \times 2$	=	0.84	m ²	
	$\frac{1}{2}(1.15 + 0.85) \times 0.39 \times 2$	=	0.74	m ²	
	$\frac{1}{2}(0.65 + 0.50) \times 0.30 \times 2$	=	0.35	m ²	
	$\frac{1}{2} \times 0.15 \times 0.30 \times 2$	=	0.05	m ²	
	total			2.06	m ² (3) - (1)

NO. 2 IRRIGATION CULVERT					
Table 2 Concrete, form & Others.					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (ml)	
SECTION ④					
Excavation	$\frac{1}{2}(2 \times 7.35 + 2 \times 5.75) \times 1.60$	=	20.96	m ²	
	$\frac{1}{2}(2 \times 5.75 + 2 \times 4.76) \times 2.80$	=	29.93		
	$\frac{1}{2}(2.21 + 2.15) \times 0.30 \times 2$	=	1.31		
	total		51.70	m ²	④
Embankment	$\frac{1}{2}(1.50 + 3.00) \times 0.50 \times 2$	=	2.25	m ²	
Backfilling	$\frac{1}{2} \times 0.15 \times 0.30 \times 2$	=	0.05	m ²	
	$\frac{1}{2}(0.50 + 0.55) \times 0.30 \times 2$	=	0.32		
	$\frac{1}{2}(0.75 + 2.70) \times 2.80 \times 2$	=	9.66		
	total		10.03	m ²	④ ⑤

NO. 2 IRRIGATION CULVERT Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total (m) (m ³)	Remarks
<i>Earth-work (OPEN TRANSITION)</i>					
<i>Excavation</i>	$\frac{1}{2}(\textcircled{1} + \textcircled{2}) \times 10.00 = \frac{1}{2}(65.25 + 60.88) \times 10.00$			= 630.7	m ³
	$\frac{1}{2}(\textcircled{3} + \textcircled{4}) \times 10.00 = \frac{1}{2}(53.55 + 51.70) \times 10.00$			= 526.3	
	<i>sub total</i>			1157.0	m ³
<i>Embankment</i>	$\frac{1}{2}(225 + 225) \times 10.00$			= 225	m ³
<i>Backfilling</i>	$\frac{1}{2}(\textcircled{1} + \textcircled{2}) \times 10.00 \times 2 = \frac{1}{2}(2.06 + 1203) \times 2$			= 120.9	m ³

NO. 2. IRRIGATION CULVERT Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ²)	
	5				
	7.950 7.950				
	2.500 3.350 3.350				
	500 4.250 4.250 500				
	BOX CULVERT				
	SECTION ⑤ SECTION ⑥				
	SECTION ⑤				
Excavation	$\frac{1}{2}(2 \times 7.95 + 2 \times 5.85) \times 1.90$	=	25.2	m ²	
	$\frac{1}{2}(2 \times 5.85 + 2 \times 7.95) \times 3.20$	=	33.9	m ²	
	total		59.1	m ²	
Backfilling	$\frac{1}{2}(1.60 + 0.50) \times 3.20 \times 2$	=	6.7	m ²	
	$1 \times 0.90 \times 3.60 \times 2$	=	3.5	m ²	
	total		9.0	m ²	
	SECTION ⑥				
Excavation	$\frac{1}{2}(2 \times 7.30 + 2 \times 4.75) \times 5.10$	=	61.5	m ²	
Backfilling	$\frac{1}{2}(2 \times 7.30 + 2 \times 4.75) \times 5.10$	=	61.5	m ²	
	$\frac{1}{2}(2 \times 3.35 + 2 \times 4.25) \times 5.60$	=	71.98	m ²	
	$4.35 \times 0.60 \times 2$	=	5.1	m ²	
	total		36.6	m ²	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
	<p style="text-align: center;">14.00</p> <p style="text-align: center;">6.70</p> <p style="text-align: center;">4.50</p> <p style="text-align: center;">5.00 4.25 2.50 5.00</p>				
	BOX CULVERT				
	SECTION ⑦				
	SECTION ⑦				
Excavation	$\frac{1}{2}(14.00+9.50) \times 4.50$		=	52.9 m ²	
Backfilling	$\frac{1}{2}(14.00+9.50) \times 4.50$		=	52.9 m ²	
	$\frac{1}{2}(6.70+8.50) \times 2.50$		=	(-) 19.8	
	8.50×0.10		=	(-) 5.1	
	total.			28.0 m ²	

Table 2 Concrete, form & Others.

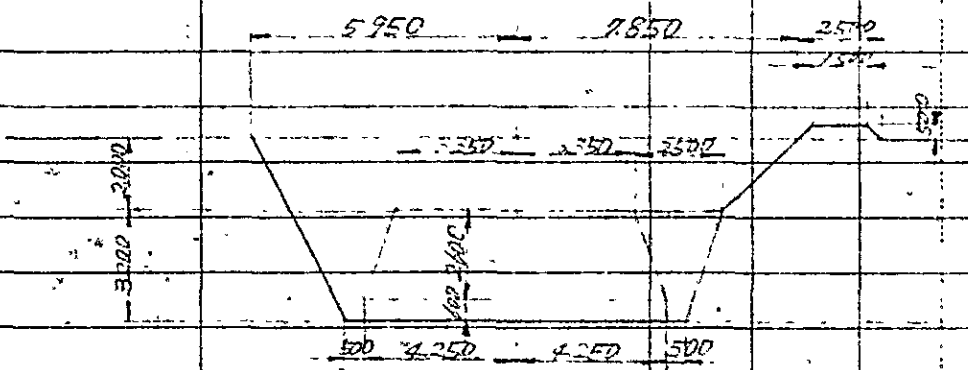
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²) (m ²)	
					
BOX CULVERT					
SECTION ⑧					
Excavation	$\frac{1}{2}(2 \times 5.95 + 2 \times 4.75) \times 5.20$		= 55.6	m ²	
Backfilling	$\frac{1}{2}(2 \times 5.95 + 2 \times 4.75) \times 5.20$		= 55.6	m ²	
	$\frac{1}{2}(2 \times 3.25 + 2 \times 4.25) \times 2.60$		= (-) 19.8		
	$4.25 \times 0.50 \times 2$		= (-) 4.3		
	Total		31.5	m ²	
SECTION ⑨					
Excavation	$\frac{1}{2}(2 \times 7.85 + 2 \times 5.85) \times 2.00$		= 57.4	m ²	
	$\frac{1}{2}(2 \times 5.85 + 2 \times 4.95) \times 3.20$		= 33.9		
	Total		61.3	m ²	
Embankment	$\frac{1}{2}(3.50 + 1.50) \times 0.50 \times 2$		= 2.0	m ²	

Table 2 Concrete, form & Others..

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ²)	
<i>Backfilling</i>	$\frac{1}{2}(1.60+0.50) \times 3.20 \times 2$	=	6.7	m ²	
	$\frac{1}{2} \times 0.70 \times 2.60 \times 2$	=	2.3		
	<i>total</i>		9.0	m ²	

No. 2. IRRIGATION CULVERT Table 2 Concrete, form & Others.

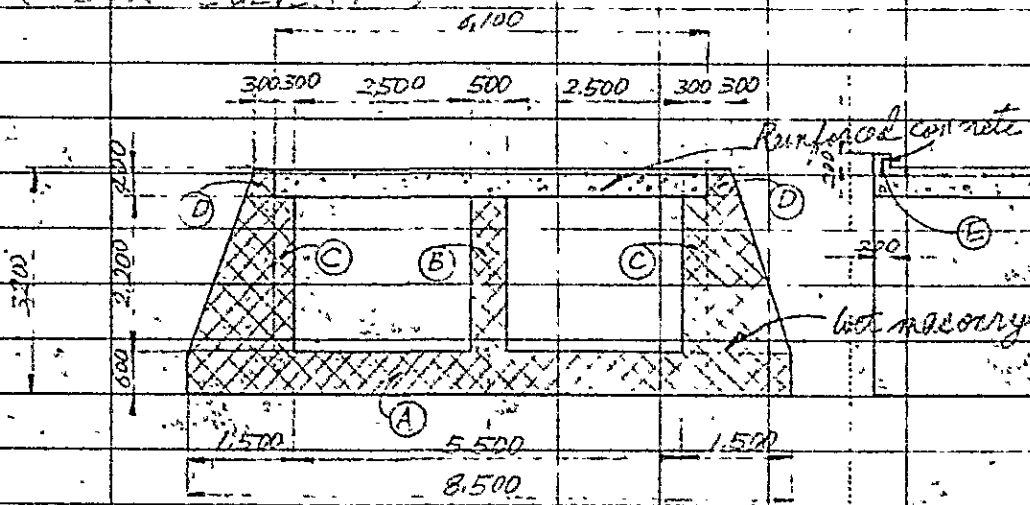
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ³)	
	Earth work (BOX CULVERT)				
Excavation	⑤ × 1.00 = 59.7 × 1.00		=	59.7	m ³
	$\frac{1}{2}(\textcircled{5} + \textcircled{6}) \times 4.00 = \frac{1}{2}(59.7 + 61.5) \times 4.00$		=	242.4	
	⑥ × 3.00 = 61.5 × 3.00		=	184.5	
	$\frac{1}{2}(\textcircled{6} + \textcircled{7}) \times 2.00 = \frac{1}{2}(61.5 + 52.9) \times 2.00$		=	114.4	
	⑦ × 60.00 = 52.9 × 60.00		=	3174.0	
	$\frac{1}{2}(\textcircled{7} + \textcircled{8}) \times 2.00 = \frac{1}{2}(52.9 + 55.6) \times 2.00$		=	108.5	
	⑧ × 3.00 = 55.6 × 3.00		=	166.8	
	$\frac{1}{2}(\textcircled{8} + \textcircled{9}) \times 4.00 = \frac{1}{2}(55.6 + 61.3) \times 4.00$		=	233.8	
	⑨ × 1.00 = 61.3 × 1.00		=	245.2	
		total			4522.3
Embankment	$\frac{1}{2} \times \textcircled{9} \times 4.00 \times 2 = \frac{1}{2} \times 2.00 \times 4.00 \times 2$		=	8.0	m ³
	⑨ × 1.00 × 2 = 3.00 × 1.00 × 2		=	4.0	
	total			12.0	m ³
Backfilling	⑤ × 1.00 = 9.0 × 1.00		=	9.0	m ³
	$\frac{1}{2}(\textcircled{5} + \textcircled{6}) \times 1.00 = \frac{1}{2}(9.0 + 36.6) \times 1.00$		=	91.2	
	⑥ × 3.00 = 36.6 × 3.00		=	109.8	
	$\frac{1}{2}(\textcircled{6} + \textcircled{7}) \times 2.00 = \frac{1}{2}(36.6 + 28.0) \times 2.00$		=	64.6	
	⑦ × 60.00 = 28.00 × 60.00		=	1680.0	
	$\frac{1}{2}(\textcircled{7} + \textcircled{8}) \times 2.00 = \frac{1}{2}(28.00 + 31.5) \times 2.00$		=	59.5	
	⑧ × 3.00 = 31.5 × 3.00		=	94.5	
	$\frac{1}{2}(\textcircled{8} + \textcircled{9}) \times 4.00 = \frac{1}{2}(31.5 + 9.0) \times 4.00$		=	81.0	
	⑨ × 1.00 = 9.0 × 1.00		=	9.0	
		total			2198.6

NO. 2
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	(OPEN TRANSITION)				
	SECTION ①		SECTION ②		
Wet masonry	SECTION ①				
	$0.30 \times 1.50 \times 2$	=	2.90 m^2		A
	$0.30 \times 1.30 \times 2$	=	0.78		B
	$0.37 \times 0.90 \times \frac{1}{2} \times 2$	=	0.33		C
	$0.30 \times (0.90 - 0.3 \times 0.37) \times \frac{1}{2} \times 2$	=	0.34		D
	$0.30 \times (\sqrt{2.50^2 + 1.50^2} + \sqrt{1.21^2 + 2.09^2}) \times \frac{1}{2} \times 2$	=	3.09		E
	$0.30 \times (0.20 + 0.35) \times \frac{1}{2} \times 2$	=	0.17		F
	total		5.5 m^2		
	SECTION ②				
	$0.30 \times 2.75 \times 2$	=	1.65 m^2		A
	$0.30 \times 1.65 \times 2$	=	0.99		B
	$0.90 \times \frac{1}{2} \times (0.30 + 1.25) \times 2$	=	4.34		C
	total		6.98 m^2		
	$0.40 \times \frac{1}{2} \times (0.40 + 0.30) \times 1.30 \times 2$	=	0.36 m^2		G

NO. 2 IRRIGATION CULVERT Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m ²)	
	(BOX CULVERT)				
					
	Reinforced concrete				
	0.40 x 6.10	=	2.44	m ²	
	0.20 x 0.20 x 6.10	=	2.44	m ²	E
	Form				
	0.40 x 6.10	=	2.44	m ²	
	2.50 x 10.00 x 2	=	50.00	m ²	
	0.20 x 0.20 x 2	=	0.08	m ²	
	0.50 x 6.10 x 2	=	2.44	m ²	
	Wet masonry				
	0.60 x 8.50	=	5.10	m ²	A
	2.20 x 0.50	=	1.10	m ²	B
	2.20 x 0.30 x 2	=	1.32	m ²	C
	2.60 x (0.30 + 1.20) x 1/2 x 2	=	3.90	m ²	D
	total		11.42	m ²	

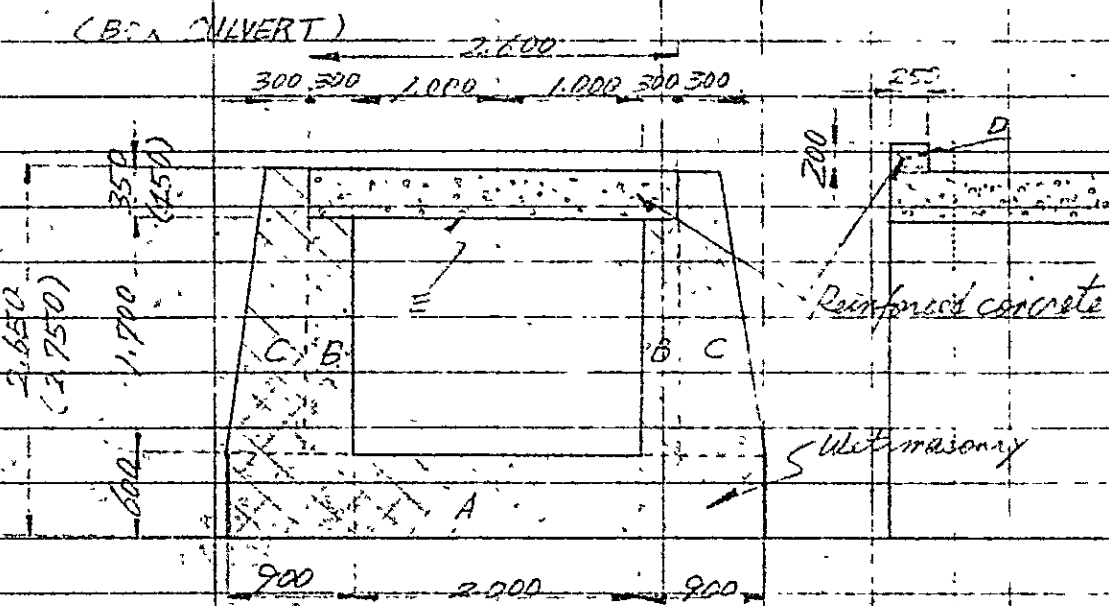
NO. 4, 5, 6, 7, 9, 10
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	(OPEN TRANSITION)				
Wet masonry	SECTION ①				
	$0.30 \times 0.50 \times 2$		0.30	m ²	A
	$0.30 \times 1.30 \times 2$		0.78		B
	$0.37 \times 0.90 \times \frac{1}{2} \times 2$		0.33		C
	$0.30 \times (0.90 - 0.3 \times 0.37) \times \frac{1}{2} \times 2$		0.24		D
	$0.30 \times (\sqrt{1.70^2 + 3.40^2} + \sqrt{1.10^2 + 2.61^2}) \times \frac{1}{2} \times 2 = 2.01$		2.01		E
	$0.30 \times (0.30 + 0.35) \times \frac{1}{2} \times 2$		0.17		F
	total		3.83	m ²	NO. 4, 5, 6, 7, 9, 10 ①
	SECTION ②				
	$0.30 \times 1.00 \times 2$		0.60	m ²	A
	$0.30 \times 1.50 \times 2$		0.90		B
	$2.35 \times (0.30 + 1.10) \times \frac{1}{2} \times 2$		3.29		C NO. 4, 5, 6, 7, 9, 10
	$(2.45 \times (0.30 + 1.10) \times \frac{1}{2} \times 2)$		3.43		C NO. 7

NO. 4, 5, 6, 7, 9, 10.					
IRRIGATION Table 2 Concrete, form & Others					
CULVERT					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	<i>total</i>		4.79	m ²	NO. 4, 5, 6, 9, 10
	(A+B+C)		(4.93)	m ²	NO. 7
					②
	$0.40 \times (0.40 + 0.30) \times \frac{1}{2} \times 0.30 \times 2$		= 0.09	m ³	NO. 4, 5, 6, 7, 9, 10
	<i>Others (OPEN TRANSITION)</i>				
<i>Wet masonry</i>	$\frac{1}{2}(\textcircled{1} + \textcircled{2}) \times 10.00 \times 2 + G \times 2 =$		=	86.36	m ³ NO. 4, 5, 6, 9, 10
	$\frac{1}{2}(\textcircled{1} + \textcircled{2}) \times 10.00 \times 2 + G \times 2 =$		=	87.76	m ³ NO. 7

NO. 4, 5, 6, 7, 8, 10
IRRIGATION
CULVERT Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
	(B.C.A. CULVERT)				
					
Reinforced concrete	0.35 x 2.60 (0.45 x 2.60)	=	0.92 (1.17)	m ²	NO. 4, 5, 6, 7, 9, 10
	0.20 x 0.25 x 2.60 x 2	=	0.26	m ³	D
Form	0.35 x 2.60 (0.45 x 2.60)	=	0.92 (1.17)	m ²	NO. 4, 5, 6, 7, 9, 10
	0.20 x 0.25 x 2	=	0.10	m ²	
	0.20 x 2.60 x 2	=	1.04	m ²	
	sub total		1.14	m ²	NO. 4, 5, 6, 7, 9, 10
	2.00 x 1.00		2.00	m ²	E
					NO. 4, 5, 6, 7, 9, 10

NO. 4, 5, 6, 7, 9, 10.
IRRIGATION
CULVERT. Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²)	
				(m)	
Wet masonry	0.60 x 3.80	=	2.28	m ²	A
	1.70 x 0.30 x 2	=	1.02		B
	2.05 x 1/2 (0.30 + 0.60) x 2	=	1.85		C
	(2.15 x 1/2 (0.30 + 0.60) x 2)	=	(1.94)		C
	total		5.15	m ²	NO. 4, 5, 6, 9, 10.
	(A+B+C)		(5.24)	m ²	NO. 7.
Concrete work (BOX CULVERT)					
Reinforced concrete	0.91 x 28.00 + 0.26	=	25.74	m ³	NO. 4.
	0.91 x 20.00 + 0.26	=	18.46	m ³	NO. 5, 10.
	0.91 x 15.00 + 0.26	=	13.91	m ³	NO. 6.
	1.17 x 652.06 + 0.26	=	762.17	m ³	NO. 7.
	0.91 x 310.26 + 0.26	=	282.60	m ³	NO. 9.
Form	0.91 x 4 + 1.14 x 2 + 2.00 x 28.00	=	61.97	m ²	NO. 4.
	0.91 x 3 + 1.14 x 2 + 2.00 x 20.00	=	45.01	m ²	NO. 5, 10.
	0.91 x 3 + 1.14 x 2 + 2.00 x 15.00	=	35.01	m ²	NO. 6.
	1.17 x 66 + 1.14 x 2 + 2.00 x 652.06	=	1383.62	m ²	NO. 7.
	0.91 x 32 + 1.14 x 2 + 2.00 x 310.26	=	651.92	m ²	NO. 9.

NO. 4, 5, 6, 7, 9, 10
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m)	
	Others (BOX CULVERT)				
Wet masonry	5.15 x 28.00		=	144.20	m ³ NO.4.
	5.15 x 20.00		=	103.00	m ³ NO.5,10.
	5.15 x 15.00		=	77.25	m ³ NO.6.
	5.24 x 652.06		=	3416.80	m ³ NO.7.
	5.15 x 310.26		=	1597.84	m ³ NO.9.

NO. 8.11.
IRRIGATION
CONVECT.

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²)	
				(m ²)	
(OPEN TRANSITION)					
Wet masonry	SECTION ①				
	$0.30 \times 0.50 \times 2$	=	0.30	m ²	A
	$0.30 \times 1.30 \times 2$	=	0.78	m ²	B
	$0.37 \times 0.90 \times 4 \times 2$	=	0.33	m ²	C
	$0.30 \times (0.90 - 0.3 \times 0.37) \times \frac{1}{2} \times 2$	=	0.24	m ²	D
	$0.30 \times (\sqrt{1.70^2 + 3.40^2} + \sqrt{1.28^2 + 2.61^2}) \times \frac{1}{2} \times 2$	=	2.01	m ²	E
	$0.30 \times (0.70 + 0.35) \times \frac{1}{2} \times 2$	=	0.17	m ²	F
	Total		3.83	m ²	NO. 8.11.
					①

NO. 8/11
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	SECTION ②				
	0.30 x 1.00 x 2	=	0.60	m ²	A
	0.30 x 1.50 x 2	=	0.90		B
	2.30 x (0.30 + 1.10) x 1/2 x 2	=	3.22		C
	<i>1/2</i> <i>1.40</i>		4.72	m ²	② NO. 8/11
	0.40 x (0.40 + 0.30) x 1/2 x 0.30 x 2	=		m ³ 0.08	NO. 8/11
	Others (OPEN-TRANSITION)				
	Wet masonry				
	1/2 (①+②) x 1.00 x 2 + G x 2	=	85.66	m ³	NO. 8/11

NO. 8.11
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ²)	
(BOX CULVERT)					
Reinforced concrete	0.30×2.60	=	0.78	m ²	
	$0.20 \times 0.25 \times 2.60$	=	0.13	m ³	D
Form	0.40×2.60	=	1.04	m ²	
	$0.20 \times 0.25 \times 2$	=	0.10	m ²	D
	$0.20 \times 2.60 \times 2$	=	1.04	m ²	D
	2.00×1.00	=	2.00	m ²	E

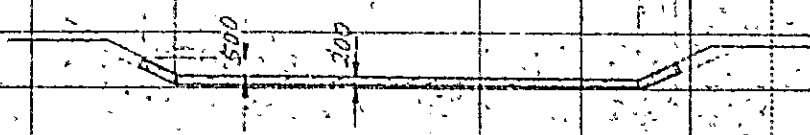
NO. 8 11
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
Wet masonry	0.60 x 3.30	=	2.28	m ²	A
	1.70 x 0.30 x 2	=	1.02		B
	2.00 x (0.35 + 0.60) x 1/2 x 2	=	1.50		
	5.10			m ²	
Concrete (BOX CULVERT)					
Pre-formed concrete	0.18 x 30.00 + 0.13 x 2	=	23.66	m ³	N.O.B.
	0.78 x 80.00 + 0.13 x 2	=	62.66	m ³	N.O.11
Form =	1.04 x 4 + 0.10 x 2 + 1.04 x 2 + 2.60 x 30.00	=	56.44	m ³	N.O.E.
	1.04 x 9 + 0.10 x 2 + 1.04 x 2 + 2.60 x 80.00	=	171.64	m ³	N.O.11.
Others (BOX CULVERT)					
Wet masonry	5.10 x 30.00	=	153.00	m ³	N.O.B.
	5.10 x 80.00	=	408.00	m ³	N.O.11.

NO. 8/11
IRRIGATION
CULVERT

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	(LINING OF RIVER)				
	1000 13.000 (52.800) 1.000				
					
Wet masonry	$0.20 \times 13.00 \times 20.00$		=	52.00	m ³
	$0.20 \times (\sqrt{0.50^2 + 1.00^2} \times 2 + 0.10) \times \frac{1}{2} \times 2 \times 20.00 =$			9.34	
	total			61.34	m ³ NO. 8.
	$0.20 \times 52.80 \times 20.00$		=	211.20	m ³
	$0.20 \times (\sqrt{0.50^2 + 1.00^2} \times 2 + 0.10) \times \frac{1}{2} \times 2 \times 20.00 =$			9.34	
	total			220.54	m ³ NO. 11.

TRANSITION FOR A ROUTE

No. 129

KINDS	UNIT	NO. 1	NO. 2	NO. 3	NO. 4	TOTAL
IDEARTH WORK						
ROCK EXCAVATION	M ³	87.2				87.2
SAND EXCAVATION	M ³		112.4	151.2	222.5	486.1
EMBANKMENT	M ³			285.4	196.4	481.8
BACKFILLING	M ³			37.4	50.7	88.1
(E) OTHERS						
NET MASONRY	M ³	87.20	112.40	126.52	108.21	434.13

NO. 1
TRANSITION

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m³)	
				(m)	
NET MASONRY				m³ 87.20	
ROCK EXCAVATION				m³ 87.2	

No. 1 Table 2 Concrete, form & Others.
TRANSITION

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
① WET MASONRY	<p>BP. SECTION E.P. SECTION</p>				
	<p>CUT-OFF WALL</p>				
WALL	$(0.3+0.5) \times \frac{1}{2} \times 2.21 \times 2 = 1.77$ $(0.3+0.5) \times \frac{1}{2} \times 2.5 \times 2 = 2.00$ $(1.77+2.00) \times \frac{1}{2} \times 20.0 = 37.70$			37.70	TRANSITION LENGTH 20.0m
FLOOR	$0.5 \times 2.865 \times 2 = 2.87$ $0.5 \times 2.0 \times 2 = 2.00$ $(2.87+2.00) \times \frac{1}{2} \times 20.0 = 49.70$				
CUT-OFF WALL	$(0.3+0.5) \times \frac{1}{2} \times 0.5 \times 20 \times 2 = 2.00$				
TOTAL				87.20	m ³
② EARTH WORK					
1. ROCK EXCAVATION (WALL & FLOOR)				87.2	m ³
EXCAVATION OF CANAL SECTION IS EXCLUDED.					

No. 2

Table 2 Concrete, form & Others.

TRANSITION

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m')	
EARTH WORK					
-EXCAVATION				m ³ 112.4	
OTHER WORK					
NET MASONRY				m ² 112.40	

No. 2
TRANSITION

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
① WET MASONRY	<p>R.P. SECTION E.P. SECTION</p> <p>CUT-OFF WALL</p>			(m) (m)	
WALL	$(0.3+0.5) \times \frac{1}{2} \times 2.5 \times 2 = 200$ $(0.3+0.5) \times \frac{1}{2} \times 1.8 \times 2 = 144$ $(200+144) \times \frac{1}{2} \times 20.0 = 3440$				TRANSITION LENGTH 20.0m
FLOOR	$(0.5 \times 2.0 \times 2 + 5.5 \times 0.5 \times 2)$ $\times \frac{1}{2} \times 20.0 = 75.00$				
CUT-OFF WALL	$(0.3+0.5) \times \frac{1}{2} \times 0.5 \times (4.0+11.0) = 3.00$				
TOTAL				11240 m ³	
② EARTH WORK					
EXCAVATION (WALL & FLOOR)				1124 m ³	
EXCAVATION OF CANAL SECTION IS EXCLUDED.					

NO. 3
 TRANSITION Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
EARTH WORK					
EXCAVATION				m ³ 151.2	
BACKFILLING				m ³ 37.4	
EMBANKMENT				m ³ 285.4	
OTHER WORK					
RET. MASONRY				m ³ 126.32	

No.3 Table 2 Concrete, form & Others.
TRANSITION

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
① WET MASONRY					
	<p>CUT-OFF WALL</p>				
WALL	$(0.3+0.9) \times \frac{1}{2} \times 0.3 = 0.18$ $(0.6+1.0) \times \frac{1}{2} \times 1.5 = 1.20$ $1.0 \times 0.3 + 1.8 \times 0.5 = 1.20$ $A = 2.58$ $(0.3+1.0) \times \frac{1}{2} \times 2.5 = 1.63$ $1.0 \times 0.3 + 1.8 \times 0.5 = 1.20$ $B = 2.83$				
	$(A+B) \times 2 \times \frac{1}{2} \times 15.0 = 81.15 \text{ m}^3$				TRANSITION LENGTH 15.0m
FLOOR	$(5.0 \times 2 + 4.3 \times 2) \times \frac{1}{2} \times 0.3 \times 15.0 = 41.85 \text{ m}^3$				
CUT-OFF WALL	$(0.3+0.5) \times \frac{1}{2} \times 0.5 \times (4.5+3.8) \times 2 = 3.32 \text{ m}^3$				
TOTAL VOLUME				126.32 m ³	

No.3

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
② EARTH WORK					
1. EXCAVATION					
RD24+963 (TRANSITION END POINT)					
RD24+914					
(TRANSITION BEGINNING POINT)					
$(12.2+13.66) \times \frac{1}{2} \times 1.46 = 18.88$					
$(6.1+6.6) \times \frac{1}{2} \times 0.5 = (-) 3.10$					
$(14.2+13.6) \times \frac{1}{2} \times 0.6 = 8.34$					
$(7.5+8.0) \times \frac{1}{2} \times 0.5 = (-) 0.88$					
$(15.70-4.46) \times 15.0 \times \frac{1}{2} = 151.2$				151.2	m ³

Table 2. Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
Z. EMBANKMENT					
WALL THICKNESS IS NEGLECTED					
$(20.2 + 28.2) \times \frac{1}{2} \times 2.0 = 48.40$					
$(10.0 + 17.2) \times \frac{1}{2} \times 1.8 = (-) 24.48$ $A = 23.92$					
$(2.0 + 5.68) \times \frac{1}{2} \times 1.84 \times 2 = 14.13 = B$					
$(A + B) \times 15.0 \times \frac{1}{2} = 285.4 \text{ m}^3$					

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
3. BACKFILL					
	$(0.8+1.1) \times \frac{1}{2} \times 0.6 - 0.3 \times 0.5 = 0.42$				
	$(0.5+0.75) \times \frac{1}{2} \times 0.5 = 0.19$				
	0.61				
	$(0.5+0.75) \times \frac{1}{2} \times 0.5 = 0.19$				
	$(0.8+1.72) \times \frac{1}{2} \times 1.46 - 0.3 \times 0.5 = 1.69$				
	1.88				
	$(0.61+1.88) \times 7 \times 15.0 \times \frac{1}{2} =$			374	m ³

NO.4 TRANSITION Table 2 Concrete, form & Others.		Unit	Numbers	Total	Remarks
				(m) (m)	
EARTH WORK					
EXCAVATION				m ³ 222.5	
BACKFILLING				m ³ 50.7	
EMBANKMENT				m ³ 196.4	
OTHER WORK					
WET MASONRY				m ³ 106.21	

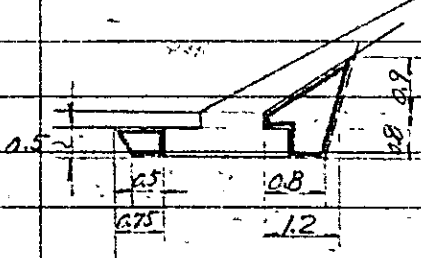
No. 4
 TRANSITION Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ³)	
① WET MASONRY					
			196.48		
	CUT-OFF WALL				
- 1. WALL	$(0.3+1.0) \times \frac{1}{2} \times 2.5 = 1.63$				
	$1.0 \times 0.3 + 1.8 \times 0.5 = 1.20$				
	A = 2.83				
	$(0.3+0.9) \times \frac{1}{2} \times 0.3 = 0.18$				
	$(0.6+1.0) \times \frac{1}{2} \times 2.5 = 1.20$				
	$1.0 \times 0.3 + 1.8 \times 0.5 = 1.20$				
	B = 2.58				
	$(A+B) \times 2 \times \frac{1}{2} \times 15.0 = 81.15 \text{ m}^3$				
	TRANSITION LENGTH 15.0m				

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
2. FLOOR	$(4.3 \times 2 + 1.5 \times 2) \times 0.3 \times \frac{1}{2} \times 15.0 = 26.10 \text{ m}^3$				
3. CUT-OFF WALL	$(0.3 + 0.5) \times \frac{1}{2} \times 0.5 \times (3.8 + 1.0) = 0.96 \text{ m}^3$				
TOTAL VOLUME				108.21 m ³	
② EARTH WORK					
1. EXCAVATION					
	$(6.1 + 6.83) \times \frac{1}{2} \times 1.46 \times 2 = 18.87$				
	$(3.05 + 3.3) \times \frac{1}{2} \times 0.5 \times 2 = (-) 3.17$				
	A = 15.70				
	$(3.3 + 4.25) \times \frac{1}{2} \times 1.9 \times 2 = 14.35$				
	$(0.25 + 0.5) \times \frac{1}{2} \times 0.5 \times 2 = (-) 0.38$				
	B = 13.97				
	$(A + B) \times 7 \times 15.0 = 222.5 \text{ m}^3$				
2. EMBANKMENT (WALL THICKNESS IS EXCLUDED)					
	$(5.68 + 2.0) \times \frac{1}{2} \times 1.84 = 70.7 = A$				
	$(7.1 + 1.5) \times \frac{1}{2} \times 1.4 = 6.02 = B$				

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
	$(A + B) \times 2 \times \frac{1}{2} \times 15.0 = 196.35$			196.4	m ³
3. BACKFILL					
					
	$(0.5 + 0.75) \times \frac{1}{2} \times 0.5 = 0.19$				
	$(0.8 + 1.72) \times \frac{1}{2} \times 1.46 = 1.84$				
	$0.3 \times 0.5 = (-) 0.15$				
	$A = 1.88$				
	$(0.5 + 0.75) \times \frac{1}{2} \times 0.5 = 0.31$				
	$(0.8 + 1.2) \times \frac{1}{2} \times 0.8 = 0.80$				
	$0.3 \times 0.5 = (-) 0.15$				
	$1.2 \times 0.9 \times \frac{1}{2} = 0.54$				
	$B = 1.50$				
	$(A + B) \times 2 \times \frac{1}{2} \times 15.0 = 50.70$			50.7	m ³

OUTLET STRUCTURE FOR A ROUTE

NO. 143

KINDS	UNIT	NO. 1	NO. 2	NO. 3	NO. 4	TOTAL	REMARKS
1) EARTH WORK							
EXCAVATION	m ³	76.3	88.3	86.3	90.3	351.2	NO. 1 IS TYPE A
BACKFILLING	m ³	49.6	49.6	49.6	51.9	198.7	NO. 2 IS TYPE B
CONCRETE WORK							NO. 3 IS TYPE B
REINFORCED CONCRETE	m ³	1.49	5.50	5.50	6.14	17.63	NO. 4 IS TYPE C
FORM	m ²	20.70	27.14	27.14	31.44	106.42	
REINFORCEMENT	Kg	444.56	528.14	528.94	594.80	2097.24	
OTHERS							
NET MASONRY	m ³	30.32	33.69	33.69	33.94	133.64	(HEIGHT 1.10M)
SLUICE GATE	SET	1	1	1	1	1	100 x 700
	SET	1	1	1	1	1	900 x 1000
	SET	1	1	1	1	1	1100 x 1200

OUTLET STRUCTURE FOR B ROUTE (1 SHEET OF 2)

No. 144

KINDS	UNIT	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10	SUB-TOTAL	REMARKS
1) EARTH WORK									
EXCAVATION	M ³	120.1	120.1	120.1	134.0	142.0	120.1	748.4	No. 5 IS TYPE D
BACK FILLING	M ³	84.2	84.2	84.2	86.0	56.0	84.2	508.8	No. 6 IS TYPE D
2) CONCRETE WORK									No. 7 IS TYPE E
REINFORCED CONCRETE	M ³	5.29	5.29	5.29	6.04	1.04	5.29	23.24	No. 8 IS TYPE E
FORM	M ²	25.39	25.39	25.39	29.37	29.37	25.39	160.30	No. 9 IS TYPE D
REINFORCEMENT	KG	536.62	536.62	536.62	579.26	579.96	536.62	3306.40	
3) OTHERS									
NET MASONRY	M ³	51.26	51.26	51.26	55.04	55.04	51.26	215.12	(HEIGHT) (WIDTH)
SURFACE GATE	SET	1	1	1	1	1	1	4	600 x 500
					1	1		2	900 x 1000

OUTLET STRUCTURE FOR B ROUTE (2 SHEET OF 2)

KINDS	UNIT	SUB TOTAL OF SHEET	NO 11	NO 12	NO 13	NO 14	TOTAL	REMARKS
1) EARTH WORK								
EXCAVATION	M ³	748.4	120.1	120.1	120.1	399.1	1507.8	NO. 11 IS TYPE D
EMBANKMENT	M ³					740	740	NO. 12 IS TYPE D
BACK FILLING	M	508.8	84.2	24.2	84.2	88.3	849.7	NO. 13 IS TYPE D
2) CONCRETE WORK								
REINFORCED CONCRETE	M ³	33.24	5.29	5.29	5.29	27.1	76.52	
FORM	M ²	160.30	25.29	25.29	25.29	103.56	340.03	
REINFORCEMENT	KG	3306.40	536.02	536.02	536.02	1623.44	6539.70	
3) OTHER								
NET MASONRY	M ³	315.12	51.26	51.26	51.26	128.46	587.36	(HEIGHT) (WIDTH)
SLUICE GATE	SET	4	1	1	1		7	600 x 700
	SET	2					2	900 x 1000
	SET					2.5	2.5	1600 x 2300

OUTLET STRUCTURE FOR C ROUTE

No. 146

KINDS	UNIT	NO 15	TOTAL	REMARKS
U. EARTH WORK				
EXCAVATION	M ³	72.4	72.4	NO. 15 25 TYPE P
BACK FILLING	M ³	42.0	42.0	
(E) CONCRETE WORK				
REINFORCED CONCRETE	M ³	4.37	4.37	
FORM	M ²	20.03	20.03	
REINFORCEMENT	KG	444.64	444.64	
(S) OTHERS				
NET MASONRY	M ³	30.20	30.20	(HEIGHT) (WIDTH) 600 x 700
SLUICE GATE	SET	1	1	

TYPE A
OUTLET

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ²)	
<u>Concrete Work</u>					
Reinforced Concrete	243 + 2.06			m ² 249	
Form	881 + 71.87			m ² 2070	
<u>Others</u>					
Wet Masonry	5.50 + 9.12 + 2.55 + 12.15			m ³ 3032	
Sluice Gate	14 ^m x 3 ^m 600 x 700			m ² 7	
Earth Work					
Excavation				m ³ 76.3	
Backfilling				m ³ 47.6	
<u>REINFORCEMENT</u>				m ³ 424.56	

TYPE B OUTLET						Table 2 Concrete, form & Others					
Kinds	Calculated	Process	Unit	Numbers	Total	Remarks					
					(m ²) (m ³)						
Concrete Work											
Reinforced Concrete	3.74	2.76			m ² 6.50						
Form	10.86	13.28			m ² 27.14						
Others											
Water Masonry	6.71	11.66			m ³ 33.69						
Sluice Gate					m ² 1						
Earth Work											
Excavation					m ³ 88.3						
Backfilling					m ³ 49.6						
REINFORCEMENT					m ³ 528.94						

TYPE C OUTLET Table 2 Concrete, form & Others

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
Concrete Work					
Reinforced Concrete	2.91 + 3.23			6.14	
Form	12.63 + 9.41			31.94	
Others					
Wet Masonry	7.80 + 13.08 + 2.55 + 12.52			35.94	
Sluice Gate	H 1100 x B 1200			1.22	
Earth Work					
Excavation				98.3	
Backfilling				51.9	
REINFORCEMENT				594.80	

TYPED
OUTLET

Table 2 Concrete, form & Others.

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
<u>Concrete Work</u>					
Reinforced Concrete	283 - 2.47			5.29 ^{m³}	
Form	10.07 + 15.32			25.39 ^{m²}	
<u>Others</u>					
Wet Masonry	5.50 + 0.64 + 5.14 + 2.78			14.06 ^{m²}	
Sluice Gate	600 - 700			1 ^{set}	
Earth Work					
Excavation				120.1 ^{m³}	
Backfilling				84.2 ^{m³}	
REINFORCEMENT				536.62 ^{kg}	

TYPE E
OUTLET

Table 2 Concrete, form & Others

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
Concrete	Work				
Reinforced Concrete	3.22 + 2.82			6.04	
Form	12.54 + 16.83			29.37	
Bar					
Wet Masonry	6.71 + 13.74 + 5.14 + 3.45			28.04	
Sluice Gate	M B 700 x 700			1.00	
Earth Work					
Excavation				12.20	
Backfilling				26.00	
REINFORCEMENT				kg 579.96	

TYPE A OUTLET					
Table 2 Concrete, form & Others					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
Concrete Work					
Reinforced Concrete	2.27 + 2.00			m ³ 4.27	
Form	8.43 + 11.40			m ² 20.03	
Bridges					
Wet Masonry	5.50 + 9.63 + 2.26 + 12.81			m ³ 30.20	
Sluice Gate	H = 8 600 x 700			m ² 1	
Earth Work					
Excavation				m ³ 72.4	
Backfilling				m ³ 42.0	
REINFORCEMENT				kg 54,264	

EARTH WORK TYPE A Table 2 Concrete, form & Others.					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ³)	
Earth Work					
Excavation	$\frac{1}{2} \times \frac{1}{2} (3.50 + 4.60) \times 1.10 + \frac{1}{2} (3.10 + 4.20) \times 1.30 \times 3.00$			12.0	
	$\frac{1}{2} (2.20 + 3.55) \times 2.15 \times 2.50$			15.0	
	$\frac{1}{2} \times \frac{1}{2} (2.90 + 3.55) \times 1.15 + \frac{1}{2} (2.20 + 2.65) \times 2.25 \times 2.20$			12.5	
	$\frac{1}{2} (2.90 + 4.65) \times 2.25 \times 1.50$			7.19	
	$\frac{1}{2} \times \frac{1}{2} (2.40 + 4.65) \times 2.25 + \frac{1}{2} (2.40 + 4.20) \times 1.80 \times 2.70$			6.2	
	$\frac{1}{2} \times \frac{1}{2} (3.50 + 4.30) \times 1.80 + \frac{1}{2} (3.10 + 4.45) \times 1.35 \times 2.25$			6.5	
	$0.70 \times 1.40 \times 1.85$			1.02	
	$\frac{1}{2} \times \frac{1}{2} (3.10 + 4.60) \times 1.50 + \frac{1}{2} (2.70 + 3.30) \times 0.60 \times 1.15$			7.0	
	$\frac{1}{2} (1.40 + 2.70) \times 0.40 \times 1.85$			1.5	
	$1.15 \times 1.30 \times 6.00$			2.1	
				11.3	
	Total			76.3	
Backfilling	$1.20 - \{5.46 + \frac{1}{2} (0.15 + 2.35) \times 3.00\}$			4.0	
	$(7.54 + 12.5 + 11.9) - 1.15 \times 1.40 \times 4.25$			26.2	
	$(6.2 + 5.5 + 0.2) - \frac{1}{2} (2.98 + 2.52) \times 2.65 - 1.89 + 2.48$			7.3	
	$(9 + 1.5) - (1.22 + 0.71)$			6.6	
	Total			47.6	

EARTH WORK TYPE B Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m)	
<u>Earth Work</u>					
Excavation	$\frac{1}{2} \frac{1}{2} (3.60 + 5.10) \times 1.40 - \frac{1}{2} (3.10 + 4.70) \times 1.60 \times 3.00$			13.4	
	$\frac{1}{2} (2.70 + 4.15) \times 1.45 \times 1.50$			22.3	
	$\frac{1}{2} \frac{1}{2} (2.70 + 2.15) \times 1.45 + \frac{1}{2} (2.70 + 2.85) \times 2.25 \times 1.60$			10.9	
	$\frac{1}{2} (2.70 + 4.75) \times 2.25 \times 1.50$			12.9	
	$\frac{1}{2} \frac{1}{2} (2.70 + 4.85) \times 2.25 + \frac{1}{2} (2.70 + 4.50) \times 1.80 \times 1.70$			6.8	
	$\frac{1}{2} \frac{1}{2} (3.80 + 5.60) \times 1.70 + \frac{1}{2} (3.10 + 4.75) \times 1.35 \times 1.25$			5.9	
	0.20 x 0.40 x 2.85			0.1	
	$\frac{1}{2} \frac{1}{2} (3.20 + 4.90) \times 1.50 + \frac{1}{2} (3.00 + 3.60) \times 1.60 \times 1.85$			7.6	
	$\frac{1}{2} (1.10 + 2.40) \times 0.40 \times 2.85$			1.3	
	1.15 x 0.30 x 6.00			2.1	
	total			80.3	
Backfilling	18.4 - $\frac{1}{2} \frac{1}{2} (1.1 + 1.8) \times 3.00$			8.1	
	$(2.25 + 1.0) \times 1.29 + 1.70 \times 1.40 \times 1.85$			26.8	
	$(4.8 + 5.8 + 0.1) - \frac{1}{2} \frac{1}{2} (3.1 + 2.30) \times 1.65 + 2.76$			8.1	
	$(7.8 + 1.3) - 2.3$			6.8	
	total			49.6	

EARTH WORK TYPE C Table 2 Concrete, form & Others.					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
Earth Work					
Excavation	$\frac{1}{2} \times \frac{1}{2} (3.80 + 5.40) \times 1.60 + \frac{1}{2} (3.60 + 5.40) \times 1.70$	m ³	3.00	23.2	
	$\frac{1}{2} (2.70 + 4.55) \times 1.65 \times 1.50$			27.7	
	$\frac{1}{2} \times \frac{1}{2} (2.70 + 4.55) \times 1.65 + \frac{1}{2} (3.70 + 5.15) \times 2.25$	m ³	1.20	9.1	
	$\frac{1}{2} (2.90 + 5.15) \times 2.25 \times 1.50$			13.6	
	$\frac{1}{2} \times \frac{1}{2} (2.70 + 5.15) \times 2.25 + \frac{1}{2} (2.90 + 4.70) \times 1.80$	m ³	1.75	9.2	
	$\frac{1}{2} \times \frac{1}{2} (4.00 + 5.80) \times 1.80 + \frac{1}{2} (3.60 + 4.75) \times 1.35 \times 0.85$			6.2	
	$0.20 \times 0.40 \times 0.85$			0.1	
	$\frac{1}{2} \times \frac{1}{2} (3.60 + 5.10) \times 1.50 + \frac{1}{2} (3.20 + 3.80) \times 1.60$	m ³	1.85	8.0	
	$\frac{1}{2} (0.90 + 2.20) \times 0.40 \times 1.85$			1.1	
	$1.15 \times 0.30 \times 6.00$			2.1	
	<i>total</i>			98.3	
Backfilling	$232 - 17.80 + 5.1$			219.3	
	$(277 + 8.1 + 13.6) - 1.70 \times 1.85 \times 7.95$			27.0	
	$17.2 + 6.2 + 0.1 - (2.4 + 3.0)$			8.1	
	$(8.0 + 1.1) - 2.6$			6.5	
	<i>total</i>			51.9	

EARTH WORK Table 2 Concrete, form & Others.
TYPE D

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m)	
<i>Earth Work</i>					
Excavation	$\frac{1}{2} \left[\frac{1}{2}(2.50+4.60) \times 1.10 + \frac{1}{2}(2.10+4.40) \times 1.30 \right] \times 3.00$			14.0	
	$\frac{1}{2}(2.40+3.55) \times 1.15 \times 4.50$			15.4	
	$\frac{1}{2} \left[\frac{1}{2}(2.40+3.55) \times 1.15 + \frac{1}{2}(2.40+5.35) \times 2.95 \right] \times 3.60$			26.7	
	$\frac{1}{2}(2.40+5.35) \times 2.95 \times 1.50$			17.1	
	$\frac{1}{2} \left[\frac{1}{2}(2.40+4.35) \times 2.95 + \frac{1}{2}(2.40+4.70) \times 2.50 \right] \times 0.90$			9.3	
	$\frac{1}{2} \left[\frac{1}{2}(3.50+6.10) \times 2.50 + \frac{1}{2}(3.10+5.15) \times 2.05 \right] \times 0.85$			8.6	
	$\frac{1}{2} \left[\frac{1}{2}(3.10+5.30) \times 2.20 + \frac{1}{2}(2.70+3.30) \times 0.60 \right] \times 3.25$			17.9	
	$\frac{1}{2}(4.70+6.70) \times 0.40 \times 3.25$			7.4	
	$0.75 \times 2.30 \times 10.00$			2.3	
	$4.00 \times 4.40 \times 0.85$			1.4	
	<i>total</i>			120.1	
<i>Backfilling</i>					
	$14.0 - (5.06 + 1.5)$			7.0	
	$(15.4 + 26.7 + 17.1) - 10.0 - 11.5 - 2.95$			43.3	
	$(7.3 + 8.6 + 1.2) - (2.4 + 3.3)$			13.6	
	$(17.9 + 7.4) - 5.0$			20.3	
	<i>total</i>			74.2	

EARTH WORK TYPE E Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>Earth Work</u>					
Excavation	$\frac{1}{2} \left\{ \frac{1}{2} (3.60 + 5.00) \times 1.40 + \frac{1}{2} (2.10 + 4.70) \times 1.80 \right\} \times 3.00$			18.4	
	$\frac{1}{2} (2.70 + 4.15) \times 1.05 \times 4.50$			2.3	
	$\frac{1}{2} \left\{ \frac{1}{2} (2.70 + 4.15) \times 1.45 + \frac{1}{2} (2.70 + 5.55) \times 2.75 \right\} \times 3.00$			25.9	
	$\frac{1}{2} (2.70 + 5.65) \times 2.75 \times 1.50$			18.5	
	$\frac{1}{2} \left\{ \frac{1}{2} (2.70 + 5.65) \times 2.75 + \frac{1}{2} (2.70 + 5.20) \times 2.50 \right\} \times 1.70$			10.0	
	$\frac{1}{2} \left\{ \frac{1}{2} (3.80 + 1.30) \times 2.50 + \frac{1}{2} (3.40 + 5.45) \times 2.25 \right\} \times 0.95$			9.2	
	$3.70 \times 0.40 \times 0.95$			1.3	
	$\frac{1}{2} \left\{ \frac{1}{2} (3.40 + 5.60) \times 2.20 + \frac{1}{2} (3.00 + 3.60) \times 2.60 \right\} \times 3.25$			19.3	
	$\frac{1}{2} (2.40 + 6.40) \times 0.40 \times 3.25$			7.0	
	$0.70 \times 0.30 \times 10.00$			2.1	
	<i>total</i>			134.0	
<u>Backfilling</u>	$18.4 - (6.7 + 1.3 + 6.7)$			3.7	
	$(2.3 + 25.9 + 18.5) - 1.7 \times 1.05 \times 4.50$			43.9	
	$(10.0 + 9.2 + 1.3) - (2.9 + 3.9)$			13.7	
	$(19.3 + 7.0) - 6.0$			20.3	
	<i>Total</i>			86.0	

EARTH WORK TYPE F Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m)	
<u>Earth Work</u>					
Excavation	$\frac{1}{2} \left[\frac{1}{2} (3.50 + 4.60) \times 1.10 + \frac{1}{2} (3.10 + 4.40) \times 1.30 \right] \times 3.00$			14.0	
	$\frac{1}{2} (2.40 + 3.55) \times 1.15 \times 4.50$			15.4	
	$\frac{1}{2} \left[\frac{1}{2} (2.40 + 3.55) \times 1.15 + \frac{1}{2} (2.40 + 2.55) \times 2.15 \right] \times 2.00$			10.9	
	$\frac{1}{2} (2.40 + 2.15) \times 2.15 \times 1.50$			11.2	
	$\frac{1}{2} \left[\frac{1}{2} (2.40 + 4.55) \times 2.15 + \frac{1}{2} (2.40 + 4.10) \times 1.70 \right] \times 0.90$			5.8	
	$\frac{1}{2} \left[\frac{1}{2} (3.50 + 5.20) \times 1.70 + \frac{1}{2} (3.10 + 4.55) \times 1.25 \right] \times 0.85$			5.1	
	$0.80 \times 1.40 \times 0.85$			0.3	
	$\frac{1}{2} \left[\frac{1}{2} (3.10 + 4.50) \times 1.40 + \frac{1}{2} (2.70 + 3.30) \times 0.60 \right] \times 1.65$			3.9	
	$\frac{1}{2} (1.50 + 2.70) \times 1.40 \times 1.65$			1.4	
	$1.25 \times 0.30 \times 6.00$			2.4	
	Total			72.4	
<u>Backfilling</u>					
	$14.0 - (5.46 + 1.5)$			7.0	
	$15.4 + 10.9 + 11.2 - 1.20 \times 1.1 \times 8.25$			24.2	
	$(5.8 + 5.1 + 1.3) - (1.7 + 0.4)$			5.1	
	$(5.9 + 1.4) - 1.6$			5.7	
	Total			42.2	

OPEN TRANSITION Table 2 Concrete, form & Others.
TYPE A D.F

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
	$\frac{600 \times 50}{200 \times 200} = \frac{900}{200}$				
	<p style="text-align: center;"><u>OPEN TRANSITION</u></p> <p>SECTION (1) SECTION (2)</p>				
	<p style="text-align: center;">TYPE A D.F</p>				
Wet Masonry	SECTION (1)				
	$10 \times 0.3 \times 2 = 0.60$				A
	$\frac{1}{2} \times (0.30 + 0.60) \times 100 \times 2 = 0.70$				B
	$0.50 \times 0.30 = 0.15$				C
	sub. total = 1.65				
	SECTION (2)				
	$1 \times 0.30 \times 2 = 0.78$				D
	$\frac{1}{2} \times 0.90 \times 0.37 \times 2 = 0.33$				E
	$\frac{1}{2} \times 0.30 \times 0.79 \times 2 = 0.24$				F
	$\frac{1}{2} \times (0.25 + 0.23) \times 0.30 \times 2 = 0.47$				H
	$\frac{1}{2} \times 0.30 \times 0.20 \times 2 = 0.06$				I
	$0.30 \times 0.30 = 0.09$				G
	sub. total = 1.99				
	$\frac{1}{2} \times (1.65 + 1.99) \times 3.00 = 5.26$				
	$\frac{1}{2} \times (0.30 + 0.40) \times 0.40 \times 0.30 = 0.04$				J
	TOTAL				
				5.30	

OPEN TRANSITION Table 2 Concrete, form & Others.
TYPE B, E

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	SECTION ① SECTION ②				
	TYPE B, E				
Wet Masonry	SECTION ①				
	$1.0 \times 0.3 \times 2 = 0.60$				A
	$\frac{1}{2} (0.30 + 2.60) \times 1.30 \times 2 = 1.17$				B
	$1.40 \times 0.30 \times 2 = 0.24$				C
	sub total = 2.01 m ²				
	SECTION ②				
	$1.30 \times 0.30 \times 2 = 0.78$				D
	$\frac{1}{2} \times 1.70 \times 0.37 \times 2 = 0.33$				E
	$\frac{1}{2} \times 0.30 \times 0.79 \times 2 = 0.24$				F
	$1.20 \times 0.30 \times 2 = 0.12$				G
	$\frac{1}{2} \sqrt{5} (0.8 + 0.53) \times 0.30 \times 2 = 0.89$				H
	$\frac{1}{2} \times 0.20 \times 0.30 \times 2 = 0.06$				I
	sub total = 2.42 m ²				
	$\frac{1}{2} (\text{①} + \text{②}) \times 3.00 = \frac{1}{2} (2.01 + 2.42) \times 3.00 = 6.66$				J
	$\frac{1}{2} (0.30 + 1.40) \times 0.40 \times 0.40 = 0.06$				
	total = 6.71 m ²				

OPEN TRANSITION Table 2 Concrete, form & Others.
TYPE C

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²) (m ²)	
	SECTION ① SECTION ②				
TYPE C					
Wet Masonry	SECTION ①				
	$1.10 \times 0.30 \times 2 = 0.66$				A
	$\frac{1}{2} (0.30 + 0.70) \times 1.50 \times 2 = 1.50$				B
	$0.50 \times 1.30 \times 2 = 1.30$				C
	sub-total = 2.46 m ²				
	SECTION ②				
	$1.30 \times 0.30 \times 2 = 0.78$				D
	$\frac{1}{2} \times 0.90 \times 1.37 \times 2 = 0.33$				E
	$\frac{1}{2} \times 0.79 \times 1.30 \times 2 = 0.24$				F
	$0.30 \times 0.30 \times 2 = 0.18$				G
	$\frac{1}{2} \times (1.0 + 0.73) \times 1.30 \times 2 = 1.16$				H
	$\frac{1}{2} \times 0.30 \times 0.20 = 0.03$				I
	sub-total = 2.72 m ²				
	$\frac{1}{2} (\text{①} + \text{②}) \times 3.00 = \frac{1}{2} (2.46 + 2.72) \times 3.00 = 7.77$			7.77	
	$\frac{1}{2} (0.30 + 0.20) \times 0.90 \times 0.20 = 0.03$			0.03	J
	total = 7.80			7.80	

BOX CULVERT TYPE A D.F. Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
	<u>BOX CULVERT</u>				
	<u>TYPE A</u>				
Reinforced Concrete	1.40 x 0.20 x 8.45			2.37	A
	0.20 x 0.20 x 1.40			0.06	B
	Total			2.43	
Form	0.20 x 8.45 x 2			3.38	A
	1.40 x 0.20 x 2			0.56	
	0.50 x 8.45			0.23	
	0.20 x 0.20 x 2			0.08	B
	0.20 x 1.40 x 2			0.56	
	total			4.81	
Wet Masonry	0.45 x 1.40 x 8.45			5.32	C
	0.45 x 0.50 x 8.45 x 2			3.80	D
	total			9.12	
	<u>TYPE D</u>				
Reinforced Concrete	1.40 x 0.20 x 7.75			2.16	A
	0.20 x 0.20 x 1.40			0.06	B
	total			2.22	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
Form	0.20 x 9.25 x 2			3.94	A
	1.40 x 0.20 x 2			0.56	
	0.50 x 9.25			4.63	
	0.20 x 0.20 x 2			0.08	B
	0.20 x 1.40 x 2			0.56	
	<i>total</i>			10.07	
Wet Masonry	1.45 x 1.40 x 9.25			19.21	C
	0.45 x 0.50 x 9.25 x 2			4.23	D
	<i>total</i>			23.44	
TYPE F					
Reinforced Concrete	1.40 x 0.20 x 9.25			2.59	
	0.20 x 0.20 x 1.40			0.06	
	<i>total</i>			2.65	
Form	0.20 x 8.25 x 2			3.30	
	1.40 x 0.20 x 2			0.56	
	0.50 x 8.25			4.13	
	0.20 x 0.20 x 2			0.08	
	0.20 x 1.40 x 2			0.56	
	<i>total</i>			8.63	
Wet Masonry	0.45 x 1.40 x 9.25			5.96	
	0.45 x 0.50 x 9.25 x 2			4.23	
	<i>total</i>			10.19	

BOX CULVERT Table 2 Concrete, form & Others
TYPE B, E

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
					reinforced concrete
<u>TYPE B</u>					
Reinforced Concrete	1.70 x 0.20 x 7.85			2.67	A
	0.20 x 0.20 x 1.70			0.07	B
	total			2.74	
Form	0.20 x 7.85 x 2			3.14	A
	1.70 x 0.20 x 2			0.68	
	0.80 x 7.85			6.28	
	0.20 x 0.20 x 2			0.08	B
	1.70 x 0.20 x 2			0.68	
	total			10.86	
Wet Masonry	0.45 x 1.70 x 7.85			6.01	C
	0.45 x 0.80 x 7.85 x 2			5.65	D
	total			11.66	
<u>TYPE E</u>					
Reinforced Concrete	1.70 x 0.20 x 9.25			3.15	A
	0.20 x 0.20 x 1.70			0.07	B
	total			3.22	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²)	
				(m ²)	
<i>Form</i>	<i>0.20 x 7.25 x 2</i>			<i>2.9</i>	<i>A</i>
	<i>1.70 x 0.20 x 2</i>			<i>0.68</i>	
	<i>1.80 x 9.25</i>			<i>16.65</i>	
	<i>0.20 x 0.20 x 2</i>			<i>0.08</i>	<i>B</i>
	<i>1.70 x 0.20 x 2</i>			<i>0.68</i>	
	<i>total</i>			<i>20.99</i>	
<i>Wet Masonry</i>	<i>0.45 x 1.70 x 9.25</i>			<i>7.29</i>	<i>C</i>
	<i>0.45 x 0.80 x 9.25 x 2</i>			<i>6.66</i>	<i>D</i>
	<i>total</i>			<i>13.95</i>	

50X CULVERT
TYPE C

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
Reinforced Concrete	1.70 x 0.20 x 7.45			2.53	
	0.20 x 0.20 x 90			0.08	
	<i>total</i>			2.61	
Form	0.20 x 7.45 x 2			2.98	A
	1.70 x 0.20 x 2			0.76	
	1.00 x 7.45			7.45	
	0.20 x 0.20 x 2			0.08	B
	0.20 x 1.70 x 2			0.76	
	<i>total</i>			12.03	
Net Masonry	0.45 x 1.90 x 7.45			6.17	C
	0.45 x 0.60 x 7.45 x 2			6.71	D
	<i>total</i>			12.88	

GATE PORTION TYPE A Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
	450 500 450	1,500			
	GATE PORTION				
Reinforced Concrete	0.45 x 1.40 x 1.50			0.95	A
	(1.60 x 1.40 - 0.50 x 0.50) x 0.25			0.50	B
	0.65 x 0.20 x 1.40			0.18	C
	0.30 x 1.60 x 0.40 x 2			0.38	D
	0.15 x 0.70 x 0.75 x 2			0.05	E
	Total			1.06	
Form	0.45 x 1.40 x 2			1.26	A
	0.45 x 1.50 x 2			1.35	
	0.25 x 1.60 x 2			0.80	B
	1.40 x 1.60 = 0.50 x 0.50			1.79	
	1.80 x 1.60 = 0.50 x 0.50			1.33	
	1.25 x 0.50 x 3			0.38	
	0.20 x 1.40 x 2			0.56	E
	0.65 x 0.20 x 2			0.26	
	1.40 x 1.80			1.32	
	0.40 x 1.60 x 2 = 0.25 x 0.70 x 2			2.21	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²)	
				(m ²)	
	0.30 x 1.60 x 2			0.96	Σ
	0.15 x 0.70 x 4			0.42	Σ
	0.25 x 0.70 x 2			0.35	
	<i>total</i>			1.73	
Splice Gate	H B 600 x 700			205	

GATE PORTION TYPE B Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
	<p>The drawing shows a gate portion with a total width of 2.00m (300 + 1.100 + 300) and a total height of 2.50m (0.50 + 1.00 + 1.00). It is divided into several sections labeled A, B, C, D, and E. Section A is a central rectangular area. Sections B and D are vertical strips on either side of A. Sections C and E are horizontal strips at the top and bottom of A, respectively. Dimensions for each section are provided in the drawing.</p>				
Reinforced Concrete	$0.45 \times 1.70 \times 1.50$			0.115	A
	$(2.20 \times 1.70 - 0.80 \times 0.80) \times 0.25$			0.78	B
	$0.20 \times 1.70 \times 0.65$			0.22	C
	$0.30 \times 2.20 \times 0.40 \times 2$			0.53	D
	$0.15 \times 1.00 \times 0.25 \times 2$			0.08	E
	Total			2.76	
Form	$0.45 \times 1.70 \times 2$			1.53	A
	$0.45 \times 1.50 \times 2$			1.35	
	$0.25 \times 2.20 \times 2$			1.10	B
	$2.20 \times 1.70 - 0.80 \times 0.80$			3.10	
	$0.80 \times 0.75 \times 3$			0.60	
	$2.20 \times 1.70 - 0.80 \times 0.80$			1.78	
	$0.20 \times 1.70 \times 2$			0.68	C
	$0.20 \times 0.15 \times 2$			0.26	
	1.40×1.50			0.44	
	$0.60 \times 2.20 \times 2 - 0.25 \times 7.00 \times 2$			3.02	D

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total (m) (m ²)	Remarks
	2.20 x 0.30 x 2			1.32 m ²	D
	0.25 x 1.00 x 2			0.50 m ²	E
	0.15 x 1.00 x 2			0.60 m ²	
	<i>Total</i>			16.28 m ²	
Service Gate	H B 3.00 x 1.000			1 set	

GATE PORTION TYPE C Table 2 Concrete, form & Others.					
Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ³)	
	300 1,300 300 650				
	450 1,000 450 1,500				
Reinforced Concrete	$0.45 \times 1.90 \times 1.50$ $(2.60 \times 1.90 - 1.00 \times 1.00) \times 0.25$ $0.65 \times 0.20 \times 1.90$ $0.30 \times 2.60 \times 0.40 \times 2$ $1.20 \times 0.15 \times 0.25 \times 2$			1.28 0.99 0.25 0.62 0.09	A B C D E
	total			3.23	
Form	$0.85 \times 1.90 \times 2$ $0.45 \times 1.50 \times 2$ $0.25 \times 2.60 \times 2$ $1.90 \times 2.60 - 1.00 \times 1.00$ $1.30 \times 2.60 - 1.00 \times 1.00$ $1.00 \times 0.25 \times 3$ $1.90 \times 0.20 \times 2$ $0.65 \times 0.20 \times 2$			3.17 1.35 1.30 3.74 2.38 0.75 0.76 0.26	A B C

Table 2 Concrete, form & Others.

Kinds	Calculated, Process	Unit	Numbers	Total	Remarks
				(m ²) (m ²)	
	0.40 x 1.50			0.52	C
	1.40 x 2.60 x 2 - 1.25 x 1.20 x 2			3.56	D
	0.30 x 2.60 x 2			1.56	-
	1.25 x 1.20 x 2			0.60	E
	1.15 x 1.20 x 2			0.72	-
	<i>total</i>			18.41	
<i>Sluice Gate</i>	H - B 1.100 x 1.200			2.88	

GATE PORTION TYPE D Table 2 Concrete, form & Others.

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
Reinforced Concrete	$0.45 \times 1.40 \times 1.50$ $(2.20 \times 2.30 - 0.50 \times 0.50) \times 0.25$ $1.40 \times 0.20 \times 0.65$ $1.50 \times 2.30 \times 0.40 \times 2$ $0.15 \times 0.70 \times 0.25 \times 2$ total	m ³		0.25 0.24 0.18 0.15 0.05 0.77	A B C D E
Form	$0.45 \times 1.40 \times 2$ $0.45 \times 1.50 \times 2$ $2.25 \times 2.30 \times 2$ $2.20 \times 2.30 - 0.50 \times 0.50$ $1.80 \times 2.30 - 0.50 \times 0.50$ $0.50 \times 0.25 \times 3$ $1.15 \times 0.70 \times 2$ $1.40 \times 1.50 \times 2$ 0.45×0.50	m ²		1.26 1.35 1.05 0.27 0.57 1.50 1.50 0.22	A B C

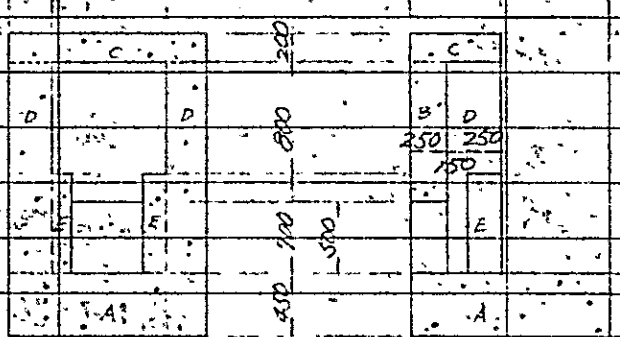
Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total (m) (m ²)	Remarks
	$0.40 \times 2.30 \times 4 - 1.25 \times 0.70 \times 2$			2.33	D
	$2.30 \times 2.30 \times 2$			2.39	
	$1.25 \times 0.70 \times 2$			0.35	E
	$0.15 \times 0.70 \times 4$			0.42	
	total			5.52	
Splice Gate	4 B 500 x 700			1.00	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	$2.4 \times 2.30 \times 4 - 1.60 \times 0.25 \times 2$			2.2	D
	$1.30 \times 2.30 \times 2$			3.18	
	$0.25 \times 1.00 \times 2$			1.38	E
	$1.15 \times 1.00 \times 4$			0.50	
	total			0.60	
				16.83	
Sluice Gate	7 B 900×1000			set	

GATE PORTION TYPE F Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
	300 600 300		650		
					
	250 500 250		500		
Reinforced Concrete	0.40 x 1.40 x 1.50			0.28	A
	(1.50 x 1.50 - 2.50 x 0.50) x 1.25			0.46	B
	0.15 x 0.20 x 1.40			0.18	C
	0.30 x 1.50 x 0.40 x 2			0.36	D
	0.25 x 0.75 x 0.70 x 2			0.25	E
	Total			1.33	
Form	0.45 x 1.40 x 2			1.26	A
	0.45 x 1.50 x 2			1.35	
	1.50 x 1.40 - 2.50 x 0.50			1.25	B
	1.50 x 0.80 - 2.50 x 0.50			0.80	
	0.25 x 1.50 x 2			0.75	
	0.50 x 0.25 x 3			0.38	
	0.45 x 1.20 x 2			0.26	C
	1.40 x 0.20 x 2			0.56	
	0.40 x 0.80			0.32	
	0.40 x 1.50 x 2 - 2.50 x 0.70 x 2			2.05	D
	0.30 x 1.50 x 2			0.90	

SHEATHING PORTION Table 2 Concrete, form & Others
TYPE A, B, C

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	SECTION ①				
	SECTION ②				
	SECTION ③				
	SECTION ④				
	TYPE A, B, C				
Wet Masonry	SECTION ①				
	$1.35 \times 0.45 = 0.16$				A
	$\frac{1}{2}(0.30 + 0.35) \times 1.35 = 0.74$				B
	sub total = 0.90				
	SECTION ②				
	$1.225 \times 0.45 = 0.16$				C
	$\frac{1}{2}(0.30 + 0.35) \times 1.225 = 0.51$				D
	sub total = 0.67				
	SECTION ③				
	$\frac{1}{2}(0.30 + 0.40) \times 1.225 = 0.55$				
	SECTION ④				
	$\frac{1}{2}(0.30 + 0.40) \times 1.225 = 0.55$				
	(① + ②) $\times 0.85 = (0.90 + 0.67) \times 0.85$				
	(③ + ④) $\times 1.25 = (0.55 + 0.55) \times 1.25$				
	total				

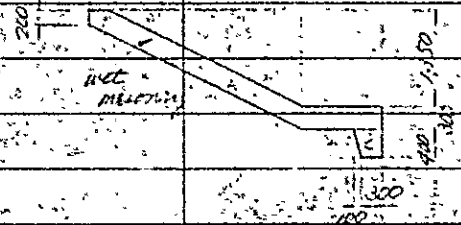
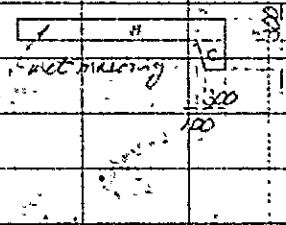
SHEATHING PORTION Table 2 Concrete, form & Others.
TYPE D E

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ²) (m ²)	
	SECTION ①				
	SECTION ②				
	SECTION ③				
	SECTION ④				
	TYPE D E				
Net Masonry	SECTION ①				
	$0.35 \times 0.45 \times 2 = 0.32$				A
	$\frac{1}{2}(0.30 + 0.45) \times 2.15 \times 2 = 2.26$				B
	sub total = 2.58				
	SECTION ②				
	$0.35 \times 0.65 \times 2 = 0.45$				C
	$\frac{1}{2}(0.30 + 0.60) \times 1.725 \times 2 = 1.79$				D
	sub total = 2.24				
	SECTION ③				
	$\frac{1}{2}(0.30 + 0.60) \times 1.725 \times 2 = 1.79$				
	SECTION ④				
	$\frac{1}{2}(0.30 + 0.40) \times 0.30 \times 2 = 0.21$				
	$\frac{1}{2}(\text{①} + \text{②}) \times 0.25 = \frac{1}{2}(2.58 + 2.24) \times 0.25$				
	$\frac{1}{2}(\text{③} + \text{④}) \times 0.25 = \frac{1}{2}(1.79 + 0.21) \times 0.25$				
	Total				

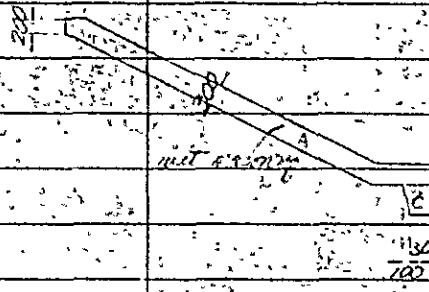
SHEATHING PORTION Table 2 Concrete, form & Others.
TYPE: F.

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	300				
	300				
	500				
	1.25				
	600				
	1.40				
	350 450				
	450 350				
SECTION ①	SECTION ②	SECTION ③	SECTION ④		
Wet Maserail	SECTION ①				
	$0.35 \times 0.45 \times 2 = 0.32$				A
	$\frac{1}{2} (0.30 + 0.80) \times 1.25 \times 2 = 1.38$				E
	sub total = 1.70				
	SECTION ②				
	$0.35 \times 0.45 \times 2 = 0.32$				C
	$\frac{1}{2} (0.30 + 0.80) \times 0.825 \times 2 = 0.91$				D
	sub total = 1.23				
	SECTION ③				
	$\frac{1}{2} (0.30 + 0.60) \times 1.25 \times 2 = 1.01$				
	SECTION ④				
	$\frac{1}{2} (0.30 + 0.60) \times 0.30 \times 2 = 0.21$				
	$\frac{1}{2} (1.70 + 1.23) \times 0.85 = 1.26$				
	$\frac{1}{2} (1.01 + 0.21) \times 1.15 = 0.81$				
	total = 2.26				

BANK REVETMENT Table 2 Concrete, form & Others.
TYPE A, B, C

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
	300 2.70 1.50		1,000		
					
	SECTION (1)		SECTION (2)		
TYPE A					
Net Masonry	$(15 \times 2.70 + 1.15) \times 0.30 \times 7.90$			10.57	A
	$3.00 \times 0.30 \times 0.50$			0.45	B
	$1.15 \times 1.30 \times 0.30 \times 2$			0.21	
	$\frac{1}{2} (0.30 + 2.40) \times 0.40 \times (6.00 + 3.95 \times 2)$			1.92	C
	Total			13.15	
TYPE B					
Net Masonry	$(15 \times 2.70 + 1.15) \times 0.30 \times 4.60$			9.92	A
	$2.00 \times 0.30 \times 0.80$			0.72	B
	$1.15 \times 0.30 \times 0.30 \times 2$			0.21	
	$\frac{1}{2} (0.30 + 0.80) \times 0.40 \times (6.00 + 3.95 \times 2)$			1.92	C
	Total			12.77	
TYPE C					
Net Masonry	$(15 \times 2.70 + 1.15) \times 1.30 \times 4.40$			9.49	A
	$3.00 \times 0.30 \times 1.00$			0.90	B
	$1.15 \times 0.30 \times 0.30 \times 2$			0.21	
	$\frac{1}{2} (0.30 + 1.40) \times 0.40 \times (6.00 + 3.95 \times 2)$			1.92	C
	Total			12.52	

BANK REVETMENT Table 2 Concrete, form & Others.
TYPE D, E

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ²)	
	300 4,100 750				
					
	SECTION (1)		SECTION (2)		
TYPE D					
Wet Masonry	$(\frac{1}{2} \times 4.10 + 0.75) \times 0.30 \times 8.90$			26.41	A
	$0.30 \times 4.00 \times 0.50$			0.60	B
	$0.30 \times 7.5 \times 1.30 \times 2$			2.34	
	$\frac{1}{2} (1.30 + 1.40) \times 0.40 \times (10.00 + 9.85 \times 2)$			2.76	C
	<i>total</i>			29.98	
TYPE E					
Wet Masonry	$(\frac{1}{2} \times 4.10 + 0.75) \times 0.30 \times 8.60$			25.59	A
	$0.30 \times 2.00 \times 0.80$			0.96	B
	$0.75 \times 0.30 \times 0.30 \times 2$			0.14	
	$\frac{1}{2} (1.30 + 1.40) \times 0.40 \times (10.00 + 9.85 \times 2)$			2.76	C
	<i>total</i>			29.45	

BANK RETEMENT Table 2 Concrete, form & Others.
TYPE A

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m') (m')	
			3,000		
				100	
	SECTION (1)				
Wet Masonry	$(15 \times 2.50 + 1.25) \times 0.30 \times 1.90$			10.20	A
	$3.00 \times 0.30 \times 0.50$			0.45	B
	$1.35 \times 0.30 \times 0.30 \times 2$			0.24	
	$\frac{1}{2} (0.30 + 1.40) \times 0.40 \times (6.00 + 2.85 \times 2)$			1.92	C
	<i>total</i>			12.81	

TYPE A Table 3 Reinforcement
OUTLET STRUCTURE

Kinds	Dia. (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ13	1.38	0.24		1.62	1.042	1.69	10	16.90	
2	"	1.28	"		1.52	"	1.58	16	25.28	
3	"	0.53	"		0.77	"	0.80	20	16.00	
4	"	0.36	"		0.60	"	0.63	8	5.04	
5	φ16	2.13	0.30		2.43	1.578	3.83	16	61.28	
6	"	1.03	"		1.33	"	2.10	8	16.80	
7	"	1.28	"		1.58	"	2.49	8	19.92	
8	φ13	1.18	0.24		1.42	1.042	1.48	4	5.92	
9	φ16	1.28	0.30		1.58	1.578	2.49	8	19.92	
10	φ13	0.53	0.24		0.77	1.042	0.80	12	9.60	
11	φ16	1.28	0.30		1.58	1.578	2.49	58	144.12	
12	φ13	8.33	0.48	0.52	9.33	1.042	9.72	10	97.20	
13	φ9	0.83			0.83	0.499	0.41	4	1.64	
14	"	0.58			0.58	"	0.29	16	4.64	
									244.56	

TYPE B Table 3 Reinforcement
OUTLET STRUCTURE

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ13	1.38	0.24		1.62	1.042	1.69	12	20.28	
2		1.58			1.82		1.90	16	30.40	
3		0.53			0.77		0.80	28	22.40	
4		0.36			0.60		0.63	12	7.56	
5	φ16	2.73	0.30		3.03	1.578	4.78	16	76.48	
6		1.33			1.63		2.57	8	20.56	
7		1.58			1.88		2.97	10	29.70	
8	φ13	1.48	0.24		1.72	1.042	1.79	6	10.74	
9	φ16	1.58	0.30		1.88	1.578	2.97	8	23.76	
10	φ13	0.53	0.24		0.77	1.042	0.80	14	11.20	
11	φ16	1.58	0.30		1.88	1.578	2.97	54	160.38	
12	φ13	7.73	0.18	0.52	8.73	1.042	9.10	12	109.20	
13	φ9	0.83			0.83	0.499	0.41	4	1.64	
14		0.58			0.58		0.29	16	4.64	
									528.94	

Table 3 Reinforcement
 TYPE C OUTLET STRUCTURE

Kinds	Dia. (mm)	Actual length (m)	hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ13	1.38	0.24		1.62	1.042	1.69	14	23.66	
2	"	1.78			2.02		2.10	16	33.60	
3	"	0.53			0.77		0.80	32	25.60	
4	"	0.36			0.60		0.63	16	10.08	
5	φ16	3.13	0.30		3.43	1.578	5.41	16	86.56	
6	"	1.53			1.83		2.89	8	23.12	
7	"	1.78			2.08		3.28	12	39.36	
8	φ13	1.68	0.24		1.92	1.042	2.00	8	16.00	
9	φ16	1.78	0.30		2.08	1.578	3.28	8	26.24	
10	φ13	0.53	0.24		0.77	1.042	0.80	16	12.80	
11	φ16	1.78	0.30		2.08	1.578	3.28	52	170.56	
12	φ13	2.33	0.48	0.52	3.33	1.042	3.68	14	121.52	
13	φ9	0.83			0.83	0.499	0.41	4	1.64	
14	"	0.58			0.58		0.29	14	4.06	
									594.80	

TYPE D Table 3 Reinforcement.
OUTLET STRUCTURE

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ13	1.38	0.24		1.62	1.042	1.69	10	16.90	
2	"	1.28			1.52		1.58	16	25.28	
3	"	0.53			0.77		0.80	28	22.40	
4	"	0.36			0.60		0.63	8	5.04	
5	Φ16	2.83	0.30		3.13	1.578	4.94	16	79.04	
6	"	1.03			1.33		2.10	8	16.80	
7	"	1.28			1.58		2.49	12	29.88	
8	Φ13	1.88	0.24		2.12	1.042	2.21	4	8.84	
9	Φ16	1.28	0.30		1.58	1.578	2.49	8	19.92	
10	Φ13	0.53	0.24		0.77	1.042	0.80	12	9.60	
11	Φ16	1.28	0.30		1.58	1.578	2.49	74	184.26	
12	Φ13	9.73	0.48	0.52	10.73	1.042	11.18	10	111.80	
13	Φ9	0.83			0.83	0.499	0.41	4	1.64	
14	"	0.58			0.58		0.29	18	5.22	
									536.62	

TYPE E Table 3 Reinforcement.										
OUTLET STRUCTURE										
Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ13	1.38	0.24		1.62	1.042	1.69	12	20.28	
2	"	1.58			1.82	"	1.90	16	30.40	
3	"	0.53			0.77	"	0.80	28	22.40	
4	"	0.36			0.60	"	0.63	12	7.56	
5	φ16	2.83	0.30		3.13	1.578	4.94	16	79.04	
6	"	1.33			1.63	"	2.57	8	20.56	
7	"	1.58			1.88	"	2.97	10	29.70	
8	φ13	1.58	0.24		1.82	1.042	1.90	6	11.40	
9	φ16	1.58	0.30		1.88	1.578	2.97	8	23.76	
10	φ13	0.53	0.24		0.77	1.042	0.80	14	11.20	
11	φ16	1.58	0.30		1.88	1.578	2.97	64	190.08	
12	φ13	9.13	0.48	0.52	10.13	1.042	10.56	12	126.72	
13	φ9	0.83			0.83	0.499	0.41	4	1.64	
14	"	0.58			0.58	"	0.29	18	5.22	
									579.96	

TYPE F Table 3 Reinforcement.
OUTLET STRUCTUER

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	φ13	1.38	0.24		1.62	1.042	1.67	10	16.90	
2	"	1.28	"		1.52	"	1.58	16	25.28	
3	"	0.53	"		0.77	"	0.80	20	16.00	
4	"	0.36	"		0.60	"	0.63	8	5.04	
5	φ16	2.03	0.30		2.33	1.578	3.68	16	58.88	
6	"	1.03	"		1.33	"	2.10	8	16.80	
7	"	1.28	"		1.58	"	2.49	12	29.88	
8	φ13	1.08	0.24		1.32	1.042	1.38	4	5.52	
9	φ16	1.28	0.30		1.58	1.578	2.49	8	19.92	
10	φ13	0.53	0.24		0.77	1.042	0.80	12	9.60	
11	φ16	1.28	0.30		1.58	1.578	2.49	56	139.11	
12	φ13	8.13	0.48	0.52	9.13	1.042	9.51	10	95.10	
13	φ9	0.83			0.83	0.499	0.41	4	1.64	
14	"	0.58			0.58	"	0.29	16	4.64	
									134.64	

NO. 14 Table 2 Concrete form & Others
OUTLET

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
<u>EARTH WORK</u>					
EXCAVATION				377.1	
EMBANKMENT				70.0	
BACKFILLING				88.3	
<u>CONCRETE WORK</u>					
REINFORCED CONCRETE	12.58 + 14.83			27.41	
FORM	37.61 + 65.95			103.56	
REINFORCEMENT				123.44	
<u>OTHER WORK</u>					
NET MASONRY	44.07 + 62.93 + 21.46			128.46	
SLUICE GATE	H B 1.600 x 2.200			2	

EARTH WORK Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
Excavation	$\frac{1}{2}(20.0+22.5) \times 5.50$			16.9	
	12.1×7.65			146.1	
	17.8×1.50			26.7	
	$\frac{1}{2}(18.4+34.8) \times 3.50$			93.1	
	33.8×0.50			16.9	
	Total			399.1	
Earthwork	$\frac{1}{2}(3.3+0.8) \times 5.50$			11.3	
	0.9×4.50			4.1	
	3.5×5.90			20.7	
	2.7×14.20			38.3	
	Total			74.4	
Backfilling	$\frac{1}{2}(4.2+9.5) \times 5.50$			34.9	
	5.1×7.65			39.0	
	4.6×1.50			6.9	
	$\frac{1}{2}(3.0+1.2) \times 3.50$			7.4	
	0.2×0.50			0.1	
	Total			88.3	

OPEN TRANSITION Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m ²)	
Ust. Masonry	SECTION (1)				
	$\frac{1}{2}(0.30+1.00) \times 2.80 \times 2$			= 3.64	A
	$1.80 \times 0.50 \times 2$			= 1.80	B
	$2.30 \times 0.50 \times 2$			= 2.30	C
	Sub. Total = 7.74				
	SECTION (2)				
	$1.80 \times 0.50 \times 2$			= 1.80	D
	$\frac{1}{2}(0.875+1.00) \times 0.50 \times 2$			= 0.94	E
	$1.50 \times 0.50 \times 2$			= 1.50	F
	$(0.875 \times 2.30 - \frac{1}{2} \times 1.18 \times 0.575) \times 2 = 3.72$				G
	$\frac{1}{2} \times 0.30 \times 0.18 \times 2$			= 0.05	H
	Sub. Total = 8.21				
	$\frac{1}{2}((1) + (2)) \times 5.50 = \frac{1}{2}(7.74 + 8.21) \times 5.50$			= 43.78	I
	$\frac{1}{2}(0.30 + 0.40) \times 0.30 \times 2.0$			= 2.1	J
	Total			45.87	

BOX CULVERT Table 2 Concrete, form & Others.

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m)	
				(m)	
			250		
			500		
Reinforced Concrete	$5.20 \times 0.30 \times 7.65$ $0.25 \times 0.50 \times 5.20$			11.93 0.85	J B
	Total			12.58	
Form	$2.00 \times 7.65 \times 2$ 5.20×0.30 $0.50 \times 5.20 \times 2$ $0.25 \times 5.0 \times 2$			30.60 1.56 5.20 2.50	A B "
	Total			39.86	
Wet Masonry	$0.60 \times 1.50 \times 7.65$ $\frac{1}{2} (0.69 + 1.00) \times 1.50 \times 7.65 \times 2$ $\frac{1}{2} (0.30 + 1.37) \times 0.30 \times 7.65 \times 2$ $0.70 \times 6.60 \times 7.65$			6.89 17.16 7.54 35.04	C D E F
	Total			66.93	

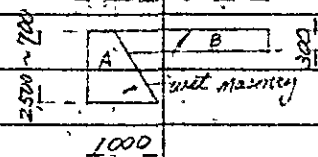
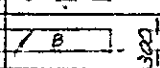
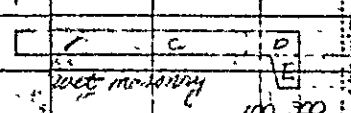
GATE PORTION Table 2 Concrete, form & Others

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³) (m ³)	
	300 2,300 300 2,300 300		100		
	600 2,000 600 2,000 600		1,500		
Reinforced Concrete	0.70 x 5.80 x 1.50			6.09	A
	0.25 x 5.50 x 1.95			2.68	B
	0.25 x (5.80 x 7.80 - 2.00 x 1.50 x 2)			1.11	
	0.10 x 1.95 x 0.45 x 3			0.99	C
	(0.60 x 0.45 - 0.15 x 0.20) x 1.50 x 2			0.96	D
	(0.60 x 0.45 - 0.15 x 0.20 x 2) x 1.80			0.38	
	1/2 (0.45 x 0.60 + 0.80 x 0.60) x 1.80 x 2			1.05	E
	1/2 (0.15 x 0.60 + 0.20 x 0.60 + 0.14 x 0.30) x 1.80			0.61	
	0.25 x 5.50 x 0.70			0.96	F
	Total			14.83	
Form	0.70 x (1.50 + 0.80) x 2			10.22	A
	0.25 x 3.75 x 2			1.88	B
	0.95 x 5.50			10.73	
	0.95 x 2.30 x 2			8.97	
	0.80 x 5.80 + 2.00 x 1.50 x 2			7.44	

Table 2 Concrete, form & Others.

Kinds	Calculated Process	Unit	Numbers	Total	Remarks
				(m ³)	
				(m ²)	
	0.30 x 2.00 x 2			1.20	B
	2.45 x 1.95 x 2 x 3			5.27	C
	1.30 x 1.95 x 3			1.76	
	0.45 x 1.80 x 2 x 3			4.36	D
	0.15 x 1.80 x 4			1.08	
	0.45 x 0.60 x 2			0.54	E
	0.15 x 1.60 + $\frac{1}{2} \times 3.14 \times 2.30^2$			0.23	
	$\frac{1}{2} (0.45 + 0.80) \times 1.80 \times 4$			4.50	
	$\frac{1}{2} (0.15 + 0.50) \times 1.80 \times 2$			1.17	
	0.60 x $\sqrt{1.80^2 + 1.35^2} \times 2$			2.70	
	$\frac{1}{3} \times 2 \times 3.14 \times 0.30 \times \sqrt{1.80^2 + 1.35^2}$			1.73	
	0.70 x 0.25 x 2			0.35	F
	5.50 x 0.25 x 2			2.75	
	0.45 x 2.30 x 2			2.07	
	Total			65.95	
Sluice Gate	$\frac{H}{B} = \frac{1.600}{2.200}$			0.73	

SHEATHING WORK Table 2 Concrete, form & Others
AND BANK REVETMENT

Kind	Calculated Process	Unit	Numbers	Total	Remarks
				(m) (m)	
	300 2.200		3.250	750	
	 2.50 1.00 3.00 A wet masonry				
	 0.30 2.00 B wet masonry				
	 3.25 4.00 0.35 C wet masonry				
	1.00				
Wet Masonry	$\frac{1}{2}(0.30 + 1.00) \times \frac{1}{2}(2.70 + 2.50) \times \frac{1}{2}(3.25 + 3.60) \times 2$			7.12	A
	$0.30 \times 2.00 \times 2 \times 2$			4.80	B
	$\frac{1}{2}[\frac{1}{2}(3.20 + 2.12) + \frac{1}{2}(2.20 + 1.90)] \times 0.30 \times 7.80 \times 2$			5.09	
	$0.35 \times 3.25 \times 4.00$			4.65	C
	$0.35 \times 0.75 \times 9.80$			2.57	D
	$\frac{1}{2}(0.30 + 0.40) \times 0.45 \times 9.80$			1.54	E
	total			21.46	

NO. 14
OUTLET

Table 3 Reinforcement

Kinds	Dia (mm)	Actual length (m)	Hook length (m)	Joint length (m)	Total length (m)	Weight per meter (kg/m)	Weight of Unit (kg/unit)	Number	Total Weight (kg)	Remarks
1	Φ13	5.68	0.45	0.52	6.65	1.042	6.96	6	41.76	
2	"	5.68	"	"	6.68	"	6.96	6	41.76	
3	"	1.38	0.24	"	1.62	"	1.69	38	64.22	
4	"	2.27	"	"	2.51	"	2.62	30	78.60	
5	Φ16	2.94	0.30	"	3.24	1.578	5.11	18	91.98	
6	Φ13	3.52	0.24	"	3.76	1.042	3.92	10	39.20	
7	"	2.25	"	"	2.49	"	2.59	5	12.95	
8	"	0.56	0.24	"	0.60	"	0.63	30	18.90	
9	Φ16	2.14	0.30	"	2.44	1.578	3.85	18	69.30	
10	Φ13	2.38	0.24	"	2.62	1.042	2.73	34	92.82	
11	"	5.38	"	"	5.62	"	5.86	17	99.62	
12	Φ16	5.38	0.30	"	5.68	1.578	8.96	3	26.88	
13	Φ13	1.34	0.24	"	1.58	1.042	1.65	21	34.65	
14	"	1.29	"	"	1.53	"	1.59	17	27.03	
15	"	1.22	"	"	1.46	"	1.52	5	7.60	
16	Φ16	5.38	0.30	"	5.68	1.578	8.96	26	232.96	
17	Φ13	7.53	0.48	0.52	8.53	1.042	8.89	36	320.04	
18	"	5.38	0.24	"	5.62	"	5.86	26	152.36	
19	"	1.18	"	"	1.42	"	1.48	18	26.64	
20	"	0.68	"	"	0.92	"	0.96	18	17.28	
21	"	5.08	"	"	5.32	"	5.54	4	22.16	
22	Φ16	0.80	0.30	"	1.10	1.578	1.74	52	90.48	
23	Φ9	0.90	"	"	0.90	0.499	0.45	5	2.25	
24	"	1.04	"	"	1.04	"	0.52	4	2.08	
25	"	0.63	"	"	0.63	"	0.31	4	1.24	
26	"	0.63	"	"	0.63	"	0.31	28	8.68	
									1623.44	

INLET STRUCTURE FOR A ROUTE

No. 199

KINDS	UNIT	NO.1	NO.2	NO.3	NO.4	NO.5	NO.6	NO.7	NO.8	NO.9	SUB-TOTAL
1) EARTH WORK											
EXCAVATION	m ³	178.4	178.4	189.4	189.2	172.9	172.9	231.6	351.0	344.2	2008.0
EMBANKMENT	m ³										
2) OTHERS											
NET MASONRY	m ²	132.06	132.06	135.25	126.22	108.64	108.64	150.42	203.57	197.47	1194.13
DRY STONE PITCHING	m ²					57.00	57.00				114.00
KINDS	UNIT	NO.10	NO.11	NO.12	NO.13	NO.14	NO.15	NO.16	NO.17	NO.18	SUB-TOTAL
1) EARTH WORK											
EXCAVATION	m ³	287.7	298.3	195.2	204.2	192.2	375.8	294.6	284.1	293.8	2425.9
EMBANKMENT	m ³										
2) OTHERS											
NET MASONRY	m ²	167.51	185.19	144.02	141.16	129.16	228.97	183.57	177.50	181.43	1538.57
DRY STONE PITCHING	m ²	93.00									93.00
KINDS	UNIT	NO.19	NO.20	NO.21	SUB-TOTAL	TOTAL	REMARKS				
1) EARTH WORK											
EXCAVATION	m ³	282.5	300.6	285.4	878.3	5312.2					
2) OTHERS											
NET MASONRY	m ²	180.67	170.06	174.44	545.17	3372.41					
DRY STONE PITCHING	m ²			93.00	93.00	300.00					

