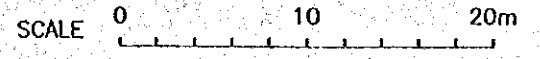
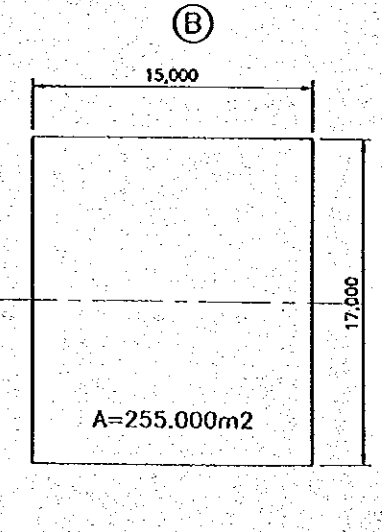
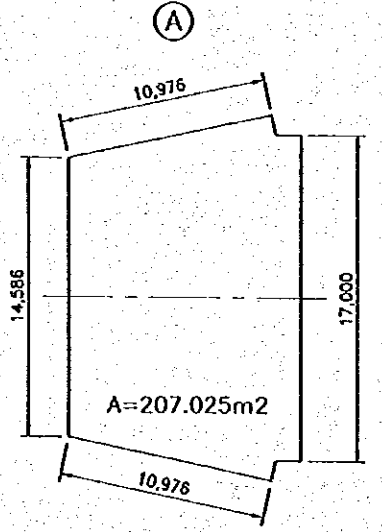
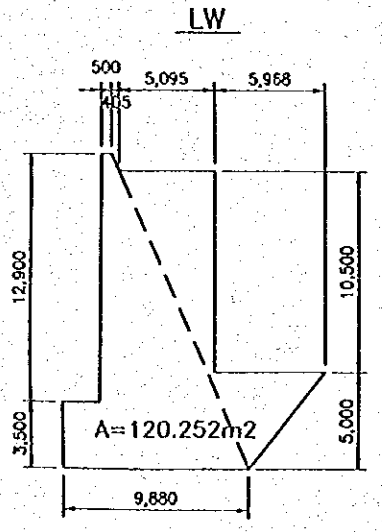
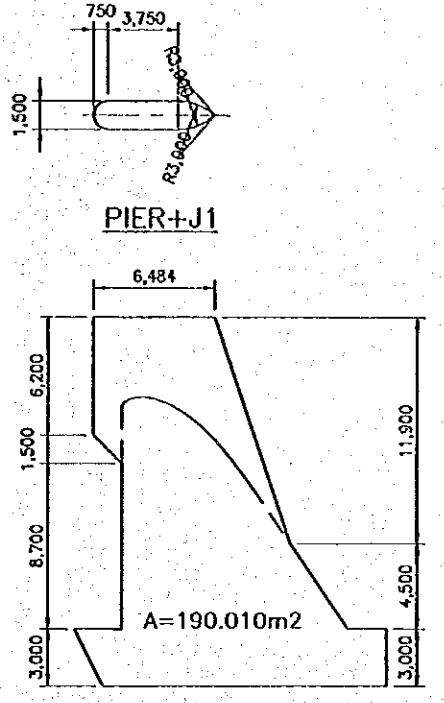
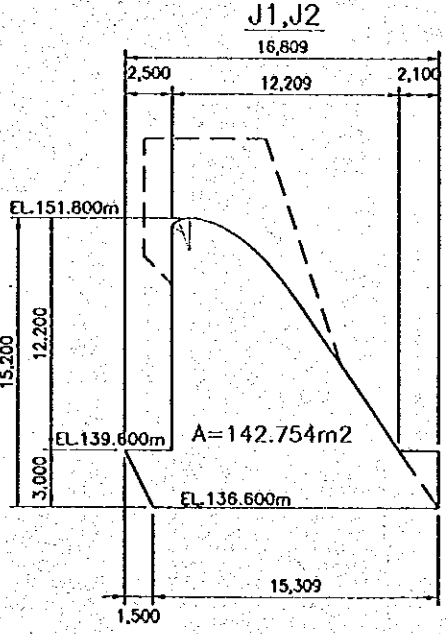
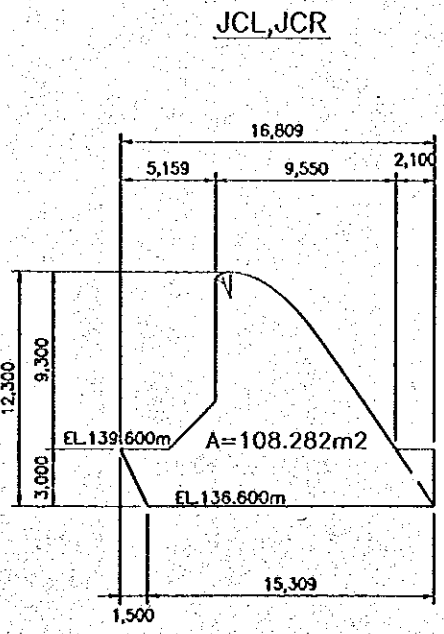
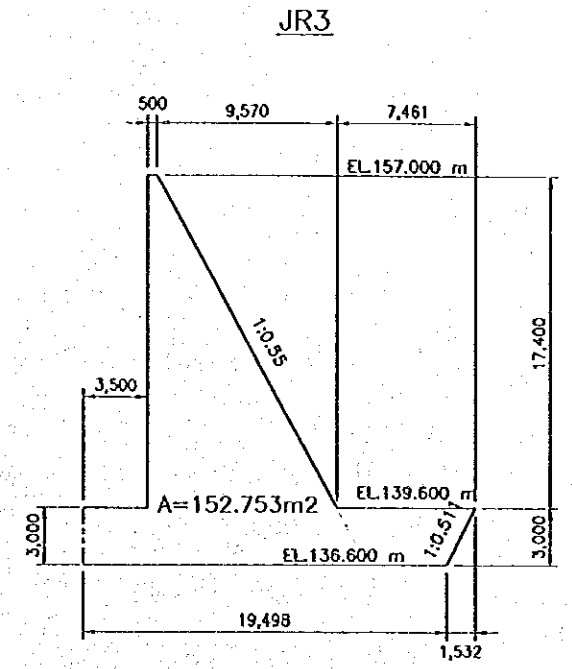
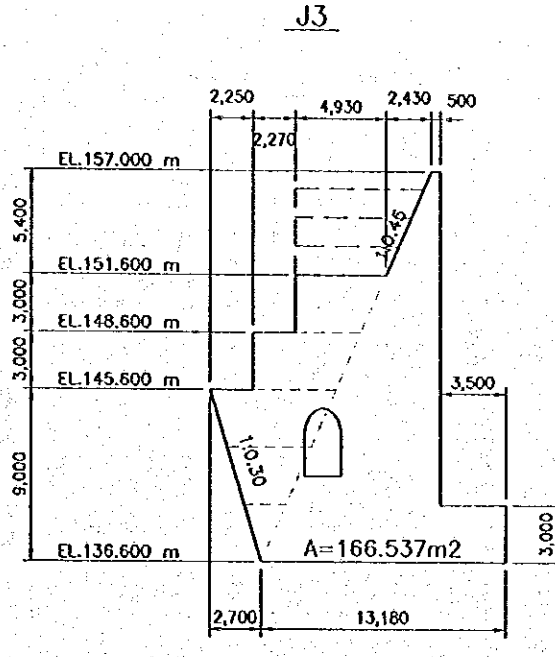
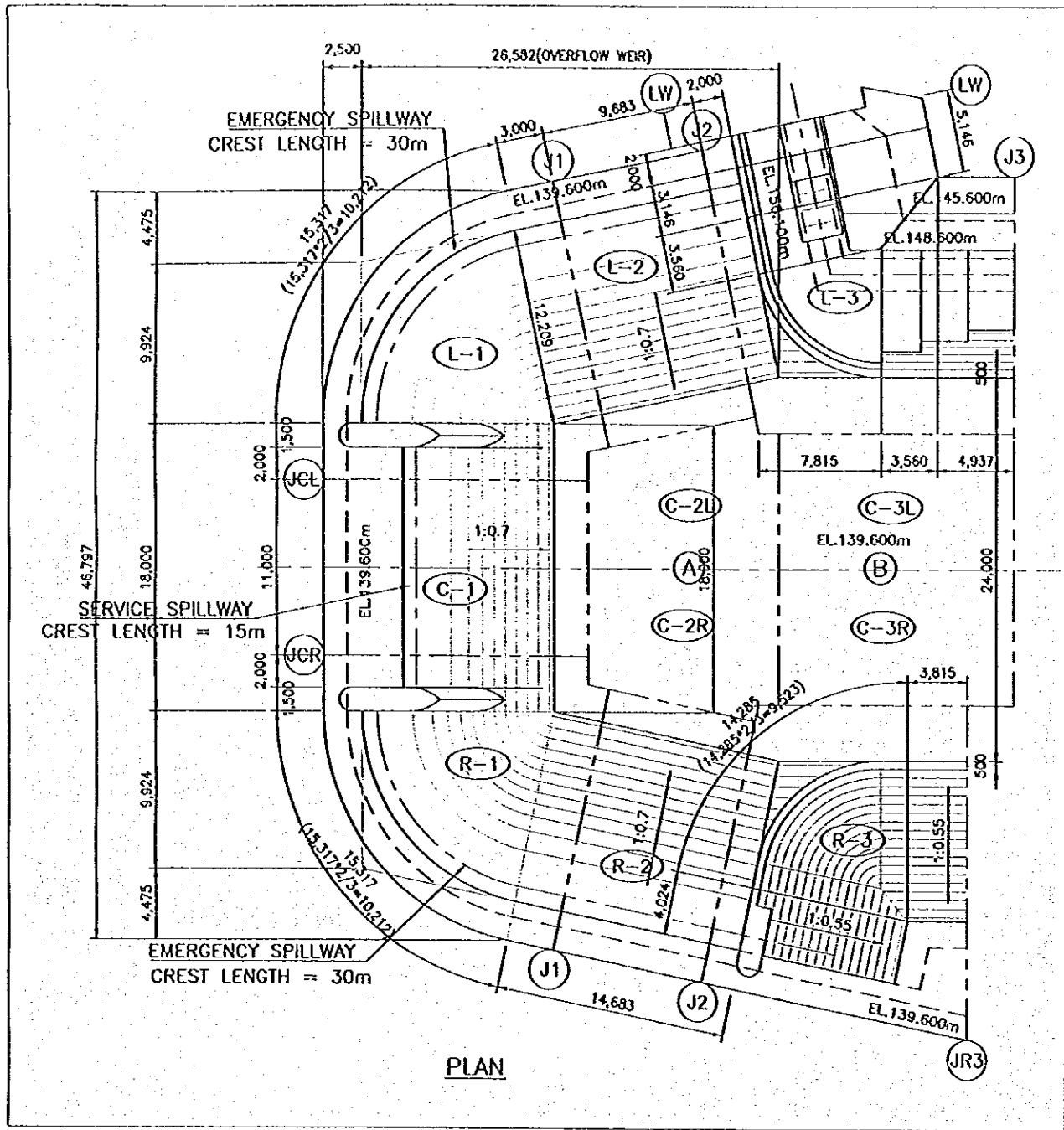


2.4.4 Weight of Steel Reinforcing Bar by each Block

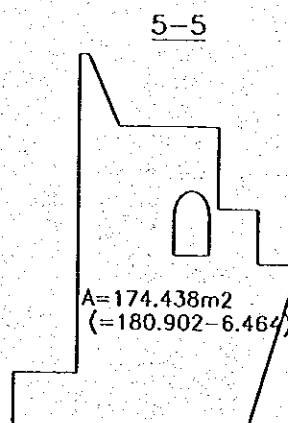
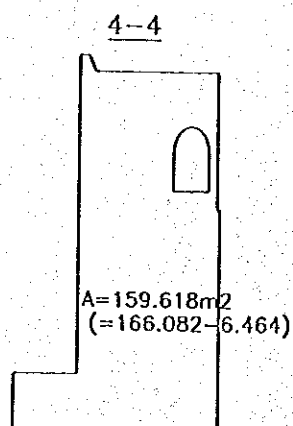
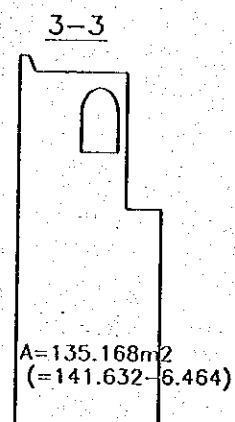
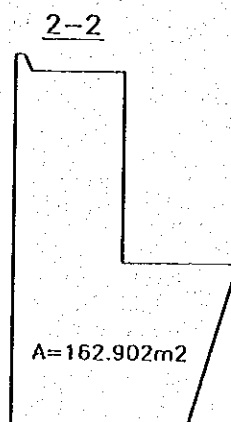
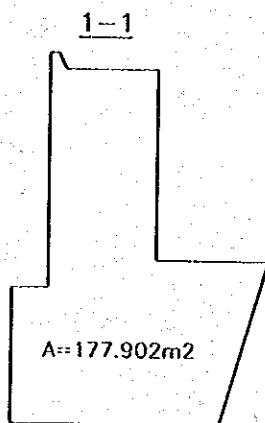
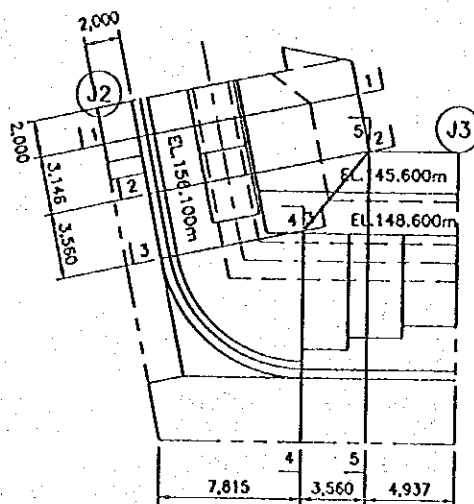
Unit : (kg)

Block	Left Wall		Center Slab				Right Wall	
	Name	Weight (kg)	Name	Weight (kg)	Name	Weight (kg)	Name	Weight (kg)
1	L-1	4,907	C-1	1,702	---	---	R-1	4,907
2	L-2	1,515	C-2	7,090	---	---	R-2	1,515
---	L-W	1,079	---	---	---	---	---	---
3	L-3	13,942	C-3	8,776	---	---	R-3	12,903
4-1	L-4-1	21,051	C-4-1	8,776	---	---	R-4	28,813
4-2	L-4-2	13,565	C-4-2	7,252	---	---	---	---
5	L-5	12,960	C-5	9,513	---	---	R-5	7,780
6	L-6	4,387	C-6L	4,744	C-6R	4,744	R-6	4,183
7	L-7	3,178	C-7L	5,294	C-7R	5,294	R-7	3,178
8	L-8	2,319	C-8L	5,294	C-8R	5,294	R-8	2,319
9	L-9	2,319	C-9L	5,294	C-9R	5,294	R-9	2,319
10	L-10	2,539	C-10L	5,300	C-10R	5,300	R-10	2,539
11	L-11	2,510	C-11L	5,374	C-11R	5,374	R-11	2,510
12	L-12	2,133	C-12L	5,622	C-12R	5,622	R-12	2,133
13	L-13	2,223	C-13L	5,604	C-13R	5,604	R-13	2,223
14	L-14	2,689	C-14L	5,679	C-14R	5,679	R-14	2,689
15	L-15	11,684	C-15	9,250	---	---	R-15	11,724
16	L-16	13,421	C-16	9,226	---	---	R-16	Hydro PS
17	L-17	12,624	C-17	9,050	---	---	R-17	Hydro PS
18	L-18	12,624	C-18	8,776	---	---	R-18	12,624
19	L-19	14,543	C-19	14,852	---	---	R-19	12,191
20	---	---	---	---	---	---	R-20	8,018
Total		158,212		142,468		48,205		124,568
							G-Total :	473,453
							G-Total x 1.06	502,000

DETAIL OF OVERFLOW WEIR (1/2)

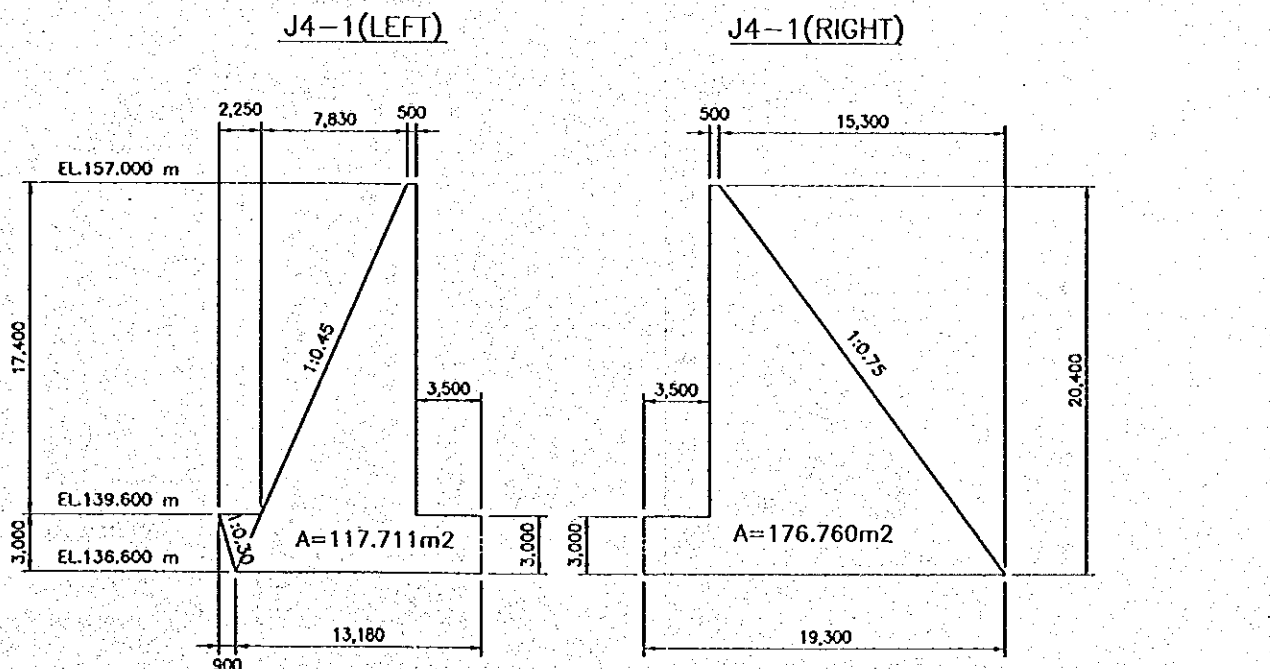
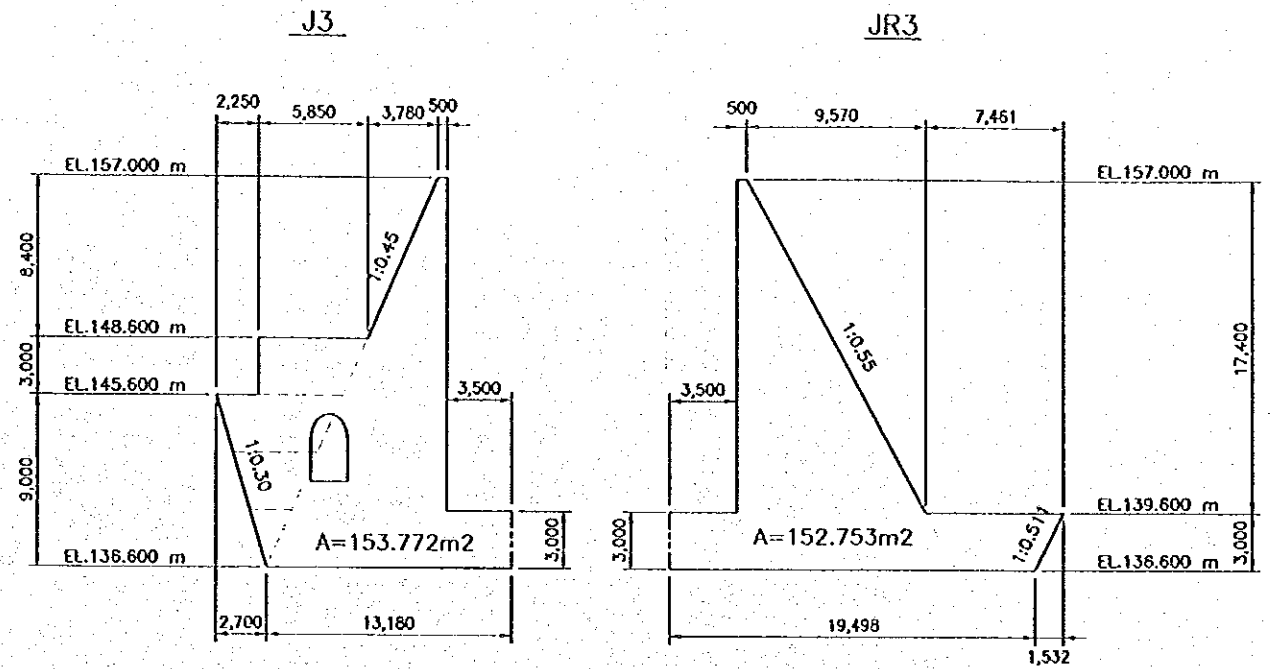
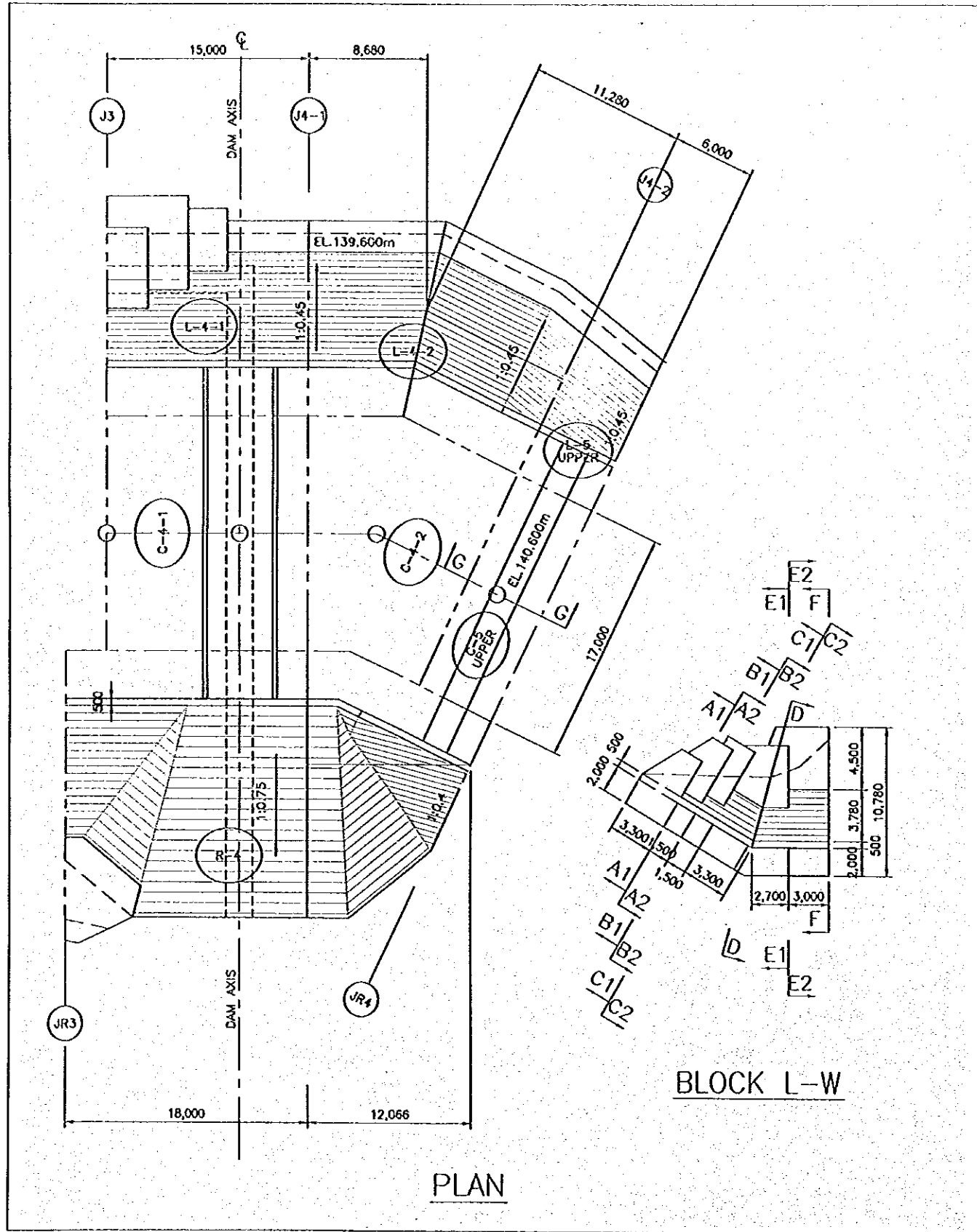


DETAIL OF OVERFLOW WEIR (2/2)



SCALE 0 10 20m

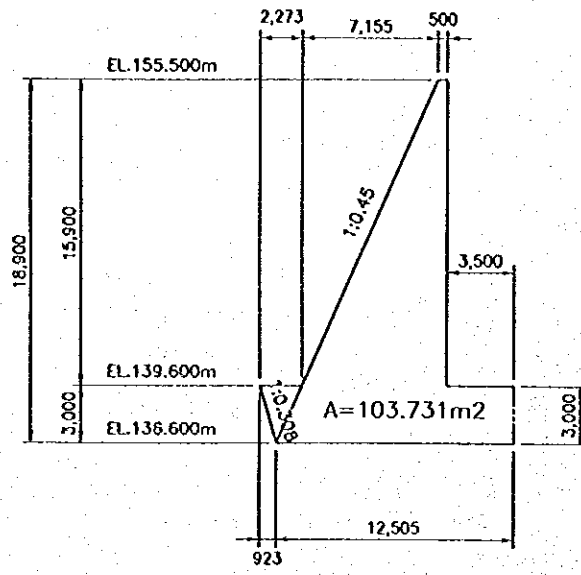
DETAIL OF CONTROL PORTION (1/2)



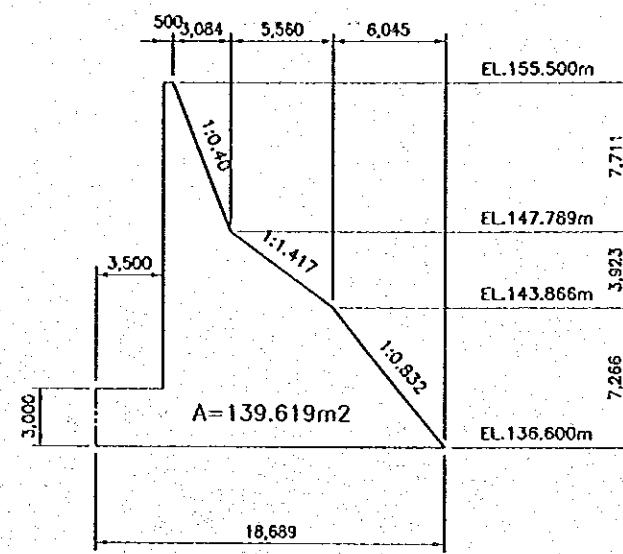
SCALE 0 10 20m

DETAIL OF CONTROL PORTION (2/2)

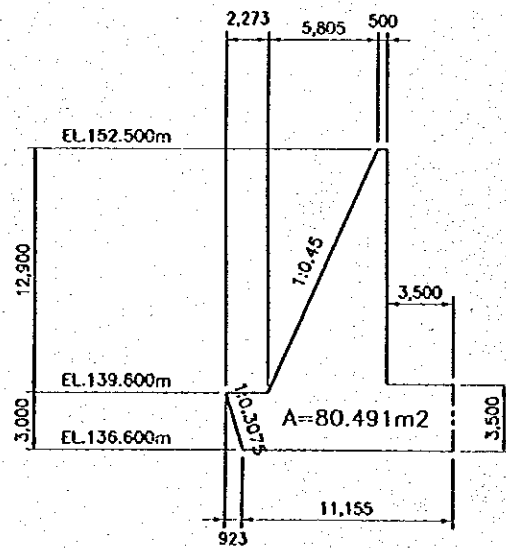
J4-2(LEFT)



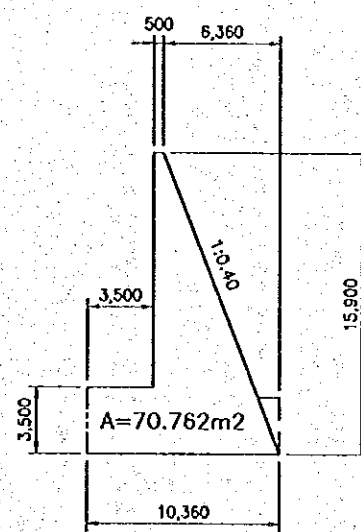
J4-2(RIGHT)



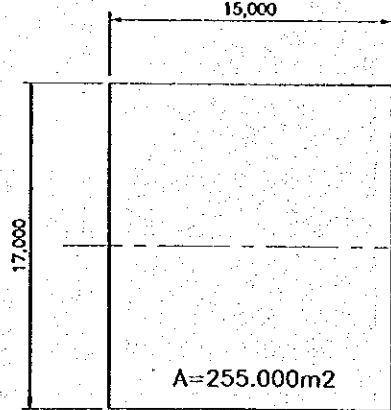
JR4(LEFT)



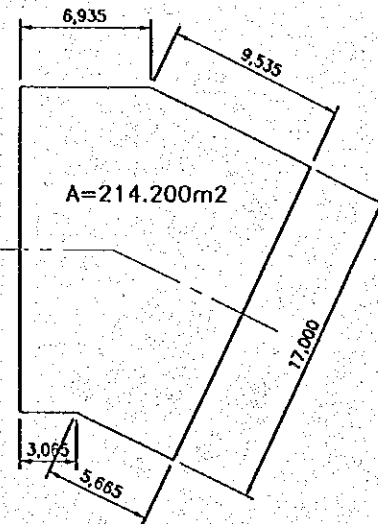
JR4(RIGHT)



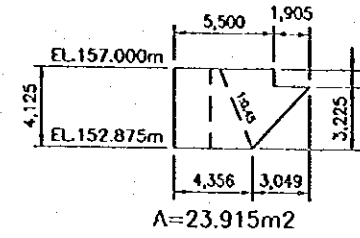
C-4-1



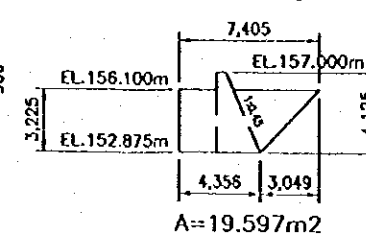
C-4-2



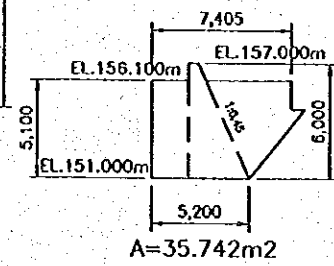
A1-A1



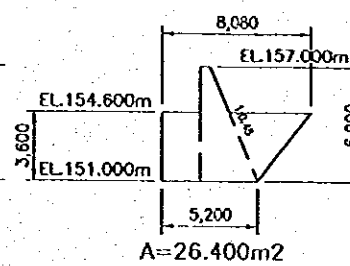
A2-A2



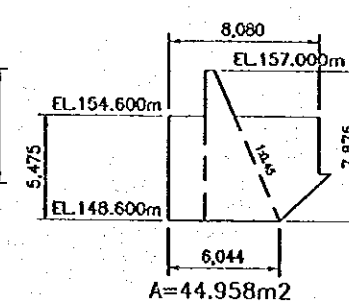
B1-B1



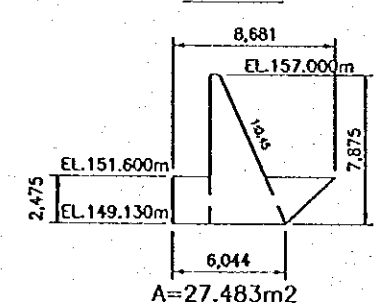
B2-B2



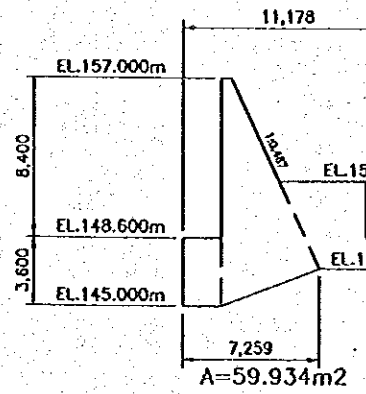
C1-C1



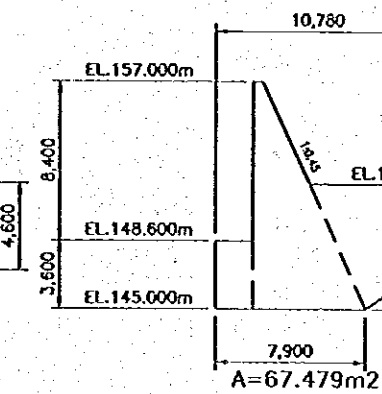
C2-C2



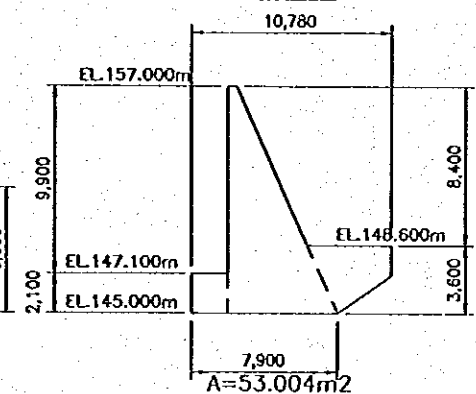
D-D



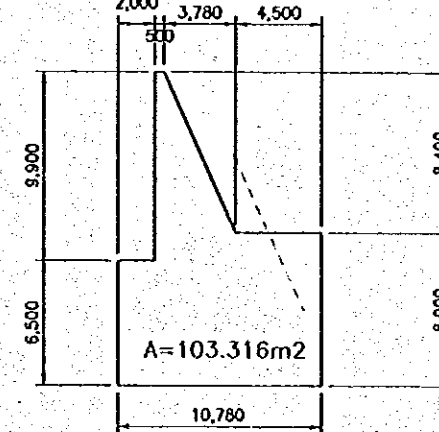
E1-E1



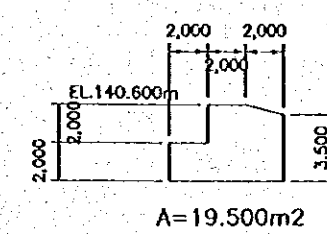
E2-E2



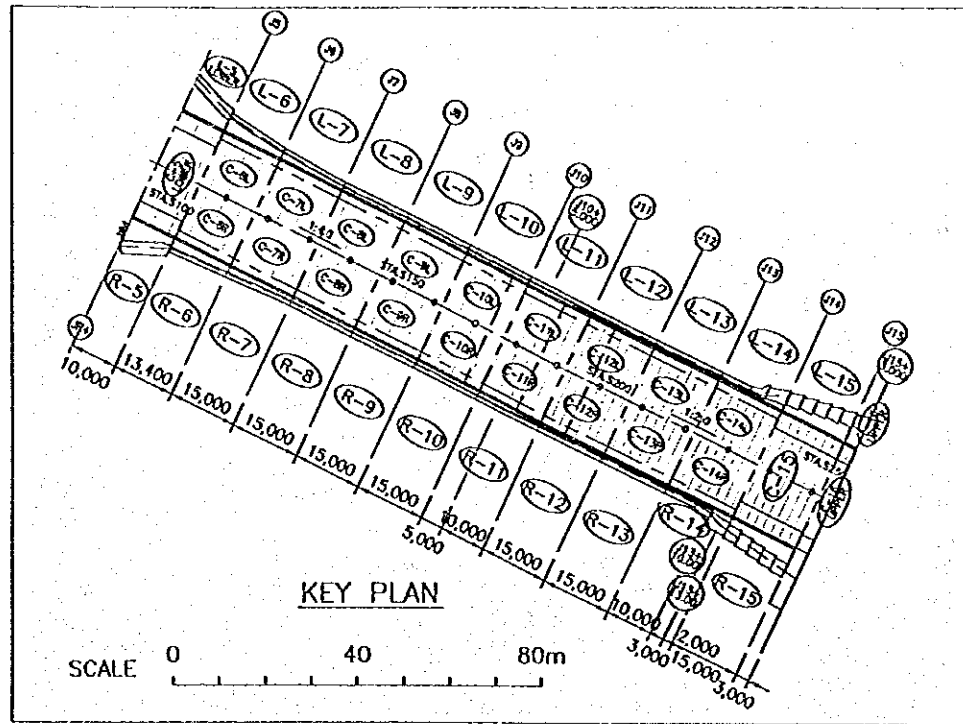
F-F



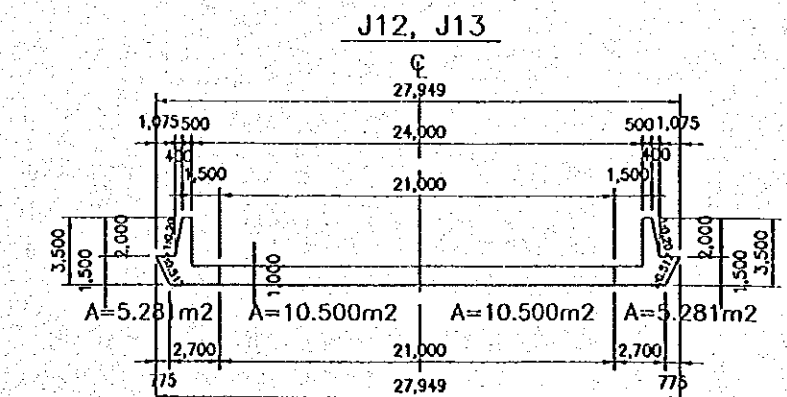
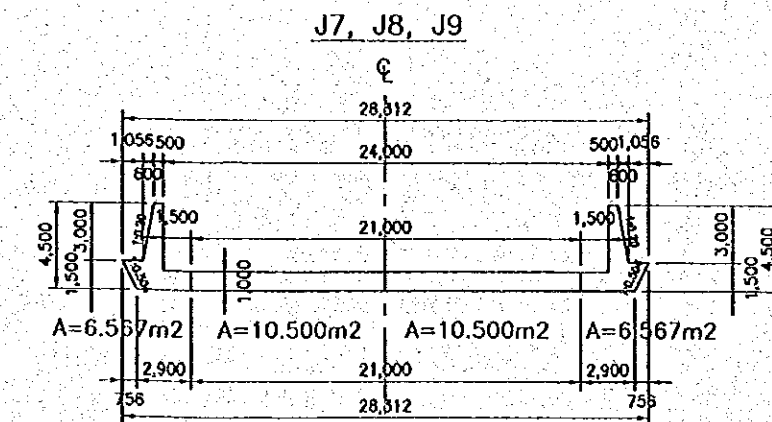
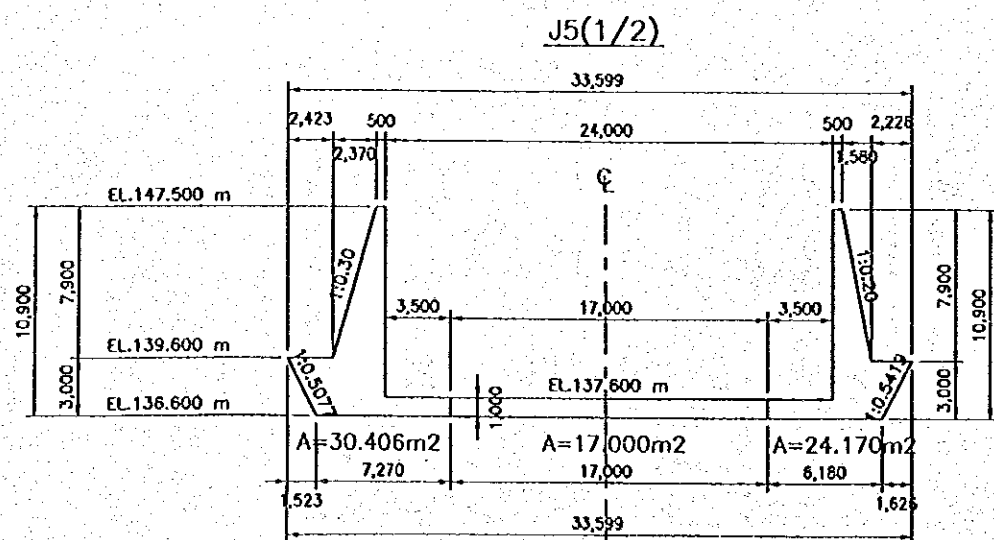
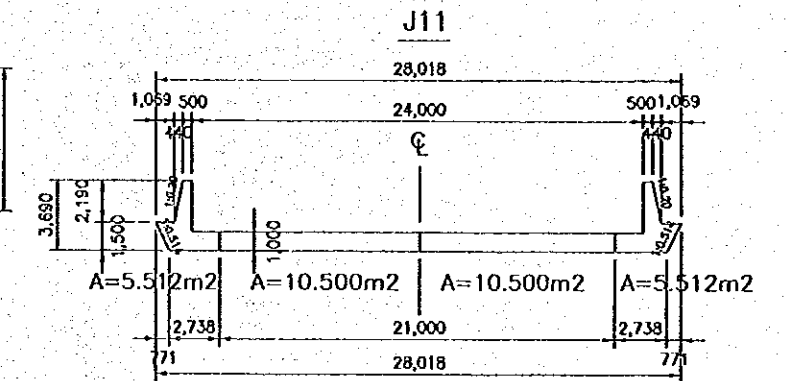
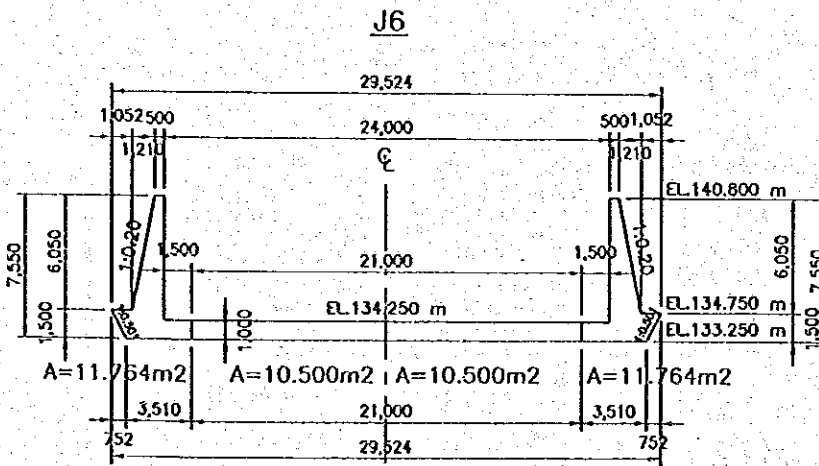
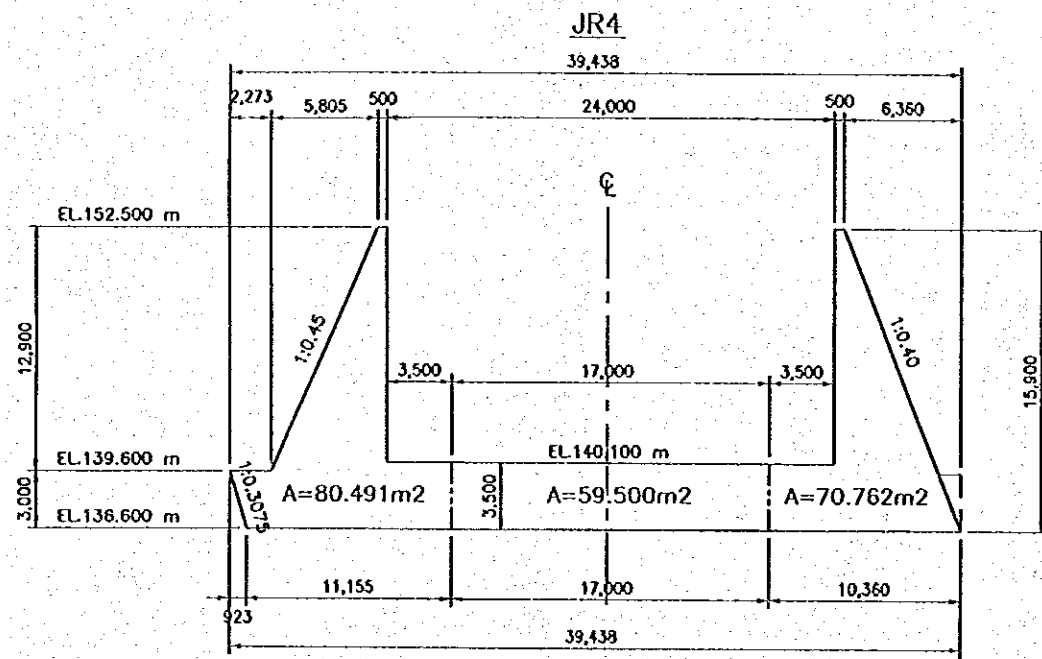
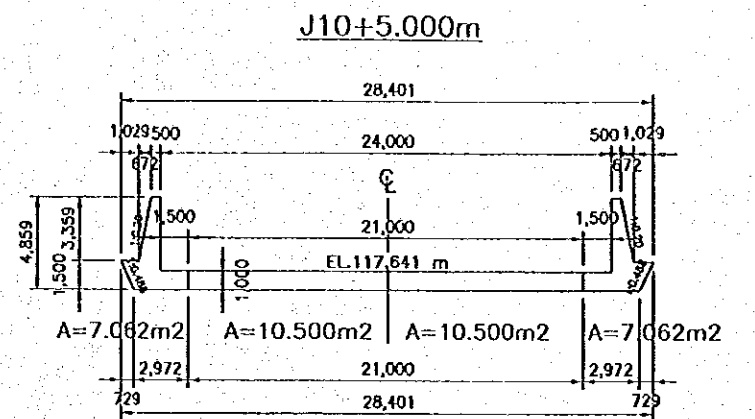
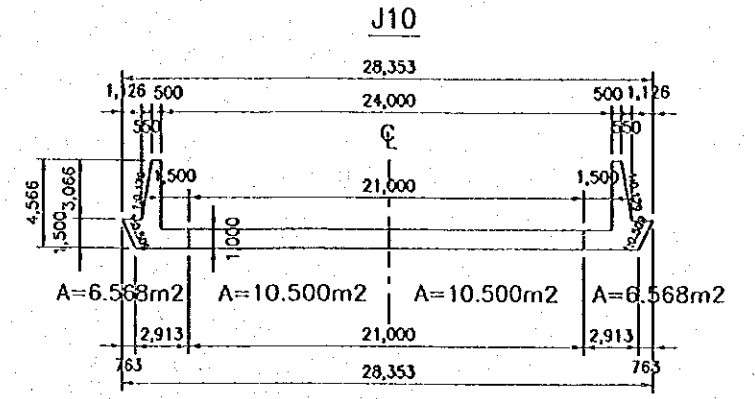
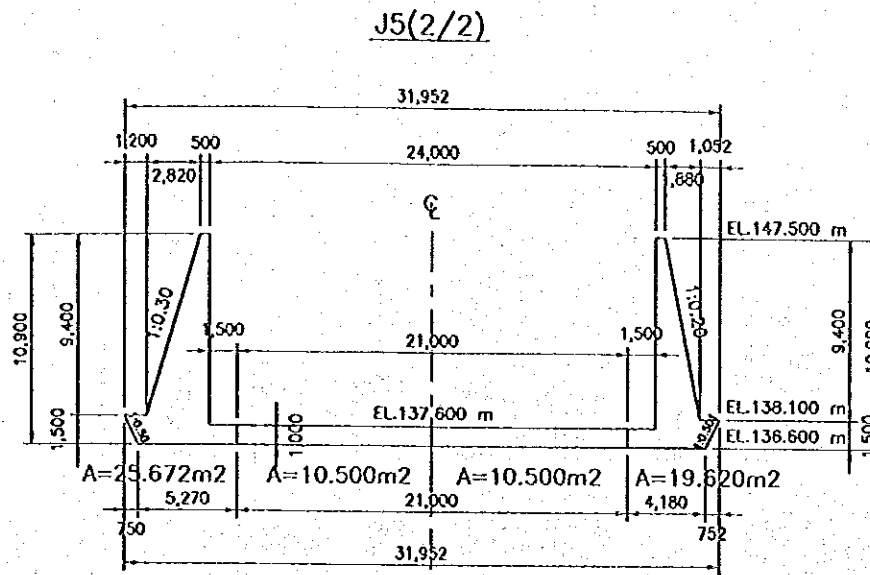
G-G



SCALE 0 10 20m



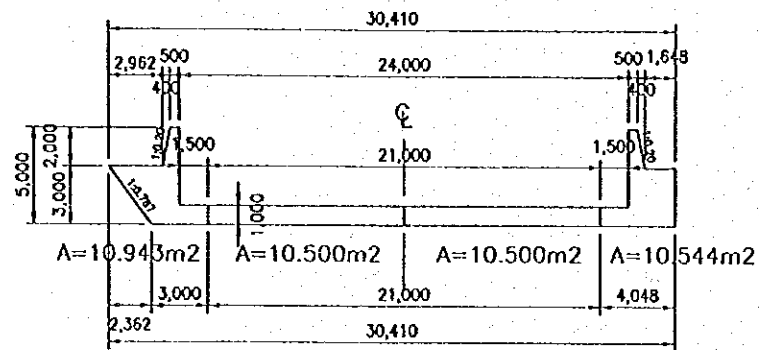
DETAIL OF CHUTE (JR4 - J15+3.000 m) (1/2)



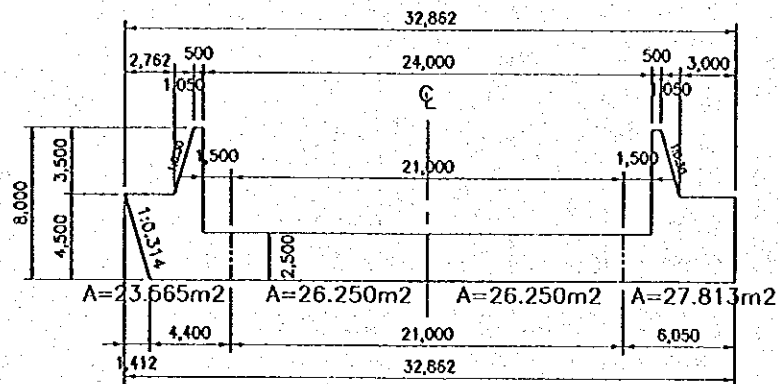
SCALE 0 10 20m

DETAIL OF CHUTE (JR4 - J15+3.000 m) (2/2)

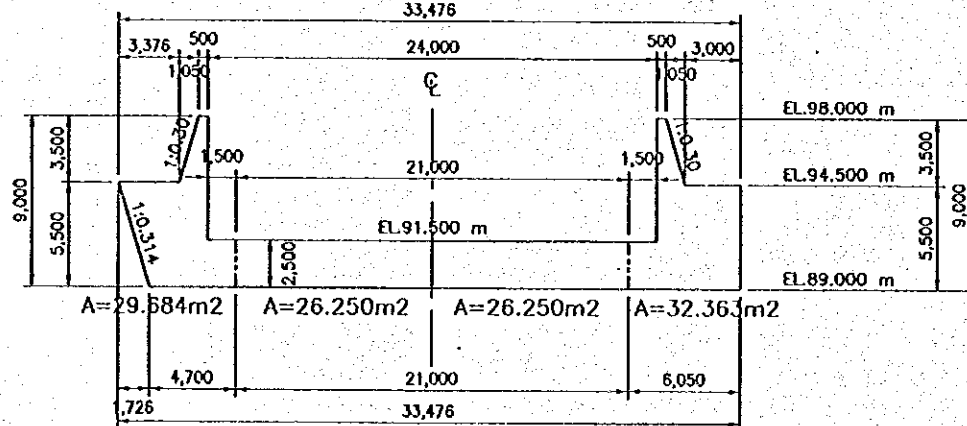
J13+10.000m



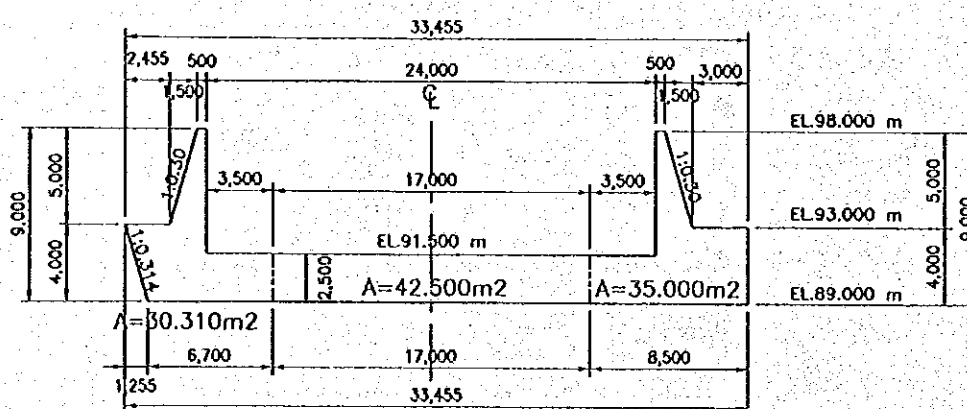
J13+13.000m



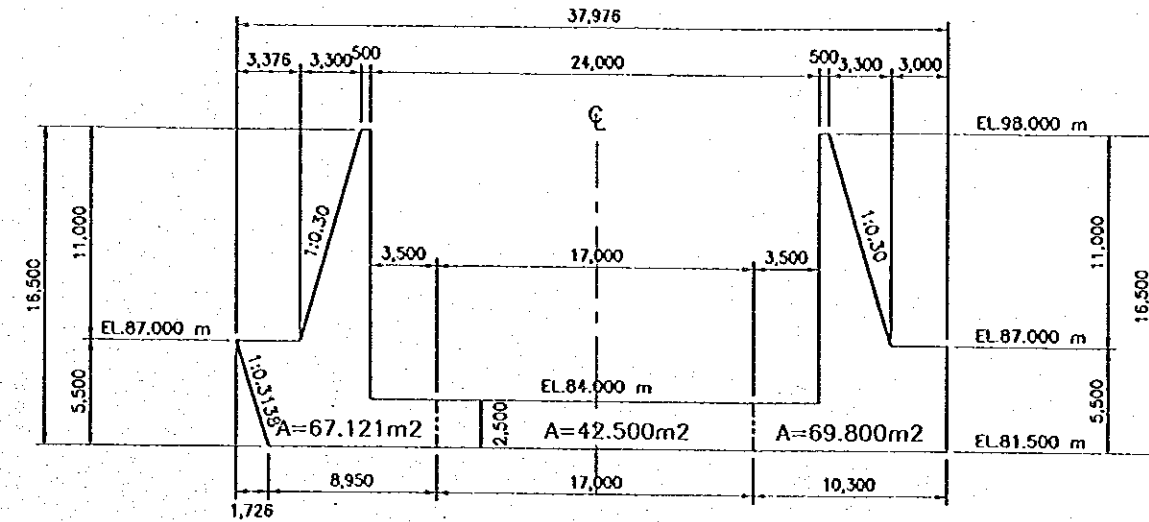
J14(1/2)



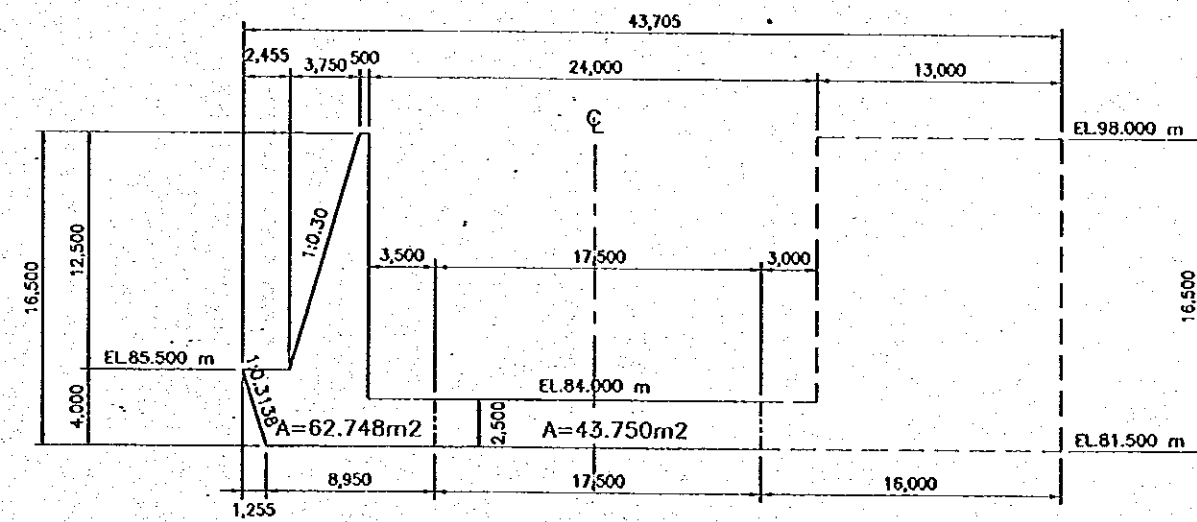
J14(2/2)



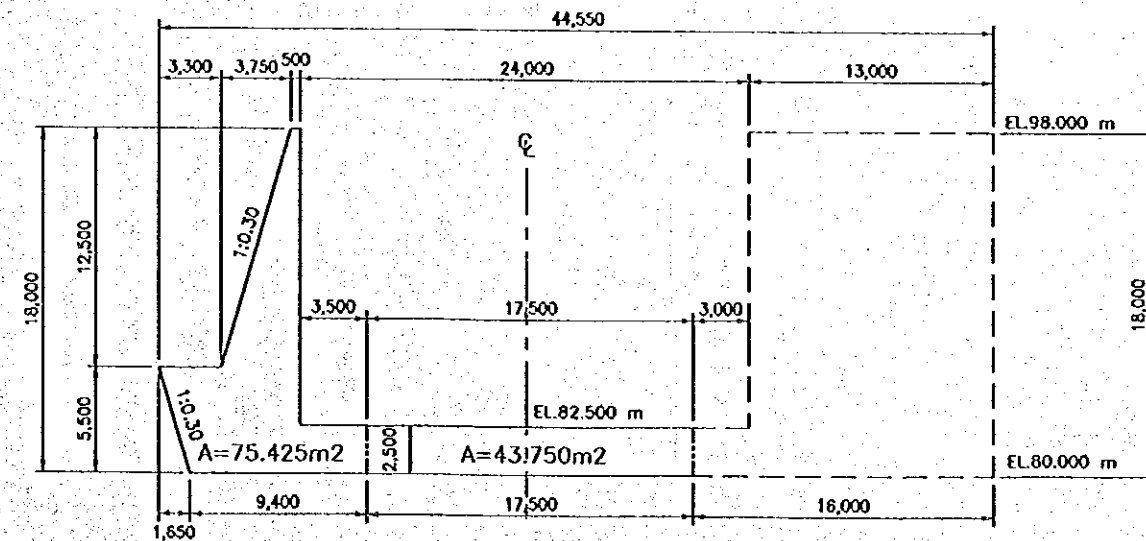
J15(1/2)



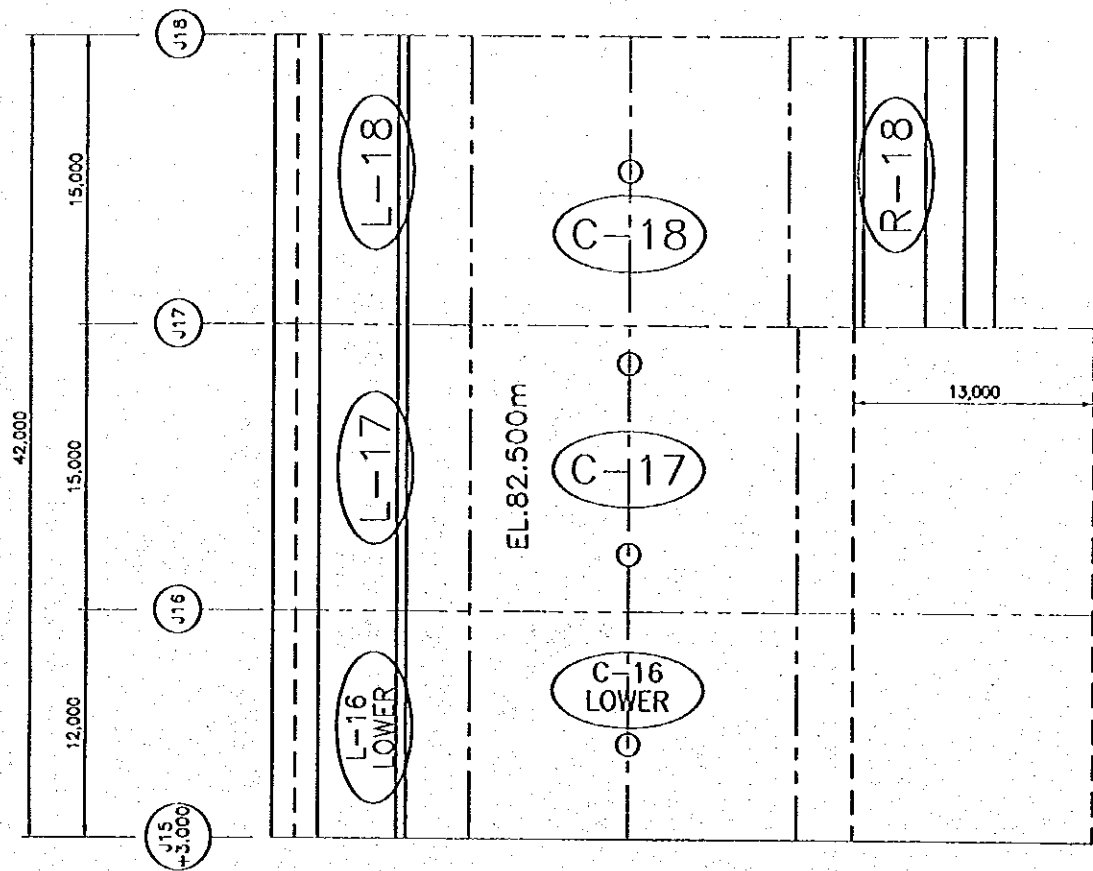
J15(2/2)



J15+3.000m

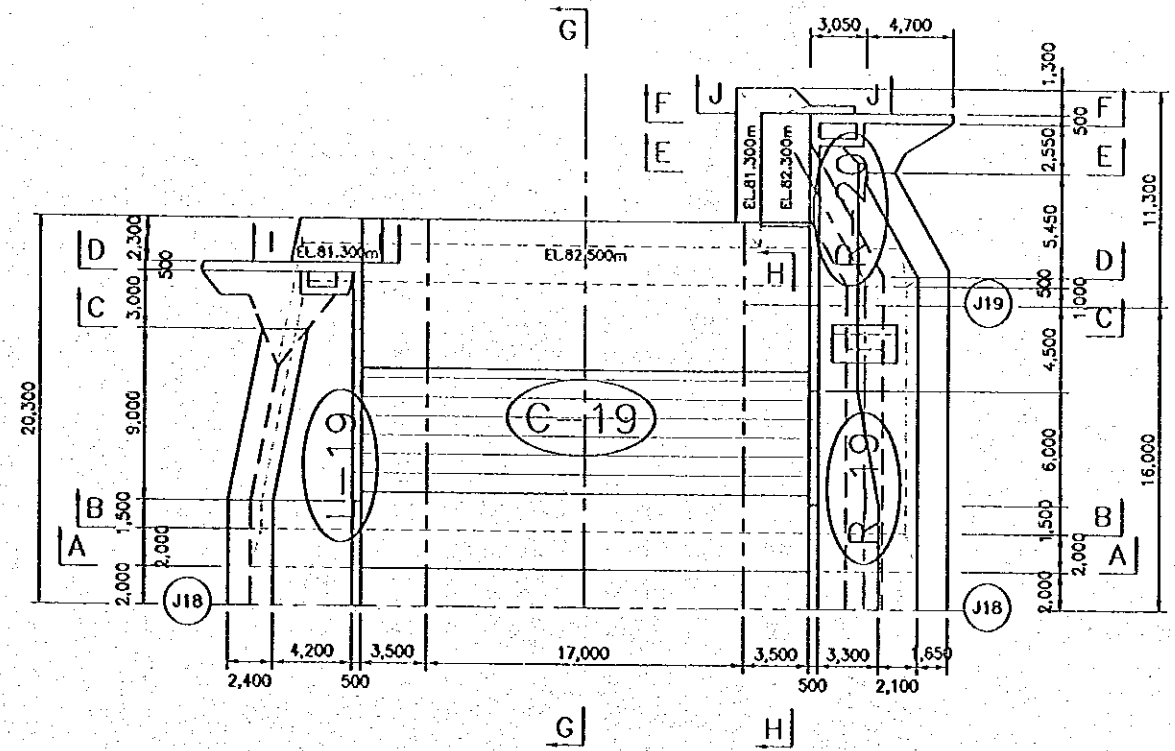


DETAIL OF STILLING BASIN (1/2)

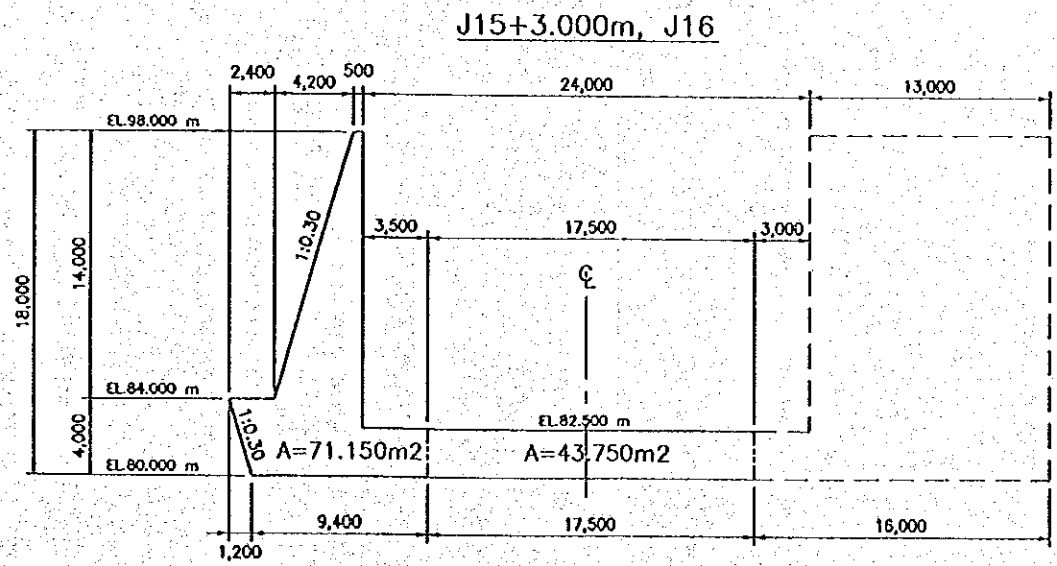
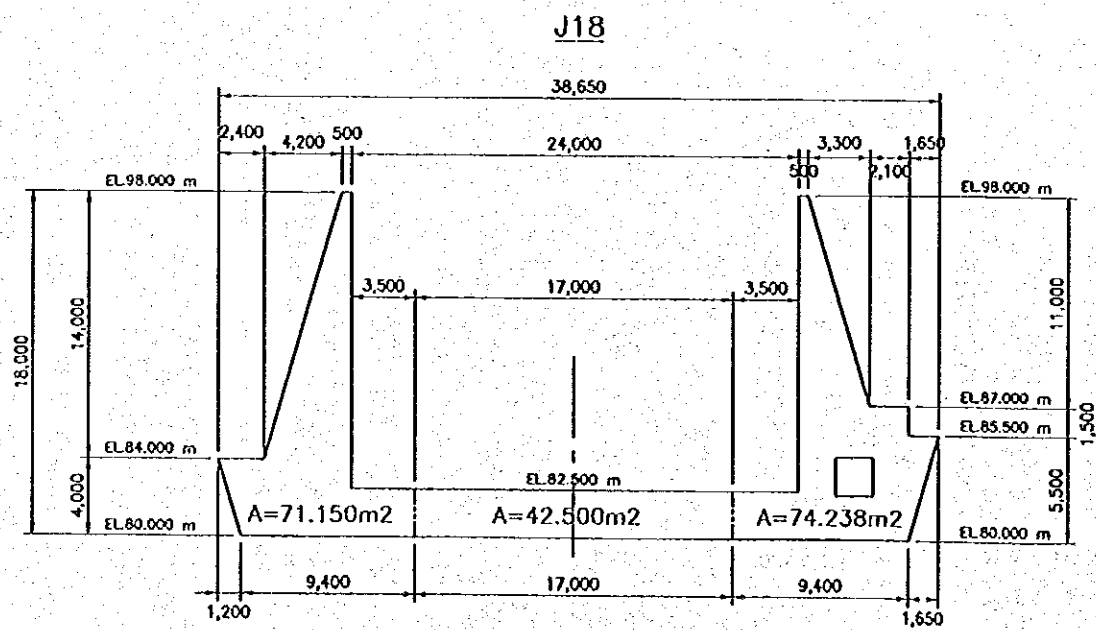


PLAN (J15+3.000m - J18)

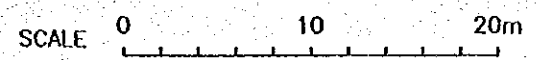
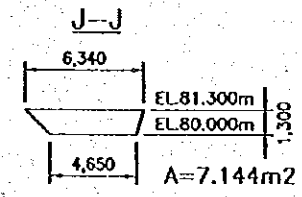
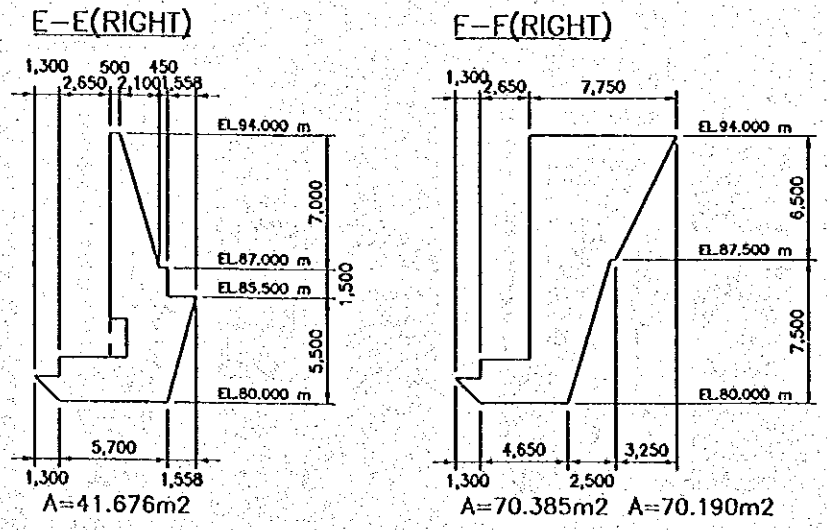
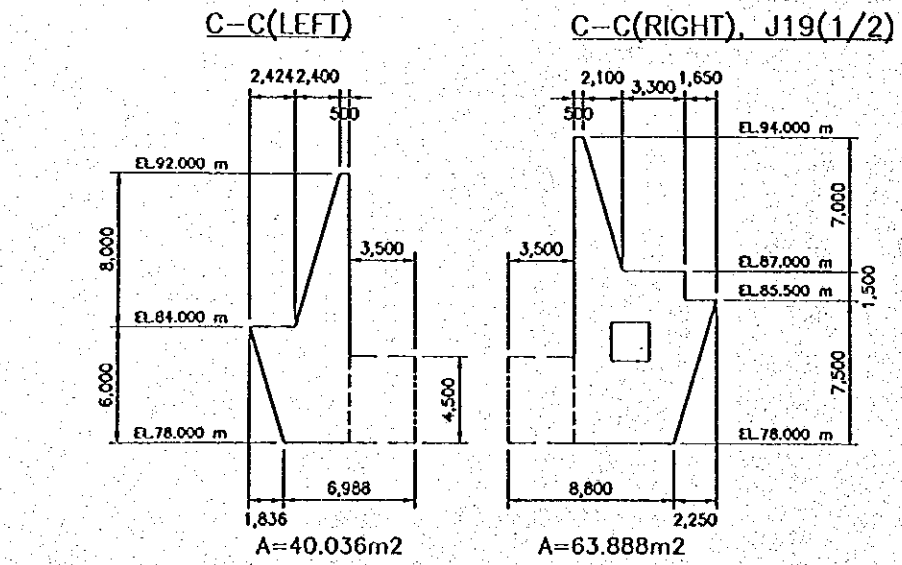
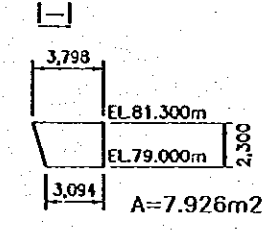
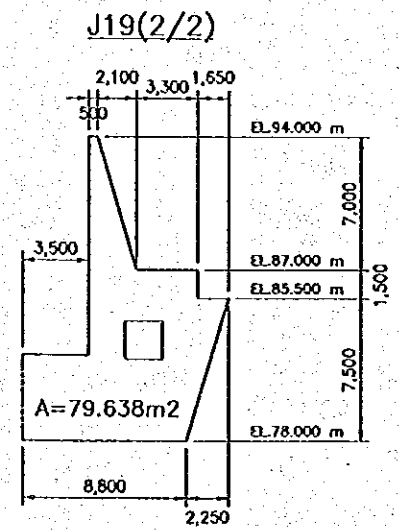
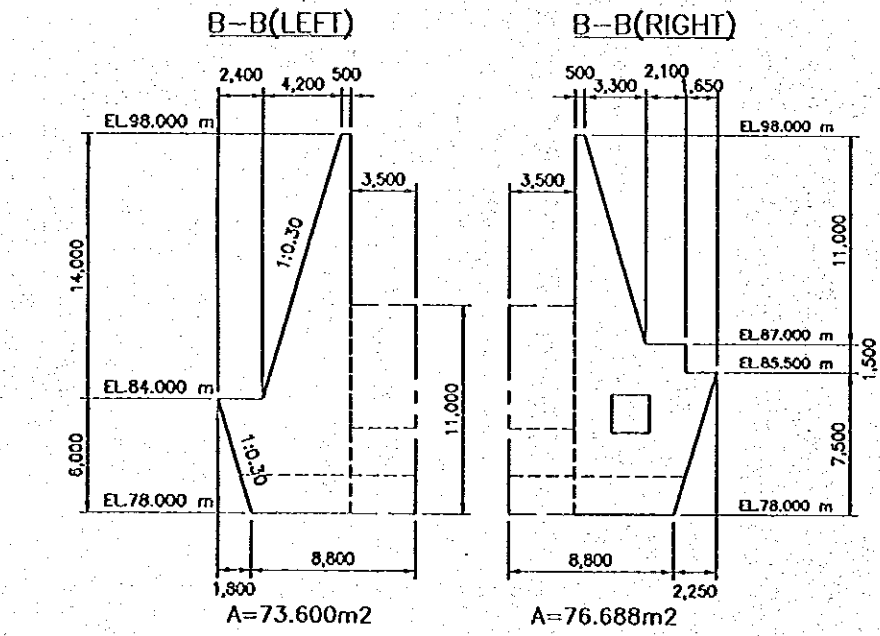
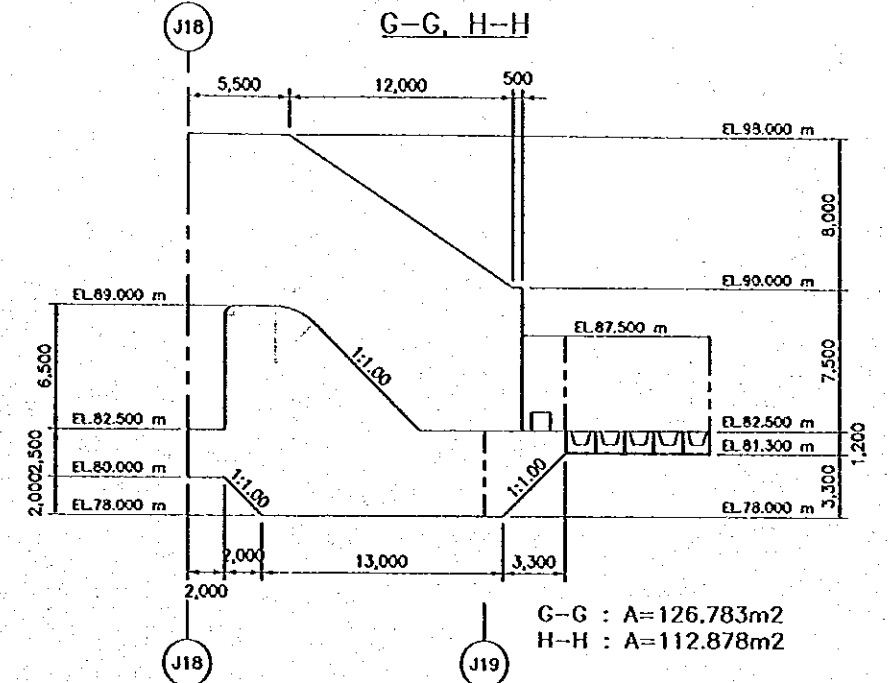
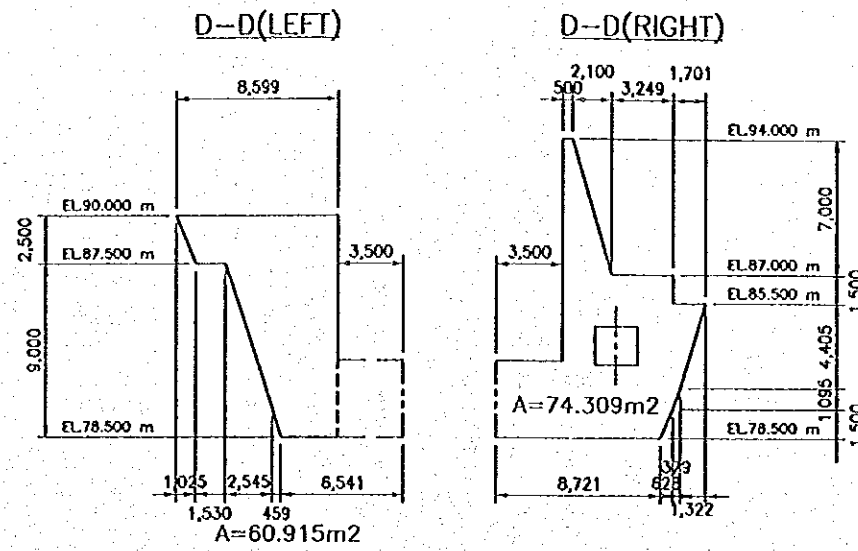
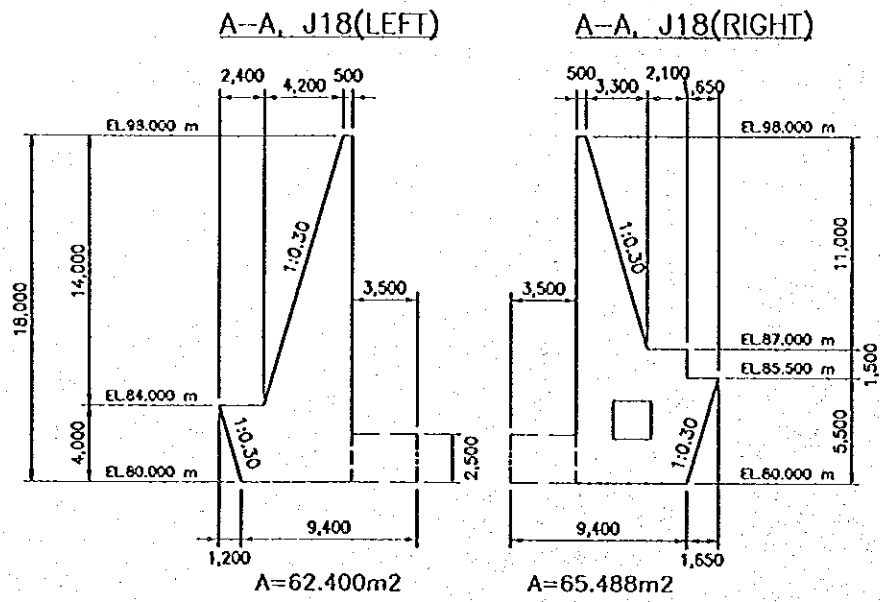
(L-14)



PLAN (BLOCK 19)



DETAIL OF STILLING BASIN (2/2)



2.4.5 Backfill Gravel of Spillway

Unit : (m³)

		Left	Right	Total
Overflow Weir	Overflow Weir~J3, JR3	273.30	0.00	273.30
Control Portion	J3, JR3 ~ JR4, Block L-W	402.01	0.00	402.01
Chute	JR4 ~ J15+3.000	257.51	153.19	410.70
Stilling Basin	J15+3.000 ~ End	369.32	219.92	589.24
Grand Total		1,302.13	373.12	1,675.25
Grand Total x 1.05		1,370.00	390.00	1,760.00

(1) Overflow Weir (Overflow Weir~J3 and JR3)

Left					Right				
Section	Length (m)	Distance (m)	Area (m ²)	Volume (m ³)	Section	Length (m)	Distance (m)	Area (m ²)	Volume (m ³)
J3	18.09	30.21	546.60	273.30					

(2) Control Portion (J3 and JR3 ~ JR4, and Block L-W)

Left					Right				
Section	Length (m)	Distance (m)	Area (m ²)	Volume (m ³)	Section	Length (m)	Distance (m)	Area (m ²)	Volume (m ³)
J4-1(left)	17.98	34.96	628.72	314.36					
J4-2	16.34	6.00	98.03	49.02					
L-W	-	-	77.26	38.63					

(3) Chute (JR4 ~ J15+3.000)

Left					Right				
Section	Length (m)	Distance (m)	Area (m ²)	Volume (m ³)	Section	Length (m)	Distance (m)	Area (m ²)	Volume (m ³)
JR4(left)	11.95								
		10.00	90.57	45.28					
J5(1/2)	6.16								
J5(2/2)	7.73								
		13.40	79.44	39.72					
J6	4.13								
		15.00	38.63	19.31					
J7	1.02				J7	1.02			
		50.00	60.15	30.08			50.00	60.15	30.08
J10+5.0	1.39				J10+5.0	1.39			
		47.00	56.54	28.27			47.00	56.54	28.27
J13+7.0	1.02				J13+7.0	1.02			
		26.00	189.70	94.85			26.00	189.70	94.85
J15+3.0	13.57				J15+3.0	13.57			

(4) Stilling Basin (J15+3.000 ~ End)

Left					Right				
Section	Length (m)	Distance (m)	Area (m ²)	Volume (m ³)	Section	Length (m)	Distance (m)	Area (m ²)	Volume (m ³)
J15+3.0	13.57				J15+3.0	13.57			
		47.50	644.67	322.34			20.50	278.23	139.11
J18+5.5	13.57				J18+5.5	13.57			
		9.00	93.96	46.98			9.00	96.01	48.01
C-C	7.31				C-C	7.76			
							8.45	65.61	32.80
					E-E	7.76			

2.4.6 Water Stop

Grand Total of Water Stop :	1,800.87 (m)
Grand Total of Water Stop x 1.05	1,900.00 (m)

Along Cross Section

Unit : (m)

Section	Left	Right	Center
JCL,JCR	37.57	37.57	-
J1	47.54	47.54	-
J2	47.54	47.54	17.00
JR3	-	43.61	-
J3	33.75	-	17.00
Jw	15.90	-	-
J4-1	20.90	-	17.00
J4-2	19.40	-	17.00
JR4	-	15.90	-
J5	13.40	13.40	17.00
J6	8.05	8.05	21.00
J7	5.00	5.00	21.00
J8	5.00	5.00	21.00
J9	5.00	5.00	21.00
J10	5.00	5.00	21.00
J11	5.00	5.00	21.00
J12	4.00	4.00	21.00
J13	4.00	4.00	21.00
J14	10.00	10.00	17.00
J15	17.50	17.50	17.00
J16	19.00	19.00	17.00
J17	19.00	19.00	17.00
J18	19.00	19.00	17.00
J19	-	15.00	-
Total	361.56	346.11	338.00

Along Profile Section

Unit : (m)

Block	Left	Right	Center
C-1	-	-	-
C-2	13.35	13.35	-
C-3	15.00	15.00	-
C-4-1	15.00	15.00	-
C-4-2	16.47	8.73	-
C-5	17.37	17.37	-
C-6	13.81	13.81	13.81
C-7	15.46	15.46	15.46
C-8	15.46	15.46	15.46
C-9	15.46	15.46	15.46
C-10	15.48	15.48	15.48
C-11	15.95	15.95	15.95
C-12	16.69	16.69	16.69
C-13	16.77	16.77	16.77
C-14	16.77	16.77	16.77
C-15	16.77	16.77	-
C-16	15.35	15.35	-
C-17	15.00	15.00	-
C-18	15.00	15.00	-
C-19	29.39	29.39	-
Total	310.55	302.81	141.85

2.4.7 Others

Drainage Ditch

Total Length of Drainage Ditch Type 1-1 :		89.6m
Total Length of Drainage Ditch Type 1-1 x 1.05		94.0m
Type 1-1 (Depth = 500 mm)		
Left Side		Right Side
Location	Length (m)	Location
on EL.97.0m	53.5	
on EL.97.0m	22.2	
Slope of 1:1.5	13.9	
Total		Total
		0.0

Total Length of Drainage Ditch Type 1-2 :		301.1m
Total Length of Drainage Ditch Type 1-2 x 1.05		316.0m
Type 1-2 (Depth = 250 mm)		
Left Side		Right Side
Location	Length (m)	Location
on EL.157.0m	8.1	Slope of 1:4.0
Slope of 1:2.0	55.3	Slope of 1:2.0
Slope of 1:4.0	54.5	
Slope of 1:2.0	53.4	
Total		Total
		100.4

From Mountain Stream, Type 1-2 (Depth = 250 mm)

Left Side		Right Side	
Location	Length (m)	Location	Length (m)
Slope of 1:0.5	8.4		
on EL.104.5m	1.5		
Slope of 1:0.5	8.4		
on EL.112.0m	1.5		
Slope of 1:0.8	9.6		
Total		Total	0.0
		29.4	

Drainage Box

Total Volume of Drainage Box :	7.63 (m ³)
Total Volume of Drainage Box :	8.00 (m ³)

Drainage Box Type 1-1
 2.1m x 2.1m x 0.75m - 1.5m x 1.5m x 0.6m
 = 1.958 (m³/1box)
 3 Boxes : 1.958 x 3 = 5.87 (m³)

Drainage Box Type 1-2
 1.25m x 1.25m x 0.50m - 0.75m x 0.75m x 0.35m
 = 0.584 (m³/1box)
 3 Boxes : 0.584 x 3 = 1.75 (m³)

PVC Drain Pipe

(1) $\phi 250$ mm

Total Length of $\phi 250$ mm : 850.3m

Behind Side Walls

Left Side		Right Side	
Location	Length (m)	Location	Length (m)
J4-1 ~ J5	45.1	J7+9.0 ~ J13+7.0	94.40
J5 ~ J13+7.0	133.0	Step EL.96.0m	3.50
Step EL.96.0m	3.5	Step Concrete	21.50
Step Concrete	28.6	Step ~ Type 1	9.92
on EL.84.25m	58.7	on EL.84.25m	41.90
Total	268.9	Total	171.2

Under the Chute (Type 1)

Left Side		Right Side	
Location	Length (m)	Location	Length (m)
J4-1 ~ J4-2	16.1	J4-1 ~ J4-2	9.20
J4-2 ~ J5	16.0	J4-2 ~ J5	16.0
J5 ~ J13	125.1	J5 ~ J13	125.1
J31 ~ EL.84.25m	27.7	J31 ~ EL.84.25m	27.7
on EL.84.25m	28.7	on EL.84.25m	18.6
Total	213.6	Total	196.6

(2) $\phi 200$ mm

Total Length of $\phi 250$ mm : 260.5m

Under the Chute (type 2)

Location	Length (m)	Number	Total length (m)
C-5	20.5	1	20.5
C-6 ~ C-15	24.0	10	240.0
Total			260.5

Gravel Bedding for Drain Pipe

Total Volume of Gravel Bedding : 901.4 m³

Under the Chute (Type 1), ϕ 250 mm

Type 1 (ϕ 250 mm), Left Side					
Location	Area (m ²)	Length (m)	Number	Volume (m ³)	
J4-1 ~ J4-2	1.28	16.1	1	20.6	
J4-2 ~ J5	1.28	16.0	1	20.4	
J5 ~ J13	1.28	125.1	1	159.9	
J31 ~ EL.84.25m on EL.84.25m	1.28	27.7	1	35.4	
Total	1.41	28.7	1	40.5	
		213.6		276.8	

Type 1 (ϕ 250 mm), Right Side

Location	Area (m ²)	Length (m)	Number	Volume (m ³)	
J4-1 ~ J4-2	1.28	9.20	1	11.8	
J4-2 ~ J5	1.28	16.0	1	20.4	
J5 ~ J13	1.28	125.1	1	159.9	
J31 ~ EL.84.25m on EL.84.25m	1.28	27.7	1	35.4	
Total	1.41	18.6	1	26.2	
		196.6		253.7	

Under the Chute (type 2), ϕ 200 mm

Location	Area (m ²)	Length (m)	Number	Volume (m ³)	
C-5	1.36	20.5	1	27.8	
C-6 ~ C-11	1.39	24.0	6	200.0	
C-12 ~ C-15	1.49	24.0	4	143.0	
Total		68.50		370.9	

Excavation for Gravel Bedding for Drain Pipe

Total Volume of Excavation : 1,029.7 m³

Under the Chute (Type 1), ϕ 250 mm

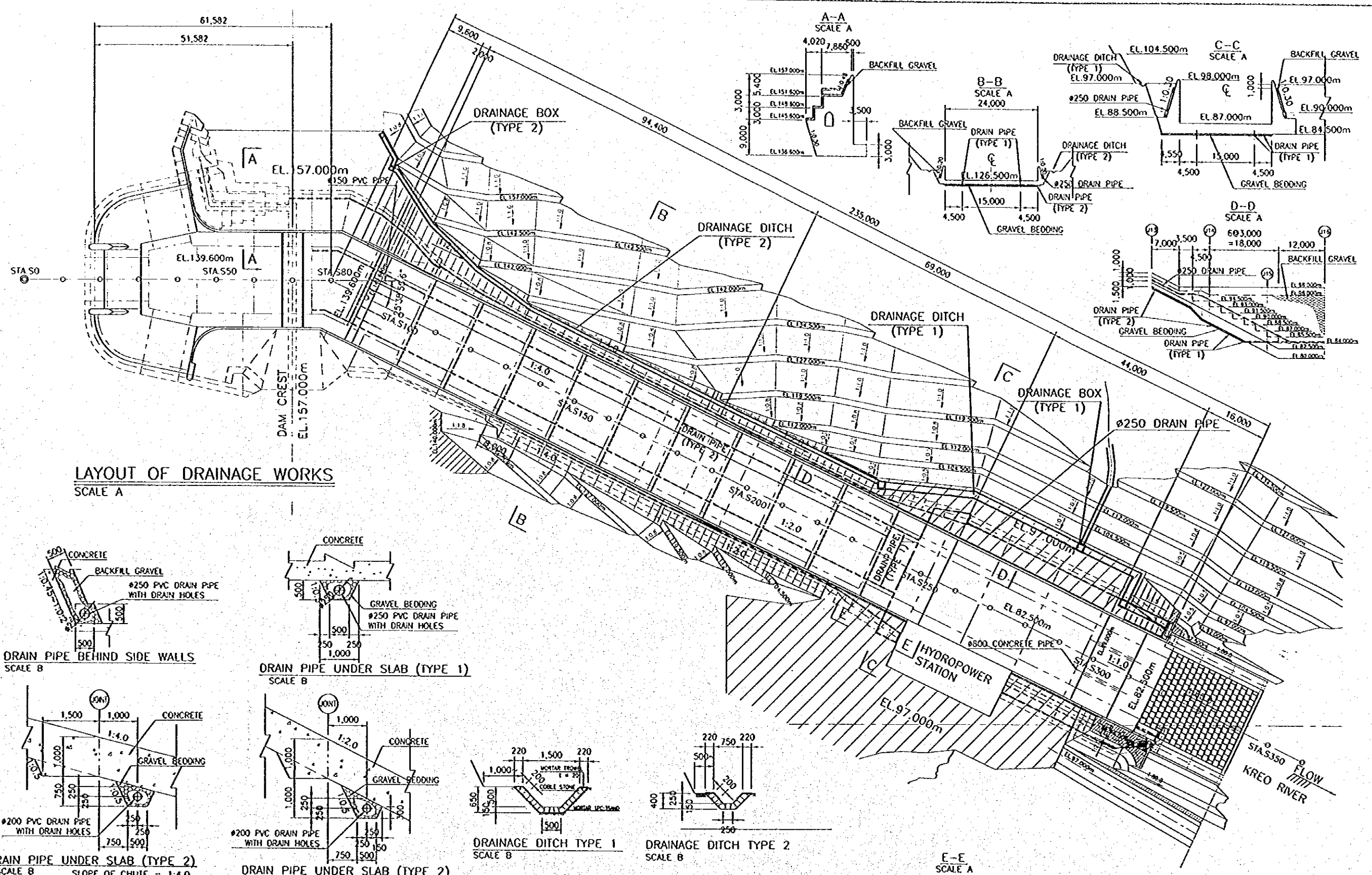
Type 1 (ϕ 250 mm), Left Side					
Location	Area (m ²)	Length (m)	Number	Volume (m ³)	
J4-1 ~ J4-2	1.50	16.1	1	24.2	
J4-2 ~ J5	1.50	16.0	1	24.0	
J5 ~ J13	1.50	125.1	1	187.7	
J31 ~ EL.84.25m on EL.84.25m	1.50	27.7	1	41.6	
Total	1.63	28.7	1	46.9	
		213.6		324.2	

Type 1 (ϕ 250 mm), Right Side

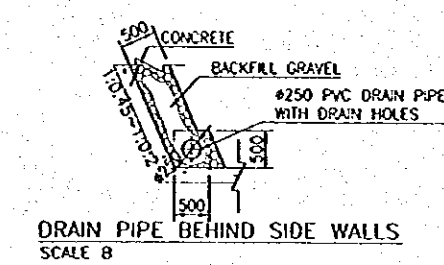
Location	Area (m ²)	Length (m)	Number	Volume (m ³)	
J4-1 ~ J4-2	1.50	9.20	1	13.8	
J4-2 ~ J5	1.50	16.0	1	24.0	
J5 ~ J13	1.50	125.1	1	187.7	
J31 ~ EL.84.25m on EL.84.25m	1.50	27.7	1	41.6	
Total	1.63	18.6	1	30.4	
		196.6		297.4	

Under the Chute (type 2), ϕ 200 mm

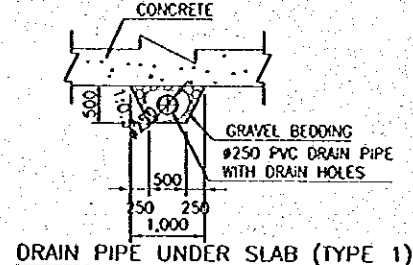
Location	Area (m ²)	Length (m)	Number	Volume (m ³)	
C-5	1.50	20.5	1	30.8	
C-6 ~ C-11	1.53	24.0	6	220.6	
C-12 ~ C-15	1.63	24.0	4	156.8	
Total		68.50		408.1	



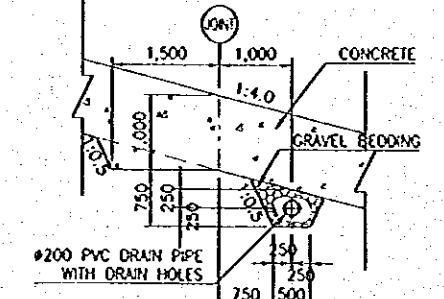
LAYOUT OF DRAINAGE WORKS
SCALE A



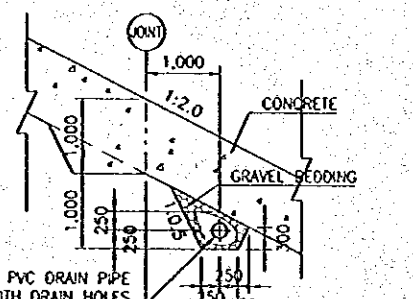
DRAIN PIPE BEHIND SIDE WALLS
SCALE B



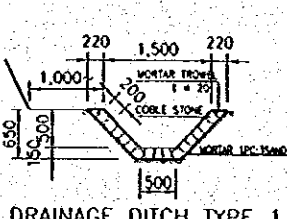
DRAIN PIPE UNDER SLAB (TYPE 1)
SCALE B



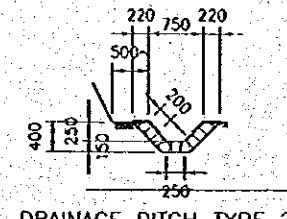
DRAIN PIPE UNDER SLAB (TYPE 2)
SCALE B
SLOPE OF CHUTE = 1:4.0



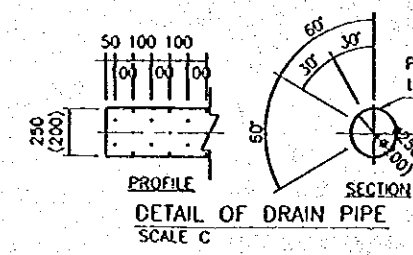
DRAIN PIPE UNDER SLAB (TYPE 2)
SCALE B
SLOPE OF CHUTE = 1:2.0



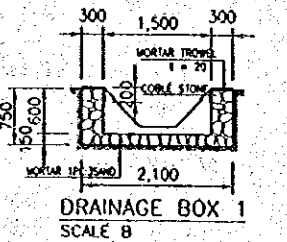
DRAINAGE DITCH TYPE 1
SCALE B



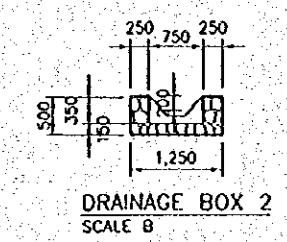
DRAINAGE DITCH TYPE 2
SCALE B



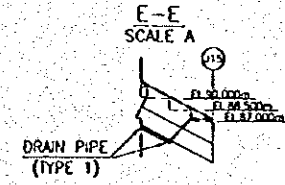
DETAIL OF DRAIN PIPE
SCALE C



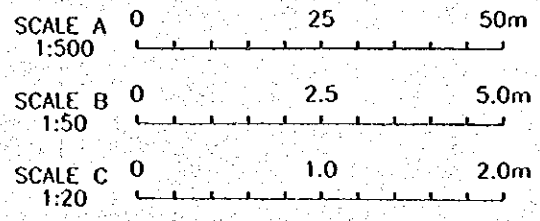
DRAINAGE BOX 1
SCALE B



DRAINAGE BOX 2
SCALE B



DRAIN PIPE (TYPE 1)
SCALE A



Shotcrete

Grand Total of Shotcrete : 3,825.26 (m²)

(1) Shotcrete on Excavation Slope

Left Side of Spillway			Right Side of Spillway			Left Upstream of Spillway		
Slope of Excavation	1:0.5		Slope of Excavation	1:0.5		Slope of Excavation	1:0.8	
Elevation (EL.m)	Horizontal Area Ah (m ²)	Area of Slope (m ²)	Elevation (EL.m)	Horizontal Area Ah (m ²)	Area of Slope (m ²)	Elevation (EL.m)	Horizontal Area Ah (m ²)	Area of Slope (m ²)
		Ah x 2.2			Ah x 2.2			Ah x 1.6
172~164.5	-	-	172~164.5	-	-	145~157	270.8	433.4
157~164.5	-	-	157~164.5	-	-	Total		433.4
149.5~157	-	-	149.5~157	-	-			
142~149.5	-	-	142~149.5	-	-			
134.5~142	-	-	134.5~142	-	-			
127~134.5	-	-	127~134.5	-	-			
119.5~127	-	-	119.5~127	-	-			
112~119.5	-	-	112~119.5	-	-			
104.5~112	538.0	1,202.9	104.5~112	-	-			
97~104.5	444.0	992.7	97~104.5	-	-			
92~97	66.9	149.7	95~97	59.7	133.5			
87.5~92	47.8	106.9	87.5~95	85.9	192.1			
Total		2,452.3	Total		325.6			

(2) Shotcrete on Berm

Left Side			Right Side	
Location	1:0.5 ~ 1:0.8	among 1:0.5	Location	among 1:0.5
Elevation (EL.m)	Area of Berm (m ²)	Area of Berm (m ²)	Elevation (EL.m)	Area of Berm (m ²)
172.0	-	-	172.0	-
164.5	-	-	164.5	-
157.0	-	-	157.0	-
149.5	-	-	149.5	-
142.0	-	-	142.0	-
134.5	-	-	134.5	-
127.0	-	-	127.0	-
119.5	-	-	119.5	-
112.0	232.9	-	112.0	-
104.5	-	197.8	104.5	-
97.0	-	47.0	97.0	-
92.0	-	14.5	95.0	40.0
87.5	-	49.1	87.5	32.7
Total	232.9	308.4	Total	72.8

Sodding

Grand Total of Sodding : 10,889.5 (m²)

(1) Sodding on Excavation Slope (1/2)

Sub-Total : 7,173.9 (m²)

Left Side of Spillway

Slope of Excavation	1:1.0		1:1.0		1:0.8	
	Horizontal Area Ah (m ²)	Area of Slope (m ²)	Horizontal Area Ah (m ²)	Area of Slope (m ²)	Horizontal Area Ah (m ²)	Area of Slope (m ²)
		Ah x 1.4		Ah x 1.4		Ah x 1.6
172~	-	-	-	-	-	-
164.5~172	34.6	49.0	-	-	-	-
157~164.5	152.6	215.8	-	-	100.1	160.3
149.5~157	283.2	400.6	-	-	83.7	134.0
142~149.5	401.2	567.4	-	-	81.6	130.6
134.5~142	462.3	653.8	28.7	40.6	124.2	198.8
127~134.5	475.7	672.7	284.1	401.8	180.9	289.6
119.5~127	643.7	910.3	465.0	657.6	50.9	81.5
112~119.5	-	-	-	-	1,005.5	1,609.6
104.5~112	-	-	-	-	-	-
97~104.5	-	-	-	-	-	-
92~97	-	-	-	-	-	-
87.5~92	-	-	-	-	-	-
Total		3,469.5	Total	1,100.0	Total	2,604.4

(2) Sodding on Excavation Slope (2/2)

Sub-Total : 780.5 (m²)

Right Side of Spillway

Slope of Excavation	1:0.8		1:1.8	
	Horizontal Area Ah (m ²)	Area of Slope (m ²)	Horizontal Area Ah (m ²)	Area of Slope (m ²)
		Ah x 1.6		Ah x 1.1
172~	-	-	-	-
164.5~172	-	-	-	-
157~164.5	-	-	-	-
149.5~157	-	-	-	-
142~149.5	-	-	-	-
134.5~142	89.2	142.8	61.4	70.2
127~134.5	157.9	252.8	-	-
119.5~127	106.0	169.7	-	-
112~119.5	49.7	79.5	-	-
104.5~112	28.9	46.3	-	-
97~104.5	12.1	19.3	-	-
95~97	-	-	-	-
87.5~95	-	-	-	-
Total		710.3	Total	70.2

(3) Sodding on BermSub-Total : 1,049.3 (m²)

Left Side of Spillway

Location	1:0.8 ~	1:0.8 ~
Elevation (EL.m)	Area of Berm (m ²)	Area of Berm (m ²)
172.0	-	-
164.5	30.2	-
157.0	66.6	-
149.5	92.4	-
142.0	111.1	-
134.5	136.8	34.3
127.0	137.7	74.2
119.5	148.4	112.9
112.0	-	-
104.5	-	-
97.0	-	-
92.0	-	-
87.5	-	-
Total	723.1	221.4

Right Side of Spillway

Location	1:0.8 ~
Elevation (EL.m)	Area of Berm (m ²)
172.0	-
164.5	-
157.0	-
149.5	-
142.0	-
134.5	38.6
127.0	35.3
119.5	16.5
112.0	9.7
104.5	4.6
97.0	-
92.0	-
87.5	-
Total	104.7

(4) Sodding on Backfill Slope (1/2)Sub-Total : 1,244.0 (m²)

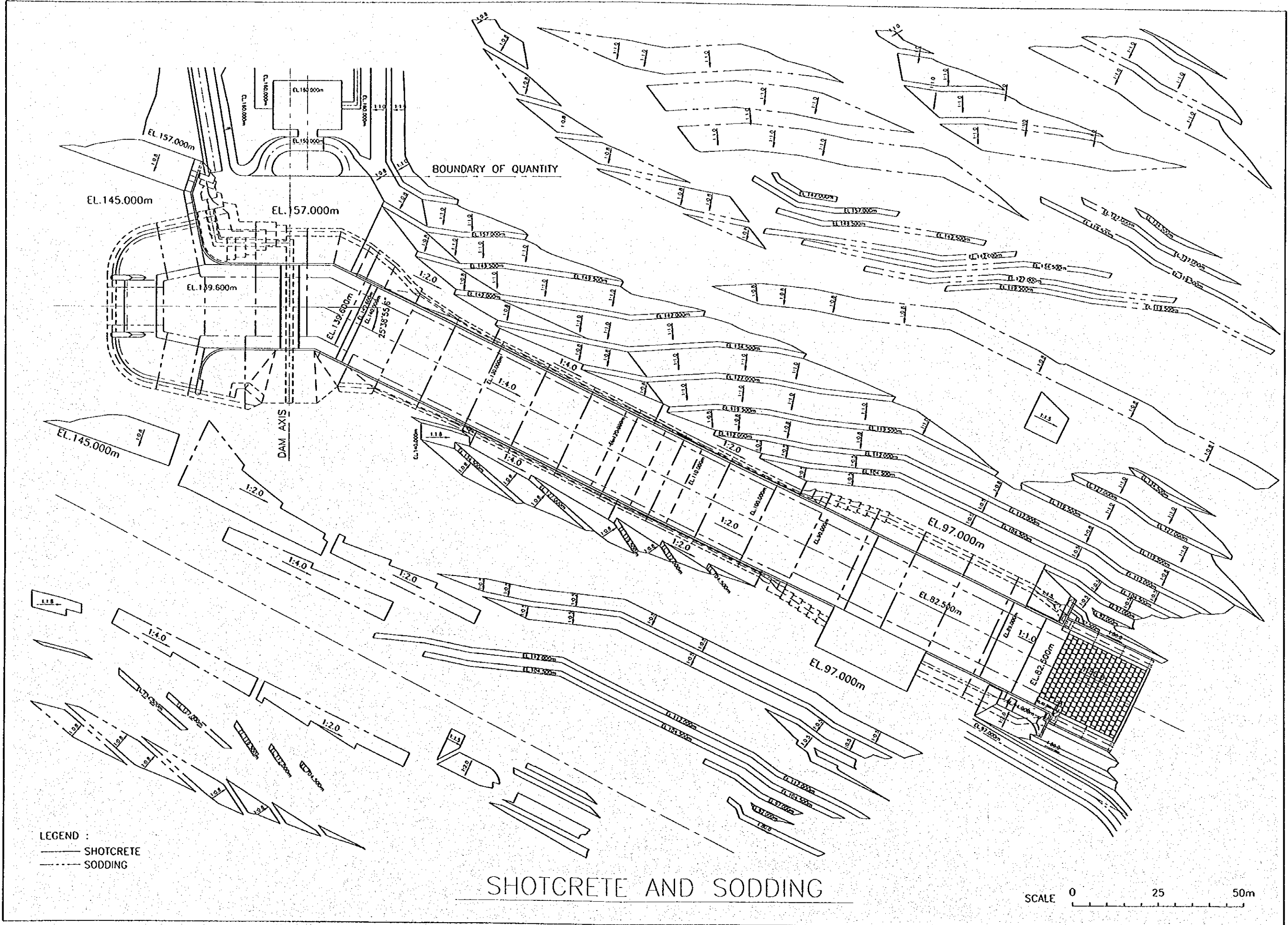
Left Side of Spillway

Slope of Backfill					
1:2.0		1:4.0		1:1.5	
Horizontal Area Ah (m ²)	Area of Slope (m ²)	Horizontal Area Ah (m ²)	Area of Slope (m ²)	Horizontal Area Ah (m ²)	Area of Slope (m ²)
	Ah x 1.1		Ah x 1.0		Ah x 1.2
520.7	582.2	271.7	280.0	104.5	125.5
229.2	256.2				
Total	838.4	Total	280.0	Total	125.5

(5) Sodding on Backfill Slope (2/2)Sub-Total : 641.7 (m²)

Right Side of Spillway

Slope of Backfill					
1:2.0		1:4.0		1:1.5	
Horizontal Area Ah (m ²)	Area of Slope (m ²)	Horizontal Area Ah (m ²)	Area of Slope (m ²)	Horizontal Area Ah (m ²)	Area of Slope (m ²)
	Ah x 1.1		Ah x 1.0		Ah x 1.2
230.6	257.8	237.4	244.7	31.3	37.6
90.9	101.6				
Total	359.4	Total	244.7	Total	37.6



2.5 Diversion Tunnel

1. SUMMARY

DESCRIPTION		UNIT	UPPER	UNDER	TOTAL	LEGEND
EXCAVATION	EXCAVATION	m ³	8,421.4	8,859.4	17,280.8	
	OVERBREAK	m ³	639.8	321.9	961.7	13cm
	TOTAL	m ³	9,061.2	9,181.3	18,242.5	
STEEL RIB SUPPORT	H-125	kg	110,802.1	58,253.3	169,055.4	
	PLATE(t=9)	kg	1,856.7	-1,738.4	3,595.1	
	PLATE(t=16)	kg	-	5,860.0	5,860.0	
	BOLT NUT	kg	2,646	-	2,646	
	COLLAR BRACE	kg	4,498.4	1,499.5	5,997.9	Φ16
	Total	kg	119,803.2	67,351.2	187,154.3	
	Total x 1.05	kg	125,800.0	70,700.0	196,500.0	
	STEEL PIPE		5,292	1,764	7,056	Φ21.7x1.9x80
WIRE NET		m ²	2,646.9	2,469.4	5,116.3	Φ5x150x150 (2.13 kg/m ²)
		(kg)			10,897.7	
				x 1.05	11,400.0	
CURTAIN GROUT			-	-	18	L=10.00m
CONSOLIDATION GROUT			-	-	56	L=5.00m
ROCK BOLT	D25 L=3.0m		-	-	4,823	TYPICAL
	D25 L=4.0m		-	-	520	INLET, OUTLET
	TOTAL	m			16,550	
	TOTAL x 1.05	m			17,400	
SHOTCRETE	OVERBREAKAGE	m ³	248.2	123.0	371.2	5cm
	PRIMARY	m ³	245.1	123.0	368.1	5cm
	SECONDARY	m ³	766.7	246.9	1013.5	10cm
	TOTAL	m ³	1,260.0	492.8	1,752.8	
	OVERBREAKAGE	m ²	5,002.1	2,465.0	7,467.1	
	PRIMARY	m ²	4,522.0	2,466.0	6,987.9	
	SECONDARY	m ²	4,863.9	2,467.7	7,331.7	
	TOTAL	m ²	14,388.0	7,398.7	21,786.7	
CONCRETE	CONCRETE	m ³	3,033.4	2,872.7	5,906.1	
	OVERBREAKAGE	m ³	394.9	195.0	589.9	8cm
	TOTAL	m ³	3,428.3	3,067.8	6,496.0	
	TOTAL x 1.05	m ³	3,600.0	3,200.0	6,800.0	
FORM		m ²	402.4	357.0	759.4	JOINT, OUTLET
WATER STOP SEAL		m	440.7	473.3	914.0	
x 1.05		m			960.0	
REINFORCING	D13	kg	-	-	270,296.1	
	D22	kg	-	-	4,124.2	
	TOTAL	kg	-	-	274,420.3	
	TOTAL x 1.06	kg	-	-	291,000.0	
PLUG	PLUG CONCRETE	m ³	-	-	903.7	
	FORM	m ²	-	-	257.8	
	MAIN SEAL COPPER	m	-	-	18.3	
	HEADER PIPE	m	-	-	60.0	Φ40mm (1.50 kg/m)
	AIR OUTLET PIPE	m	-	-	30.0	Φ40mm
	RIZER PIPE	m	-	-	113.3	Φ25mm (0.94 kg/m)
	COOLING PIPE	m	-	-	205.0	Φ25mm
	TOTAL	kg			431.2	
	x 1.05	kg			460.0	
	DRAIN PIPE	m	-	-	30.0	Φ150mm
JOINT GROUT OUTLET		-	-	66		

SUMMARY (Upstream Portal and Temporary Cofferdam)

DESCRIPTION		UNIT	TOTAL	LEGEND
Upstream Portal	Excavation	Total	m ³ 5,301.9	
		x 1.1	m ³ 5,800.0	
	Concrete Type D	Total	m ³ 1,761.0	
		x 1.05	m ³ 1,850.0	
	Concrete Type C	Total	m ³ 9.8	
		x 1.05	m ³ 10.0	
Reinforcing Bar	Total	kg 30.6		
	x 1.06	kg 32.0		
Temporary Cofferdam	Excavation	Total	m ³ 1,800.0	
		x 1.1	m ³ 2,000.0	
	Embankment	Total	m ³ 21,335.9	
		x 1.1	m ³ 23,500.0	

2. EXCAVATION

2-1. EXCAVATION(TYPICAL SECTION)

1) UPPER

$$\begin{aligned} v1 &= 18.696 \times 411.2247 &= 7,688.674 \text{ m}^3 \\ v2(\text{OVERBREAK}) &= 1.436 \times 411.247 &= 590.551 \text{ m}^3 \end{aligned}$$

2) UNDER

$$\begin{aligned} v1 &= 19.674 \times 411.247 &= 8,090.873 \text{ m}^3 \\ v2(\text{OVERBREAK}) &= 0.720 \times 411.247 &= 296.098 \text{ m}^3 \end{aligned}$$

2-2. EXCAVATION(PLUG SECTION)

1) UPPER

$$\begin{aligned} v1 &= 24.508 \times 29.016 + 1/2(18.696 + 24.508) \times 1.000 &= 732.726 \text{ m}^3 \\ v2(\text{OVERBREAK}) &= 1.640 \times 30.017 &= 49.228 \text{ m}^3 \end{aligned}$$

2) UNDER

$$\begin{aligned} v1 &= 25.704 \times 29.016 + 1/2(19.674 + 25.704) \times 1.000 &= 768.516 \text{ m}^3 \\ v2(\text{OVERBREAK}) &= 0.859 \times 30.017 &= 25.785 \text{ m}^3 \end{aligned}$$

2-3. EXCAVATION(TOTAL)

$$\begin{aligned} \text{UPPER } \Sigma V &= v1+v1 = 7,688.67 + 732.73 &= 8,421.400 \text{ m}^3 \\ \text{UNDER } \Sigma V &= v1+v1 = 8,090.87 + 768.52 &= 8,859.389 \text{ m}^3 \\ \text{OVERBREAK UPPER } \Sigma V &= v2+v2 = 590.55 + 49.23 &= 639.779 \text{ m}^3 \\ \text{OVERBREAK UNDER } \Sigma V &= v2+v2 = 296.10 + 25.79 &= 321.883 \text{ m}^3 \end{aligned}$$

3. STEEL RIB SUPPORT

3-1. STEEL RIB SUPPORT(TYPICAL SECTION)

1) UPPER

ITEM	LENGTH	QUANTITY	WEIGHT/UNIT	WEIGHT/m	EXTENSION	TOTAL WEIGHT
H-125x125x6.5x9 (kg)	5.225	2	23.8	248.710	411	102219.810
PL-155x180x9 (kg)	-	4	1.971	7.884	411	3240.324
BOLT NUT Φ 25	0.070	6	-	-	411	2466
COLLAR BRACE Φ 16(kg)	1.076	6	1.58	10.200	411	4192.397
STEEL PIPE Φ 21.7x1.9	0.080	12	-	-	411	4932
WIRE NET(m ²)	10.681	1	-	10.681m ²	411.247	4392.326

2) UNDER

ITEM	LENGTH	QUANTITY	WEIGHT/UNIT	WEIGHT/m	EXTENSION	TOTAL WEIGHT
H-125x125x6.5x9	2.748	2	23.8	130.805	411	53760.773
PL-155x180x9	-	2	1.971	3.942	411	1620.162
PL-230x230x16	-	2	6.644	13.288	411	5461.368
COLLAR BRACE Φ 16	1.076	2	1.58	3.400	411	1397.466
STEEL PIPE Φ 21.7x1.9	0.080	4	-	-	411	1644
WIRE NET(m ²)	2.771	2	-	5.542m ²	411.247	2279.026

3-2. STEEL RIB SUPPORT(PLUG SECTION)

1) UPPER

ITEM	LENGTH	QUANTITY	WEIGHT/UNIT	WEIGHT/m	EXTENSION	TOTAL WEIGHT
H-125x125x6.5x9(kg)	6.010	2	23.8	286.076	30	8582.280
PL-155x180x9(kg)	-	4	1.971	7.884	30	236.520
BOLT NUT	0.07	6	-	-	30	180
COLLAR BRACE Φ 16(kg)	1.076	6	1.58	10.200	30	306.014
STEEL PIPE Φ 21.7x1.9	0.080	12	-	-	30	360
WIRE NET(m ²)	12.252	1	-	12.252m ²	30.017	367.768

2) UNDER

ITEM	LENGTH	QUANTITY	WEIGHT/UNIT	WEIGHT/m	EXTENSION	TOTAL WEIGHT
H-125x125x6.5x9(kg)	3.146	2	23.8	149.750	30	4492.488
PL-155x180x9(kg)	-	2	1.971	3.942	30	118.260
PL-230x230x16	-	2	6.644	13.288	30	398.640
COLLAR BRACE Φ 16(kg)	1.076	2	1.58	3.400	30	102.003
STEEL PIPE Φ 21.7x1.9	0.080	4	-	-	30	120
WIRE NET(m ²)	3.169	2	-	6.338m ²	30.017	190.248

6. SHOTCRETE

6-1. SHOTCRETE (TYPICAL SECTION)

1) UPPER

v1 (OVERBREKAGE)	=	0.558×411.247	=	229.476 m^3
v2 (PRIMARY)	=	0.551×411.247	=	226.597 m^3
v3 (SECONDARY)	=	1.776×411.247	=	730.375 m^3
a1 (OVERBREKAGE)	=	11.246×411.247	=	$4,624.884 \text{ m}^2$
a2 (PRIMARY)	=	11.090×411.247	=	$4,149.482 \text{ m}^2$
a3 (SECONDARY)	=	10.933×411.247	=	$4,496.163 \text{ m}^2$

2) UNDER

v1 (OVERBREKAGE)	=	0.276×411.247	=	113.504 m^3
v2 (PRIMARY)	=	0.276×411.247	=	113.504 m^3
v3 (SECONDARY)	=	0.554×411.247	=	227.831 m^3
a1 (OVERBREKAGE)	=	5.532×411.247	=	$2,275.018 \text{ m}^2$
a2 (PRIMARY)	=	5.534×411.247	=	$2,275.841 \text{ m}^2$
a3 (SECONDARY)	=	5.538×411.247	=	$2,277.486 \text{ m}^2$

6-2. SHOTCRETE (PLUG SECTION)

1) UPPER

v1 (OVERBREKAGE)	=	0.624×30.017	=	18.720 m^3
v2 (PRIMARY)	=	0.617×30.017	=	18.510 m^3
v3 (SECONDARY)	=	1.210×30.017	=	36.300 m^3
a1 (OVERBREKAGE)	=	12.566×30.017	=	377.194 m^2
a2 (PRIMARY)	=	12.409×30.017	=	372.481 m^2
a3 (SECONDARY)	=	12.252×30.017	=	367.768 m^2

2) UNDER

v1 (OVERBREKAGE)	=	0.316×30.017	=	9.485 m^3
v2 (PRIMARY)	=	0.316×30.017	=	9.485 m^3
v3 (SECONDARY)	=	0.634×30.017	=	19.031 m^3
a1 (OVERBREKAGE)	=	6.330×30.017	=	190.008 m^2
a2 (PRIMARY)	=	6.334×30.017	=	190.128 m^2
a3 (SECONDARY)	=	6.338×30.017	=	190.248 m^2

6-3. SHOTCRETE (TOTAL)

OVERBREAKAGE UPPER	$\Sigma V = v1+v1 = 229.476 + 18.72$	=	248.196 m ³
PRIMARY UPPER	$\Sigma V = v2+v2 = 226.60 + 18.510$	=	245.107 m ³
SECONDARY UPPER	$\Sigma V = v3+v3 = 730.375 + 36.300$	=	766.675 m ³
OVERBREAKAGE UNDER	$\Sigma V = v1+v1 = 113.504 + 9.485$	=	122.989 m ³
PRIMARY UNDER	$\Sigma V = v2+v2 = 113.504 + 9.485$	=	122.989 m ³
SECONDARY UNDER	$\Sigma V = v3+v3 = 227.831 + 19.031$	=	246.862 m ³
OVERBREAKAGE UPPER	$\Sigma A = a1+a1 = 4,624.884 + 377.194$	=	5,002.078 m ²
PRIMARY UPPER	$\Sigma A = a1+a1 = 4,149.482 + 372.481$	=	4,521.963 m ²
SECONDARY UPPER	$\Sigma A = a1+a1 = 4,496.163 + 367.768$	=	4,863.931 m ²
OVERBREAKAGE UNDER	$\Sigma A = a1+a1 = 2,275.018 + 190.008$	=	2,465.026 m ²
PRIMARY UNDER	$\Sigma A = a1+a1 = 2,275.841 + 190.128$	=	2,465.969 m ²
SECONDARY UNDER	$\Sigma A = a1+a1 = 2,277.486 + 190.248$	=	2,467.734 m ²

7. CONCRETE

7-1. CONCRETE (TYPICAL SECTION)

1) UPPER

v1	= 6.381 × 411.247	=	2,624.167 m ³
v2 (OVERBREAK)	= 0.877 × 411.247	=	364.776 m ³

2) UNDER

v1	= 5.981 × 411.247	=	2,459.668 m ³
v2 (OVERBREAK)	= 0.442 × 411.247	=	181.771 m ³

7-2. CONCRETE (PLUG SECTION)

1) UPPER

v1	= 12.193 × 29.016 + 1/2 (6.381 + 12.193) × 1.000	=	363.079 m ³
v2 (OVERBREAK)	= 1.003 × 30.017	=	30.107 m ³

2) UNDER

v1	= 12.048 × 29.016 + 1/2 (5.981 + 12.048) × 1.000	=	358.599 m ³
v2 (OVERBREAK)	= 0.442 × 30.017	=	13.268 m ³

7-3. CONCRETE (OUTLET PRJECTION)

UPPER v1	= 7.687 × 6.00	=	46.122 m ³
UNDER v2	= 9.007 × 6.00	=	54.462 m ³

7-4. CONCRETE (TOTAL)

UPPER ΣV = v1+v1+v1	= 2,624.167 + 363.079+46.122	=	3,033.368 m ³
UNDER ΣV = v1+v1+v2	= 2,459.668 + 358.599+54.462	=	2,872.729 m ³
OVERBREAK UPPER ΣV = v2+v2	= 364.776 + 30.107	=	394.883 m ³
OVERBREAK UNDER ΣV = v2+v2	= 181.771 + 13.268	=	195.039 m ³

8. FORM

8-1. FORM (JOINT)

1) TYPICAL SECTION

UPPER A1 = 6.381 × 411.247/9.000	= 6.381 × 46	=	293.526 m ²
UNDER A2 = 5.981 × 411.247/9.000	= 5.981 × 46	=	275.126 m ²

2) PRUG SECTION

UPPER A1 = 12.193 × 2	=	24.386 m ²
UNDER A2 = 12.048 × 2	=	24.096 m ²

3) OUTLET PROJECTION

UPPER A1 = 11.516 × 6.000 + 7.687 × 2	=	84.470 m ²
UNDER A2 = 6.600 × 6.000 + 9.077 × 2	=	57.754 m ²

2) FORM (TOTAL)

UPPER A1 = 293.526 + 24.386 + 84.470	=	402.382 m ²
UNDER A2 = 275.126 + 24.096 + 57.754	=	356.976 m ²

9. WATER STOP SEAL

UPPER L1 = 9.581 × 441.247/9.000	= 9.581 × 46	=	440.726 m
UNDER L2 = 10.289 × 441.247/9.000	= 10.289 × 46	=	473.294 m

10. REINFORCING

10-1. TYPE (A)

NO.	DIA	LENGTH	WEIGHT	WEIGHT	N	WEIGHT	LEGEND
		(mm)	(kg/m)	(kg)		(kg)	
1	D 13	4,910	0.995	4.885	3.33	16.28	
2	D 13	2,450	0.995	2.438	6.67	16.25	
3	D 13	9,110	0.995	9.064	3.33	30.21	
4	D 13	5,390	0.995	5.363	3.33	17.88	
5	D 13	2,690	0.995	2.677	3.33	8.92	
6	D 13	10,050	0.995	10.000	3.33	33.33	
7	D 13	1,000	0.995	0.995	88	87.56	
8	D 13	500	0.995	0.498	58	28.88	
D13						239.31	
TOTAL						239.31 kg	

10-2. TYPE (B)

NO	DIA	LENGTH	WEIGHT	WEIGHT	N	WEIGHT	LEGEND
		(mm)	(kg/m)	(kg)		(kg)	
1	D 13	4,910	0.995	4.885	5.00	24.43	
2	D 13	2,450	0.995	2.438	10.00	24.38	
3	D 13	1,000	0.995	0.995	51	50.75	
D13						99.56	
TOTAL						99.56 kg	

10-3. TYPE (C)

NO	DIA	LENGTH	WEIGHT	WEIGHT	N	WEIGHT	LEGEND
		(mm)	(kg/m)	(kg)		(kg)	
1	D 13	4,910	0.995	4.885	5.00	24.43	
2	D 13	2,450	0.995	2.438	10.00	24.38	
3	D 13	9,110	0.995	9.064	5.00	45.32	
4	D 13	1,000	0.995	0.995	96	95.52	
D13						189.65	
TOTAL						189.65 kg	

10-4. TYPE (D)

NO	DIA	LENGTH	WEIGHT	WEIGHT	N	WEIGHT	LEGEND
		(mm)	(kg/m)	(kg)		(kg)	
1	D 22	4,910	3.04	14.926	3.33	49.75	
2	D 22	2,450	3.04	7.448	6.67	49.65	
3	D 22	9,110	3.04	27.694	3.33	92.31	
4	D 22	1,000	3.04	3.040	82	249.28	
5	D 22	6,700	3.04	20.368	3.33	67.89	
6	D 22	4,660	3.04	14.166	6.67	94.44	
7	D 22	2,670	3.04	8.117	6.67	54.11	
8	D 22	2,920	3.04	8.877	3.33	29.59	
						D22	687.02
						TOTAL	687.02 kg

10-5. TOTAL

TYPE (A)	=239.31x40.022	D13	9,577.66
TYPE (B)	=83.82x371.206	D13	255,025.95
TYPE (C)	=158.26x30.016	D13	5,692.53
TYPE (D)	=595.82x6.003	D22	4,124.18
		TOTAL	D13 270,296.15 kg
			D22 4,124.18 kg
		TOTAL	274,420.33 kg

11. PLUG

11-1. CONCRETE

MAIN PLUG	v1	=	21.437 × 30.017	=	643.474 m ³
TEMPORARY PLUG	v2	=	26.008 × 10.006	=	260.236 m ³
	ΣV	=	v1+v2 = 643.474 + 260.236	=	903.71 m ³

11-2. FORM

MAIN PLUG	a1	=	6.142 × 30.017 + 21.437 × 2	=	227.238 m ³
TEMPORARY PLUG	a2	=	26.008 + 4.571	=	30.579 m ³
	ΣA	=	v1+v2 = 227.238 + 30.579	=	257.82 m ³

11-3. MAIN SEAL CUPPER

$$L = 18.295 \text{ m}$$

11-4. COOLING PIPE

HEADER PIPE	Φ40mm	=		=	60.00 m
AIR OUTLET PIPE	Φ40mm	=		=	30.00 m
RISER PIPE	Φ25mm	=	(4.96+2.42+2.92) × 11	=	113.30 m
COOLING PIPE	Φ25mm	=	106+99	=	205.00 m
DRAIN PIPE	Φ150mm	=		=	30.00 m
JOINT GROUT OUTLET	6 × 11	=		=	66

TYPE OF WORK : Production and Construction of concrete (Type D)
 LOCATION : Upstream Portal of Diversion Facility

CALCULATION	RESULT
$A_1 = 1.00 \times 2.50 = 2.500 \text{ m}^2$	
$A_2 = \frac{1}{2} \times (1.00 + 3.26) \times 11.300 = 24.069 \text{ m}^2$	
$A_3 = \frac{1}{2} \times (12.120 + 13.320) \times 3.00 + \frac{1}{2} \times 1.80 \times 1.50 \times 2 = 40.860 \text{ m}^2$	
$A_4 = (A_1 + A_2) \times 2 + A_3 = 93.998 \text{ m}^2$	
$V_1 = A_4 \times 11.128 = 1046.010 \text{ m}^3$	
$A_5 = \frac{1}{2} \times (8.150 + 1.878) \times 3.800 = 19.053 \text{ m}^2$	
$V_2 = A_5 \times 5.60 = 106.700 \text{ m}^3$	
$A_6 = 0.40 \times 2.50 = 1.000 \text{ m}^2$	
$A_7 = \frac{1}{2} \times (0.40 + 2.88) \times 12.400 = 20.336 \text{ m}^2$	
$A_8 = \frac{1}{2} \times (12.560 + 13.320) \times 1.90 + \frac{1}{2} \times 1.80 \times 1.50 \times 2 = 27.286 \text{ m}^2$	
$A_9 = (A_6 + A_7) \times 2 + A_8 = 69.958 \text{ m}^2$	
$V_3 = A_9 \times 1.522 + (0.40 \times 0.40 \times 8.400) + (0.50 \times 0.40 \times 8.400) = 109.500 \text{ m}^3$	
$A_{10} = \frac{1}{2} \times (1.00 + 1.88) \times 4.40 = 6.336 \text{ m}^2$	
$A_{11} = \frac{1}{2} \times (9.36 + 13.320) \times 9.90 + \frac{1}{2} \times 1.80 \times 1.50 \times 2 - (5.60 \times 5.60) = 83.606 \text{ m}^2$	
$V_4 = (A_1 + A_{10}) \times (9.72 + 6.67) \times \frac{1}{2} \times 2 = 144.822 \text{ m}^3$	
$V_5 = A_{11} \times (6.67 + 1.320) \times \frac{1}{2} = 334.006 \text{ m}^3$	
$V_6 = \frac{1}{2} \times 1.80 \times 1.50 \times (16.320 + 13.320) \times \frac{1}{2} = 20.007 \text{ m}^3$	
$\Sigma V = V_1 + V_2 + V_3 + V_4 + V_5 + V_6 = 1761.045 \text{ m}^3$	

TYPE OF WORK :

LOCATION : Upstream Portal of Diversion Facility

CALCULATION	RESULT
(Formwork)	
$A_1 = \{1.00 \times 2.50 + \frac{1}{2} \times (1.00 + 3.26) \times 11.30\} \times 2 = 53.14 \text{ m}^2$	
$A_2 = \frac{1}{2} \times (12.12 + 12.72) \times 1.50 = 18.63 \text{ m}^2$	
$A_3 = \frac{1}{2} \times (22.37 + 21.12) \times 2.50 \times 2 = 108.73 \text{ m}^2$	
$A_4 = \frac{1}{2} \times (21.12 + 15.821) \times 12.80 \times 1.019 \times 2 = 481.83 \text{ m}^2$	
$A_5 = \{12.25 \times 13.80 - \frac{1}{2} \times (1.878 + 8.150) \times 3.80\} \times 2 = 299.99 \text{ m}^2$	
$A_6 = 3.80 \times 5.60 = 21.28 \text{ m}^2$	
$A_7 = 5.60 \times (0.785 + 0.882) = 9.34 \text{ m}^2$	
$A_8 = 5.60 \times 7.538 = 42.21 \text{ m}^2$	
$A_9 = \frac{1}{2} \times (10.120 + 6.670) \times 6.90 \times 2 = 115.85 \text{ m}^2$	
$A_{10} = \frac{1}{2} \times (5.577 + 2.695) \times 5.60 \times 2 = 46.32 \text{ m}^2$	
$A_{11} = 5.577 \times 5.60 = 31.23 \text{ m}^2$	
$A_{12} = 0.60 \times 6.10 \times 2 \times 4 = 29.28 \text{ m}^2$	
$A_{13} = 0.60 \times 6.90 \times 2 \times 2 = 16.56 \text{ m}^2$	
$A_{14} = 0.40 \times 6.80 \times 2 = 5.44 \text{ m}^2$	
$A_{15} = 2.014 \times 5.60 = 11.28 \text{ m}^2$	
$\sum A = A_1 + \dots + A_{15} = 1291.11 \text{ m}^2$	
(Scaffolding)	
$A_1 = 53.14 \text{ m}^2$	
$A_2 = 18.63 \text{ m}^2$	
$A_3 = 108.73 + 481.83 = 590.56 \text{ m}^2$	
$A_4 = 299.99 \text{ m}^2$	
$A_5 = 21.28 \text{ m}^2$	
$A_6 = 115.85 \text{ m}^2$	
$A_7 = 46.32 \text{ m}^2$	
$A_8 = 29.28 \text{ m}^2$	
$A_9 = 16.56 \text{ m}^2$	
$A_{10} = 7.697 \times 5.60 = 43.10 \text{ m}^2$	
$\sum A = A_1 + \dots + A_{10} = 1234.71 \text{ m}^2$	
(Supporting)	
$V = \frac{1}{2} \times (5.577 + 2.695) \times 5.60 \times 5.60 = 129.70 \text{ m}^3$	

Upstream Portal

Excavation

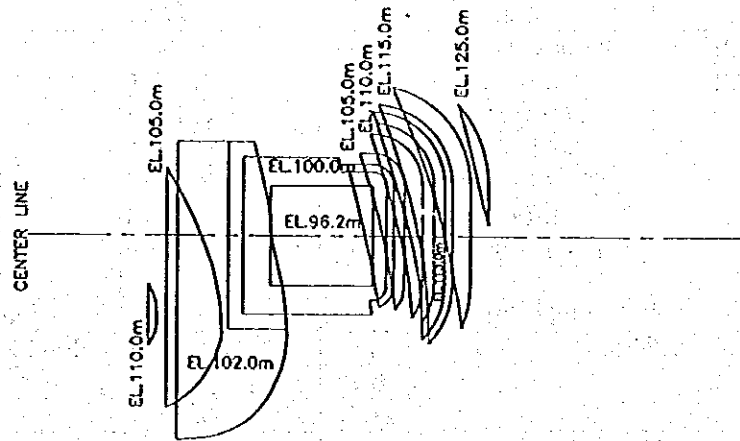
Elevation (m)	Area (m ²)			Volume (m ³)
	Area 1	Area 2	Total	
127.0	0.000		0.000	
125.0	19.207		19.207	19.2
120.0	123.224		123.224	356.1
115.0	142.726		142.726	664.9
113.0	140.246		140.246	283.0
113.0	89.134		89.134	0.0
110.0	79.558	6.655	86.213	263.0
105.0	65.063	161.388	226.451	781.7
102.0	74.772	508.412	583.184	1,214.5
102.0	74.772	150.539	225.311	0.0
100.0	393.356		393.356	618.7
96.2	186.080		186.080	1,100.9
Total				5,301.9
Total x 1.1				5,800.0

Temporary Cofferdam

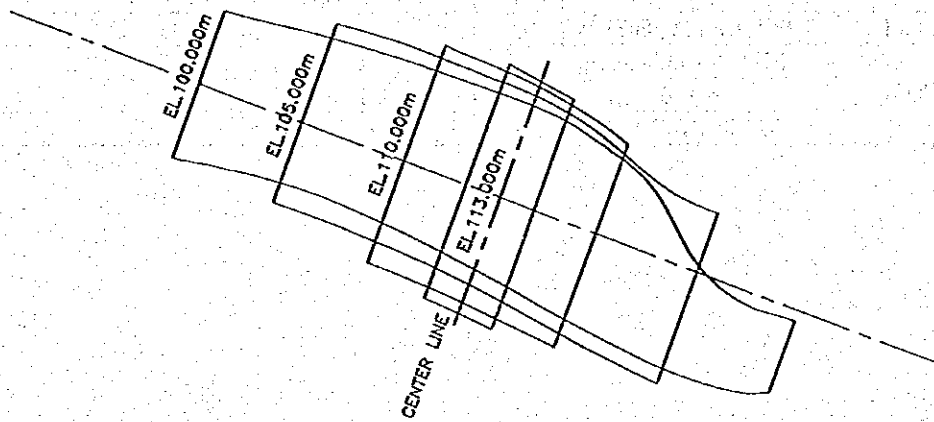
Embankment

Elevation (m)	Area (m ²)			Volume (m ³)
	Area 1	Area 2	Total	
113.0	330.386		330.386	
110.0	852.640		852.640	1,774.5
105.0	1,497.322		1,497.322	5,874.9
100.0	1,742.388		1,742.388	8,099.3
99.0	1,742.388		1,742.388	1,742.4
95.0	180.000		180.000	3,844.8
Total				21,335.9
Total x 1.1				23,500.0

UPSTREAM PORTAL EXCAVATION



TEMPORARY COFFERDAM EMBANKMENT



SCALE 0 10 20 30 40 50m